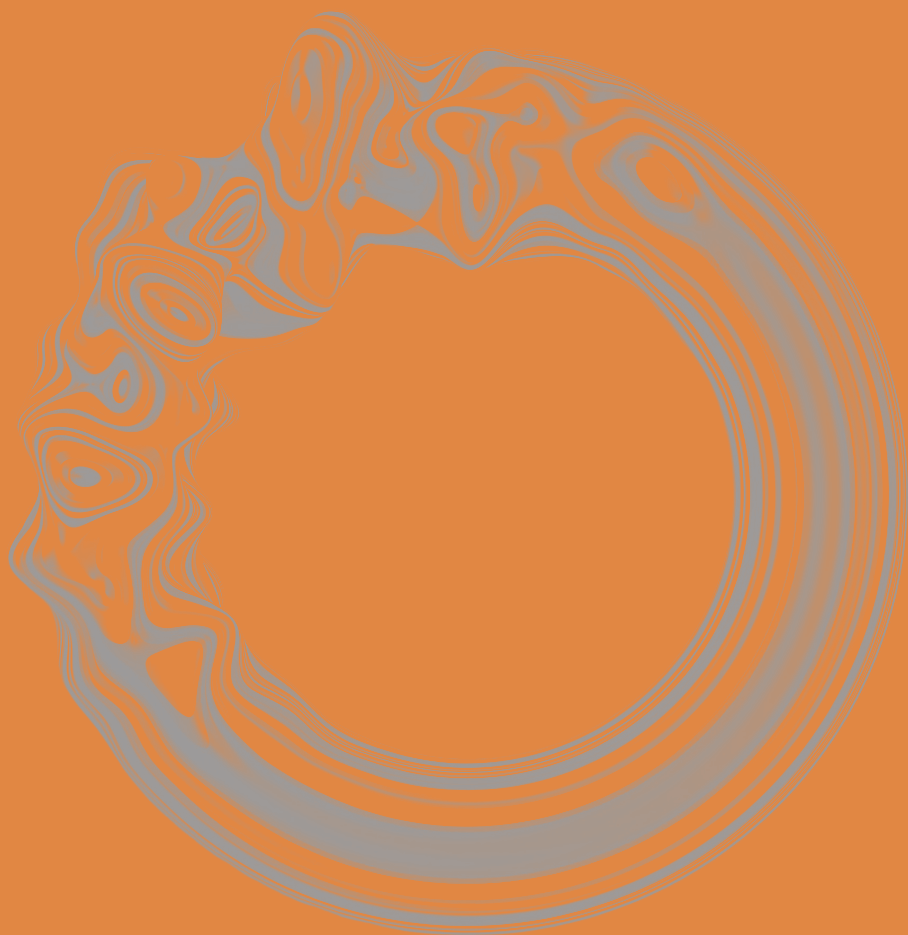


CPOSAT

Christian Perspectives on Science and Technology



*Christian Perspectives
on Science and
Technology*

The ISCAST Journal

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For submissions: journal@iscast.org

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About the Journal

The ISCAST journal, *Christian Perspectives on Science and Technology* (CPOSAT), was relaunched in 2022. Building on a strong publication history (online since 2006 with a rich archive available on the website), the journal is now a world-standard academic resource.

CPOSAT is unique in the Australian landscape and one of the few journals globally that discusses the intersection of science, technology, faith, ethics, and spirituality. In doing so, it advances ISCAST's mission to promote a climate of mutual understanding and constructive dialogue between science and technology practitioners, and people of faith.

The target readership includes academics interested in science and faith, as well as educators, church leaders, and postgraduate and graduate students.

The relaunched journal is an online, open-access resource, inviting original contributions from national and international scholars. It features book reviews, critical notes, and double-blind peer-reviewed articles. As submissions are accepted, they are published on a rolling basis. At the end of each calendar year, the published materials are collected in one downloadable document, which also serves as the journal's printed release.

We invite articles in science/technology that have theological/ethical/spiritual implications, and articles in theology/ethics/spirituality that engage scientific/technological topics. Original studies of the history of science and faith are equally welcome. While the authors retain the copyright for their respective works, the materials published in CPOSAT may be freely disseminated, with due acknowledgment of their authorship and the place of original publication.

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Editorial

In its third year after relaunch, the ISCAST journal, *Christian Perspectives on Science and Technology* (CPOSAT), continued to develop at a quick pace. We are pleased to present this regular 2024 issue alongside a parallel special issue, “Artificial and Spiritual Intelligence: Proceedings of the 2023 Conference of the International Society for Science & Religion,” which is being released separately.

The special issue of this third volume was coedited by Fraser Watts¹ and Marius Dorobantu.² Readers can hear from the guest editors of “Artificial and Spiritual Intelligence” by accessing the respective issue of the journal. Here, we can only express our gratitude, as hosts, to Fraser and Marius for curating a superb lineup of papers, which, we are certain, will elicit much interest in Australia and beyond.

This regular issue of this third volume of the journal features nine peer-reviewed articles, together with seventeen book reviews and three contributions to a brand new Opinion & Response section. We especially invite readers to explore this new section: while its pieces are not peer reviewed, they offer thoughtful engagement with the conversation between Christian faith, science, and technology. We are grateful to our ISCAST colleagues, David Hooker, for curating the book reviews and the Opinion & Response section, and Emma Berthold, who provided editorial assistance.

At this point, it is important to acknowledge that the journal’s development was once again supported by funds from the Australian Research Theology Foundation (ARTFinc) via two small grants (2023–2024, 2024–2025). ISCAST and we as editors are profoundly grateful for this support. Indeed, interdisciplinary pursuits at the crossing of faith,

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- 1 Formerly Reader in Theology and Science in the University of Cambridge and President of the British Psychological Society, currently Executive Secretary of the International Society for Science and Religion and Visiting Professor of Psychology of Religion at the University of Lincoln, United Kingdom.
 - 2 Assistant Professor of Theology and Artificial Intelligence at the Vrije Universiteit Amsterdam, The Netherlands.

science, and technology, such as this journal, could not survive and flourish without support from generous funders and donors.

The nine articles published in this volume hail from various parts of the world. One article was written by a scholar from Aotearoa New Zealand (Graeme Finlay), four by Australian scholars (Andrew Sloane, Margaret Somerville, and Paul Tyson, the latter being the author of two contributions), another one by a Canadian scholar (Alan Dickin), one by a Chinese scholar (John Shi), one by a Greek scholar (Sandy Sakorrafou), and, last but not least, one article coauthored by two researchers from the United Kingdom (Samuel McKee and Jon Reynolds). The journal's international reach is evident not only by this volume's special issue, but also its regular edition.

The topics range from examining the obstacles that hinder the dialogue between people of faith and scientists (Tyson's "Learned Ignorance?" and Somerville's "Respect for the Natural") to ethical matters (Sloane's "Enhancing Medicine?" and Tyson's "A Philosophical Theologian's Review Essay") to overviews of significant moments in the history of science and religion (Sakorrafou's "Greek Orthodox Perceptions of Communication Technology," Shi's "John C. Polkinghorne and Chen Ning Yang," and McKee and Reynolds' "A Brief Critique of Arthur Eddington") to examples of the usefulness of technological aids for biblical archaeology (Dickin's "A Reassessment of Scientific Evidence") to grand interdisciplinary narratives of the history of life (Finlay's "The Primal Testament").

More concretely, Finlay's article concludes a series of analyses begun in the previous two volumes of *CPOSAT*. It draws together approaches that usually run wide apart, namely, biblical history, genetics, and evolutionary mechanisms, to present the history of life on Earth—including humans—as an implicit narrative. Diligent readers can discern both the unity of natural processes—indeed, the unity of life—and the signature of God's providence that leads all things. It is in our genes, Finlay proposes, that we should therefore seek the original message—the primal testament—of God's caretaking and guidance of creation, a message which the other two Testaments decipher for

believers. Further nuances of this message become apparent within the article's poetic appendix, "A Freed Man's Worship: The Point of It All," where the author broadens the scope of this foundational testament by sketching a theological history of the universe, our home on Earth, life, and ourselves, from beginning to end, a history whose crucial point is Christ's sacrifice for the life of the world. The article and its appendix prove Finlay's maturity of thought as a scientist and a believer, with the appendix qualifying—we propose—as an excellent educational tool for students of faith and science.

A similar complex integration of perspectives can be found in Somerville's and Tyson's articles, which address the values—currently under threat in many Western societies, from both the right and the left sides of political ideology—from different though not unrelated angles. Specifically, Somerville, an ethicist, tackles the matter from the viewpoint of categories such as "nature" and "natural," endeavouring to show that the competing contemporary ideologies are drawn from philosophical assumptions rather than natural realities. An ethics based on nature—as described by the sciences—rather than ideological preference could be the way ahead for reconciling our contemporary culture marred by antagonism and conflict. In turn, Tyson's first article addresses the ideological hijacking of science, with its methods and findings, to serve agnostic and atheistic agendas. The author aptly notes that this phenomenon hinders the conversation between people of faith and people of scientific expertise and inclination, not science as such. His second article showcases the ideological derailment of genuine scientific research in the latest work of gender theorist Judith Butler. The article, written by a philosopher who has a background in social science, represents a plea for upholding scientific information free of ideological manipulations.

The articles of Dickin and Sloane examine concrete examples of use and misuse of technology. Dickin, an expert in isotope geochemistry, applies his scientific expertise to reexamine the dating of the biblical events of the Exodus and the Israelite conquest of Palestine. The article shows how various forms of scientific analysis can be applied and that

only by corroborating data from various tests—combined with further archaeological evidence—can biblical events be dated with reasonable certainty. In this light, the article offers a clear example of how technology can be useful as an aid for biblical studies. Sloane, a biblical scholar with a medical background, discusses ethical matters related to the current trend to deploy technological tools for human enhancement within medical contexts. His article presents the positives and the negatives of this trend, bringing to the fore the transhumanist ideas that undergird it and questioning the calling of medical sciences to implement enhancing procedures in healthcare settings. In the final analysis, he concludes, such procedures and the trend they represent say something significant about modern views of the body. A scripturally anchored theology of the body—and of the human being more broadly—can suggest a different approach to the matters at hand.

Last but not least, the contributions of McKee and Reynolds, Sakorrafou, and Shi fill various gaps in the historiography of the field. McKee and Reynolds' article brings to light the forgotten contributions of Arthur Eddington, whose nonconformist thinking as a scientist and a Quaker represents an interesting alternative to the current squabbles between New Atheists and Christian apologists of theism. In turn, Sakorrafou paints a detailed image of Greek Orthodox attitudes to technology, from the earlier stances on the use of radio and television for communicating faith messages to the contemporary ambivalence regarding the digital space. She argues that a clear understanding of how technology works, and how it can be used, is needed to dispel the current confusion. Finally, Shi's article uncovers a significant moment in the history of science and religion in Hong Kong and China more broadly, namely, the visit of John Polkinghorne in 2006 and his public conversation with Chen Ning Yang. The author considers this event a turning point in the public Chinese opinion on matters of faith and science.

Each article contributes meaningfully to the conversation by raising awareness of the complexities pertaining to the interaction between Christian faith, the scientific culture of our age, and

our technological civilisation. These contributions are essential for advancing the conversation and for highlighting its multiple benefits—from edifying a harmonious society to reaching a better understanding of our world as perceived through the eyes of faith—especially given the current quest for further modalities of attaining these and related goals. Indeed, in recent years, academics and church leaders alike noted the slow progress in terms of bridging the worlds of faith, science, and technology, despite seventy years of ongoing efforts at the crossing of various disciplines. The same goes for the transdisciplinary movement, whose philosophy of accommodating all forms of knowing under one roof—in the search for unified knowledge—constitutes a generous framework. We mention it here given the recent thirtieth anniversary from the signing of the Charter of Transdisciplinarity, in November 1994, which was marked by international celebrations.³ That said, while the outcomes of the dialogue are modest, the purpose of the quest is noble. It is against this backdrop that we should consider the significance of the articles, the opinion & response pieces, and the book reviews reunited in this volume of the ISCAST journal.

We cannot conclude this presentation of the volume without expressing our heartfelt gratitude to the advisory board members, the peer reviewers, the copyeditors, and our ISCAST colleague, Brittany Spencer, who has produced the items for the website through the year and the complete files of *CPOSAT*'s 2024 volume, including this regular issue and the separately released special issue.

Doru Costache & Mark Worthing
January 2025

3 We are happy to report, furthermore, that one of the authors whose articles are published in this volume, Professor Margaret Somerville, contributed to the early development of the transdisciplinary movement, before the launching of the Charter. Recently, she published for the first time a talk to that effect, “‘Spacing-Out’ and ‘Spacing-In’: Searching for the ‘Purplepink Middle,’” originally delivered at the Spring Convocation of the University of Windsor (Windsor, Ontario, Canada), on 6 June 1992. The text can be freely accessed via the following link: <https://aiocs.net/spacing-out-and-spacing-in-searching-for-the-purplepink-middle/>.

Learned Ignorance? On Enlightened Blindness to the Divine and the Demonic

Paul Tyson

Abstract: The Kantian “limits of knowledge” powerfully regulates the Enlightenment-framed contemporary academy as secular, methodologically atheistic, and functionally materialist when it comes to public knowledge. This shapes all science and religion discourse considered palatable to an Enlightenment sensibility. This limit makes public knowledge blind to the divine and the demonic in everyday life (and *in extremis*). The paper argues that this blindness illustrates the abstract and artificial conception of reality that governs academic knowledge. If “religion” adapts itself to these limits in order to dialogue successfully with “science” in an Enlightenment framed academy, it also becomes abstract and artificial. Using Nicholas of Cusa and Johann Hamann, the paper attempts to reclaim “learned ignorance” as a viable alternative to the Kantian “limits of knowledge.” Returning to the “science and religion” domain, the paper concludes by noting that conflict in the basic framing of reality and knowledge is now inherent if theology is to uphold a learned ignorance perspective on reality and natural philosophy. I argue that this sort of conflict should not be feared and is necessary to save modern science from floundering in its own metaphysical vacuum or being swept aside by a post-truth totally poetic constructivism.

Keywords: demonic; divine; Kant; limits of knowledge; Nicholas of Cusa; science and religion

Dr Paul Tyson is an Honorary Senior Research Fellow with the School of Historical and Philosophical Inquiry at the University of Queensland. He works across philosophy, theology, and sociology. He has been working in the “science and religion” domain for the past decade, and recently coordinated the “After Science and Religion” project with such contributing luminaries as John Milbank, William Desmond, Peter Harrison, and Charles Taylor. His most recent book in this domain is *A Christian Theology of Science* (Grand Rapids: Baker Academic, 2022).

Arguably, the central principle of intellectual propriety in the contemporary Western academy is a broadly Kantian respect for “the limits of knowledge.”¹ Here, logic is entirely formal, and knowledge is entirely empirical, and there shall be no speculation about “God’s eye” transcendent delusions, such that all legitimate human knowledge and action must be situated within a completely human perspective.² Respecting the fact that pure logic and objective science cannot give us demonstrable and substantive knowledge about, say, God, means that there is a clear range of things that Enlightened academic propriety will and will not permit into the discourse of respectable knowledge and interpretation pertaining to “religion.”³

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- 1 Presuming that many of the readers of this esteemed journal are not professional philosophers, this footnote is designed to open up the investigation of the Kantian concept of the limits of knowledge, starting with the short and highly accessible, and moving to the long and more technically philosophical. For a short and accessible introduction to a Kantian conception of the limits of knowledge, see Farid Alsabeh, “Immanuel Kant on the limits of knowledge,” *Medium*, 22 February 2019, <https://falsabeh.medium.com/immanuel-kant-on-the-limits-of-knowledge-fe3e928ea644> (accessed 20 January 2024). Alsabeh’s account is—from my reading of Kant—both clear and, in overview terms, philosophically fair. There are ambiguities in Kant’s thought as regards objective knowledge which Alsabeh’s helpful account does not open up, and these ambiguities and aporias are helpfully summarised in Scruton’s book cited below. But the basic Kantian reason why we cannot know how things are in themselves is clearly outlined by Alsabeh in 1,300 words. For a considerably more rigorous account of Kant’s understanding of the limits of reason (which is more complex than an Enlightenment “take home” understanding of the limits of knowledge), see Senior Lecturer in Philosophy at Lancaster University, Dr Garrath Williams’ fine article (15,000 words), “Kant’s Account of Reason,” *Stanford Encyclopedia of Philosophy*, 2023, <https://plato.stanford.edu/entries/kant-reason/> (accessed 20 January 2024). For an excellent introduction to Kant’s life and thought, see Roger Scruton, *Kant: A Very Short Introduction* (Oxford: Oxford University Press, 2001). If you wish to read Kant’s central argument about the limits of reason and the appropriate scope of knowledge, you must read Immanuel Kant, *The Critique of Pure Reason* (London: Everyman, 1993). This is a daunting text and well over two hundred years after its publication there remain complex interpretive differences as to what Kant really means and whether he really makes sense in contemporary philosophical scholarship.
 - 2 See, for example, Kant’s discussion of “transcendental illusion” in *Critique of Pure Reason*, A292–98. Distinguishing between the right use of transcendental deduction and the always wrong temptation to any transcendent speculation, Kant explains that one must always pay proper “attention to the limits of the sphere in which pure understanding is allowed to exercise its function” (A294).
 - 3 Throughout this paper, I will display some textual difficulty in using the

Let us think a bit further on God. In one direction, “the limits of knowledge” facilitates a broad intellectual church which accommodates a range of stances. For example, such limits are readily taken as validating evangelical atheists who think that because one cannot *know* about God, only a fool would *believe* in God. These limits also accommodate those who have a deep fascination with religious texts, behaviours, and beliefs, though they remain silent about God. More broadly, this “church” is entirely comfortable housing people who never even consider anything beyond what structures of knowledge and meaning the artefacts of human logic, science, and cultural construction can build. But be not deceived by this rich pluralism within the “Church of The Limits of Knowledge,” for there is a clear demarcation line that defines heresy. This line was drawn by that paragon of Enlightenment philosophical virtue, Immanuel Kant. Anyone who steps over the line of the knowledge only of what is real *for us*, and wants to ask substantive truth questions about what is *really* real in itself (crossing the boundary between phenomena and noumena) will be deemed an epistemic heretic, and will be treated in one of two ways.

The most genteel way to treat Enlightenment Heretics is to simply ignore their heresy and hope the offenders will grow out of it or learn to keep it to themselves when they are attempting to become scholars. For, with magnanimous condescension, the ethos of Enlightened intellectual respectability finds that most hum drum heretics, who do not understand learned ignorance, are largely harmless. But perhaps some academic clerics may really believe in the reality of God, may even believe that they experience some sort of knowable fellowship with God in prayer, and (shamefully) might even believe premodern superstitions claiming that God acts in human history in occasional miraculous ways. Yet, provided they keep these rationally and empirically

words “science” and “religion.” Both of these terms defy any naturalistic and transhistorical definition, so there is much debate in the literature about whether these terms really have any agreed usable meaning or not. I do not intend to enter into that debate in this essay, though I have been directly engaged in it. See Paul Tyson, “After Science and Religion?” in *After Science and Religion: Fresh Perspectives from Philosophy and Theology*, ed. Peter Harrison and John Milbank (Cambridge: Cambridge University Press, 2022), 1–11.

unknowable inner convictions out of their scholarship, no one is really going to care about their private heretical predilections. On the other hand, should some scholar reject the doctrine that matters of ultimate meaning and reality cannot be mixed with *real* (methodologically atheist and reductively naturalistic) knowledge, then such a person will be denounced along a spectrum that starts with the crackpot, moves to charlatans exploiting the credulous, and includes more serious promoters of delusional pseudoscience. And let it be well noted, all heretics who transgress the limits of knowledge are to some degree post-truth, anti-science, disinformation conspirators, plotting against modern Enlightenment. Such nostalgic and backward-looking people are seeking to return us all to the cold, dark, and violent Age of Ignorance.

Three Different “Science and Religion” Responses to the Enlightened Limits of Knowledge

Rupert Sheldrake is an interesting example of a highly scientifically educated person, doing what might be described as respectable empirical research on, amongst other things, strange psychic phenomena. This is all well and good, but then he brings unorthodox metaphysics and even theology into how he theorises his research.⁴ Sheldrake is a difficult case in some regards for, on the one hand, he has done original research pushing back the frontier of knowledge in plant physiology and biochemistry that is highly respected. On the other hand, his explorations of consciousness and his questioning of philosophically materialist understandings of physical nature are dangerously unorthodox. So, he is some sort of crackpot, no matter how good his empirical studies might be, and no matter what his credentials. But Sheldrake—by all normal measures a capable philosopher, a sophisticated though adventurous theologian, and a Cambridge and Harvard educated biochemist and philosopher of science—is not in the same class of Enlightenment Heretic as, say, a Young Earth Creationist or an Intelligent Design advocate.

4 See Rupert Sheldrake, *The Science Delusion* (London: Coronet, 2020).

Michael Behe is a legitimately qualified and well published professor of biochemistry, but Limits of Knowledge (LOK hereafter) orthodoxy would not call him an eccentric and possibly harmless intellectual crackpot, but rather, a determined peddler of pseudoscience. For his natural theology work in Intelligent Design—though he is not a Young Earth Creationist—presumes to read divine purposes off from natural facts, and thereby casts doubt on aspects of current Darwinian orthodoxy in the domain of the origin, development, and nature of life.⁵ This we call pseudoscience because legitimate science strictly observes the LOK such that any properly scientific knowledge of life *must* presuppose only material, statistically determinate, and non-intelligent causes, and will certainly not entertain medieval formal (intrinsically intellective) or final (inherently purposive) causes. To read purpose and the divine mind into natural causation is to abandon *real* scientific knowledge and to try and take learning back to the Dark Ages.

Unlike Behe, Christians who are orthodox Darwinian scientists, such as Denis Alexander,⁶ seek to show careful ways of arranging parallel features of both orthodox science and properly interpreted conservative Christian doctrines. This is acceptable to Enlightenment norms precisely because it pays such careful attention to upholding the autonomy of objective and merely positive science from any direct influence from interpretive and normative religious categories that reach beyond the LOK. The Enlightened academy is comfortable with any appeal to Scripture, religious doctrine, metaphysics, and religious experience that is held as outside of the domain of scientific and public knowledge, and provided no attempt is made to hold that such exotic and indemonstrable beliefs are treated as if they are, or should be, public knowledge. If such religion accepts the authority of science, and then interprets itself to agree with present scientific knowledge, this is unobjectionable, though it is scientifically unnecessary. Hence, at least

5 See Michael J. Behe, *Darwin Devolves: The New Science about DNA that Challenges Evolution* (New York: HarperOne, 2019).

6 See Denis Alexander, *Creation or Evolution: Do We Have to Choose?* (Oxford: Monarch, 2014).

in theory, Alexander's speculative enterprise in aligning Christian beliefs with scientific truths is entirely acceptable. Alexander works hard, and largely successfully, to be a Christian presence in scientific knowledge that is acceptable to the broad Church of the Limits of Knowledge.

The "science and religion" domain provides plenty of interesting material to look at as regards how the Enlightenment LOK principle regulates intellectual orthodoxy in our academies. This essay is very much concerned with how these limits play out in the "science and religion" domain, but I want to take a seeming detour from that domain at this point in the essay. Let us now look at the peculiar manner in which the Enlightened LOK are determinedly blind to two categories of reality that are immediately obvious, pervasive, and deeply important in our experience of being human: the divine and the demonic. After unpacking this peculiar blindness, we will return to "science and religion."

On the Enlightenment Blindness to the Divine and the Demonic

Throughout recorded human history, and in what we can piece together from before recorded history, it is a continuous and deep feature of human experience to encounter spiritual agencies of good and evil that are not—in the modern sense of the word—natural. This is not to say that pre-Enlightenment people saw what I will call the divine and the demonic as extra-natural. There were often held to be higher and lower levels of nonhuman spiritual agency present within nature, which did not preclude categories of divinity that really were supernatural, such as seen in the traditional Christian theology of creation. To Aquinas, for example, God as the grounds of all created being is ontologically immanent to creation at all times and places (hence the doctrine of divine omnipresence), yet God also entirely transcends creation as the Creator.⁷

There is a magnificent book by the renowned Classics scholar, E. R. Dodds, titled *The Greeks and the Irrational*.⁸ In this book the learned

7 See Simon Oliver, *Creation: A Guide for the Perplexed* (London: Bloomsbury, 2017) for a very helpful exposition of Aquinas' theology of creation.

8 E. R. Dodds, *The Greeks and the Irrational* (Berkeley: University of California

Oxford don unpacks the complex interest of the ancient Greeks in that which transcends rational and natural (in the modern sense) explanation. It is a fascinating read. If anyone is familiar with Plato, they will be aware that Socrates lived his life in the presence of a daemon which forbade him to take money for teaching, and which spoke inner truths to him on a regular basis. Further, Socrates famously went to see the oracle at Delphi. Receiving divine messages was an unremarkable feature of Classical Greek life, though Hermes, the messenger of the gods, was a known trickster, and rightly interpreting the meaning of any pithy message from the gods was a perilous enterprise. Rhapsodes—Greek poets who had memorised the great Homeric sagas—were only any good if they were literally inspired by the muses when recounting the great ballads of the Greeks. Daemonic possession was integral to a good poetic, dramatic, or musical performance. Such possession could have illuminating or horrifying effect. Dionysian *sparagmos*, for example, was depicted in Euripides' play, *The Bacchae*, where female maenads in a state of possessed frenzy ripped King Pentheus to pieces. Unnatural violent physical power in the possessed was a known and feared phenomenon of Greek (and New Testament)⁹ experience.

It is important to recognise that the daemonic in Classical Greek antiquity should not be conceptually confused with the demonic in the Christian New Testament. Certainly, the Christian understanding of the demonic arises from Greek culture and from the same word used in antiquity. However, to the pre-Christian Greeks, the daemonic was not necessarily the domain of spiritual malice. The daemonic was an intermediary designation of divinity which could be either friendly or unfriendly to mortals (indeed, the fickleness of the gods is integral to Greek mythology). Yet Plato's high God is far above the daemonic domain. In the Christian understanding of spiritual cosmology, Greek categories of the daemonic become bifurcated into the angelic and the demonic; those intermediary spiritual powers aiding the Christian in the love of God and neighbour, and those intermediary spiritual powers

Press, 1951).

9 See Mark 4:35–5:20

of wickedness in heavenly places, undertaking a war on God with the souls of mortals at stake.

From the above I wish to draw two conclusions. Firstly (with Plato in mind) much Greek Classical philosophy was in no sense incompatible with divine inspiration and spiritual significance. Indeed, Walter Burkert, the renowned scholar of ancient Greek religion, points out that the interplay between mortal immanence and divine transcendence is a central concern of Plato's philosophical religion.¹⁰ Secondly, when—below—I discuss the demonic and the divine, I do so imposing a Christian reading on these categories, meaning, thereby that the demonic concerns spiritual powers that are malicious, actively opposed to true human flourishing, and affiliated with evil. Equally, I am using the word “divinity” to indicate divine powers that are integral with human flourishing and affiliated with goodness. The experience of good and evil as open to spiritual energies and agencies that are superhuman is what I am concerned with when I speak of the divine and the demonic.

Throughout Western intellectual history, until the Enlightenment, there has always been a keen interest in the divine and the demonic as integral with daily life and the life of the mind. It is from the eighteenth-century Enlightenment onwards that intellectual attitudes start to change, and the divine and the demonic increasingly become—certainly after Kant—categories of superstitious belief that (if there be anything divine or demonic at all) are beyond the limits of real knowledge.¹¹ Pre-fortified with dogmatic unbelief, the Enlightened

10 Walter Burkert, *Greek Religion* (Oxford: Blackwell, 1985), 305–338.

11 See Charles Taylor, *A Secular Age* (Cambridge, MA: Harvard University Press, 2007), 40. Here, Taylor notes that prior to a deep cultural shift towards the “buffered self” which his book locates as completed somewhere in the late nineteenth century, “the boundary around the mind was constitutionally porous. Things and agencies which are clearly extra-human could alter or shape our spiritual and emotional conditions ... [The] way in which we draw this physical/moral boundary today wasn't recognised then.” It goes without saying that the Christian Scriptures and all the saints and theologians of the Christian church prior to what Taylor describes as the “buffering” of the self (notionally cutting this constitutional porosity off) assumed spiritual porosity, and hence the divine and the demonic were taken for granted as integral features of normal Christian life. With C. S. Lewis, I take it that this older view

mind cannot see the divine or the demonic, even when staring them in the face.¹² This leaves a significant blind spot in the categories of knowable reality concerning our actual experience as moral and spiritual agents who encounter both good and evil, and who are engaged in the lifelong doxological contest between good and evil as regards our own agency.

Interestingly, cracks are opening up in the Enlightened world-view, particularly as regards the experience of evil and the demonic.

The Demonic, after Enlightenment

In his book *People of the Lie*, celebrated psychiatrist M. Scott Peck explores some rare cases where the person he is seeking to help steps beyond the boundaries of psychiatric or psychologically recognisable pathology, and into the domain of the spiritual energy of evil, as a power originating from beyond the individual.¹³ Perhaps contrasted with this outlook, Hannah Arendt's *Eichmann in Jerusalem* provides a vivid account of how normal people can end up performing horrendous atrocities of genuine evil.¹⁴ Arendt's central point, and it is a point of keen political significance, is that the person who does evil is not a rare and exotic monster, but rather an ordinary person, and evil is not some unfathomable and abnormal anomaly but a latent energy within all humanity. The demonic, Arendt implies, is latent within us all.

Combining Peck and Arendt, then, we might say that there is a spectrum of evil action wherein the spiritual energies seem entirely

is in fact true, and the modern buffered self—as powerfully present in our socially constructed reality as it is—is delusional. William Desmond is a fine contemporary advocate for the truth of spiritual porosity, and a deep critic of the buffered self. See William Desmond, *The Intimate Strangeness of Being: Metaphysics after Dialectic* (Washington, DC: Catholic University of America Press, 2012).

12 George MacDonald was acutely aware of the manner in which moral and spiritual commitments shape one's interpretation of reality. In this context he notes: "seeing is not believing—it is only seeing." George MacDonald, *The Princess and the Goblins* (London: Puffin Classics, 1996), 173.

13 M. Scott Peck, *People of the Lie* (London: Arrow, 1990).

14 Hannah Arendt, *Eichmann in Jerusalem: A Report on the Banality of Evil* (London: Penguin, 2006).

human at one end, and one in which they seem external to the human and invading of the human on the other end, though it is possible that evil agency in humans is at once entirely natural and also firmly situated in a spiritual ecology that cannot be explained in the reductively naturalistic terms that arise by assuming the sixteenth century doctrine of *natura pura*.¹⁵ Whether such a thing as pure nature (nature that does not depend on divine grace) exists at all is something that Henri de Lubac has seriously questioned.¹⁶ The Christian doctrine of Christ the Logos of creation is indeed incompatible with modern reductively materialist naturalism, though traditional Christian Logos theology does not preclude genuinely undetermined human agency as regards spiritual choices as then played out in moral action.¹⁷ But these theological matters are not the central concern of this essay. The central issue here is that demonic energies—whether natural or spiritually exogenous to any given human agent—are evident in extreme immoral conditions, but also to a less obvious extent in any struggle to exercise good moral agency. This is something the LOK is intentionally blind to and must always explain away or explain differently.

The above does not mean that Enlightenment-framed scholarship has no interest in witches, demons, the devil, and theologies of spiritual warfare and the like. Indeed, there are thriving knowledge construction industries built around these topics in the academy.

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- 15 See Louis Dupré, *Passage to Modernity* (New Haven: Yale University Press, 1993), 167–189, for a very brief description of this profound transition away from the deep and continuous ontological embedding of all creation in the Creator as a very significant move in the passage to modernity. What is going on in the sixteenth century as regards difficulties with prime matter as interpreted via Scottist accounts of haecceity and Ockhamist nominalism, discussions in Thomistic interpretation centring around Francisco Suárez and his complex integration of Thomistic, Ockhamist, and Scottist trajectories, and complex debates about the nature and meaning of grace and nature, makes the details of the development of *natura pura* a very demanding topic. The only relevant point here is that there is a powerful move towards making each individual physical being ontologically self-standing in the sixteenth century, and this becomes the grounds of modern naturalism thereafter.
- 16 Henri de Lubac, *Surnaturel: Études historiques* (Paris: Aubier, 1946).
- 17 John R. Betz, *Christ the Logos of Creation* (Steubenville, OH: Emmaus Academic, 2023).

One of my colleagues at the University of Queensland—Professor Philip Almond—has produced fascinating books with top tier academic publishers on demonic possession, the devil, witches, the afterlife, and so forth.¹⁸ Professor Almond is one of the most erudite and delightful persons one could meet, who lost his Christian faith—imbibing LOK embedded historical critical biblical scholarship—whilst studying to become an Anglican priest as a young man. All his books study the development of historical narratives, gently touching on the psychology of believers in the paranormal within their historical context. The good professor obviously finds the poetic creativity, the politics, and the morality of religious belief deeply fascinating, even if it is nutty and disturbing, and oftentimes tragic and malicious. As to the question of whether the demonic or the divine themselves are real, Professor Almond’s enlightened scholarship shows no interest. These matters are clearly assumed to be phenomena of human psychology, indemonstrable belief, and credulous behaviour, with a dry and sometimes warm humour being expressed by the learned historical scholar in their description. Silence is politely reserved for those matters on which logic and reasonable historical demonstration cannot comment. Professor Almond is a noble exponent of enlightened scholarship conducted strictly within the Limits of Knowledge.

Terry Pratchett has continuity with scholars like Philip Almond in that the narrative world of spiritual belief is keenly fascinating at the same time as a modern materialist realism is assumed (though, as a narrative construct itself). Pratchett seems to be reverting to a somewhat Classical Greek conception of the gods and the intimate relation of the spiritual to the natural where the only entity approaching a high god is Death. Even so, Pratchett’s perspective is firmly within the Kantian “reality for us”—as we imaginatively and poetically interpret

18 See Philip Almond, *The Lancashire Witches* (London: Bloomsbury, 2020); Philip Almond, *Afterlife: A History of Life After Death* (London: Bloomsbury, 2016); Philip Almond, *England’s First Demonologist* (London: Bloomsbury, 2014); Philip Almond, *The Devil: A New Biography* (New York: Cornell University Press, 2014); Philip Almond, *Demonic Possession and Exorcism in Early Modern England* (Cambridge: Cambridge University Press, 2007); Philip Almond, *Heaven and Hell in Enlightenment England* (Cambridge: Cambridge University Press, 1994).

it—and never presumes to be about how anything *really* is. Human knowledge is always perspectival, always situated within narratives of meaning and practice that the individual does not really choose, always mysterious and surprising, because it never finally makes sense of how things really are. Meaning is the slippery, constructed, and always inadequate human response to the inexplicable experience of being.

Let us now briefly consider the divine.

The Divine, after Enlightenment

If Epicurus' rejection of a benevolent and omnipotent God because of the existence of evil is an argument used since Hume by enlightened humanists against traditional theists, then "the existence of goodness" is the other edge of that same sword, and it cuts against agnostic humanism. Which is to say that an ultimately utilitarian and hedonic account of the qualitative experience of goodness—as if goodness is a mere quantity of pleasure—is superficial and unpersuasive. Again, respecting the LOK, only the quantifiable and the formally determinate is ultimately admitted to knowledge, and every account of a quality—beauty, goodness, virtue—every immaterial process of our mind—truth-apprehending thought, intelligence, mind itself—every meaningful action that is not simply instrumental—love and meaning—and the intelligible cosmos itself, has to be reexplained so that these immediate qualitative, intellective, and spiritual features of our experience are "known" to *not* be what they seem to be. (So much for respecting reality as it is *for us*!) The LOK interprets all quality, meaning, and spirit *out* of legitimate knowledge, replacing these qualitative intangibles with reductive "observations" and instrumentally oriented theories that are amenable to the methodological atheism and functional materialism of Enlightened orthodox academic knowledge. Thus are meaning, goodness, love, and even truth scientifically extracted out of the world leaving us with only the phenomenological domain of apparent facts that can be interpreted any way you like, other than as substantively meaningful qualitative and spiritual truths.

Kant's attempt to create morality out of rational autonomy is rhetorically impressive, but no matter how noble rational duty is in practice, in his own theory, I cannot see how Kant's universal rational laws as qualitatively *good* can be derived from the mere *fact* that they are formally *logical*. Formal rationality in Kant's own system has no substantive content so there must be some philosophical sleight of hand involved to move from pure rational universality as a formal "fact of reason"¹⁹ to a practical but genuinely morally qualitative reality. In a purely logical and purely empirical phenomenological world, rational procedure never simply *becomes* qualitative, practical reason never simply *becomes* substantive moral meaning, any more than brains simply *become* minds.²⁰ Higher order capacities rely on lower order conditions, but it is an act of pure and unjustified (even unjustifiable) assertion based on an unwavering faith in a determinedly naturalistic functional materialism to require that lower conditions *must* produce higher order capacities. But "is" simply does not become "ought," "logical" simply does not become "right," "complexity" simply does not become "consciousness," inanimate matter does not simply become living. Qualitative distinctions between different orders of reality and meaning are only illusions if one is a determined materialist where the qualitative itself is ultimately an illusion. Facts and values, reason and meaning, brains and minds coinhere in the unity of our lives, but the three former terms of each pair are not the determinate cause of the later three terms, such that the later three terms are only really epiphenomena of the former. There is no *evidence* to support such a determined belief in the emergence of a total transition of kind from, say, logic to morality, quantity to quality, neurological activity to thought. As brilliantly as Kant tries to justify the purely logical emergence of moral truth, he does not achieve this alchemy.

19 Immanuel Kant, *Critique of Practical Reason*, trans. Lewis White Beck (Indianapolis: Bobbs-Merrill, 1956), 31.

20 See David Bentley Hart, *All Things Are Full of Gods* (New Haven: Yale University Press, 2024; forthcoming) for a powerful set of arguments eviscerating materialist brain to thinking mind emergence.

Further, we do not *need* to tie the wonder of the world down to the rational and empirical limits of Enlightened faith-free knowledge. Indebted to John Duns Scotus, Gerard Manley Hopkins notices that each individual dappled thing is a wonder, and that the glory of God shines out through every feature of the cosmos, should we have eyes to see it. There is no credible reason not to take love, goodness, qualitative truth, intelligible essence, intrinsic meaning etc., as divinely gifted realities in which we live all the time.²¹ But our academy only embraces an abstract world of mere quantity, fact, and number (as Hume put it). Only phenomenologically demonstrable facts, the logic of linguistic engineering, and entirely poetically constructed and substantively indemonstrable meanings are epistemically admissible. This entails the “learned ignorance” of the demonic and the divine that all credible scholars respecting the LOK must confess.

Nicholas of Cusa, Kant, Hamann, and Desmond, on Learned Ignorance

At this point I want to outline briefly the manner in which Nicholas of Cusa and Immanuel Kant interpret the limits of knowledge in exactly opposite ways, and how Hamann critiques Kant pointing us back to Cusanus. William Desmond’s contemporary philosophy of “the between” then shows how Cusanus’ fifteenth-century stance, as thrown against Enlightenment philosophical hubris in the eighteenth century by Hamann, remains dynamic and persuasive in the present.

To Nicholas, “the foundation for learned ignorance is the fact that absolute truth is beyond our grasp.”²² This applies just as much to things we can have naturally credible knowledge of—empirical things and mathematical relations—as it does to that which totally surpasses our knowledge (God), even though in Christ God has supremely made

21 For an argument for taking the divinely graced realities of our ordinary experience of the qualities of goodness, beauty, and truth as *real*, see Paul Tyson, *Seven Brief Lessons on Magic* (Eugene: Cascade, 2019).

22 Nicholas of Cusa, *Of Learned Ignorance*, trans. Gerain Heron (Eugene: Wipf & Stock, 2007), 10.

himself known to us. Nicholas—a lover of mathematics and natural philosophy—was definitely not a sceptic, but he was under no illusion that there really is *any such thing* as absolutely true reason and absolutely true experiential knowledge, for us. The absolute is only for God. But resting in the certainty of that Absolute, who is also the Creator, we can embrace what knowledge natural sensation and natural reason relatively and incompletely gives to us, in good faith. Thus the traditional view of Cusanus, rephrased by Hamann for Enlightenment ears, is that “it is pure idealism to separate faith and sensation from thought.”²³ The practical reliability (but certainly not any infallible interpretation) of sensory knowledge, and the abstract (but certainly not ultimate) certainty of human systems of logic (mathematics) and human meaning (language), can only be rightly appropriated if one acts in good faith towards the divine and always transcendent source of Truth. The aim of the Enlightenment to decommission faith and only rely on reason and science was inconceivable to Cusanus, and was considered an impossible pipe-dream by Hamann.

Kant’s LOK project seems humble and restrained, but in fact it is an attempt to mark off a small and artificially controlled arena where only that which is logically and practically demonstrable *to us* is taken as true, regardless of what stands both above and below human reason, language, and perception. Kant is seeking to define an arena where human knowledge, in its own finite and rational categories, is Master. This removes theology, traditional metaphysics, and good faith in Christian doctrine from the domain of valid knowledge, cutting out any higher grounds of reason (Logos) and any higher grounds of nature (the Creator) from sense, reason, and intuition. Once we believe our own propaganda (that only what is under the phenomenological domain of purely rational and purely empirical human epistemic mastery can be taken to be real), then we ever more reductively interpret the symbols and approximations of real meaning. In such manner we devalue that which we *can* incompletely know as mere epiphenomena of some

23 Quoted in Kenneth Haynes, *Hamann: Writings of Philosophy and Language* (Cambridge: Cambridge University Press, 2007), xvii.

supposedly “pure,” rational, and empirical “reality,” which ultimately has no *real* qualitative meaning or value.²⁴

Hamann describes how the Kantian LOK process ends in impossible celebrations of academic nonsense thus:

The apodeictic certainty of mathematics depends on a ... portrayal of the simplest, most sensible intuition and then on the ease of proving its synthesis and the possibility of its synthesis in obvious constructions of symbolic formulas and equations ... However ... metaphysics [Hamann here means the Kantian “transcendental superstition”] abuses the word-signs and figures of speech of our empirical knowledge by treating them as nothing but hieroglyphs and types of ideal relations. Through this learned troublemaking it works the honest decency of language into such a meaningless, rutting, infinite something = x, that nothing is left but a ... magic shadow play... [of] empty sacks and slogans.²⁵

In his “Metacritique on the Purism of Reason,” Hamann points out that Kant’s central philosophical enterprise—the *Critique of Pure Reason*—is impossible because it is an artifice neither of pure logic nor pure sensation, but of *language*.²⁶ And language is an inherently graced and utterly astonishing mystery that no reduction of mathematics or objectivist sensory observation can in any manner master.

As Ronald Gregor Smith explains:

for Hamann... the “givenness of things” is in his view never purely arbitrary, but is always at the same time a sign, a speech, *the Word*. When [Hamann says], for instance, that “the whole ability to think rests upon language,” that “language is the sole ... instrument and criterion of reason,” that “without language there can be

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- 24 In the reductively mathematico-empiricist direction, see Lawrence Krauss, *The Greatest Story Ever Told ... So Far. Why Are We Here?* (London: Simon & Schuster, 2017). In the total social and “political” poetic construction of “meaning” direction, see Judith Butler, *Gender Trouble* (New York: Routledge, 1990).
- 25 Johann Georg Hamann, “Metacritique on the Purism of Reason,” in *Hamann: Writings on Philosophy and Language*, 210.
- 26 Hamann, “Metacritique,” 205–218.

no reason,” and that language is the “Deipara, the mother of our reason,” he is thinking all the time of what he elsewhere explicitly says: “Without the Word there is no reason, no world. Here is the source of creation and government.”²⁷

The inescapably Christian theological point of appreciating that no human knowledge is ever absolutely true—and that this applies as much to rational and empirical truth statements as to metaphysical, moral, aesthetic, and theological statements—leads to amazement at the richness of the meaningful cosmos and joyful trust in its divine origin and destiny. Our small human languages (our *logoi*) in some strange measure participate in the divine *Logos*.²⁸ To trust in the superabundant richness, the astonishing overflow of meaning and splendour out of which reality arises, is the only way to be reasonable, the only way to see truly and to touch the world in which we live, the only meaning of meaning itself. Appreciating the limits of merely human knowledge should situate our knowledge as a function of the divine Word, and should tutor us in humble openness to God who speaks to us through every aspect of our experience of reality. This is the exact opposite of what the Kantian LOK does.

William Desmond is a powerful contemporary exponent of a Christian metaphysics of astonishment.²⁹ His “between” books³⁰ draw

27 Ronald Gregor Smith, *J. G. Hamann 1730–1788: A Study on Christian Existence* (New York: Harper & Brothers, 1960), 85. The most able contemporary Christian philosophical theologian exploring the significance of Logos for natural knowledge and much else besides, of my acquaintance, is John Betz. See Betz, *Christ the Logos of Creation*.

28 It must be pointed out that Hamann’s “linguistic turn” has nothing to do with either Anglophone deflationary “linguistic” philosophies (such as Logical Positivism) or with postmodern performative adventures in interpretive miscommunication, such as celebrated by Judith Butler and, in perhaps a different register, Jacques Derrida. For those interested in understanding Hamann’s *Logos* theology, see John R. Betz, *After Enlightenment: Hamann as Post-Secular Visionary* (Chichester: Wiley-Blackwell, 2009).

29 Desmond’s work has direct bearing on the contemporary “science and religion” debate, particularly in rejecting the post-metaphysical Kantian limits of knowledge boundaries. See Paul Tyson (ed.), *Astonishment and Science: Engagements with William Desmond* (Eugene: Cascade, 2023).

30 William Desmond, *God and the Between* (Oxford: Blackwell, 2008); William

out the ancient Greek meaning of *metaxu* (“between”) where our lives are always situated underneath a transcendence we can never master, and above an immanence we can never master, and we are unavoidably porous to both unknowables. Relinquishing the will to epistemic mastery—the idolatrous desire to “be as God” through special knowledge—is the pathway to discovering grace and revelation, ever held out to our minds by the Logos of God. And as one of the most powerful philosophers of our times, it will come as no surprise to learn that Desmond finds the post-metaphysical trajectory of philosophy after Kant, radically overrated.³¹

Back to Science and Religion and the Limits of Knowledge

There are reasons why C. S. Lewis is seldom thought of as among the more significant science and religion thinkers of the twentieth century. The natural sciences were not of any particular interest in his body of work, but the manner in which he stays firmly outside of the Enlightenment LOK in everything he writes—particularly as it pertains to the divine and the demonic—is arguably a more significant reason why he does not sit in the science and religion hall of fame.

Lewis was a lover of all learning, and not “anti-science” in any way, but he was very aware of the manner in which scientific atheism functioned as an ersatz theology and a counter-Christian religion in the rapidly secularising university, and in culture at large. Some of his most profound writing in this area is in his science fiction, which tends to be treated as purely imaginative and allegorical fantasies rather than serious theological engagements with scientific knowledge. Unlike thinkers like Pannenberg—who worked with enormous energy in interfacing rigorous theology with rigorous natural science—and unlike dual

Desmond, *Ethics and the Between* (New York: State University Press of New York, 2001); William Desmond, *Being and the Between* (New York: State University Press, 1995).

31 William Desmond, *The Intimate Strangeness of Being: Metaphysics after Dialectic* (Washington, DC: Catholic University of America Press, 2012), 89–119.

qualified scientist and theologian thinkers like Polkinghorne, Lewis did not engage directly with science as such. But listen to this passage from *That Hideous Strength*:

The physical sciences, good and innocent in themselves, had already ... begun to be warped, had been subtly manoeuvred in a certain direction. Despair of objective truth had been increasingly insinuated into the scientist; indifference to it, and a concentration on mere power, had been the result. ... Dreams of the far future destiny of man were dragging up from its shallow and unquiet grave the old dream of Man as God.³² The very experiences of the dissecting room ... were breeding a conviction that the stifling of all deep seated repugnances was the first essential for progress ... [Scientists without sacred respect for both God and creation are] like straw in the fire. What should they find incredible, since they believed no longer in a rational universe? What should they regard as too obscene, since they held that all morality was a mere subjective byproduct of the physical and economic situations of men? The time was ripe. From the point of view which is accepted in Hell, the whole history of our earth had led up to this moment ...³³

Lewis deliberately violates the central principle of the Enlightenment LOK: never publicly treat the divine or the demonic as anything other than subjective derivatives of secular knowledge and culturally and psychologically constructed meaning. Spiritual contest—the war between Heaven and Hell—is the real business of life to Lewis. And knowledge, though secondary to that war, is never spiritually neutral and is always drawn into that spiritual war. The knowledge that rests in the graces of love, goodness, and truth is divine; the knowledge characterised by the lust for power, or a means of personal advancement, or the worship of humankind, or just a compulsive greed for more “how it works” curiosity, is always demonic. Kierkegaard likewise profoundly

32 One cannot help but think of Yuval Harari's *Homo Deus* (London: Vintage, 2017) in this context.

33 C. S. Lewis, *That Hideous Strength* (New York: Scribner, 1996; originally published in 1945), 203.

grasps that the most fundamental epistemic concerns do not pertain to demonstrated rational and empirical truth, but to sin and faith.³⁴

An abiding concern with the divine³⁵ and the demonic³⁶ in ordinary life, and an awareness of the intimacy of states of the soul with approaches to knowledge does not fit Lewis to be taken seriously as a LOK-approved commentator on science and religion. But worst of all, Lewis openly derides the doctrine of progress.

As a fine scholar of Renaissance and Medieval literature, and with a strong background in the Classical thought world and Icelandic sagas, Lewis came to reject the “chronological snobbery” of his youth as a bright young rational atheist at Oxford.³⁷ He came to see that we are not more advanced than our forebears simply because we live in the present and can fly in planes and cheat death with penicillin. Rejecting the fashionable academic ideology of progress, Lewis holds that science and technology are no measure of human value, virtue, wisdom, piety, reasonableness, or kindness. Lewis has no qualms in connecting Darwinian ideology with the doctrine of progress too.³⁸ And rightly so. The doctrine of emergent evolution well predates Darwin in the nineteenth century with its most sublime philosophical expression in Hegel. But Darwin enables the conversion of high emergent idealism into reductively naturalistic scientific fact and—with the likes of Herbert Spencer—into a handy doctrine of the naturalness of competitive domination. Power-centrism disdaining metaphysical meaning is deeply embedded in modern science from its Baconian origins. Bacon is driven by the will to dominate nature, to rule over

34 For his masterpiece in theological epistemology see Søren Kierkegaard, *Concluding Unscientific Postscript to the Philosophical Fragments* (New Jersey: Princeton University Press, 1992).

35 See C. S. Lewis, *The Complete Chronicles of Narnia* (London: Collins, 2000). Here Lewis evokes an awareness of the divine presence and the spiritual struggle in ordinary life by the most wondrous allegorical fairy tales.

36 In *That Hideous Strength* Lewis takes us on a high imaginative ride with demonic powers. However, it is in his very humdrum portrayal of the temptations and anxieties of the early career scholar, and his intimate depictions of institutional politics at a college level, where he is at his most powerful in describing the demonic.

37 C. S. Lewis, *Surprised by Joy* (Bath: Chivers Press, 1998), 237–239.

38 C. S. Lewis, *Poems*, “Evolutionary Hymn” (New York: Harcourt, 1992), 55–56.

her, and a sense of entitlement to torture all secrets out of her in order to achieve the power of greater human utility.³⁹ Such practical concern with power over nature, and over technologically inferior peoples, translates very comfortably into nineteenth century imperial and commercial domination.

Notice how the LOK works in the doctrine of progress. Kant's transcendental deduction effects a phenomenological reduction of reality such that only that which lies *beneath* reason as merely regulative and universally applicable, and that which lies *within* the purview of scientific positivity and technological mastery (as necessities of the apparent world) is considered real. Any horizon of meaning and value that stands above human knowledge and action simply disappears from reality. Now—with staggering chronological snobbery—all the great saints and sages of the past are transformed into superstitious speculators whose childish notions of sacred value and transcendent reality can be ignored as ignorant and foolish.⁴⁰ Lewis accepts none of it, and is keenly aware of how “science” becomes the primary ideological vehicle of secular materialist pragmatism from the late nineteenth century and throughout the twentieth century, leading up to the collapse of broadly held Christian cultural assumptions in the 1960s.⁴¹

One can say Lewis is only concerned with scientism, which is true, but the interlocking roots of the wheat of honest and demonstrable

39 See John Henry, *Knowledge Is Power: How Magic, the Government and an Apocalyptic Vision Helped Francis Bacon to Create Modern Science* (London: Icon, 2002). The Baconian venture in the new mathematico-experimental natural philosophy has, from the birth of the Royal Society, a very intimate association with aristocratic, naval, commercial, and military power.

40 For the iconic rhetorical apology for the Enlightenment as the long awaited rational and moral maturity of humankind, see Immanuel Kant, “An Answer to the Question: What Is Enlightenment?” *Berlinische Monatsschrift*, December 1784. For an English translation see: https://www.nypl.org/sites/default/files/kant_whatisenlightenment.pdf (accessed 12 December 2023). See also Richard Dawkins’ address to the Oxford Union on 18 February 2014, here: https://www.youtube.com/watch?v=xYY99oD_cvs (accessed 10 December 2023), where, with a cheeky smile, Dawkins explains how he despises theology. This public confession of his complete ignorance of the meaning of theology is met with appropriately knowing laughter by his oh so grown-up God-ignorant acolytes.

41 Lewis did not live to see the sexual revolution in popular culture. But this revolution was firmly in place in academic culture well before the 1960s.

natural knowledge and the tares of the cultural ideology of scientism—particularly in our secularised and state-controlled education systems—are much more deeply bonded than Christian “science and religion” discourse usually cares to notice. But Lewis noticed it.⁴²

Conclusion: Suiting Up for a New Conflict

The “learned ignorance” of Nicholas of Cusa and the “limits of knowledge” of Immanuel Kant respond to the inherent impossibility of any human claim to a total rational, empirical, or metaphysical demonstration of indubitable truth, in opposite ways. To Nicholas, finding the small lamp of human understanding well suited to practical life, well suited to worship, and well suited to the diligent study of creation, is a cause for humble joy and loving faith in the Father of all Lights who dwells in unapproachable radiance. All our reason and knowledge are a function of relational good faith, and there can be no participation in truth without such faith. But this is not the Enlightenment LOK. Bracketing out divinity and the demonic, disallowing any partial knowledge of transcendent qualities and intrinsically intellectual realities, reducing the scope of meaningful scholarship to only what can be subordinated to merely regulative logic and the useful constructions of scientific knowledge and cultural meaning, and proceeding ever reductively onward ... one may ask, what is left of actual reality to know? The Enlightenment LOK intentionally locks out *actual* (unmasterable) reality in order to define a phenomenological “realism” that is very practically useful, but is an entirely abstract epistemic construct. This is the purchasing of power at the cost of truth, and the purchasing of a delusional sense of epistemic mastery at the cost of reality.⁴³

42 Lewis was very aware of education as spiritually and morally loaded (for good and for ill) mind formation. The manner in which a pervasive soft scientism, presupposing at least a functional materialism, has infiltrated education is explored with keen insight in C. S. Lewis, *The Abolition of Man* (New York: Macmillan, 1955).

43 Robert Pasnau finds these sorts of trade-offs at the very origin of the modern scientific age, where seeking to understand primary causes and first principles is traded for precision in describing phenomena. Galileo and Newton are

Granted, Kant is but one factor in this modern trajectory. The removal of intelligible form, moral meaning, and purpose from matter is another factor we have not touched on. The replacement of a Christian Aristotelian hylomorphic understanding of the material world with the modern atomic philosophy of matter radically flattens our sense of what the material world is. This is a key ingredient in the spiritual poverty of the modern life-world.⁴⁴ Our assumptions about what the material world is means we can no longer see the world as sacrament,⁴⁵ as a divinely graced creation,⁴⁶ as a spiritually active theatre,⁴⁷ as full of sympathetic and living agencies both above and beneath the categories of human intelligence.⁴⁸ But the baseless arrogance of Kant's so-called maturity, and the brazen anti-theological hubris of the so-called dignity and freedom of post-religious rational and scientific humanity, still carries the rhetorical day in our educational formation.

explicitly working on this trade-off. See Robert Pasnau, *After Certainty* (Oxford: Oxford University Press, 2017), 14–18.

44 The revolution in the philosophy of matter effected by the likes of Pierre Gassendi, replacing Aristotle's hylomorphic understanding of the material world with a modern version of Democritean atomism was so successful and so complete that it goes hardly noticed by the non-specialist. But this is a profound shift in our understanding of the nature of nature. On that shift, see Lynn Sumida Joy, *Gassendi the Atomist* (Cambridge: Cambridge University Press, 1987).

45 The dependence of the world on sacramental realities, and hence the inherently sacramental nature of the material cosmos, is still well understood in Eastern Orthodox Christianity. See Alexander Schmemmann, *For the Life of the World* (New York: Saint Vladimir's Seminary Press, 1973).

46 See Betz, *Christ the Logos of Creation*.

47 Walter Wink gets some way towards recovering the meaning of spiritual struggle as an ordinary feature of life in the context of the Anabaptist commitment to reject *realpolitik* approaches to power. See Walter Wink, *Engaging the Powers: Discernment and Resistance in a World of Domination* (Minneapolis: Fortress Press, 1992).

48 See James Lovelock, *Gaia* (Oxford: Oxford University Press, 1979). Lovelock tries to think of the biosphere as a self-regulating, possibly intentional, possibly agential, living organism. Earth Systems science is a fascinating field, but Lovelock's formulations have been highly contested. Lovelock himself became more scientific, and less mystical as Earth Systems thinking progressed, and as he fell afoul of reductive LOK orthodoxy. But his 1979 book marks a significant modern interest in recovering agencies in nature that are not reductively naturalistic. For a fine introduction to medieval sympathetic natural philosophy see Spike Bucklow, *The Alchemy of Paint: Art, Science and Secrets from the Middle Ages* (London: Marion Boyars, 2009).

The LOK still functionally sets science against religion and still brackets all that is most pressingly important in life out from “reality.”

If we are to do “science and religion” without adapting religion to the manners and silences of the Enlightenment vision of the limits of knowledge, this is going to be read as a sad attempt to revive the now happily resolved war of backward religious fundamentalism against enlightened science and humanism. The reasons it will be read as such are simple: science won the twentieth century war of science against religion (hence there is no real conflict now). The battle between faith seeking a true but partial understanding of unmasterable reality, and a faith-free Enlightenment understanding that rationally and empirically *contains* phenomenological reality, is over. But now a new battle is brewing. This is between a tired scientific positivism that has no metaphysical warrants, and a powerful new postmodern irrationalism. Religion that does not play by the LOK rule book will be labelled anti-science and considered a force for irrational post-enlightenment darkness. But this is a misreading. Rather it is science’s oh so effective removal of itself from any theological warrant that has produced a postmodern irrationalism of pure meaning *poesis* and fully amoral normativity-constructivism.⁴⁹

I think Michael Hanby is right. The only way to save science from post-truth constructivism on steroids is a recovery of theology as the first philosophy for any viable natural philosophy. No God, no science.⁵⁰ Modern science may well die at the hands of basely pragmatic financial and corporate power that happily and manipulatively controls

49 On the nineteenth century separation of science from religion, see Peter Harrison, *The Territories of Science and Religion* (Chicago: Chicago University Press, 2015). On an anti-naturalist, anti-essentialist understanding of the complete linguistic and performative construction of human meaning, see Butler, *Gender Trouble*.

50 I am turning Hanby’s question into a statement here, but the statement does seem to fall out of asking the question as carefully as Hanby does. See Michael Hanby, *No God, No Science?* (Chichester: Wiley-Blackwell, 2013). For similar recent enterprises in seeking to rethink modern natural philosophy from theological first principles, see Larry S. Chapp, *The God of Covenant and Creation* (London: T&T Clark, 2011); Paul Tyson, *A Christian Theology of Science* (Grand Rapids: Baker Academic, 2022).

research, economies, and states. Modern science might die at the hands of the algorithmic reduction of the individual to the consumer, and at the hands of educators formed by an academy suffering deeply from a postmodern cultural failure of truth confidence. As historians have clearly shown, there is no intrinsic opposition between science and religion, and Christian theology is the essential incubator out of which modern science arises.⁵¹ Equally, science cannot provide its own truth warrants. Science needs theology. Yet the reality is that the Enlightenment LOK is deeply opposed to theology as its first philosophy, and will probably defend the autonomy of science from metaphysics and religion to the death.

In this context, if we should try and open up human knowledge to a reality we cannot narrowly epistemically master, and if we should try and think about natural knowledge in the context of higher truths and unavoidable substantive philosophical commitments, there will be science and religion conflict. There is nothing to be gained by insisting that science and religion relations must always be friendly. For the only “friendly” that science will recognise is proper respect from religion for the LOK, upholding the autonomy of science, and judging truth (and the phenomenologically *real* meaning of religion) by scientific categories. Christians can go on bending around the manners of the Enlightenment forever, but this is to concede to the unreality of actual reality, and to let modern science die at the hands of its own metaphysical poverty.

There needs to be a new science and religion conflict. Not the conflict of Darwinian atheistic truth against a fading nineteenth-century natural theology where both “enemies” are equally embedded in reductive modern positivism. That was a conflict between two types of shallow metaphysics and two literal positivisms that was going to end badly for everyone (which it did). Evangelical Darwinian atheism is on the fade now, but it is also the case that Bishop Usher’s chrono-

51 For a couple of excellent texts in this very fruitful domain, see Amos Funkenstein, *Theology and the Scientific Imagination* (New Jersey: Princeton University Press, 1986); Stephen Gaukroger, *The Emergence of a Scientific Culture* (Oxford: Clarendon Press, 2006).

logical enterprise will never hold broad credibility in the West again. Even so, various iterations of biblical literalism regarding the *hexaemeron* may well live on in their enclaves. This is because modern biblical literalist Christians, who have never abandoned early modern natural theology, remain inherently more reproducible than those who uphold a literalist commitment to the present cosmological theories of our natural philosophy and who mythologise central Christian doctrines to make them compatible with the present state of scientific knowledge. But Darwinian atheism and fundamentalist creationism were a sideshow anyway. More than a sideshow only in that this flashy conflict was a convenient diversion from the profound and uncontested secularisation of the academy from the 1870s to the 1970s. That secularisation was largely achieved through the separation of science from religion and the limiting of public truth-claims to the Enlightenment LOK. But the victory of science as master of public truth, and religion as a private meaning game for the unenlightened, will probably be pyrrhic for both modern science and modern religion.

Science needs to rest on a viable metaphysics and, from the origin of the university until the late nineteenth century, viable Western metaphysical visions of nature have been embedded in Christian theology.⁵² The success of the eighteenth-century push against Christian theology as the first philosophy for the West and as the warrant of its natural philosophy, finally arrives in the post-Christian era after the 1960s. This is not going well and shows significant signs of ending badly. For the sake of a viable science, and the recovery of the meaningful public pursuit of genuinely qualitative ends, let us not fear engaging in conflict with the Enlightenment LOK.

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52 Though the argument is from the 1970s, Hooykaas is still persuasive in maintaining that modern science rests on Christian theological warrants, and cannot long survive being cut off from the root system that made modern science flourish. See Reijer Hooykaas, *Religion and the Rise of Modern Science* (Vancouver: Regent College Publishing, 2000).

Greek Orthodox Perceptions of Communication Technology: Past and Present

Sandy Sakorrafou

Abstract: Over the last two decades, the engagement of various Orthodox Christian groups with digital communication technology increased significantly in Greece. The outbreak of the Covid-19 pandemic not only reinforced the existing trend of using technology to support religious activities and outreach, but also brought to light previous pastoral and ecclesial concerns about worship and the dissemination of the Gospel message. The present paper explores the attitude of various Greek Orthodox circles towards digital communication expressed in representative periodicals and websites, before and during the pandemic. To understand this attitude, it provides an overview of how these groups have perceived communication technology since the 1950s, especially the use of radio and television for liturgical purposes. This paper shows that certain pastoral and ecclesial concerns regarding worship, the dissemination of the Gospel message, and the nature of the church have persisted over time, conditioning the attitude of some Greek Orthodox Christians towards contemporary digital media.

Keywords: communication technology; digital communication; Greek Orthodox Christian circles; radio; television

Sandy Sakorrafou holds a PhD in the History and Philosophy of Science from the University of Leeds (UK). She is a Postdoctoral Researcher at the National Hellenic Research Foundation (Project “At.H.O.S: Atheism, Hellenic Orthodoxy, and Science, 1936–1974”) and is pursuing a Master’s degree in “Orthodox Christian Theology and Religious Pluralism” at the Hellenic Open University.

During the Covid-19 pandemic, the Greek government took measures to control the spread of the virus. On 23 March 2020, they announced a nationwide lockdown, which lasted until 4 May 2020 (then repeated in November for three weeks). During the lockdown, the performance of any religious activities and rites in places of worship was temporarily prohibited. All religious institutions had to suspend their regular activities and gatherings to comply with health and safety measures. To support the government's efforts to contain the pandemic, the Orthodox Church of Greece¹ adhered to these restrictions and ceased conducting divine services.

The restrictions imposed by the Coronavirus pandemic impacted religious practices. The use of online platforms for conveying religious content soared, and social networks became instrumental in broadcasting divine services. For instance, the Cathedral in Athens utilised YouTube and several parishes used Facebook to livestream their services. This shift to online broadcasting allowed believers to experience church life in a different way, though online activity was not entirely novel. The interest in utilising modern technology within the Church of Greece had seen significant growth and development, particularly over the last two decades. This period had witnessed a sustained effort, especially by the younger metropolitans and priests who were more technologically savvy, to utilise digital platforms to connect with their congregations. Various religious entities, such as parishes, monasteries, ecclesiastical organisations, religious educational institutions, religious bookstores, periodicals, and newspapers had promptly acknowledged the importance of digital media in engaging a wider audience.²

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- 1 Orthodox Christianity has historically been the dominant religion in Greece. The Greek Constitution recognises it as the “prevailing religion” of the country. The Church of Greece is autocephalous (self-ruled). The primate of the Church of Greece is the Archbishop of Athens and All Greece. On another note, unless otherwise stated, all translations from Greek are my own.
 - 2 For example, the International Association of Digital Media and Orthodox Pastoral Care (<https://dmopc.org/>) organised two international conferences on Digital Media and Orthodox Pastoral Care. These were held in Athens (2015) and in Kolymbari, Hania (2018) under the auspices of the Ecumenical Patriarch Bartholomew. The conferences addressed the challenges posed by the internet

The pandemic accelerated the integration of digital media as a means of communication by a range of Greek Orthodox organisations, reinforcing the existing trend of utilising technology to support religious activities and outreach. At the same time, it brought to light older pastoral and ecclesiological concerns in regard to the use of communication technology for the purposes of worship and dissemination of the Gospel message, but with a significant difference. Thus, during the pandemic, the concerns about whether digital broadcasting of the Divine Liturgy could adequately replace the experience of attending the service in person became more immediate. The main focus for concern was the suspension of the service of Holy Communion, central to the Orthodox ethos, which was an unprecedented situation.

In the following, I consider the way various Greek Orthodox circles³ perceive communication technology and its relationship with

and explored both the benefits and the dangers of using digital media in the mission of the Orthodox Church.

- 3 By “Greek Orthodox circles” I mean entities such as the official Church of Greece, with its hierarchy, clergy, monastics, academic theologians, and laity, as well as members of “para-” or “extra-ecclesiastical” organisations. The latter emerged in Greece in the late nineteenth century, being at their peak from the 1940s to the 1960s. These organisations resemble the pietistic movements of the Protestant tradition. For them, the Bible has an objective, absolute authority; what matters above all are individual faith and moral purity. Their publications focus on apologetics, promoting the cultural value of religion. Overall, they cultivate a simplistic and popularising version of Orthodox Christian theology. These organisations maintain close association with likeminded clergy, and sometimes direct communication with the officialdom of the Orthodox Church of Greece. For the para-ecclesiastical organisations in Greece, see Apostolos Alexandridis, “Ενα φαινόμενο της νεοελληνικής θρησκευτικής ζωής: Οι χριστιανικές οργανώσεις” (A phenomenon of Neo-Hellenic religious life: Christian organisations), *Synoro* 39 (September–November 1966): 163–246; Vasileios Gioultsis, “Κοινωνιολογική θεώρησης των θρησκευτικών αδελφοτήτων” (A social view of religious brotherhoods), in *Θέματα Κοινωνιολογίας της Ορθοδοξίας* (Issues in Orthodox sociology), ed. George Mantzaridis (Thessaloniki: Pournaras, 1975), 169–203; Alexander Gousidis, *Οι χριστιανικές οργανώσεις—Η περίπτωση της Αδελφότητας Θεολόγων ‘Η Ζωή’: Κοινωνιολογική προσέγγιση* (Christian organisations—the case of the “Zōē” Brotherhood of theologians: A sociological approach) (Thessaloniki: Pournaras, 1993); Polykarpos Karamouzis, “Κράτος, Εκκλησία και Εθνική ιδεολογία στην νεώτερη Ελλάδα: Κλήρος, Θεολόγοι και θρησκευτικές οργανώσεις στο μεσοπόλεμο” (State, church, and national ideology in modern Greece: Clergy, theologians, and religious organisations between the [world] wars), PhD diss. (Panteion University of Social and Political Sciences, 2004), 301–350;

the Orthodox ethos. To that end, I examine the stances of a range of organisations, made public in representative Greek Orthodox periodicals and websites. To gain a comprehensive understanding of their attitude towards communication technology, I explore the evolution of their perception of technology since the 1950s, focusing on responses to previous advances in communication technology, such as radio and television, and their use for liturgical purposes. By examining these antecedents in recent history, I hope to uncover valuable insights into how certain pastoral and ecclesial concerns over worship, the dissemination of the Gospel message, and the nature of the church shaped the perception of communication technology as an expression of modernity's impact upon Christian life *within* these organisations.

As we shall discover soon, evidence shows that, for some entities, the current negative stance on communication technology does not differ from previous attitudes to using radio and television for liturgical purposes. In particular, the brotherhoods of both clergy and laypeople tend to emphasise, as in the past, a pietistic and moral viewpoint when it comes to the Orthodox assessment of communication technology. Usually, these groups consider communication technology as of one piece with Western secularism and dismiss its usefulness. No wonder many voices from within these groups urge the official church leadership and the clergy to use communication media in moderation even for the purposes of promoting the Christian faith, and to educate the congregations in working towards a safe integration of communication technology in their religious activities. Very often, these groups highlight the harmful social and psychological consequences of internet use. They also contest the appropriateness of broadcasting the liturgy, their concerns revolving around the apophatic dimension of worship.

Christos Yannaras, *Orthodoxy and the West*, trans. Peter Chamberas and Norman Russell (Brookline, MA: Holly Cross Orthodox Press, 2006), 217–250; Amaryllis Logotheti, “The Brotherhood of Theologians Zoe and Its Influence on Twentieth-Century Greece,” in *Orthodox Christian Renewal Movements in Eastern Europe*, ed. Aleksandra Djurić Milovanović and Radmila Radić (Cham: Palgrave Macmillan and Springer Nature, 2017), 285–302.

They have not, however, produced in-depth analyses of the impact of digitisation upon Orthodox worship. Even when their own use of communication technology intensified due to the pandemic, their primary motivation was to inform the congregations in simple language and to emphasise what aligns with Orthodox dogma. Notably, during the temporary suspension of the Eucharist for health and safety reasons, these groups did not focus on the use of communication technology for liturgical purposes, instead discussing the proper practice of Holy Communion and raising significant questions about the impact of pandemic-related restrictions on the Orthodox ethos. In what follows, I detail and substantiate my above claims. I begin by mapping the spread of perceptions regarding the online space and its use for liturgical and pastoral purposes during the pandemic.

Religion Online, Online Religion, and the Orthodox Liturgical Life

As mentioned earlier, the engagement with digital media has undergone significant development in Greek Orthodoxy over the last two decades. Although this progress demonstrates willingness to embrace and adapt to the new online environment, it is uncertain whether, or to what degree, this adaptation has affected the perception of the groups involved when it comes to communication technology and its relation to Orthodox Christianity.

According to Christopher Helland's distinction, there are two aspects about religion in the online realm: "religion online" and "online religion."⁴ The former refers to the circulation of religious

4 See Christopher Helland, "Online-Religion/Religion-Online and Virtual Communities," in *Religion on the Internet: Research Prospects and Promises*, ed. Jeffrey K. Hadden and Douglas E. Cowan, Religion and the Social Order 8 (Amsterdam, London, and New York: JAI Press, 2000), 205–224; Christopher Helland, "Online Religion as Lived Religion: Methodological Issues in the Study of Religious Participation on the Internet," *Online – Heidelberg Journal of Religions on the Internet* 1:1 (2005): 1–16, DOI: 10.11588/heidok.00005823. For the relationship of religion and digital media, see Jay Kinney, "Net Worth? Religion, Cyberspace, and the Future," *Futures* 27:7 (1995): 763–776, [https://doi.org/10.1016/0016-3287\(95\)80007-V](https://doi.org/10.1016/0016-3287(95)80007-V); Simone Heidbrink, "Exploring the Religious

information—such as theological articles and programs of activity—through websites and social media platforms, with the main goal of communicating with the relevant audiences. In the case of the website of the Church of Greece, it displays, for example, the church's hierarchical structure and institutional roles.⁵ This type of religious communication does not affect in-person participation in religious activities; instead, it complements existing religious practices like ceremonies and sermons offered in physical places of worship.

Within this context, websites and social media platforms are usually perceived by Greek Orthodox circles as valuable tools for pastoral care and information dissemination, as well as a new form of catechism that is better suited to engage with young people.⁶ In addition, the use of the new media is credited with raising the religious literacy of believers and their acquaintance with the Orthodox heritage.⁷ This approach aligns with the mission of the Communication and Educational Service of the Church of Greece, established in 1999 by the Holy Synod. This service is dedicated to advancing the Orthodox ecclesial tradition and Greek national identity, while also embracing the practice of contemporary pastoral care through a diverse range of communication channels.⁸ Digital media and the internet as mass

Frameworks of the Digital Realm: Offline–Online–Offline Transfers of Ritual Performance,” *Masaryk University Journal of Law and Technology* 1:2 (2007): 175–184.

5 See <https://www.ecclesia.gr/English/EnIndex.html> (accessed 15 September 2023).

6 Eva Halabi (Nun Sarah), “Η χρήση του διαδικτύου στην ποιμαντική πράξη της Εκκλησίας” (The use of the internet in the pastoral practice of the Church), PhD diss. (Aristotle University of Thessaloniki, 2012), 64–66; Anastasios G. Maras, “Η θεολογία της πληροφορικής και του διαδικτύου” (Theology of informatics and the internet), in *Επιστημονική Επιθεώρηση του Μεταπτυχιακού Προγράμματος “Σπουδές στην Ορθόδοξη Θεολογία”* (Scientific review of the postgraduate programme “Studies in Orthodox Theology”), vol. 6 (Patra: EAP, 2015), 359–379.

7 Elena Apostolidou, “Η χρήση των social media από την εκκλησία στην εποχή του Covid-19” (The church's use of social media in the age of Covid-19), *Makedonia* (15 April, 2021), available at <https://www.makthes.gr/h-khrisi-ton-social-media-apo-tin-ekklisia-stin-epokhi-toy-covid-19-377283> (accessed 1 October 2023).

8 <https://www.e-nomothesia.gr/kat-ekklesia-thriskia/kanonismoi-ieras-sunodou/kanonismos-ieras-sunodou-ekklesias-114-1999.html> (accessed 22 November 2023).

pastoral tools for the dissemination of the Gospel message are said to follow the example of Apostle Paul who, according to Sotirios Despotis, did not hesitate to employ the communication means of his time, such as epistles, to be in contact with various Christian communities.⁹ As Stavros Yangazoglou notices, the church always “adapted her course within history according to the local cultural conditions so that her living tradition can contribute to culture.”¹⁰

The usefulness of digital communication tools for pastoral needs became increasingly apparent during the Covid pandemic, as highlighted by Gabriel, Metropolitan of Nea Ionias, Philadelphia, Heraklion, and Chalcedon:

[The internet] serves as a powerful “weapon” at our disposal, which can be wielded either positively for our benefit or negatively, leading to problems. Throughout my life, I have consistently prioritised the former, a choice I believe should be embraced by every individual and institution. Since my initial call to minister to the Metropolis, I have sought to enhance communication with people. This interaction naturally occurs on a personal level through the church, divine liturgies, services, worship activities, and general contact with individuals of all ages. Additionally, whenever possible, I leverage new technologies such as social media. I view social media as a direct and genuine mode of communication, particularly given its potential to counteract any spreading of fake news related to Orthodox Christian life, a challenge that the pandemic has notably underscored. Consequently, in our local church, especially during this pandemic, I felt it imperative to place greater emphasis on utilising social media. Through our website and Facebook, we have initiated activ-

9 Sotirios Despotis, “Παύλος και ηθική του Διαδικτύου στον παγκοσμιοποιημένο κόσμο του 1ου μ.Χ. αι. και το μετανεωτερικό 21 αι. μ.Χ.” (Paul and internet ethics in the globalised world of the 1st century AD and the postmodern 21st century AD), 2nd International Conference on Digital Media and Orthodox Pastoralism, Orthodox Academy of Crete, 18–21 June 2018. See <https://www.pemptousia.gr/video/pavlos-ke-ithiki-tou-diadiktiou-ston-pagkosmiopiimeno-kosmo-tou-lou-m-ch-e-ke-to-metaneoteriko-21-e-m-ch/> (accessed 1 November 2023).

10 Stavros Yangazoglou, *Το μεταίχμιο της θεολογίας: Δοκίμια για τον διάλογο θεολογίας και πολιτισμού* (The edge of the theology: Essays on the dialogue between theology and culture) (Athens: Domos, 2018), 491.

ities with the sole purpose of supporting people, ensuring they feel the embrace and care of the church and remain resilient.¹¹

The positive appraisal of communication technology does not stop here. The internet and social media shared something of the vibrant nature of the Orthodox liturgical life when churches remained closed because of the pandemic. As Christos Tsironis explains:

The implementation of new technologies by the Orthodox Church serves two primary functions. First, these technologies serve as a bridge to lived experiences. Believers use them to maintain a connection to ritual activities which they may be unable to participate in physically, for the time being. This enables them to invest their emotional and social needs visually, preserving a sense of normality in their lives. Second, the adoption of new media holds the quality of “symbolic performativity” (συμβολική επιτελεστικότητα)¹² within a world dominated by images and data. Orthodox liturgical life is open and expressed in public space. The use of the internet and social media maintains this character even when churches remain closed due to a pandemic.¹³

In the same vein, according to the website of the International Association of Digital Media and Orthodox Pastoral Care, the digital world presents opportunities for reiterating the Pentecost experience. At Pentecost, the Christian faith was communicated via a plethora of languages called to celebrate the unity of Christians in the Holy Spirit. This experience is taken to provide the Orthodox Church with a pattern for communicating with users globally, and for discussing matters of faith with them.¹⁴

11 See Apostolidou, “Η χρήση των social media.” See further the website of the Metropolis: <https://www.nif.gr>.

12 By “symbolic performativity” (συμβολική επιτελεστικότητα), Tsironis refers to the ability of the new media (communication technologies) to contribute to enacting liturgical life and communication with the congregation.

13 See Apostolidou, “Η χρήση των social media.”

14 See https://dmopc.org/?page_id=700 (accessed 20 April 2023).

This optimistic attitude runs alongside the hesitancy of others. There are members of the hierarchy who stress the harmful psychological and social effects of the internet, which outmatch those of television:

The use of television, the “ancient” ancestor of the internet, has already led us, after so many decades, to the conclusion that it has alienated people from traditional, genuine communication of persons with each other ... The new reality of the internet is a continuation of the “reality” created by television, unfortunately having the same or worse effects on various social structures...¹⁵

No wonder warnings such as the following, by Simeon Venetsianos (Archimandrite, Director of the Youth Foundation of the Holy Archdiocese of Athens):

... our church advocates a path of discerning use. This involves avoiding the extremes of outright rejection and the tendency to demonise aspects of the digital landscape, on the one hand, and unrestrained enthusiastic acceptance, on the other hand. Instead, our approach underscores the importance of acknowledging the inherent dangers and temptations associated with excessive attachment to matters temporal and perishable.¹⁶

This stance is balanced, but a note of caution remains at the end of the passage. In fact, many voices have recently levelled criticisms at the internet and digital media as an unsafe space where reductionist views of Orthodox life and distorted representations of ecclesiastical rites are left unchecked. Digital platforms of unknown origin allegedly distract

15 Chrysostomos Nasios (Archdeacon of the Holy Metropolis of Trikki and Stagi), “Μια εκκλησιολογική προσέγγιση του Διαδικτύου” (An ecclesiological approach to the internet). See <https://www.romfea.gr/katigories/10-apopseis/273-mia-ekklisiologiki-proseggisi-tou-diadiktuou>, accessed 20 September 2023).

16 Simeon Venetsianos (Archimandrite), “Το Διαδίκτυο στην υπηρετική υποστολή της Εκκλησίας: Από τον ζήλο της ιεραποστολής μέχρι και την ευθύνη της ισορροπίας” (The internet in the church’s ministerial service: From missionary zeal to responsibility and balance). Available at <https://www.ecclesia.gr/greek/holysynod/committees/press/venetsianos.htm> (accessed 10 September 2023).

the believers from the true nature of church life, which revolves around the sacraments, prayer, and the practice of fellowship, while drawing attention to sensationalist thinking, miracles of saints, and opinions of elders. This undermines the personal pursuit of fellowship with God and people, it is further alleged. Critics also point out that this kind of outreach encourages self-promotion and fosters insensitivity to real issues, including suffering, while the users seek exciting information or indulge, for example, in speculations about dubious prophecies. For various reasons, not exclusively related to the above situation, concerns have been raised about the suitability of digital media for communication with believers. Rather, preference should be given to direct, personal communication. An encyclical of the Church of Greece (2015), issued an order to clarify the limits of using digital media by Orthodox Christian clergy and congregations, stating the following:

The attempt of online pastoral practice on the part of pastors, however well-meant, cannot replace the living, experiential relationship of the faithful with each other and with the pastor within the context of the parish as an active cell of ecclesial life.¹⁷

In the same vein, two Orthodox clergymen authored an article where they assert that the use of communication technology erodes the principle of mutual trust and “face-to-face” communication between the priest and the congregation, and that, moreover, it allows a bishop to exceed his ecclesiastical boundaries, influencing matters beyond his local jurisdiction in terms of teaching or conducting services.¹⁸

The resistance becomes more substantial when it comes to adopting what Helland refers to as “online religion.” This is evident

17 Orthodox Church of Greece, “Λειτουργία ιστοσελίδων ἐκ μέρους ἐκκλησιαστικῶν φορέων καὶ ἐκ μέρους κληρικῶν καὶ μοναχῶν” (The function of websites belonging to ecclesiastical institutions, clergy, and monks), available at https://www.ecclesia.gr/greek/holysynod/egyklloi.asp?id=1946&what_sub=egyklloi (accessed 13 October 2023).

18 Vasileios Kalliakmanis and Chrysostomos-Grigorios Tympas, “Orthodox Worship and Indoctrination in Digital Media: Ecclesiological Principles and Modern Reality,” *Theologia* 90:3 (2019): 77–99.

in the design of diocesan websites,¹⁹ which lack open and interactive areas that would allow users to engage in religious rituals and activities freely. Even during the restrictive health measures imposed by the Covid-19 pandemic, when the clergy and the congregations were left yearning for the church as a eucharistic community, the Church of Greece opted to confine religious practice only to online, non-interactive broadcasting of divine services and sermons. Online broadcasting, as an extension of the existing radio and television broadcasts of the Divine Liturgy, was considered a legitimate form of ecclesial “economy” (dispensation), meant to meet a unique and unprecedented challenge. This was in line with the aforementioned encyclical:

... under no circumstances should the operation of such websites give a false impression, even to those who visit them with sincere interest, that visiting such websites is a substitute for participation in liturgical life or that it is a kind of manifestation of faith. In the past, it has been observed that websites ... have been imitating piety, but verged on the ridiculous (e.g., online candle lighting on a website).²⁰

The comment quoted just above highlights the reasons the Church of Greece has never ventured into the realm of “online religion.” It has never explored practices such as virtual lighting of candles, virtual confession, or virtual Eucharist, primarily due to the belief that the level of interactivity required for virtual religious activities is inconsistent with the framework of the Orthodox tradition. It has been argued that if the Orthodox Church becomes captive to the conveniences of digital technology, it may risk diluting the essence of its identity, its Eucharistic and ascetic ethos. As we read elsewhere,

The digital age, characterised by a tendency towards dematerialisation, depersonalisation, and the devaluation of physical mediation

19 For example, see the following diocesan websites: <https://www.imchalkidos.gr/Site/wSite/Site.asp?Lang=1>; <https://imd.gr/>; <https://imverias.gr/>; <http://i-mpatron.gr/>; <https://www.imml.gr/#>.

20 Orthodox Church of Greece, Λειτουργία ιστοσελίδων.

and presence, represents a striking contrast to the incarnation of the Son and Word of God. The Orthodox Church and its understanding of human nature face a new widespread reality—digital religiosity—that appears to be moving in a direction that opposes the traditional values.²¹

Orthodox Christians perceive the sacrament of the Eucharist as the space where the gathered community unites with Christ through the Holy Spirit, being transformed into the Body of Christ and becoming integral to the “one, holy, catholic, and apostolic church.” Any attempt to separate the Holy Communion from the church is seen as an indicator of weak faith and of lack of understanding of Orthodoxy’s liturgical and sacramental traditions.²² Historically, for the Orthodox, the unity of

- 21 Alexandros Katsiaras, “The Orthodox Anthropology before a New ‘Normality’ (‘New Normal’) or a New ‘Religiosity,’” *Theologia* 92:1 (2021): 301–306, here 305.
- 22 Ioannis K. Angelopoulos, “Η Ορθοδοξία στο Διαδίκτυο” (Orthodoxy on the internet), *Aktines* 64:620 (April 2001): 131–132; Ioannis Tsoukalas, “Η διήθηση του προσώπου στις σύγχρονες κοινωνίες της πληροφορικής” (The condition of the person within the modern information theology society), in *Ιμάτια Φωτός Αρρήτου: Διεπιστημονική προσέγγιση του προσώπου* (The garments of ineffable light: Interdisciplinary approaches to the person), Philosophical and Theological Series 51, ed. Christos L. Siasos (Thessaloniki: Pournaras, 2002), 213–214; Philip Kariatlis, “Affirming *Koinonia* Ecclesiology: An Orthodox Perspective,” *Phronēma* 27:1 (2012): 51–66; Philip Kariatlis, “The Significance and Meaning of the Liturgy for Our Daily Lives,” *Voice of Orthodoxy* 36:4–6 (2014): 4–5 and 36:6–9 (2014): 20–21; Stavros Yangazoglou, “Εκκλησία και Διαδίκτυο” (The church and the internet), *Theologia* 87:2 (2016): 3–5, esp. 4; Vasileios Kalliakmanis, “Ορθόδοξη χριστιανική λατρεία και ψηφιακή τεχνολογία” (Orthodox Christian worship and digital technology), in the 2nd International Conference on Digital Media and Orthodox Christianity, Orthodox Academy of Crete, 18–21 June 2018, available at <http://www.dmpc18.com/el/program-2/> (accessed 16 September 2023); Thanasis Papathanasiou, “Θεία Λειτουργία: Η Εκκλησία στη νέα ψηφιακή εποχή” (Divine Liturgy: The church in the new digital era), *Municipality and State*, December 8, 2020, available at <https://dimoskaipoliteia.gr/2020/12/08/h-ekklisisti-ne-psifiaki-epoxi/> (accessed 20 September 2023); Nikolaos Papaioannou, “Η ψηφιακή αναμετάδοση της Θείας Λειτουργίας: Όροι και Προϋποθέσεις” (The digital transmission of the divine liturgy: terms and conditions), *Pemptousia*, September 19, 2022, available at <https://www.pemptousia.gr/2022/09/i-psifiaki-anametadosi-tis-thias-litourgias-ori-ke-proipothesis/> (accessed 22 September 2023); Panhellenic Union of Theologians (ΠΕΘ), “Δεν διαχωρίστηκε ποτέ ο εκκλησιασμός από τη Θεία Κοινωνία: Αναφορά στο περιστατικό της Θείας Κοινωνίας μαθητών στο Ηράκλειο” (Church worship has never been separated from holy communion: Report on the incident with the Holy Communion of students in Heraklion), *Dogma*, February 11, 2022, available at <https://>

“Christ’s body” is achieved within a temple: “the temple represents the mystagogical place and time of worship, and preserves the apophatic character of worship, something that the internet cannot replicate.”²³

Many clergy and theologians agree that while the internet and social media can help believers feel connected to the “Body of Christ,” this experience is seen as merely a sign, lacking substance. Nikolaos Papaioannou notes the following:

So, the possibility of online attendance gives comfort. It is somehow a breath of fresh air in the restricted atmosphere of the pandemic. The believer feels a restriction that until recently was probably felt only by the immobile and the bedridden. However, it is crucial to view online attendance not as a comprehensive replacement but as a pointer to real experiences. In other words, it does not serve as a substitute for the physical encounter; it is not its equivalent. Rather, it constitutes a reminder that these experiences are still pending.²⁴

Online liturgical life is perceived as being deprived of crucial components that are intrinsic to the Orthodox Christian ethos. These components include the language of communication, both verbal and non-verbal, and the language of symbols, such as lighting candles or venerating holy icons. These elements play a vital role in the Orthodox tradition, and their absence in the virtual setting is seen as compromising the authenticity and fullness of the religious experience. Most importantly, the Divine Liturgy is viewed as a deeply participatory event where believers actively and personally engage in the company of others. For Tsironis,

www.dogma.gr/ellada/peth-den-diachoristike-pote-o-ekklisiasmos-apo-ti-theia-koinonia-anafora-sto-peristatiko-tis-theias-koinonias-mathiton-sto-irakleio/132528/ (accessed 25 September 2023).

23 Kalliakmanis and Tympas, “Orthodox Worship,” 89. The term “mystagogical” signifies the symbolic nature of the church building, which constitutes an implicit form of initiation in the ecclesial life.

24 Nikolaos Papaioannou, “Online λειτουργική ζωή και πράξη” (Online liturgical life and practice), *Pemptousia*, March 14, 2022. Available at <https://www.pemptousia.gr/2022/03/online-litourgiki-zoi-ke-praxi-2/> (accessed 2 September 2023).

The Divine Liturgy *de facto* relies on presence, encounter, participation, and communication ... The evident risk [of digital transmission] lies in the potential reduction of sacred practices to the consumer-oriented norms of society due to excessive exposure to electronic media.²⁵

The Divine Liturgy is not to be treated as a mere spectacle or a product to be consumed passively. In the same vein, John Zizioulas, Metropolitan of Pergamos, points out,

I do not agree with the broadcasting of the Divine Liturgy on television or the internet ... I consider this an expression of irreverence. It is irreverent to sit and watch the Liturgy. The Divine Liturgy is not a spectacle. It is a gathering and a “supper,” and requires physical presence.²⁶

This point could explain the hesitation expressed in a statistical assessment among students of Social Theology and the Study of Religions at the National and Kapodistrian University of Athens during the first general pandemic lockdown. Specifically, most respondents expressed dissatisfaction with the televised and online broadcasting of worship services.²⁷

Thus, while online participation in the liturgy or watching the liturgy online may offer some consolation, it is believed to be an incomplete experience primarily due to the absence of Holy Communion. As a result, the idea of virtual Eucharist is firmly rejected by the Church of Greece. As shown below, the Eucharist, which is at the core

25 Apostolidou, “Η χρήση των social media.”

26 John Zizioulas, Metropolitan of Pergamos, “Η Εκκλησία χωρίς την Ευχαριστία δεν είναι πλέον Εκκλησία: Μια συνέντευξη” (The church without the Eucharist is not complete: An interview), in *Καιρός του ποιήσαι: Η Ορθοδοξία ενώπιον της πανδημίας του κορωνοϊού* (The time is to work: Orthodoxy in the face of the coronavirus pandemic), ed. Nikolaos Asproulis and Nathaniel Wood (Volos: Ekdotiki Dimitriadis, 2020), 19–28, here 20.

27 Sotirios Despotis and Vasileios Fanaras, “Ο ρόλος της πανδημίας κατά την εμφάνιση και διάδοση του Χριστιανισμού τον 2ο αι. μ.Χ. κι η επίδραση του COVID-19 στη θρησκευτικότητα του 21ου αι.” (The role of the pandemic in the emergence and spread of Christianity in the 2nd century AD and the impact of Covid-19 on 21st-century religiosity), *Theologia* 92:1 (2021): 179–216, esp. 205.

of the church's life for Orthodox Christians, has always been regarded as irreplaceable and inseparable from the church's sacramental tradition and life.

Greek Orthodox Perceptions of Technology: An Historical Overview

To understand the contemporary attitude of Greek Orthodox circles towards innovation in communication technology, it is important to explore the evolution of their relevant views in modern times. By analysing Greek Orthodox sources such as articles, books, and websites, one can discern how technology has been discussed, praised, criticised, and questioned against the backdrop of Orthodox beliefs and values.

From the late 1950s and the 1960s, as radio, cinema, and television became increasingly prominent in everyday life in Greece, and throughout the 1970s, a complex interplay of fear of the perceived negative effects of technology and the recognition of its potential to improve various aspects of human life became apparent. These contrasting views shaped the current divergent perceptions of various Greek Orthodox entities regarding the impact of technology on society and the individual believer.

From the outset, conservative groups approached technology with scepticism. They viewed technology with suspicion, considering it spiritually detrimental and a contributor to moral corruption. The gradual rise of modern technology made some of these groups believe that technological advances led to an overwhelming sense of isolation and estrangement among people, a profound sense of hopelessness and despair, and the transformation of humans into materialistic consumers, driven solely by their desires and wants. The prevailing sentiment of these groups was that modernity and technology posed a threat to the so-called “traditional Greek Orthodox way of life.”²⁸ In response,

28 The phrase “traditional Greek Orthodox way of life” entails the ethnotheological and cultural assumption that Greek Orthodoxy is the unique outcome of crossbreeding Hellenism and Christianity. For ethnophyletism and ethnotheology, see Pantelis Kalaitzidis, “Orthodox Theology Challenged

they felt compelled to denounce the entire Western tradition, of which technology was an integral part. This view stemmed from concerns that Western values, including technological progress, eroded the spiritual and the moral fabric of society, leading people away from the traditional Orthodox values.²⁹ In this context, it was emphasised that while the clergy may choose to modernise their pastoral methods by incorporating certain technological innovations, they must always be mindful not to compromise the essence of their pastoral work by indulging secular pursuits or by conforming to the prevailing spirit of the time.³⁰

Examples of caution towards such use of technology were noticeable. For instance, Savvas Aggouridis explored the relationship between Orthodox Christianity and technology in the 1960s. He argued that while Western Christianity often represented the Christian faith and scientific or technological advances as conflicting, Orthodoxy has historically maintained a more neutral position. However, as technological progress has outpaced intellectual progress, it has become evident that, while machines themselves might be neutral,

by Balkan and East European Ethnotheologies,” in *Politics, Society and Culture in Orthodox Theology in a Global Age*, ed. Hans-Peter Grosshans and Pantelis Kalaitzidis (Paderborn: Brill, 2022), 108–159, https://doi.org/10.30965/9783657793792_009.

- 29 H. M. Enisleidis, “Ραδιόφωνο και Πιστοί” (Radio and the believers), *Anaplasis* 3 (March 1953): 41–43; I. H. Konstadinidis, “Η θρησκευτική ζωή εις την σύγχρονον ελληνικήν κοινωνίαν” (Religious life in the modern Greek society), *Anaplasis* 14 (February 1954): 209–210; Spiros Moschonas, “Η Εκκλησία και το πρόβλημα της ψυχαγωγίας” (The church and the problem of entertainment), *Anaplasis* 61 (March 1958): 45–46; Germanos Polyzoidis, “Η Εκκλησία ενώπιον της σημερινής τεχνολογίας” (The church facing contemporary technology), *Anaplasis* 135 (May 1965): 4; Ioannis M. Konstantellis, “Το φάσμα της προόδου και η πραγματικότητα” (The spectrum of progress and reality), *Deltion Hē Hodou tou Kyriou* 3:22 (January 1969): 12–14; Eirinaios Galanakis (archimandrite), “Ο χριστιανός και η εποχή μας” (The Christian and our times), *Christos Kosmos* 96 (May 1969): 65–66, and 97 (June 1969): 81–83; Giannis Palaiologos, “Οι ηθικές αξίες στον αυριανό κόσμο” (Moral values in the world of tomorrow), *Deltion Hē Hodou tou Kyriou* 3:33 (December 1969): 186–188; Daniel G. Aerakis (archimandrite), “Ο ηθικός βίος των Χριστιανών της συγχρόνου εποχής” (The moral life of Christians in modern times), *Salpinx* 48 (August 1972): 212–214, here 213; anonymous, “Η λυτρωτική κοινωνία” (The redemptive society), *Koinōnia* 17:1 (January–February 1974): 4.
- 30 I. K., “Όροι εκσυγχρονισμού της ποιμαντικής μεθόδου” (Terms of modernisation of the pastoral method), *Ephēmeros* 25:2 (January 1976): 53–54.

their impact on people's soul can be negative, even as improvements in living standards occur.³¹ In the same vein, Alexandros, Metropolitan of Philippi, Neapolis, and Thasos, points out that “creators, who invent and discover, are not always able to control the outcomes of their intellect and skill. Consequently, creations produced by their abilities ... are not necessarily directed towards the good, causing unintended harm.”³² More serious warnings were issued. Thus, Spyros Kyriazopoulos presents technology as a substitute for religion and as something that empowers human beings to overcome their limitations.³³ He adds the following:

Technology does not appear in our time as the exclusive province of its makers; it is [inherent in] the attitude of human beings towards the world. Whereas once it was limited to specific areas of practical expression, today it defines behaviour and thought, aspirations and criteria, practice and theory ... The discourse on technology refers to human beings, not things—it is not a discourse on technological power; it is on the technical spirit [of our age].³⁴

According to him, the main concern of modern people is not about technological applications, but the “technical spirit,” the new ontological situation inaugurated by our modern technological civilisation. This situation boils down to humankind being eliminated by the achievements of technology it has developed.³⁵

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- 31 Savvas Agouridis, “Ο Χριστιανισμός και η τεχνική πρόοδος” (Christianity and technical progress), *Ekklēsia* 38:11 (15 May 1961): 182–184; 38:11 (1 June 1961): 200–201; 38:12 (15 June 1961): 221–222; 38:14 (15 July 1961): 266–268. *Ekklēsia* is the Official Bulletin of the Church of Greece.
- 32 Alexandros, Metropolitan of Philippi, Neapolis, and Thasos, “Σκέψεις τινές περί τηλεοράσεως” (Some thoughts on television), *To Phōs* 3:26 (February 1971): 17–18, here 17.
- 33 Spyros Kyriazopoulos, *The origins of the technical spirit* (Athens: self-publication, 1965), 16.
- 34 Kyriazopoulos, *The origins*, 15.
- 35 Dimitrios I. Bekridakis, “Homo Ex Machina: Η Θεολογία, η Επιστήμη και το πρόβλημα της Τεχνικής” (Homo Ex Machina: Theology, science, and the problem of technology), *Theologia* 91:1 (2020): 65–119, esp. 66–67.

Further, in 1974, Megas Farantos discussed the prominent role of technological culture. He emphasised that this culture is rooted in the innate human desire for power and dominion over the world. While acknowledging that it would be unwarranted to focus solely on the negative impact of technology, such as weapons, warfare, isolation, and pollution, he noted that, when misused, technology can have a potentially sinister aspect. Farantos spoke of the concept of “technical eschatology,” by which he suggested that the outcome of unrestrained technological advancement has detrimental consequences for society. While technology was initially meant for the service and benefit of humanity, it had been misused for the violation, slavery, and oppression of people.³⁶

Amid these concerns, other more optimistic viewpoints surfaced.³⁷ For instance, in the 1950s, an article published in the periodical *Ioannēs ho Baptistēs* highlights how the revolutionary device of the telephone brings people together, regardless of the physical distance that separates them. The anonymous author likens prayer to a spiritual telephone that enables direct communication with God.³⁸ The metaphor was picked up by another author.³⁹ In the 1960s, yet another author presented technology as what inspires people with optimism in regard to scientific progress.⁴⁰ In the same journal, someone else

36 Megas L. Farantos, “Πίστις και Τεχνικός Πολιτισμός” (Faith and the technological culture), *Koinōnia* 17:1 (July–August 1974): 234–248. *Koinōnia* is published by the Pan-Hellenic Union of Theologians.

37 George Kostadimas (trans.), “Η τεχνική πρόοδος και το παιδί” (The technical progress and the children), *Hellenochristianikē Agogē* 18:94 (May 1959): 141–145; Christos Kouris, “Η τεχνική πρόοδος και ο άνθρωπος” (The technical progress and humanity), *Aktines* 27:274 (July–September 1964): 263–265; anonymous, “Η τεχνική και η κοινωνική πρόοδος” (The technical and social progress), *Hellenochristianikē Agogē* 12:141 (October 1964): 196–198.

38 Anonymous, “Εικόνες και πραγματικότητες: Έχετε τηλέφωνον;” (Images and realities: Do you have a telephone?), *Ioannēs ho Baptistēs* 5:57 (November 1953): 7. *Ioannēs ho Baptistēs* was published by the Orthodox Christian Association “John the Baptist.”

39 George Galanakis, “Η Πίστις” (Faith), *Metamorphosis* 2:19–20 (July–August 1974): 21–22. *Metamorphosis* was published by the Christian Solidarity Fraternity.

40 A. Alexandridis, “Χριστιανισμός και Επιστήμη (γύρω από μερικές σκέψεις του Hans Urs v. Balthasar)” (Christianity and science: Some thoughts of Hans Urs v. Balthasar), *Aktines* 24:220 (April 1961): 140–5. *Aktines* is published by the

recognised the development of technology as inherent to the human psyche, pointing out that God created human beings with the innate desire and ability to build and create. Thus, the development of technology is a manifestation of God's diverse gifts to humanity, to explore and thrive on Earth.⁴¹ In the 1970s, furthermore, technological progress was praised for making possible the Moon landings. This achievement was taken to exemplify a well-organised and peaceful initiative to free humanity from the confines of our planet and to embark on a journey into outer space.⁴²

The Church of Greece was the first Orthodox Church to recognise the importance of technology and to feel the need to adapt to advances in communication technology in the 1960s. In the periodical *Ephēmeros*⁴³ of the Holy Synod of the Church of Greece, several articles were published, mostly authored by Georgios S. Ferousis, a journalist with a background in law and theology. Ferousis brought the views of the Church of Greece to public attention, fostering awareness and understanding of its stance on technology in general and especially on the significance of communication technology, then represented by radio and television. He discussed the potential benefits of technology for humankind, showing that technology leads to higher living standards, contributes to better working conditions, and increases educational opportunities, particularly for the lower social classes. He also argued that by embracing modern communication technologies, the church

(Hellenic) Christian Union of Scientists.

41 Kouris, "Η τεχνική πρόοδος," 263–265. Kouris' account is largely based on the book *Technique et conscience religieuse* (1961), by François R. Munsch and S. J. Russo.

42 A. F., "Η επιστήμη του διαστήματος" (The science of space), *Anapalmoi* 1:4 (1971): 62–64; A. F., "Ο άνθρωπος στην Σελήνη" (People on the Moon), *Anapalmoi* 1:6 (1971): 94–95; A. H. Fragos, "Διαστημικές έρευνες μετά την κατάκτηση της Σελήνης" (Space explorations after the conquest of the Moon), *Anapalmoi* 3:30 (1973): 132–135. *Anapalmoi* was published by the Christian Youth Club of Panagia Chrysokastriotissas' church in Athens.

43 *Ephēmeros* (The parish priest) was first published in 1952 as an appendix to the official bulletin *Ekklēsia*. The primary purpose of this periodical was to guide and to support the clergy in their pastoral work, keeping them informed and connected to the central teachings of the church.

aims to address a broader audience and to share its message of faith, hope, and love with the wider society.⁴⁴

Throughout the 1980s and 1990s, the “Neo-Orthodox movement,” representing a blend of Orthodox theology, traditionalism, and left-wing politics, persisted in its criticism of the secular Western world and highlighted the negative implications of technological development.⁴⁵ Moderate theological voices also expressed concerns about the way modern technology, particularly informatics and cybernetics, directly impacted the understanding of human nature and the self-awareness of individuals as beings capable of free moral choices and spiritual pursuits. For them, the issue was not solely technology but rather the way human beings responded to the challenges posed by progress. They observed that, as everyday life and moral choices became increasingly complex due to the influence of technology, humanity faced a significant test. They contemplated the implications of living in a world where the boundaries between the physical and virtual realms were blurring, leading to questions about the authenticity of human experiences and ethical decision-making in this new technologically-infused landscape.⁴⁶

During Christodoulos’ tenure as Archbishop of Athens and All Greece from 1998 to 2008, there was a notable emphasis on fostering dialogue between science and religion. The church’s acknowledgment

44 Dimitrios S. Ferousis, “Νέα μέσα ποιμαντικής” (New pastoral means), *Ephēmeros* 15:9 (May 1966): 372–374; Dimitrios S. Ferousis, “Οι κλειστές πόρτες!” (Closed doors!), *Ephēmeros* 15:10 (May 1966): 424–425; Dimitrios S. Ferousis, “Επικοινωνία ιδεών, η αμεσότητα του ραδιοφώνου” (Communication of ideas: The directness of radio transmissions), *Ephēmeros* 15:11 (June 1966): 477–478; Dimitrios S. Ferousis, “Ραδιόφωνο και Ορθοδοξία: ιστορία και δεοντολογία” (Radio and Orthodoxy: History and ethics), *Ephēmeros* 15:15–16 (August 1966): 417–422.

45 The ethos of this movement was shaped by the writings of Ioannis Romanidis (1927–2001) and Christos Yannaras (born 1935) on the origins of modern secularism, the continuity of the Greek nation, and the idea of a sharp division between “Western Christianity” and “Eastern Christianity.” See, for instance, Vasileios Makrides, “Byzantium in Contemporary Greece: The Neo-Orthodox Current of Ideas,” in *Byzantium and the Modern Greek Identity*, ed. David Ricks and Paul Magdalino (Aldershot: Ashgate, 1998), 75–90.

46 Tsoukalas, “Η διήθηση του προσώπου,” 214; Dimos Theos, “Μέσα μαζικής ενημέρωσης και ατομική ευθύνη” (Mass media and individual responsibility), *Synaxē* 50 (April–June 1994): 27–31.

of the importance of this dialogue became evident when the archbishop established the Special Synodical Committee for Bioethics in 1998. The committee was dedicated to addressing theological and ethical considerations arising from advances in science and technology.⁴⁷ The Church leadership encouraged this dialogue further with various conferences and symposia aimed at exploring the relationship between scientific progress and the Orthodox Christian faith. One such notable event took place in 2000 when the Holy Synod, in collaboration with the National (Hellenic) Centre for Scientific Research “Demokritos,” organised an international scientific conference. The primary objective of this conference was to showcase significant scientific and technological achievements, and to engage in discussions about their implications for Orthodox Christian faith and practice.⁴⁸

During that period many priests and theologians held a conciliatory approach towards technology. But the advent of the internet and its integration into everyday life posed new practical challenges for the clergy. To connect with the younger generation and foster their interest in Orthodox Christianity, the Church of Greece had to be attentive and to adapt its pastoral ministry to this new reality. However, the objective was to achieve this adjustment without abandoning tradition. Technology was still viewed as ambiguous, as it could be put to good use and also misused. Technological progress was seen as having introduced new societal challenges, possibly obstructing the path to deification, which entails spiritual transformation and union with God. Accordingly, Christians were encouraged to adopt an ascetic approach to technological means and to be discerning in their usage. That said, the Church of Greece was interested in staying up to date with scientific discoveries and technological innovations, encouraging

47 See Sandy Sakorrafou, “Science, Religion and Bioethical Issues in Greek Orthodox Journals (1998 to the present),” in *Orthodox Christianity and Modern Science: Past, Present and Future*, ed. Kostas Tampakis and Haralambos Ventis (Turnhout: Brepols, 2022), 63–82.

48 See vol. Διεθνές επιστημονικό συνέδριο “Επιστήμες, τεχνολογίες αιχμή και Ορθοδοξία,” 4–8 Οκτωβρίου 2000 (International scientific conference “Sciences, Cutting-Edge Technologies, and Orthodoxy,” 4–8 October 2000) (Athens: Holy Synod of the Church of Greece, 2002).

familiarisation with them—just as it had done in the past, throughout Late Antiquity, when it incorporated Greek philosophical concepts and methods into Christian theology. Against this backdrop, the church was considering the scientific and technical advances positively.⁴⁹

Such discussion about the intersection of scientific and technological achievements with the Orthodox Christian faith are ongoing within various Greek Orthodox circles. The debate places the “modernist” and the “neo-traditional” approaches in opposition.⁵⁰ The “modernists” delve into the relationship between science and religion, seeking to find “harmony,” “complementarity,” and a plausible “synthesis”⁵¹ between the two territories. What makes necessary this relationship is the legitimate desire to deepen our understanding of the nature of beings and their relationship with God. “Modernists” believe that scientific discoveries and progress can be integrated into the framework of the Orthodox faith. For them, pastoral work must adapt to new realities, including the online environment. The canonical expression of these convictions is the formal statement on the social doctrine of the Orthodox Church written by a special commission of Orthodox scholars (among them Theodoros Yiangou, Professor of Canon Law, from Greece), appointed by Ecumenical Patriarch Bartholomew, and published in 2020. There we read that the church should not “fail to take advantage of the resources of the sciences for her own pastoral ministry, as well as the technological advances of the internet and social media for her pastoral mission.”⁵² The theological justification

49 See “Χαιρετισμός-Ευλογία του Μακ. Αρχιεπισκόπου Αθηνών και πάσης Ελλάδος κ.κ. Χριστόδουλου” (Greeting-Blessing of His Beatitude Archbishop Christodoulos of Athens and All Greece), in *Διεθνές επιστημονικό συνέδριο*, 17–21. See also Anastasios (Archbishop of Tirana and All Albania), “Η Ορθοδοξία προ της ραγδαίας εξελίξεως των θετικών επιστημών” (Orthodoxy in the face of the rapid development of the sciences), in *Διεθνές επιστημονικό συνέδριο*, 33–43.

50 For more on the distinction between the “modernist” and “neo-traditionalist” movements in Greek Orthodox theology, see Paul Ladouceur, *Modern Orthodox Theology: Behold, I Make All Things New (Rev 21:5)* (London and New York: T&T Clark, 2019), 123–156.

51 For the “synthesis” of theology and science, see Sandy Sakorrafou, “Science and Orthodox Christianity: Perceptions of Their Relationship in Greek Christian Journals (1980–2010),” *The Journal of Religion* 100:2 (2020): 232–267.

52 *For the life of the world: Toward a Social Ethos of the Orthodox Church*, available at

for the use of technology is traditionally sought in the work of Greek Church Fathers. They talk about *technē* either as a cure for the defects of nature and an aid for the human need to survive and to use nature (Basil the Great) or a gift of the divine providence endowed with pedagogical meaning, since the salvation of our technological world is possible in Christ (Maximus the Confessor).⁵³

Nevertheless, concerns persist regarding the adverse aspects of technology. It is noteworthy that in 2018, Bartholomew, the Ecumenical Patriarch, drew attention to the negative dimensions accompanying technological advances:

Today, technology is not simply a use of scientific knowledge, but rather it has become the focus of human existence—the perspective in which all the aspects of civilization receive meaning ... In our lives today, we experience the uncontrollable dominance of machines ... “information” is glorified and thus acquires a metaphysical status. The computer leads us to evaluate everything as “data,” as something to be processed, hence, making fast and measurable effectiveness the chief aim of human thought and action. The almighty means of electronic communication do not simply transmit information; they shape our views regarding life and its meaning, they steer our desires and needs, and they influence the ranking of our values. Consequently, age-old traditions are weakened, symbols erode and progress itself ends up being identified with technological progress.⁵⁴

Technological development is viewed in its negative impact, as it compromises the essence of the human person and challenges free-

<https://www.goarch.org/social-ethos> (accessed 18 August 2023).

53 See Halabi, “Η χρήση του διαδικτύου,” 50–51; Alexis Torrance, “Ουδέν καινόν υπό τον ήλιον: Αρχές μιας Ορθόδοξης προσέγγισης της τεχνολογίας και της καινοτομίας” (Nothing new under the sun: Principles of an Orthodox approach to technology and innovation), trans. Nikos Manolopoulos, *Synaxē* 147 (July–September 2018): 16–29.

54 Ecumenical Patriarch Bartholomew, “Dilemma of the Century: Technology vs. Politics. Beyond Dilemmas,” addressed during the 21st Eurasian Economic Summit, Istanbul. Available at <https://www.ecupatria.org/2018/04/16/ecumenical-patriarch-bartholomew-at-the-21st-eurasian-economic-summit/> (accessed 25 September 2023).

dom. This impact threatens what is upheld as the pinnacle of the Christian scale of values—the safeguarding of the human person from every conceivable threat.⁵⁵

The adherents of the “neo-traditional” current, however, harden this stance towards technology. Although they acknowledge the advantages brought by Western science and technology, they heavily criticise them. “Neo-traditionalists” consider the Orthodox tradition sacred, immutable, coherent, and consistent—a set of beliefs, precepts, and practices deeply rooted in the past golden age of Orthodoxy, namely, the Byzantine era.⁵⁶ Their reservations about technological advances draw upon a sense of urgency in preserving the sanctity of religious practices and the authenticity of the Orthodox doctrine.

These contradictory attitudes towards communication technology within Greek Orthodox circles are not impossible to harmonise. They boil down to the conclusion that, while technology is not in principle unfit for church life, a measured approach to utilising the potential of its benefits should be maintained. This conclusion arises from the fact that, while the practice of “religion online” is embraced to various degrees, “online religion” is judged to be inappropriate and inadequate. As I have pointed out already, this situation is not new. The same ambivalence is obvious in the earlier responses of these groups to technological advances such as radio and television for liturgical purposes. An overview of the earlier attitudes of these circles to communication technology puts their current views on technological innovation into proper perspective.

Blasts from the Past

The Case of Radio Broadcasts

In 1938, Chrysanthos, the then Archbishop of Athens and All Greece, marked the beginning of radio broadcasting in the country by an inaugural address. On that occasion, he emphasised the immense

55 Bartholomew, “Dilemma of the Century.”

56 See also Bekridakis, “Homo Ex Machina,” 93–109.

significance of the radio as an invention that, like other technological advances, would boost the progress and development of the nation. He also noted that while Greece experienced a delay in adopting this invention, radio was to play a pivotal role in educating and guiding the Greek people. He added his conviction that radio was not merely about entertainment; he envisioned its potential to become a powerful tool for transmitting knowledge and guidance for life, thus beneficial to the overall wellbeing of the people.⁵⁷

Radio broadcasting in Greece officially began in 1938 and it remained strictly state-owned until the late 1980s.⁵⁸ During the 1950s to 1970s, as church membership was growing, the Church of Greece sought to establish its own radio station, to facilitate communication and contact.⁵⁹ Initially, in 1959, the church was given only one weekly broadcast of the Divine Liturgy (that took place in different churches throughout the country) on the radio station of the Greek Armed Forces. Thirty years later, following the liberalisation of radio frequencies, a license was granted for the official broadcast of the church's radio station. This marked a significant milestone, as it allowed the church to reach a broader audience and have a more regular presence on the airwaves.

The challenges faced by the Church of Greece in its radio broadcasting endeavours are evident in a letter sent in 1952 to the periodical *Ephēmeros*, mentioned above. In this letter, a young priest expressed his concerns and complaints about the use of a radio transmitter inside the church. The intention, of course, was to facilitate the broadcast of the Divine Liturgy across the country. But the young priest raised

57 “Ο Μακ. Αρχιεπίσκοπος Αθηνών προς τον ελληνικό λαόν” (The Archbishop of Athens to the Greek nation), *Treis Hierarchai* 29:901 (June 1938): 81–82. The periodical *Treis Hierarchai* was published by the Religious Association “Three Hierarchs.”

58 For a history of Greek radio and television broadcasting, see George N. Carter, *Ελληνική Ραδιοφωνία Τηλεόραση: Ιστορία και Ιστορίες* (Hellenic Radio and Television: History and Stories) (Athens: Kastaniotis, 2004).

59 Georgios A. Kapsanis, “Τα σύγχρονα τεχνικά μέσα επικοινωνίας με τον λαό στην υπηρεσία της ποιμαντικής” (Modern technical means of communication with the people in the service of pastoral care), *Ephēmeros* 13:17–18 (September 1964): 767–771.

serious concerns about the unintended consequences of this development. He observed that as a result of broadcasting the church services via radio, the church's life is being transferred to less appropriate places, such as coffeeshops and taverns. And he further argued that fewer people would feel the need to attend the physical church services in person.⁶⁰ This comment was hardly new. As early as 1939, another periodical, the *Christianiko Phōs*, discussed similar concerns about radio transmissions. The author of the article pointed out the absence of reverence, devotion, evocativeness, and sanctifying grace in those broadcasts. He then proposed to discontinue the transmission of the Divine Liturgy, particularly on Sundays, and especially the part where the sacrament of the Eucharist is celebrated. In turn, he encouraged the transmission of significant religious celebrations so long as religious nostalgia and enthusiasm were evoked.⁶¹

In 1952, the editor's response to the young priest's complaint in *Ephēmeros*, representing the official position of the Church of Greece, is clear and unwavering: radio transmission of the liturgy is important for individuals who are unable to attend a church physically, such as the sick, travellers on Sunday mornings, and Greek expatriates living in areas without Orthodox churches. The use of radio for this purpose is justified, compassionate, and in line with Christian principles.

Following this response, the periodical received numerous letters expressing varying viewpoints.⁶² Certain priests considered radio broadcasting a useful means of evangelism, not only among believers but also among nonbelievers. They acknowledged the potential of using this new technology to spread the message of the church to a wider audience. But other priests believed that church attendance should be enforced through police assistance, for example by closing coffeeshops on Sunday mornings. These views highlighted the concern

60 See the editorial of Dimitrios Paraskevoopoulos, "Η Ραδιοφωνική Μετάδοση των Ιερών Ακολουθιών" (Radio broadcasting of holy services), *Ephēmeros* 1:3 (February 1952): 24.

61 Editorial, "Γεγονότα και Κρίσεις. Η εκπομπή των Ιερών Ακολουθιών" (Facts and Judgements: Broadcasting the holy services), *Christianiko Phōs* 1:4 (1939): 22.

62 Editorial, "Η Ραδιοφωνική Μετάδοση," 25–26.

that radio broadcasts may contribute to a decline in the physical attendance of churchgoers. The debate concluded with the periodical's editor standing firm on the benefits of radio technology for liturgical purposes, acknowledging that participation in the Divine Liturgy should be a matter of free will, and it is the responsibility of priests to encourage the congregation to attend the church while also explaining the inadequacy of individual prayer compared to communal worship.⁶³

The April editorial of the same year examined more deeply the last remark on the significance of attending holy services in person. It emphasised that nothing can fully replace the experience of being physically present in church during liturgical gatherings. To support this argument, the editorial proceeded with an analysis of what constitutes the essence of the church, the inadequacy of individual prayer, and what the believer gains from praying together with the rest of the congregation in church. Central to this argument is the understanding of the synodical character of the church, drawing from the wisdom of St John Chrysostom, who stressed that “the church is a system and a synod.” Here, “synod” refers to a gathering of people—in this case, believers—who come together under Christ and the guidance of the Holy Spirit. The ultimate purpose of this assembly is said to be twofold: first, to enable Christians to commune with God, and second, for God to approach them through various means, such as Scripture, the mysteries (sacraments), and his grace.⁶⁴

63 Editorial, “Η Ραδιοφωνική Μετάδοση της Θείας Λειτουργίας, Β'” (Radio broadcasting of the Divine Liturgy, part two), *Ephēmeros* 1:8–9 (April 1952): 41–43; editorial, “Δι'αυτό Χειροτονήθημεν” (That is why we were ordained), *Ephēmeros* 1:11 (June 1952): 105–107. The periodical *Orpēx* offers an alternative perspective on the decrease in the number of churchgoers, suggesting that the lack of attendance may be attributed to specific factors within the church itself. For example, skilled and talented chanters who would improve the quality of liturgical music, as well as educated priests who would deliver compelling and inspiring sermons, could potentially impact the overall experience and engagement of the congregation during worship services. See editorial, “Διατί οι ναοί δεν πληρούνται εκκλησιασμό;” (Why aren't the churches filled with churchgoers?), *Orpēx* 83–84 (June 1961): 260.

64 Editorial, “Ο Ναός και η Χριστιανική Κοινότητα” (The church and Christian fellowship), *Ephēmeros* 1:10 (May 1952): 57–59.

The following June editorial drew further upon Chrysostom's words, stating that in liturgical gatherings the entire church is present, with believers supporting and encouraging one another in the journey of prayer. The weak and the strong are united in this shared experience; through their collective prayers, they find strength and solace. Church assembly is described as a family and a community. The Divine Liturgy demonstrates the unity that exists among the believers in this *synaxis* (gathering). All the members of the congregation come together in one physical place, partaking of the Holy Communion, and experiencing a profound spiritual and moral solidarity. The editorial further noticed that the public character of worship arises from an inherent need to pray collectively, acknowledging that prayer together with others holds greater strength and significance than individual prayers.⁶⁵

By 1966, regular radio broadcasting of the holy services from the Metropolitan Cathedral in Athens was established. In the periodical *Ephēmeros* radio was once again acknowledged as a valued pastoral aid and another kind of pulpit, amounting to a significant catechetical tool that provides faith education to the listeners. Radio is a newfound opportunity that God provides for missionary purposes—a powerful medium that transcends geographical boundaries and underlines the ecumenical mission of the Orthodox Church that, as Ferousis points out, had, regrettably, been overlooked. In this context, the desire of the Church of Greece to own a radio station appeared as a necessity arising from the need to evolve and to adapt creatively to contemporary conditions. Traditional means, such as the church building, the pulpit, the bells, and Sunday school, had been essential in disseminating faith teaching, but the introduction of a radio station was in tune with the changing times and a way of reaching a broader audience more dynamically. Finally, radio was regarded as a means of counteracting isolation and neglect since isolated listeners could connect with the larger church community and feel a sense of belonging even from afar.

65 Editorial, “Ἡ Κοινὴ ἐν τῷ Ναῷ Προσευχή” (Collective prayer in the church), *Ephēmeros* 1:11 (May 1952): 73–75. See also Georgios Kapsanis (archimandrite), “Ἡ Εκκλησία ὡς θεανθρώπινη κοινωνία” (The church as a divine-human fellowship), *Koinōnia* 17:2 (March–April 1974): 90–101.

It could further contribute to the nurturing of faith among the audience, addressing spiritual doubts, and serving as an avenue for people to seek solace, guidance, and reassurance during times of uncertainty.⁶⁶

It comes as a surprise, in this light, that in the late 1960s and during the 1970s despite the church's undertaking to legitimise the use of the radio for liturgical purposes,⁶⁷ there were still voices among Greek Orthodox circles who considered these changes with reservation. What was questioned is not only the potential of the radio to convey divine grace,⁶⁸ but also its capacity to foster fellowship beyond giving a broader access to information. Radio was regarded as unable to convey the fullness of liturgical or pastoral communication, such as the emotions of the priest, the expressiveness of the liturgy, or the sacred atmosphere inside the church. There were also concerns over the nature of the audience, regarded as anonymous, passive, unreflective, and indifferent—the very opposite of what a church congregation should be. Radio listeners were seen as distant and disengaged, lacking the active participation and interpersonal connections experienced in a traditional church setting. This argument raised doubts about whether the radio audience could truly be identified with the “Body of Christ,” the community of believers. The “ecclesiology of the radio” appeared to have serious limitations, particularly in terms of sacramental participation. Allegedly listeners to the radio could not partake

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- 66 Dimitrios S. Ferousis, “Νέα Μέσα Ποιμαντικής” (New means of pastoral ministry), *Ephēmeros* 15:9 (May 1966): 372–374; Dimitrios S. Ferousis, “Επικοινωνία Ιδεών (Η αμεσότητα του ραδιοφώνου)” (The communication of ideas: The immediacy of the radio), *Ephēmeros* 15:11 (June 1966): 477–478; Dimitrios S. Ferousis, “Ραδιοφωνία και Ορθοδοξία” (Radio Broadcasting and Orthodoxy), *Ephēmeros* 15:15–16 (August 1966): 717–721; Dimitrios S. Ferousis, “Μια Νέα Ευθύνη Επικοινωνίας” (A new responsibility in communication), *Ephēmeros* 15:20 (October 1966): 908–912; editorial, “Το ραδιόφωνον και η θεία λειτουργία” (Radio and divine liturgy), *Ho Sōtēr* 9:357 (1968): 173–174, here 173.
- 67 Interestingly, lay people, members of various para-ecclesiastical organisations, shared this positive attitude towards radio and, later, television. See, e.g., Ioannis Kaltekis, *Πρωινά Ραδιοφωνικά Μηνύματα* (Morning radio messages) (Athens, 1971); Konstantinos Kourkoula, *Πνευματικοί Αντίλαλοι. Αι από τηλεοράσεως και ραδιοφώνων ομιλίες του εκπαιδευτικού συμβούλου Κ. Κούρκουλα* (Spiritual echoes: The televised and radio speeches of Mr. K. Kourkoulas, educational advisor) (Athens, 1972).
- 68 Editorial, “Το ραδιόφωνον και η θεία λειτουργία,” 174.

in the sacrament of the Eucharist, which entails a mystical communion with each other and God through Christ and the Holy Spirit.⁶⁹

The Case of Television Broadcasts

As a means of communication, compared to radio, television faced greater resistance among various Greek Orthodox groups, especially from the pietistic brotherhoods, which opposed it on moral grounds. For them, television had a greater potential for misuse than radio, given the power of imagery. Visual stimuli were believed to have a significant impact on human behaviour, and television, with its captivating images, was considered capable of shaping habits and influencing the audience more profoundly than the radio. As we read in one editorial, “the technical successes and advances of humankind are undoubtedly good, provided that they are always used in a good and beneficial way, not for causing material and spiritual harm and damage.” But television, we read further, hurts people’s mental health, amounting to “an insidious death” and “a school of crime.”⁷⁰ Similar criticisms were directed at the cinema.⁷¹

Televised broadcasts of the Divine Liturgy were taken to offer the illusion of being present in a physical church instead of eliciting active participation. It enticed the viewers to engage with religious content from the comfort of their homes, not to foster a true fellowship of believers. In addition, the same circles accused television of promoting secular Western values, such as consumerism, materialism, and individualism, undermining critical thinking and the Orthodox values.⁷²

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- 69 Spyros M. Kallias, “Ο κινηματογράφος, το ραδιόφωνον και η διαπαιδαγώγησις της νεολαίας” (Cinema, radio, and youth education), *Anaplasis* 190 (December 1970): 7, 12–13; Antonios K. Papantoniou, “Εκκλησία και Επικοινωνία” (Church and Communication), *Ephēmeros* 20:20 (May 1971): 351–355.
- 70 Editorial, “Ο απαραίτητος όρος” (The qualifying condition), *Ho Sôtēr* 9:386 (1968): 633.
- 71 Editorial, “Τηλεόραση” (Television), *Ho Sôtēr* 10:406 (1969): 217; 429 (1969): 584, 587–588.
- 72 Kostantinos Argyroftalmides, “Τηλεόρασις και Κινηματογράφος” (Television and cinema), *Pavlos, the Apostle of Greece* 5:52 (June–July 1973): 105–106.

Television broadcasting in Greece commenced in 1966, but it was not until 1968 that the two new government channels began proper operations, offering a mix of news and entertainment programs. The Church of Greece recognised the potential of television as a powerful tool for communication and evangelism, aligning with the church's continuous efforts to adapt and to reach out to a broader audience with the message of Christ. Television broadcasting was regarded as an extension of radio broadcasting. This may explain the absence of articles dedicated to television in the periodicals published by the Holy Synod. For the Church of Greece, television was yet another kind of technological pulpit that could aid in pastoral care and catechism, aiming to reach even more people and fulfil the church's missionary goals. Drawing inspiration from the words of the Apostle Paul in 1 Corinthians 9:22, "I have become all things to all people so that by all possible means I might save some,"⁷³ the church regarded the arrival of television—as they had with radio before—as an opportunity to enter the private sphere and to bring the message of Christ into every household. Television, it was hoped, had a greater capability than radio to transcend the physical boundaries of the church building and to connect with people in their own homes, making it a powerful tool for spreading the teaching of the church and for nurturing the faith of the viewers.⁷⁴

Nevertheless, despite the church's desire to have its own television channel, this long-standing request never materialised. During the 1980s, the Church of Greece restricted its television presence to broadcasting the Divine Liturgy on Sunday mornings and a few religious-themed shows through the public television broadcaster. These limitations were partly a result of strong objections from certain segments within the Greek Orthodox Church—certain members of the ecclesiastical hierarchy and the brotherhoods—who continued to view television as a significant threat to Orthodox Christianity. According to them, television was a medium that devalued and trivialised the impor-

73 Translation: New King James Version.

74 Kapsanis, "Τα σύγχρονα τεχνικά," 768.

tance of spiritual life, disregarding the Christian ethos, and emphasising instead Western materialistic needs and consumerism.⁷⁵

It is of note, however, that although most Greek Orthodox groups did not share such radical ideas, they did not view radio and television as morally neutral media.⁷⁶ Rather, they considered these technologies embodiments of secular values and ideologies. Therefore, it is no wonder that the church worked hard to affirm the importance of appropriating these technologies for pastoral needs, while seeking to infuse them with Christian moral values and significance. In the same vein, the church argued that leveraging these technological means of communication could help counteract their malevolent use for spreading harmful or immoral content.⁷⁷

Nevertheless, the perception of television as a demonic tool, antagonistic to genuine spiritual growth, persists to this day. This sentiment has endured despite the gradual development of regional ecclesiastical television stations. Noteworthy is the attitude of some contemporary Mount Athos monastics who emphasise the many harmful effects of television. Archimandrite Ephraim, Abbot of the Holy and Great Monastery of Vatopaidi, for instance, portrays television as a tool of dominance wielded by the powerful in the context of globalisation. In his words,

[Television] fosters the abolition of moral values, diverting individuals from their spiritual traditions and national ideals. The aim appears to be the depersonalisation of humanity, urging people to stop being persons ... Instead of presenting a spiritually enriching reality, contemporary television often showcases a vivid portrayal of sin. If it were to emphasise a living spiritual reality, television could potentially serve as a powerful tool for human spiritual development.

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- 75 Editorial, “Τηλεόραση, μια ψεύτικη θεότητα” (Television, a false deity), *Enoriakos Logos* 3:89 (October 1972): 3; editorial, “Απόψεις και Κρίσεις: Και πάλιν η τηλεόρασις...” (Views and judgments: And once more, television...), *Ho Sôtēr* 583, (February 1973): 88; anonymous, “Σοβαρός κίνδυνος (τηλεόραση)” (A serious danger: Television) *Ho Sôtēr* 631 (February 1974): 137.
- 76 Alexandros, “Σκέψεις τινές περί τηλεοράσεως.”
- 77 Georges S. Ferousis, “Μια Νέα Ευθύνη Επικοινωνίας” (A new responsibility in communication), *Ephēmeros* 15:20 (October 1966): 908–12.

Unfortunately, finding channels dedicated to such spiritual content is a challenge.⁷⁸

Closing Remarks

The relationship between Orthodoxy and communication technology has developed for some time, but the Covid-19 pandemic brought its inevitability to the forefront for many Greek Orthodox Christians. During the health crisis, various Greek Orthodox circles had to adapt to the circumstances by utilising technology to sustain their activities.

As was described above, these circles have historically displayed ambivalence towards technological advances. There has been hesitation and fear that communication technology may either alter the sacred rituals or distort the Orthodox Christian faith. Nevertheless, in the past, many within these circles have acknowledged the immense potential of radio and television as valuable tools that can be used for enlightenment and outreach—not only for believers but also for the religiously indifferent or unengaged. But there has always been a tendency towards limiting the use of technological progress, especially given its perceived threat to the core tenets of the Christian faith, and questions as to whether it enhances or diminishes the spiritual experience. Accordingly, in regard to digital communication technology, “religion online” has been almost generally embraced, while the shift towards “online religion” has been met with scepticism and resistance. The denial of virtual liturgical life should not be interpreted as digital illiteracy or a naïve perception of the digital space as an extension of radio and television. The reluctance of the respective groups stems from a belief that digital technology—like any technological device—is not the most satisfactory way to mediate the beliefs and practices of the Orthodox faith and life.

This suspicion is closely related to the way certain Greek Orthodox circles perceive their religious identity. As shown above, they firmly

78 Virgilios Vlaescu, *Διάλογοι περί τηλεόρασεως και πνευματικής ζωής με Αγιορείτες Πατέρες* (Dialogues on television and spiritual life with Athonite Fathers) (Thessaloniki: Orthodoxos Kypseli, 2011), 121–130.

believe in the collective character of their faith, viewing the church as the *synaxis* where believers come together in one physical space and where the Eucharist takes place, as described in 1 Corinthians 11:20 (συνερχομένων ... ἐπὶ τὸ αὐτό, “when you gather together”). From this perspective, the church is intrinsically connected to the Eucharist, and true communion and participation in the sacred rituals can only occur in the physical presence of believers gathered together. It is this strong emphasis on the collective and embodied nature of the Orthodox Christian ethos that has shaped hesitancy towards earlier technological advances, such as radio and television broadcasting in the service of the church, or later to embrace virtual liturgical experiences fully.⁷⁹

We have seen above that these contradictory stances on the function of technological means of communication are not irreconcilable. While the present analysis does not claim to have reached a compelling conclusion, it seems to me that the challenge lies in finding ways to integrate technology in a manner that complements, rather than supplants, the traditional communal, or relational, aspect of Orthodox worship. The future of the relationship between Greek Orthodoxy and technology will depend on how these concerns are addressed, and whether technological progress can align with the values and ecclesiological convictions of the Orthodox community.

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79 In some cases, this attitude has been nurtured by the relational ontology of the person promoted by John Zizioulas, which, supposedly, does not allow for remote participation in the liturgy as a way of constituting the church. This line of thought has never been explicitly explored in the context of the present discussion though. For the outlines of this line of theological thinking, see Douglas H. Knight (ed.), *The Theology of John Zizioulas: Personhood and the Church* (Hampshire: Ashgate, 2007); Miroslav Volf, *After our Likeness: The Church as the Image of the Trinity* (Grand Rapids, MI: Eerdmans, 1998); John D. Zizioulas, *Communion & Otherness* (Edinburg: T&T Clark, 2006); John D. Zizioulas, *Being as Communion: Studies in Personhood and the Church* (Crestwood, NY: St Vladimir's Seminary Press, 1997).

Enhancing Medicine? Should *Medicine* Be in the Business of Human Enhancement?

Andrew Sloane

Abstract: The application of biomedical technology to human enhancement raises important philosophical, theological, and ethical questions. This paper focuses on questions relating to the practice of medicine: in particular, whether medicine should be in the business of human enhancement. I briefly outline the landscape of human enhancement, or better, anthropotechnics, and articulate a theological framework for the justification of biomedical research. I outline a theology of medicine in which vulnerability is recognised to be a fundamental feature of human existence, and care of various kinds is medicine's primary response to it. In light of those theological perspectives, I seek to determine whether anthropotechnics and associated research is the proper concern of medicine. I close with some reflections on medicine, technology, and the commodification of the body in the late modern West.

Keywords: anthropotechnics; human enhancement; medicine; theology; vulnerability

Dr Andrew Sloane is Lecturer in Old Testament and Christian Thought at Morling College, Sydney, where he has taught since 2002. He teaches and researches in the areas of Old Testament, philosophy of religion, theology of medicine, bioethics, and integration of faith and work. Andrew qualified in medicine and practiced briefly as a doctor before training as a Baptist pastor. His latest book is *Vulnerability and Care: Christian Reflections on the Philosophy of Medicine* (T&T Clark, 2016). The author wishes to thank the CPOSAT reviewers, the participants in the Morling College's research seminar, and the ISCAST–NZCIS conversations for insightful comments that *enhanced* the final product.

At least since the work of Francis Bacon (1561–1626) in the seventeenth century, medical practitioners and researchers have sought to “relieve the human condition,” to use growing scientific knowledge and technical expertise to treat and prevent disease, and to ameliorate the effects of injury and disability.¹ We have become so familiar with these interventions—from eyeglasses to prosthetic limbs and cochlear implants—that they have become almost invisible. While there are many questions that can—and should—be raised about the philosophy of medicine implicit in those aims, it is clear that broadly speaking its focus has been on achieving therapeutic and reparative goals.

The advent of human enhancement signals a significant shift in the focus of research and the resultant technologies away from relieving the human condition towards enhancing it. While human enhancement may seem to be a more-or-less distant future prospect, medical involvement in human enhancement is already here. Cosmetic surgery is, so to speak the (sculpted) camel’s nose in the tent. For with some exceptions (say, post-mastectomy breast reconstruction), its aim is not to repair damage or restore function, but to “improve” aesthetics, enhancing the appearance of generally functional structures. Whether it is responding to what are seen as the depredations of age or is oriented to the attaining of a desired aesthetic ideal, it aims not so much at relieving the human condition as at transcending it. I will have some more to say about that shortly, but before I get there, let me spell out what I aim to do in this piece.

I have an interest in both transhumanist futures and the theology of medicine. In what follows, I seek to bring the two together and deal with a number of theological and ethical questions at their intersection. I will not (attempt to) be exhaustive; and there are many large and important prior questions I will not deal with—or if I do, only in passing and inasmuch as the particular questions I want to explore have bearing on them. The main question I will *not* address is whether human enhancement is theologically and morally permissible, or even

1 Gerald P. McKenny, *To Relieve the Human Condition: Bioethics, Technology, and the Body* (Albany: University of New York Press, 1997).

desirable, or whether it transgresses moral bounds and is incompatible with theological anthropology. Those questions have been discussed at length in the literature; my interests lie elsewhere.²

I will begin by presenting a brief map of the landscape of human enhancement noting the varied interests in physical, cognitive and moral enhancement, and radical life extension.³ The particular question I want to ask is: presuming a range of enhancement technologies are feasible and permissible, is human enhancement the business of medicine? I will note the role that a distinction between “treatment” (or “restoration”) and “enhancement” plays in this discussion, and briefly identify problems with it, before turning to my own proposal. I will suggest that before we can determine whether enhancement is or is not medicine’s business, we need to understand what medicine’s business *is*. And for Christians that requires a clear theological understanding of its nature and purpose. Having articulated a notion of medicine that sees caring for vulnerable people as central to its nature and purpose, I will argue that whatever the status of human enhancement as a theological and moral good or ill (or something in between, or a mixture of the two), it should not become medicine’s business. I will close with some reflections on the role that medicine ought to play in a properly functioning human community, and the pressures that tend to corrupt that practice.

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- 2 For a range of philosophical, theological, and ethical perspectives on various aspects of human enhancement, see Michael Burdett and Victoria Lorrimar, “Creatures Bound for Glory: Biotechnological Enhancement and Visions of Human Flourishing,” *Studies in Christian Ethics* 32:2 (2019), <https://doi.org/10.1177/0953946819827141>; Tracy J. Trothen and Calvin R. Mercer (eds), *Religion and Human Enhancement: Death, Values, and Morality* (London: Palgrave Macmillan, 2017); Michael Buttrey, Moira McQueen, and Tracy J. Trothen, “Faster, Higher, More Moral: Human Enhancement and Christianity,” *Religions* 13:4 (2022), <https://doi.org/10.3390/rel13040354>; Sylvie Allouche et al. (eds), *Inquiring into Human Enhancement: Interdisciplinary and International Perspectives* (London: Palgrave Macmillan, 2015); Andrew Pinsent and Sean Biggins, “Catholic Perspectives on Human Biotechnological Enhancement,” *Studies in Christian Ethics* 32:2 (2019), <https://doi.org/10.1177/0953946819826769>.
 - 3 While now technically outdated, President’s Council on Bioethics, *Beyond Therapy: Biotechnology and the Pursuit of Happiness. A Report of The President’s Council on Bioethics* (New York: Dana, 2003), gives a good map of the landscape of human enhancement.

The Landscape of Human Enhancement

Broadly speaking, proposals for human enhancement fall into four main categories (and combinations thereof): physical, cognitive, and moral enhancement, and radical life extension. Physical enhancement aims at improving human speed, endurance, strength, and so on, beyond statistical norms and using artificial means (i.e., beyond sports physiology). Proposed mechanisms include pharmaceuticals, endogenous or synthetic hormone supplements, physical prostheses and cybernetics (including perceptual), and surgery. Surgical enhancement is already in play—most obviously in the cosmetic surgery “industry.”⁴ Somatic and germline genetic and epigenetic modification have also been proposed as means of enhancing existing persons or future progeny.⁵

Cognitive enhancement aims at improving human concentration, memory, language, and skills acquisition beyond statistical norms and using artificial means (i.e., beyond educational psychology). Proposed means to these ends include pharmaceutical agents (existing or proposed), devices external to the person (including “deep-brain stimulation”), and those implanted, and cybernetics of various levels of complexity. As with physical enhancement, somatic and germline genetic and epigenetic modification have also been proposed as means of enhancing existing persons or future progeny. Similar mechanisms have been proposed for the sake of moral enhancement, which aims at enhancing or enforcing desirable traits and thought-patterns (virtues) and limiting or blocking undesirable traits and thought-patterns (vices).

These approaches to enhancement all aim to extend human capacities to control themselves or their external world: they are, so to speak, spatially and culturally oriented. The final category seeks to

4 See <https://www.spectator.com.au/2022/05/concerning-cosmetic-cowboys/> (accessed 10 March 2024).

5 Julian Savulescu and Guy Kahane, “The Moral Obligation to Create Children with the Best Chance of the Best Life,” *Bioethics* 23:5 (2009), <https://doi.org/10.1111/j.1467-8519.2008.00687.x>.

enhance or extend a person's relationship to time, by way of radical life-extension; to extend the human lifespan beyond statistical norms. This may utilise what De Grey calls "the 'boring wet approach' of periodic, reasonably comprehensive, preventative maintenance of the body,"⁶ or extend to more radical (and highly speculative) proposals for pharmaceuticals, or somatic and germline genetic and epigenetic modification, or even cybernetic embodiment and mind uploading.⁷ While there are significant differences between these categories, including in the motivation of their advocates and the goals they have in mind, for my purposes they can be treated together as a cluster of related projects. Furthermore, for reasons that will be discussed briefly below, I think the term *human enhancement* doesn't quite capture the fundamental nature of this cluster of research programs and proposed interventions, and so, following the suggestion of Jérôme Goffette, I will refer to them collectively as *anthropotechnics*.⁸

Navigating the Anthropotechnics Landscape: Responses and Issues

Responses

As is generally the case, responses both religious and secular range from enthusiastically embracing anthropotechnics as a responsible, even obligatory means of expanding our capacities to do good and prevent catastrophic harm, through to fervid rejections of it as an expres-

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- 6 Aubrey de Grey, "Foreword: Transhumanism, Radical Life Extension, and Theology," in *Religious Transhumanism and Its Critics*, ed. Arvin M. Gouw, Brian Patrick Green, and Ted Peters (Lanham: Lexington, 2022), xii–xv, esp. xiii. For a discussion of more radical options, see Ursula Deplazes, "Technological Enhancements of the Human Body: A Conceptual Framework," *Acta Philosophica* 20:1 (2011): 53–70.
 - 7 For a discussion of the latter, see Andrew Sloane, "Disposable Bodies, Disabled Minds, and Christian Hope," *Zygon* 58:2 (2023), <https://doi.org/10.1111/zygo.12847>.
 - 8 Jérôme Goffette, "Enhancement: Why We Should Distinguish Anthropotechnics from Medicine," in *Inquiring into Human Enhancement: Interdisciplinary and International Perspectives*, ed. Sylvie Allouche et al. (London: Palgrave Macmillan, 2015), Ch. 2.

sion of hubris that threatens to corrupt human nature and destroy the world.⁹ To put it more theologically, is anthropotechnics an instance

- 9 For a range of positive responses, see Nick Bostrom, “Human Genetic Enhancements: A Transhumanist Perspective,” *Journal of Value Inquiry* 37:4 (2003): 493–516; David DeGrazia, “Enhancement Technologies and Human Identity,” *Journal of Medicine & Philosophy* 30:3 (2005), <https://doi.org/10.1080/03605310590960166>; Will Jefferson et al., “Enhancement and Civic Virtue,” *Social Theory & Practice* 40:3 (2014), <https://doi.org/10.5840/soctheorpract201440330>; Guy Kahane, Jonathan Pugh, and Julian Savulescu, “Bioconservatism, Partiality, and the Human-Nature Objection to Enhancement,” *Monist* 99:4 (2016), <https://doi.org/10.1093/monist/onw013>; Karolina Kudlek, “Is Human Enhancement Intrinsically Bad?” *Medicine, Health Care, and Philosophy* 24:2 (2021), <https://doi.org/10.1007/s11019-021-10003-w>; Ingmar Persson and Julian Savulescu, “The Perils of Cognitive Enhancement and the Urgent Imperative to Enhance the Moral Character of Humanity,” *Journal of Applied Philosophy* 25:3 (2008), <https://doi.org/10.1111/j.1468-5930.2008.00410.x>; Ingmar Persson and Julian Savulescu, “Moral Transhumanism,” *Journal of Medicine & Philosophy* 35:6 (2010), <https://doi.org/10.1093/jmp/jhq052>; Ingmar Persson and Julian Savulescu, “Getting Moral Enhancement Right: The Desirability of Moral Bioenhancement,” *Bioethics* 27:3 (2013), <https://doi.org/10.1111/j.1467-8519.2011.01907.x>; Jon Rueda, Pablo García-Barranquero, and Francisco Lara, “Doctor, Please Make Me Freer: Capabilities Enhancement as a Goal of Medicine,” *Medicine, Health Care, and Philosophy* 24:3 (2021), <https://doi.org/10.1007/s11019-021-10016-5>; Julian Savulescu, “Rational Freedom and Six Mistakes of a Bioconservative,” *American Journal of Bioethics* 19:7 (2019), <https://doi.org/10.1080/15265161.2019.1626642>. For cautious or critical responses, see Alfred Archer, “Are We Obligated to Enhance for Moral Perfection?” *Journal of Medicine & Philosophy* 43:5 (2018), <https://doi.org/10.1093/jmp/jhy017>; Birgit Beck, “Conceptual and Practical Problems of Moral Enhancement,” *Bioethics* 29:4 (2015), <https://doi.org/10.1111/bioe.12090>; Paschal Corby, *The Hope and Despair of Human Bioenhancement: A Virtual Dialogue between the Oxford Transhumanists and Joseph Ratzinger* (Eugene, OR: Pickwick, 2019); Kimbell Kornu, “Transfiguration, not Transhumanism: Suffering as Human Enhancement,” *The Heythrop Journal* 63:5 (2022), <https://doi.org/10.1111/heyj.14129>; Joseph Lenow, “Evolution, Human Enhancement, and Human Nature: Four Challenges to Essentialism in Theological Anthropology,” *Journal of Religion & Society Supplement Series* 18 (2019): 205–31; Robert Sparrow, “A Not-So-New Eugenics: Harris and Savulescu on Human Enhancement,” *The Hastings Center Report* 41:1 (2011): 32–42; Norman K. Swazo, “‘Unnatural’ Thoughts? On Moral Enhancement of the Human Animal,” *Medicine, Health Care, and Philosophy* 20:3 (2017), <https://doi.org/10.1007/s11019-017-9758-1>; Ruud ter Meulen, “The Moral Ambiguity of Human Enhancement,” in *Inquiring into Human Enhancement: Interdisciplinary and International Perspectives*, ed. Sylvie Allouche et al. (London: Palgrave Macmillan, 2015), Ch. 4. McKenny helpfully addresses the broader issues of technology, society, and human moral desires and ends, for which see Gerald P. McKenny, “Technologies of Desire: Theology, Ethics, and the Enhancement of Human Traits,” *Theology Today* 59:1 (2002): 90–103.

of humans illegitimately playing God and wanting to become as god/s? Or is it an appropriate expression of humans imaging God and expressing human vice-regency in creation (including with respect to human creaturehood)?¹⁰

Issues

There are many underlying issues that shape how people respond to the prospect of anthropotechnics. While I do not have scope in this piece to explore them in their own right, some have bearing on the particular question I want to explore, and so I will outline them briefly.

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- 10 For a range of broadly positive theological responses to these questions, see Burdett and Lorrimar, “Creatures Bound for Glory”; Ron Cole-Turner, “Theosis and Human Enhancement,” *Theology & Science* 16:3 (2018), <https://doi.org/10.1080/14746700.2018.1488526>; Ronald Cole-Turner, “*Technē* and *Teleios*: A Christian Perspective on the Incarnation and Human Enhancement Technology,” *Christian Bioethics* 28:3 (2022), <https://doi.org/10.1093/cb/cbac010>; Micah Redding, “Why Christian Transhumanism?” in *Religious Transhumanism and Its Critics*, ed. Arvin M. Gouw, Brian Patrick Green, and Ted Peters (Lanham: Lexington, 2022), 113–128; Jeanine Thweatt-Bates, *Cyborg Selves: A Theological Anthropology of the Posthuman* (Farnham, UK: Ashgate, 2012). For a range of cautious, or negative responses, see Brandon Gallaher, “Godmanhood vs Mangodhood: An Eastern Orthodox Response to Transhumanism,” *Studies in Christian Ethics* 32:2 (2019): 200–215; Brandon Gallaher, “Technological Theosis? An Eastern Orthodox Critique of Religious Transhumanism,” in *Religious Transhumanism and Its Critics*, ed. Arvin M. Gouw, Brian Patrick Green, and Ted Peters (Lanham: Lexington, 2022), Ch. 10; D. Gareth Jones, “The Transhumanist Vision: Technological Bliss or Tragic Misadventure?” *Perspectives on Science and Christian Faith* 72 (2020): 95–108; Gerald P. McKenny, *Biotechnology, Human Nature, and Christian Ethics* (New York: Cambridge University Press, 2018); Gerald McKenny, “Human Nature and Biotechnological Enhancement: Some Theological Considerations,” *Studies in Christian Ethics* 32:2 (2019): 229–40; William Sweet, “Transhumanism and the Metaphysics of the Human Person,” *Science et Esprit* 67:3 (2015): 359–71; Brent Waters, “Flesh Made Data: The Posthuman Project in Light of the Incarnation,” in *Religion and Transhumanism: The Unknown Future of Human Enhancement*, ed. Calvin R. Mercer and Tracy J. Trothen (Santa Barbara: Praeger, 2015), 291–302; David C. Winyard, Sr., “Transhumanism: Christian Destiny or Distraction?” *Perspectives on Science and Christian Faith* 72 (2020): 67–81; Simeon Zahl, “Engineering Desire: Biotechnological Enhancement as Theological Problem,” *Studies in Christian Ethics* 32:2 (2019), <https://doi.org/10.1177/0953946819827138>; Philip G. Ziegler, “‘Those He also Glorified’: Some Reformed Perspectives on Human Nature and Destiny,” *Studies in Christian Ethics* 32:2 (2019), <https://doi.org/10.1177/0953946819826764>.

First, we need to recognise that anthropotechnics has two related but distinct aims: to improve human capacities; and to negate human vulnerability. Both of these are important for advocates and opponents of anthropotechnics. Second, there are important metaphysical questions entailed in anthropotechnics programs. Is there such a thing as “human nature”? If so, how fixed or malleable is it? In either case, would some anthropotechnic interventions result in an entity that is no longer (recognisably) human? Does that matter—is it inherently wrong to change (or corrupt?) human nature? Third, there are important social questions. Who would benefit from anthropotechnics? Would that result in a posthuman elite (H+) against which unenhanced humans (H-1.0) would be unable to compete? Is anthropotechnics an illegitimate use of limited resources, or would it lead to positive benefits for all humanity and the earth as a result of the greater cognitive and moral capacities of the human subjects of anthropotechnics?

There are also important questions relating to the (theological) justification of research—at least some of which are caught up in answers to the prior questions. This is a significant matter, which does not often get the attention it deserves, and which has fairly direct bearing on the question I am exploring: what heuristics ought to guide our research—and how do we justify that theologically and ethically? It seems to me that there is—and ought to be—a specifically Christian answer to that question. I would suggest (following Wolterstorff) that the furthering of God’s *shalom*-making purposes provides the overall justification for any research, including into anthropotechnics.¹¹

That fairly straightforwardly leads to the justification of *praxis*-oriented research—that is, research projects that aim at contributing to the wellbeing of people, communities, and the integrity of creation.

11 For a brief discussion of this in relation to medicine, see Andrew Sloane, *Vulnerability and Care: Christian Reflections on the Philosophy of Medicine* (London: Bloomsbury T&T Clark, 2016), 124–25, 31. For the underlying epistemology and theory of theorising, see Nicholas Wolterstorff, *Reason Within the Bounds of Religion*, 2nd ed. (Grand Rapids: Eerdmans, 1984), 111–46; Nicholas Wolterstorff, *Until Justice and Peace Embrace* (Grand Rapids: Eerdmans, 1983), 162–76; Andrew Sloane, *On Being a Christian in the Academy: Nicholas Wolterstorff and the Practice of Christian Scholarship* (Carlisle: Paternoster, 2003), 148–60, 200–202.

Of course, that requires that we have an underlying notion of *wellbeing* (the biblical motif of *shalom* provides that);¹² and it also entails recognition that not all projects achieve their aims. It is not their effectiveness that justifies them heuristically, but their orientation or goals.

Less obviously, but equally important, a heuristics of *shalom* also justifies pure research (or at least, a good deal of it)—and not just because it often produces more and more significant practical outcomes than *praxis*-oriented projects (such as the role that quantum mechanics plays in medical diagnosis by way of Magnetic Resonance Imaging). Whether or not it leads to such unexpected practical outcomes, understanding the world is fundamental to our human calling, to our imaging God.¹³ In part that is because that enables us to relate to others and our fellow creatures more effectively and creatively; but also because understanding the world is itself a good. Pure research, then, is itself a contribution to *shalom*—whether or not it leads to better medical imaging. Theological reflection on the heuristics of research into anthropotechnics will help us understand not only the possible value of that research, but also whether it ought to be included within the ambit of medical research. I will return to this matter later.

Finally, there are also important questions with regard to which sphere or spheres of human communal life do research into anthropotechnics, and the resulting anthropotechnologies belong? And that brings me to my primary question. Mine is a relatively (perhaps deceptively?) simple question: is “human enhancement” medicine’s business? Or rather, should it be? For as the President’s Council on Bioethics report noted twenty years ago:

Wherever they may be invented and manufactured, most new biotechnologies, including those serving goals beyond therapy,

- 12 Wolterstorff, *Until Justice and Peace Embrace*, 69–72. *Shalom* (often translated “peace”) is more than the absence of conflict: it is a state of flourishing in which people are in right relationship with God, each other and the world, living lives of love, fidelity, justice, and delight.
- 13 The naming of the animals in Gen 2:19–20, for instance, is an act of discernment which enables the human to understand where these creatures do (and do not) fit into the creation order.

will probably enter ordinary use through the offices of the medical profession. Should this occur, the pursuit of happiness and self-perfection would become part of the doctor's business, joining many other aspects of human life that formerly had little to do with doctors and hospitals.¹⁴

They go on to note that the resulting medicalisation of enhancement runs the risk of patients being transformed into consumers, and medicine being “transformed from a profession into a trade.”¹⁵ Their solution is to turn away from the philosophy of medicine to a broader consideration of the nature of humanity and the goods of human flourishing—an appropriate move to make in considering whether anthropotechnics is morally desirable. But my interest is, once again, narrower than that: should anthropotechnics be medicine's business? And so, we turn to what I see as the two prior questions we need to ask in order to determine our answer to *that* question: what is medicine? and what is it for?

The Nature and Goals of Medicine

Questions of that kind are best explored by way of a detailed outline and justification of a particular *theology* of medicine which seeks to make sense of medicine as a social practice and present a normative account of it in light of a Christian understanding of human personal and social existence. Such a theological account raises both conceptual and practical problems associated with notions of healing or promoting health and/or the alleviation of suffering, meaning that while they are clearly relevant to the practice of medicine, they do not define its nature and goal. I have sought to articulate and defend such a theology of medicine elsewhere, so let me here briefly summarise.¹⁶ God has

14 President's Council on Bioethics, *Beyond Therapy*, 303.

15 President's Council on Bioethics, *Beyond Therapy*, 304.

16 Sloane, *Vulnerability and Care*. For an earlier (and considerably briefer) treatment, see Andrew Sloane, “Christianity and the Transformation of Medicine,” in *Christianity and the Disciplines: The Transformation of the University*, ed. Oliver D. Crisp et al. (London: T&T Clark, 2012), 85-99.

made humans as creatures in space and time, whose finitude and vulnerability are inherent in our creaturely existence (rather than being a consequence of the “fall”). However, both we and the world we live in are “not the way we’re supposed to be.”¹⁷ The persons whom God has created and continues to love experience the brokenness of the world as it now is through the effects of disease, injury, infirmity, and disability, experiences that call for a compassionate response to those in need. God’s desire for creation and creatures to know the flourishing for which they were created drives the story of redemption in which God’s people are called to express God’s character and enact God’s purposes.

This story climaxes in the incarnation, life, death, resurrection, and exalted rule of God the Son enfleshed, who embraced the vulnerability of the human condition, while also bringing healing and compassion to those who suffer. Christ’s resurrection is both a promise and sign of the final transformation of all things in which death will be defeated and suffering ended in the healing of creation. In light of this story, medicine exists to demonstrate the love of the Creator, model the work of Jesus, and witness to the final transformation of all things. But only in part. For Jesus’ actions were those of the Incarnate Son; ours are merely human works, however touched by the divine. Moreover, death has not yet been swallowed up in victory, and so whatever medicine achieves (and it can achieve a lot) is at most an anticipation, a pointer to and very partial expression of the end towards which the Spirit draws us.

Now, I should note two things. First, it may at first glance seem that the works of Jesus and the healing of creation make health and healing medicine’s goal. This, however, would be a mistake: the notions of health (and so healing) either claim too much (as in the notorious WHO definition) or become reductionistic; and too much of medicine falls outside the remit of healing (say, obstetrics or palliative care), and too much of what promotes health calls outside the remit of medicine (say, clean water and sanitation). Medicine’s goal is to

17 Cornelius Plantinga, *Not the Way It’s Supposed to Be: A Breviary of Sin* (Grand Rapids: Eerdmans, 1995).

provide care for “this frail flesh” and, where this is possible and as far as this is practicable, to remove impediments to human flourishing, restoring people to proper personal and relational functioning. It is a primary expression of a community’s commitment in solidarity to our vulnerable fellow humans, rather than abandoning them in their frailty. Medicine is, so to speak, a matter of health *care*, not *health* care: treatments, while important, are one aspect only of its task, and so determining whether something counts as a treatment or not is a secondary concern at best. Second, while what I have outlined is an explicitly theological account of medicine, many of its implications can be accepted by those of different faiths or none—although their rationale would, no doubt, differ at crucial points. Given the reality of God’s common grace that would come as no surprise. Our call as Christians is not to be *different* but to be *faithful*.¹⁸

The Treatment-Enhancement Distinction

If this account of medicine is sound, then one important suggestion as to how to determine the legitimacy or otherwise of anthropotechnics would not work: namely, to distinguish between “restoration and repair” and “enhancement” as the basis on which to make these judgments. This so-called “treatment-enhancement distinction” (hereon TED) has played a prominent role in discussions of anthropotechnics and social policy and its relationship to the practice of medicine.¹⁹

18 Nicholas Wolterstorff, “On Christian Learning,” in *Stained Glass: Worldviews and Social Sciences*, ed. Paul A. Marshall, Sander Griffioen, and Richard J. Mouw (Lanham, MD: University Press of America, 1989), 56–80, esp. 69.

19 See, for instance, President’s Council on Bioethics, *Beyond Therapy*, where the very title plays on the TED, but the report argues that we need to go beyond it. They state: “One needs to see the topic less in relation to medicine and its purposes, and more in relation to human beings and their purposes” (note at 13). That may be true in relation to the matter of whether anthropotechnics is good, bad, or indifferent; but it does not help us answer the question of whether it is medicine’s business, as opposed to that of biotechnology. For a range of other perspectives that engage with the TED (positively or negatively), see DeGrazia, “Enhancement Technologies and Human Identity,” esp. 262–64; Alexandre Erler, “The Limits of the Treatment-Enhancement Distinction as a Guide to Public Policy,” *Bioethics* 31:8 (2017), <https://doi.org/10.1111/bioe.12377>;

It presupposes a particular understanding of medicine (which is rarely explicitly articulated, let alone examined) which sees its job as healing disease, promoting health, and alleviating suffering.²⁰ This leads to a corresponding focus on treatment as restoration or repair, which in turn requires an understanding of the original “design plan” and then implementing treatments that restore it to its proper function rather than seeking to “improve upon it.” That notion of medicine is reflected in both defenders and opponents of the TED.²¹

Now, the TED has been the subject of sustained critique. On the one hand, disability theorists expose and criticise its ableist and normate biases.²² On the other, transhumanists argue that the existence of medical and other devices such as cochlear implants, “blade runner” prostheses, and so on, that inhabit the grey areas between therapy and enhancement blur the boundaries between them and so invalidate the TED.²³ These critiques raise important points and generate interesting counterarguments. For instance, fuzzy boundaries and grey areas do not invalidate distinctions made on paradigmatic rather than strictly criteriological grounds—after all, we can validly distinguish between dogs and wolves with reference to paradigm instances of each, despite there being no necessary and sufficient conditions on which we make

Andrew McGee, “Using the Therapy and Enhancement Distinction in Law and Policy,” *Bioethics* 34:1 (2020), <https://doi.org/10.1111/bioe.12662>.

- 20 This assumption is named in the President’s Council on Bioethics, *Beyond Therapy*, 16–17, but not carefully addressed. For proponents of this or similar notions of medicine in the enhancement debate, see Björn Hofmann, “Managing the Moral Expansion of Medicine,” *BMC Medical Ethics* 23 (2022), <https://doi.org/10.1186/s12910-022-00836-2>.
- 21 See, for instance, Erler, “Limits of the Treatment-Enhancement Distinction”; Laura Cabrera, *Rethinking Human Enhancement* (London: Palgrave Macmillan, 2015), Ch. 2: “The Biomedical Paradigm.” Restoration vs enhancement is fundamental to Wyatt’s approach, for which see John Wyatt, *Matters of Life & Death: Human Dilemmas in the Light of the Christian Faith* (Nottingham: IVP, 2009), 97–100, 265–75.
- 22 M. Eilers, K. Grüber, and C. Rehmann-Sutter (eds), *The Human Enhancement Debate and Disability: New Bodies for a Better Life* (London: Palgrave Macmillan, 2014); Sarah Chan, “Therapy, Enhancement and the Posthuman,” in *The Bloomsbury Handbook of Posthumanism*, ed. Mads Rosendahl Thomsen and Jacob Wamberg (London: Bloomsbury Academic, 2020), Ch. 16.
- 23 President’s Council on Bioethics, *Beyond Therapy*, 13–16.

such a distinction. Similarly, we might be able to distinguish between treatment and enhancement by way of identifying paradigm instances of each and forming judgements about how closely a given technology resembles those exemplars.²⁴ But I think we can leave those arguments to one side given that the TED does not quite get purchase on the question I want to address. I will argue shortly that using the TED in arguments against anthropotechnics loses its force if medicine has a different nature and task to that presupposed by it.

But before I move on to those matters, I would like to digress briefly to discuss an interesting approach to medicine and “human enhancement” that explicitly reflects on the nature and goals of medicine, even if it misunderstands them. Jérôme Goffette argues that we should sharply distinguish between medicine and what he calls anthropotechnics on the grounds of their different nature and goals.²⁵ He contends that enhancement research and (proposed) treatments are extramedical on the grounds that they do not deal with treating illness, which he sees as the goal of medicine. He labels human enhancement projects “anthropotechnics,” which he suggests is a new profession or discipline with its own normative goals and disciplinary practices that aims at improving and modifying the body and the self with the aim of greater mastery over the self and the world.²⁶

He argues that in contrast to medicine, which is structured around the poles of the pathological and the normal, anthropotechnics is structured around the poles of the normal and the improved. Drawing on earlier work he states:

24 For a helpful discussion of these matters, especially in relation to making valid distinctions along a spectrum of qualities, see Goffette, “Enhancement” (section “Beyond Therapy and The Pursuit of Perfection”).

25 Goffette, “Enhancement.”

26 Goffette, “Enhancement” (section “Field and denomination”). Søren Holm, “The Medicalization of the Posthuman Transformation Trajectory,” in *The Bloomsbury Handbook of Posthumanism*, ed. Mads Rosendahl Thomsen and Jacob Wamberg (London: Bloomsbury Academic, 2020), Ch. 18, argues to the contrary: not only will medicine evolve to include non-therapeutic benefits, but also research and procedures that contribute to posthuman goals are likely to be controlled by medicine and its normative judgements.

As a result, we have defined medicine as “the activity whose purpose is to know, to prevent, to cure the pathological” where the pathological is “the possible threat or the effective presence of an unexpected, inappropriate, disturbing and/or painful expression of the [organism’s normal] functions.”²⁷

Indeed, he states “medicine stands ideally for a pain- and disease-free life.”²⁸ He recognises that these definitions are vague, but sees them as implicit in medicine, a claim I will shortly contest. He does, however, point us in the right direction when he notes that in medicine “normal” is a “limit condition” that identifies how far we need to go, whereas “enhanced” is limitless.²⁹ Hence:

With respect to this definition, we wish to emphasise the fact that certain anthropotechnical actions do not even treat medical or existential suffering, but aim at satisfying desires, or fulfilling professional requests. Moreover, anthropotechnical acts may sometimes generate suffering and may carry a risk without any benefit from the medical point of view ... Anthropotechnics is sometimes the opposite of medicine.³⁰

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- 27 Goffette, “Enhancement” (section “Fundamental concepts”). Implicit in this statement is that these are (roughly) species-typical, or “normal” functions.
- 28 Goffette, “Enhancement” (section “The deontological problem”). This is deeply problematic, and contributes to the pathologisation of ordinary human experience and the illegitimate expansion of the medical gaze, which are major themes in the work of Stanley Hauerwas and others. See Sloane, *Vulnerability and Care*, 83–93; Stanley Hauerwas, *Suffering Presence: Theological Reflections on Medicine, the Mentally Handicapped, and the Church* (Edinburgh: T&T Clark, 1986); Stanley Hauerwas, *Naming the Silences: God, Medicine, and the Problem of Suffering* (Grand Rapids: Eerdmans, 1990); “The End of American Protestantism,” 2014, <http://www.abc.net.au/religion/articles/2013/07/02/3794561.htm> (accessed 15 April 2014); Jeffrey P. Bishop, *The Anticipatory Corpse: Medicine, Power and the Care of the Dying* (Notre Dame, IN: University of Notre Dame Press, 2011); Joel Shuman and Brian Volck, *Reclaiming the Body: Christians and the Faithful Use of Modern Medicine* (Grand Rapids: Brazos, 2006).
- 29 Goffette, “Enhancement” (section “Fundamental concepts”).
- 30 Goffette, “Enhancement” (section “Fundamental concepts”). He goes on to note that “anthropotechnics sometimes runs counter to the Hippocratic invocation ‘Primum non-nocere,’ or to the more general principles of non-maleficence and medical beneficence.” Goffette, “Enhancement” (section “The deontological problem”).

Moreover, he notes that phenomenologically a medical consultation differs significantly from an anthropotechnics consultation. Not only would the respective consultations have a different sequence of events, but the relationships entailed in them are fundamentally different: the patient becomes a client and the medical doctor is no longer a professional, but a technical service provider.³¹ Phenomenological accounts of the clinical encounter between doctor and patient are crucial to a proper philosophical and theological account of medicine,³² and so these disparities in patient/client experience indicate profound differences between these disparate practices. I should note that while he argues that we need “a sharp distinction between medicine and anthropotechnics,” this does not entail opposition to the latter as such, but aims at ensuring that we are clear about what these “concrete practices” are, and what ethical approaches should apply to them.³³

Even if he does so in creative ways, Goffette’s argument trades on the TED and the flawed notion of medicine entailed in it, and so would stand or fall in its current form along with that distinction. Nonetheless, the distinction he draws between medicine and anthropotechnics is a helpful one, and can be rearticulated in line with a more satisfactory account of medicine. Here is how I would put it. In a medical consultation a person presents as a patient (with a real or prospective vulnerability, a lack that interferes in actuality or prospect with their agency) to a doctor who is responsible to use their power and expertise in caring for them in that “health-oriented” need, with the goal of them experiencing solidarity with others in their need and, where possible, returning them to their life in society. In an anthropotechnics

31 Goffette, “Enhancement” (section “The sequence of consultation”).

32 Frederik Svenaeus, *The Hermeneutics of Medicine and the Phenomenology of Health: Steps Towards a Philosophy of Medical Practice* (Dordrecht: Kluwer, 2010); Sloane, *Vulnerability and Care*, 68–73.

33 Goffette, “Enhancement” (section “Conclusion”). And, I should note, while that is an important conceptual distinction, this relates to paradigm instances (or exemplars) of medicine and anthropotechnics respectively. As I will articulate it, this sharp conceptual distinction does not establish or require sharp lines of demarcation between these practices. For brief discussions of demarcation and approaches that depend upon that notion, see Sloane, *Vulnerability and Care*, 88–89, 94, 161.

consultation, a person would present as a client, with effective agency that they wish to enhance by specific technical means for freely chosen ends, to an anthropotechnician who is responsible to respond (or not) to that request with information and technical expertise that might enable that person to achieve their goals and expand their agency.

That, of course, presupposes a different philosophy of medicine to the one generally presupposed in these discussions.³⁴ So, let me come to the point. Theologically speaking, vulnerability is a fundamental (and theologically significant) feature of human existence; care is medicine's primary response to it.³⁵ Let me unpack that.

Human Vulnerability and Medical Care

We often speak of people suffering from illness, those with infirmity or disabilities, as vulnerable. True as that is, it masks an important truth: humans are inherently finite, limited, and vulnerable creatures. We are biological entities located in, and limited by, space and time. We are grounded in particular times and places (and cultures and languages) that enable and limit our capacities. We are also fragile beings, that can only survive and operate in a restricted range of environments. We are dependent beings: we require others for our survival and flourishing, even as we contribute to theirs. While this is most obvious when we are very young and very old, it is true at every stage in between. Our culture tends to blind us to that vulnerability, and so we may not recognise it—except when we are ill or incapacitated in some way. But illness, injury and disability do not make us vulnerable, they expose our inherent vulnerability and, perhaps, exacerbate aspects of it.

This understanding of human nature is deeply at odds with the way we like to see ourselves and the way our culture shapes us as “au-

34 This is, perhaps, most clearly evident in Rueda, García-Barranquero, and Lara, “Capabilities Enhancement,” 413–18. This situates my account of medicine squarely in the “humanistic” and “phenomenological” traditions, for which see James A. Marcum (ed.), *The Bloomsbury Companion to Contemporary Philosophy of Medicine* (London: Bloomsbury, 2016), esp. “Introduction.”

35 For a detailed articulation and defence of the ideas in the following paragraphs, see Sloane, *Vulnerability and Care*.

onomous agents of choice.” It is also, unfortunately, all-too-neglected in our theological traditions despite its importance in its own right and its contribution to a theology of medicine. Theology of medicine is also integrally related to a theology of community, of persons-in-relationship, for that vision of community provides important context for our understanding of medicine.

In the biblical vision, human beings are created by God in and for community. Human flourishing is flourishing in community and entails benefiting from and (where possible) contributing to the flourishing of that community. This means that societies have the responsibility to ensure that everyone has reasonable access to those goods and services they need in order to function as well as they reasonably can as persons and in relationship—these are what Wolterstorff calls “sustenance rights.”³⁶ These will vary from society to society, but in general will include access to decent housing, clean air/environment, safe drinking water (and the sanitation services that maintain them), safe and nourishing food, education that gives maturing members of the community the knowledge and skills they need to function well in it. I do not think that the Bible mandates particular social or economic systems to ensure that sustenance rights are provided, but it is pretty clear that such provision is mandated (see, for instance, Deut 10:12–22; Psalms 111, 112, 146). And I would suggest that in societies such as ours health care ought to be included in these sustenance rights—at least to a basic standard.

So, in this vision of human life-in-community, medicine is best understood as a social practice furthering particular social and personal goods, and plays an important role in the proper functioning of a well-ordered society. It is one crucial way that a community demonstrates its valuing of those whose vulnerability has been exposed by the exigencies of life—those related to disease and illness, disability and infirmity, and injury and trauma. Rather than abandoning them to isolation and neglect, a properly ordered community ensures that they are treated with dignity—independent of their utility—and provided

36 Wolterstorff, *Until Justice and Peace Embrace*, 73–98.

with a level of care aimed at doing what we reasonably can to sustain them as persons and return them where reasonably possible to a reasonable level of relational functioning.

You will notice a lot of “reasonables” there. That is intentional, not sloppy theology. For in an increasingly technically oriented society (and health care system) there will always be something more that could be done, and that people might ask to be done. But not all such interventions are warranted—not all are reasonable. Moreover, what is reasonable is highly situational, and depends on available technologies, the required infrastructure, personnel and facilities, as well as the relative balance of needs and resources in a particular community. It would be, for instance, unjustified to have world-standard tertiary (and even quaternary) medical facilities at the expense of people in the community having no access to clean water and safe housing—or the money to pay for those services.

So, then, how does all this help us understand the nature and goals of medicine? This all hinges, I would suggest, on vulnerability as a fundamental feature of human existence, care as a primary task of human community, and the particular ways that medicine as it has developed in the late modern period can express that care for vulnerable people. Medicine is an expression of a community’s care for, and solidarity with, those people whose inherent vulnerability as embodied creatures has been exposed by physical and psychological conditions such as illness, disease, injury, infirmity and disability. Its aim is to provide that care and stand with people in their “health-related” needs. Some of that care is warranted just because it demonstrates the care that is entailed in us respecting them as persons. Whether or not it “heals” them, or “improves their health,” or “alleviates their suffering,” it enhances their flourishing and is necessary for the flourishing of our communities. Such care (roughly corresponding to a good general practice and the services that cluster around it), it seems to me, is a sustenance right and ought to be accessible to all persons in the community, regardless of their means.

Other kinds of care are warranted because of their projected benefits: they hold out a reasonable prospect of returning persons to a reasonable level of relational functioning. Providing such care is a provisional good, and is to be supported and celebrated where its provision does not impinge on other social needs. Medicine is not the only social practice that makes a meaningful contribution to our shared lives, nor are “health care” sustenance rights the only ones available.

So, how does that relate to the anthropotechnics project? Well, in some ways the answers are obvious, and are clearly and directly entailed in the theory of medicine I have presented. Anthropotechnics does *not* fall into the remit of medicine.³⁷ But the answer is actually a little more complicated than that, so let me spell it out.

Enhancing Medicine?

Anthropotechnics and the Heuristics of (Bio)medical Research

Let me begin with anthropotechnics research in light of my earlier discussion of theological heuristics: does anthropotechnics research contribute to *shalom*? To determine that, we need to ask some fundamental questions.

First, does a particular anthropotechnics project aim to help us understand fundamental features of the world? In this case, human biological, psychological, personal, and social life? Is it warranted as pure research? Perhaps.

Some basic research might be done by anthropotechnologists with the aim of fostering anthropotechnical goals, but nonetheless provide intrinsically valuable insights. For instance, research into telomeres and their decay and possible repair, or work on intracellular metabolism, might (and have been) both be undertaken with the aim of maintaining cell function and replication in order to inhibit ageing processes. But given that this research may give rise to important insights into fundamental biological processes (with or without possible

37 As noted above, Goffette, “Enhancement,” draws the same conclusion, if on different (and I have argued problematic) grounds.

medical or anthropotechnical applications), it may well be warranted in its own right, and perhaps warranted as (bio)medical research or allied with it. However, research of that kind still needs to be balanced with respect to those fundamental aspects of biology that have bearing on the most significant health care needs of the global population, not just the affluent “West.” In this regard, questions of pure research shade into *praxis*-oriented research, which is not surprising given that life-extension is a key motivator for that research.

Second, does it aim to develop products that might contribute to the wellbeing of people, communities, or the broader created order—or be reapplied to it? Is it warranted as *praxis*-oriented research? Perhaps.

For instance, research that aims to extend human vision further into the electromagnetic spectrum might be repurposed to provide sight to the blind; similarly, research into brain-activated devices might be repurposed for use of people with physical disabilities (and some work has been done along those lines).³⁸ Here it is important to recognise the unintended benefits of technical advances, as well as their limitations and possible harms. Moreover, and in relation to that, we need to be careful about the implications of anthropotechnics for our understanding of disability and our response to people with disabilities: the “normate” assumptions intrinsic to much of this work are all too clear.³⁹

However, given the range of practical needs that need to be addressed, and the relative benefits of such technologies, I have questions about the utility of those lines of research in comparison with others. Significant advances were made in reducing the global burden of health in the period 1990–2019, but the evidence demonstrates that addressing the burden of infectious diseases rather than “high-tech”

38 While the claims of potential (and even current) applications are generally overblown, there are some extant examples, for which see: <https://neuralink.com/applications/>; <https://www.newscientist.com/article/2347757-people-with-paralysis-navigate-a-room-via-a-mind-controlled-wheelchair/>.

39 Melinda Hall, “Vile Sovereigns in Bioethical Debate,” *Disability Studies Quarterly* 33:4 (2013), <https://doi.org/10.18061/dsq.v33i4.3870>; Melinda Hall, *The Bioethics of Enhancement: Transhumanism, Disability, and Biopolitics* (Lanham: Lexington, 2016).

medical care had the greatest impact on bringing the standard of health of lower to middle income countries (LMIC) into line with high income countries (HIC).⁴⁰ Most of that requires little if any sophisticated biomedical research, but rather the implementation of well-established public health strategies and the development of appropriate physical and social infrastructure. Nonetheless, research into effective temperature-stable vaccines that can be produced and distributed relatively easily in resource-constrained environments (in contrast to, say, mRNA COVID-19 vaccines) would be likely to have considerable benefit, especially for children, who often sustain longterm health effects from preventable childhood diseases.⁴¹

In short, if research is to be justified on the grounds of its projected benefit, due consideration needs to be given to the relative benefits of *this* research as opposed to other research projects. I am sceptical that anthropotechnics research would pass such scrutiny. Moreover, given that I am discussing anthropotechnics research, which may/not have “medical” applications, and given the clear distinction we should make between medicine and anthropotechnics, even if such research were legitimate, I find it hard to see how it could be justified as *medical* research.

40 Juliet Nabyonga-Orem and James Avoka Asamani, “Ensuring the Right to Health along the Life Course,” *The Lancet Global Health* 10:12 (2022), [https://doi.org/10.1016/s2214-109x\(22\)00458-2](https://doi.org/10.1016/s2214-109x(22)00458-2); Annie Haakenstad et al., “Assessing Performance of the Healthcare Access and Quality Index, Overall and by Select Age Groups, for 204 Countries and Territories, 1990–2019: A Systematic Analysis from the Global Burden of Disease Study 2019,” *The Lancet Global Health* 10:12 (2022), [https://doi.org/10.1016/s2214-109x\(22\)00429-6](https://doi.org/10.1016/s2214-109x(22)00429-6).

41 It is encouraging to note that a malaria vaccine has recently been recommended by WHO (<https://www.who.int/news/item/06-10-2021-who-recommends-groundbreaking-malaria-vaccine-for-children-at-risk>). Other lines of prevention are also being explored, for which see Kassoum Kayentao et al., “Safety and Efficacy of a Monoclonal Antibody against Malaria in Mali,” *New England Journal of Medicine* 387:20 (2022), <https://doi.org/10.1056/NEJMoa2206966>. More research of this kind is clearly warranted. Moreover, improvements in infrastructure (especially in relation to clean water, sanitation, and housing) and basic social services (especially food security, education, and attending to the rights of girls and women) have a greater impact on the burden of disease than most medical interventions. See Sloane, *Vulnerability and Care*, 7, 19.

Anthropotechnics and Medical Care

So much for research. What about treatments? Should anthropotechnics play a role in medical care?

It is important to recognise that at this stage all such “therapies” are highly speculative, and we should be at least sceptical of the projections made by advocates of anthropotechnics. The hype surrounding stem-cell therapies a decade or so ago, and subsequent disappointing results, ought to give us pause. Indeed, should any anthropotechnics “treatments” become feasible, they would for some time fall into the “experimental research” category rather than “standard care,” and so should be made available on a very limited basis, if at all. That is itself an important point to make, as there are significant pressures in our current medical marketplace to make experimental procedures available to patients—for a variety of emotional, political, and marketplace reasons.

Let me be clear. I am not here invoking the TED. My concern is not whether we can draw a line between treatment and enhancement and, if so, whether we can determine into which category a particular anthropotechnical intervention falls. Rather, the distinction I wish to make is between proposed interventions of unproven or marginal utility, that may come at considerable (and often as-yet-unknown) risk and expense (as is often the case in the development phase of treatments), and those of proven efficacy, risk, and managed cost. Including experimental medical therapies in standard care plans is deeply problematic.⁴² Given the experimental nature of any proposed anthropotechnical intervention, including it in standard medical care is unwarranted. That relates to the more fundamental question of the basis on which any medical care is justified. The same two criteria can be applied to a proposed anthropotechnology as those that are used to justify medical care.

Is a particular anthropotechnic intervention an instance of “basic care” that must be made available to all members of a given com-

42 Sloane, *Vulnerability and Care*, 170–71.

munity as a mark of the respect that is their due as human creatures? I see no grounds on which that claim could be justified, and we have seen many reasons it is not.

Alternatively, does it respond to a clinical presentation in which a person's vulnerability has been exposed in such a way as to interfere with their relational functioning, and does it hold out reasonable prospect of a return to a reasonable level of relational functioning without impinging on the provision of care to others? And, to ensure that preventative medicine does not lose out, does it hold out a reasonable prospect of preventing a condition that stands a reasonable chance of interfering significantly with the relational functioning of persons in the community—including at a population level, and with a reasonable cost/risk-benefit? I see no grounds on which that claim could be justified, and we have seen many reasons it cannot.

If that is the case, then medicine should not be in the business of anthropotechnics.

Anthropotechnics and the Commodification of Medicine

Whatever the rights and wrongs of “human enhancement,” anthropotechnics is not medicine's business. Indeed, the temptation to make it so reveals temptations and corruptions of medicine which have become evident in that harbinger of anthropotechnics, the cosmetic medicine industry. Exploration of these matters lies beyond the scope of this piece,⁴³ so let me just make some passing comments in conclusion. Anthropotechnics treats its interventions as commodities to be chosen and purchased by “autonomous” individuals as means to attain particular life goals. Medicine already faces the temptation to see itself as a consumer product, with doctors being reduced from moral agents engaged in an inherently moral practice to become mere technicians,

43 For this, see Sloane, *Vulnerability and Care*, 9, 25, 27, 88–89, 92, 165, 71, 81; “Concerning Cosmetic Cowboys,” <https://www.spectator.com.au/2022/05/concerning-cosmetic-cowboys/>; Brent Waters, *This Mortal Flesh: Incarnation and Bioethics* (Grand Rapids: Brazos, 2009); Waters, “Flesh Made Data.”

purveyors of another product in late capitalist marketplaces. Incorporating anthropotechnics into the business of medicine would only exacerbate those ills.

I use the language of “business of medicine” advisedly, and as a deliberately loaded term. First, because we have already seen the corrupting influence of *business* on medical practice in relation to the “enhancements” of the cosmetic surgery industry. But, second, because in a society-cum-economy such as ours, business interests will inevitably impinge on the practice of anthropotechnics, should it proceed. The cost and benefit of individual procedures will determine their “viability.” But, more importantly, market and political forces will determine what counts as a desirable trait/ability that is worthy of enhancement. That is, quite frankly, deeply unsettling.

Cosmetic surgery (as my chosen harbinger of anthropotechnics) exposes another way in which technology and the market are colonising human personal and social existence, instrumentalising and commodifying the body itself. In so doing, it seems to me it renders both the body and the technologies deployed to modify it captive to expressive individualism. The nihilistic will of late modernity rejects the givenness of the body and the limitations and vulnerabilities inherent in embodied existence in space and time, and seeks to render it malleable, subject to the sovereignty of “autonomous choice.”⁴⁴ This is deeply ironic, given the role that the market and commercial interests play in shaping the self-understanding that these “autonomous individuals” wish to express. For medicine to become yet another instrumentality of the market is as ironic as it is appalling.

And so, after all of this, my answer is fairly straightforward. Whatever we may think about the intrinsic possibility and desirability of “human enhancement,” what I have called *anthropotechnics*, it is not the business of medicine. Pursuing it would only exacerbate medicine’s growing captivity to technological imperatives, market forces, and the

44 For the notion of the ‘nihilistic will’, see David Bentley Hart, “God or Nothingness,” in *I Am the Lord Your God: Christian Reflections on the Ten Commandments*, ed. Carl E. Braaten and Christopher R. Seitz (Grand Rapids: Eerdmans, 2005), 55–76.

commodification and instrumentalization of the body itself. Far from enhancing medicine, anthropotechnics runs the risk of corrupting it.

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The Primal Testament: Parallels between Evolutionary and Biblical History

Graeme Finlay

Abstract: Evolutionary biology is regarded with suspicion in some theological circles. However, the era of DNA sequencing, allowing linear side-by-side comparisons of our genome with those of related species, has revealed how our genetic “text”—that is, our genome—has incrementally developed, and has provided compelling insights into our evolutionary history. This paper presents examples of mutations in our genetic text that have generated features of our characteristically human biology. It is suggested that our genetic text be thought of as the Primal Testament, analogously to the Old and New Testaments that describe the history of God’s dealings with humankind. There are clear differences between the Primal Testament and those of the scriptures. The Primal Testament describes an impersonal and nonmoral history. But the three testaments have in common their witness to God’s purposes, their accounts of God’s creation of new realities (biological organisms, Israel, and the church), and their depictions of richer conceptions of life (successively, biological, personal/communal, and the Spirit-indwelt *zoe aionios*). The three testaments all describe contingent histories arising from God’s gift of freedom to the creatures. The histories alike describe ambiguities, suffering (even extinctions), goal-directedness, and incompleteness as they together anticipate God’s consummation of all things in the New Creation.

Keywords: biblical history; biological evolution; contingency; goal-directedness; suffering

Graeme Finlay is retired from teaching scientific pathology at the University of Auckland and is a lay preacher. He has written *Human Evolution* (Cambridge University Press, 2013), *The Gospel According to Dawkins* (Austin-Macauley, 2017), *Evolution and Eschatology* (Wipf and Stock, 2021), and *God’s Gift of Science* (Wipf and Stock, 2022).

Biological evolution and divine creation are often discussed as if they were starkly alternative ideas. Indeed, some Christians may express distaste for—or categorical rejection of—the concept of evolution because it is not compatible with the postulate that creation underwent a cataclysmic fall from an originally perfect, idyllic golden age. Moreover, people may assert that evolutionary process is inherently random and wasteful; and decry phylogenetic history as a saga of suffering, death, and mass extinctions. For many, the idea of evolution seems to exclude considerations of an overarching purpose for the cosmos.

But many of the psychologically disturbing features perceived in biological evolution are also present in the histories described in the Old Testament (or Hebrew scriptures) and New Testament. Biblical history is replete with human failure, blind alleys, and arbitrary savagery that is foreign to the nature of God. Evolutionary biology and biblical history share some commonality of character. To John Polkinghorne, there are at least methodological similarities between the historical sciences and biblical studies. The study of the “unique and fragmented records that are the basis for the insights of historico-observational sciences such as evolutionary biology and physical cosmology” comprise the closest analogy amongst the sciences to biblical studies.¹ In the same way as evolutionary biology has been rigorously and painstakingly studied to provide a developing outline of prehuman history, the rational use of the Bible as a source of information for the histories of Israel and of Jesus of Nazareth provides (as Polkinghorne continues) “a foundation for Christian belief that can be defended with intellectual care and scrupulosity.”

The thesis of this paper is that phylogenetic history is written in genomes, and comprises a Primal Testament,² albeit in the impersonal and nonmoral language of DNA. Francis Collins refers to the DNA

1 John Polkinghorne, *Science and the Trinity* (New Haven: Yale University Press, 2004), 38–39.

2 The word *testament* is used in the same way in each of the three divinely written histories to indicate that they are ordained, sustained, and consummated by the will of God (cf. Hebrews 9:15–18).

text that constitutes the genome as the language of God.³ The Primal Testament has its own authority, analogous to that of the biblical testaments written in Hebrew and Greek (Figure 1). The Primal Testament describes how God has ordained and sustained a developing biosphere in the same way as the Old and New Testaments describe the history of God's deepening engagement with humanity. All three testaments reflect tumultuous histories. They describe the actions of agents created to act freely within the time dimension of the created space-time order.

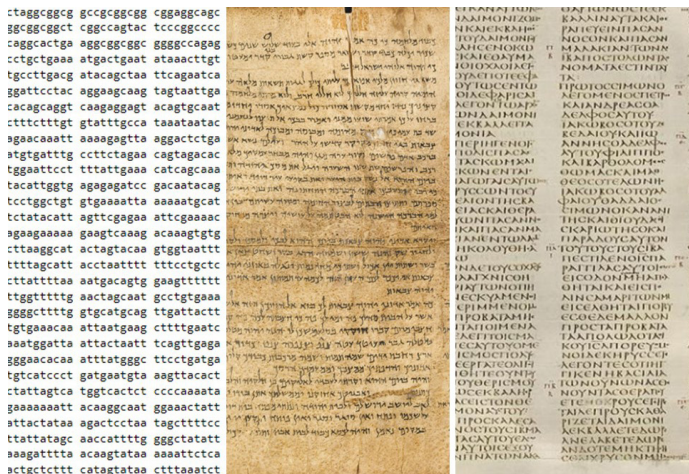


Figure 1. Authoritative texts describing three formative histories.

Languages (left to right) are genetic DNA sequence (from the *KRAS* gene), Hebrew (Isaiah Scroll, Qumran), and Greek (Codex Sinaiticus). Sources: NCBI (Refseq database) and Wikimedia Commons.

Created history extends far beyond what can be studied in written texts. God is the Author of all histories, even those not documented by one of the detailed texts to which Figure 1 refers. For this reason,

3 Francis S. Collins, *The Language of God* (New York: Free Press, 2006).

an Appendix is added to this paper: my poem entitled “A Freed Man’s Worship” that acknowledges divine authorship of all histories, however they have been reconstructed.

Episodes in Evolutionary History

We consider examples of the types of historical data encountered in evolutionary genomics, as documented in the text written in the language of DNA. They provide details of what happened in the remote past, and provide insights regarding our nature in the experienced present.

Pseudogenes

Our genomes contain thousands of degenerated genes that do not function in the way the corresponding genes do in other species. Such gene relics are called *pseudogenes*.⁴ We will consider two such genes that cannot make their respective proteins. It seems that, at some time in the past, their functions became redundant and in the absence of selective pressure, they started to accumulate inactivating mutations. They appear to be decaying into the genomic background.

Many animals communicate with each other using chemical messengers called *pheromones*. These regulate mating and other social behaviours. Pheromones activate receptors found on sensory nerve cells in the *vomer nasal organ* of the nasal cavity. The receptors are of two classes, V1R and V2R. Humans lack a vomer nasal organ, their complements of V1R- and V2R-encoding genes have been drastically reduced and, in all probability, they do not respond to pheromone signals.

A particularly ancient V1R gene (hence, *ancV1R*) is present in vertebrate genomes from bony fish to humans. However, in humans, other apes, and Old World monkeys, the *ancV1R* gene has been

4 Cristina Sisu, “GENCODE Pseudogenes,” *Methods in Molecular Biology* 2324 (2021): 67–82, DOI: 10.1007/978-1-0716-1503-4_5; or see pseudogene.org.

scrambled by inactivating mutations. In protein-coding segments of DNA, triplets of bases specify which amino acids are added into proteins. In the case of all the great apes, a TTA triplet (specifying the amino acid leucine, L) has mutated to TAA (a *stop* signal at which the elongation of protein chains is terminated) (Figure 2). The result is a truncated protein that is probably devoid of function. The only way by which the five great ape species could share such a mutation is for it to have arisen in an ancestor from which all are descended. Old World monkeys possess a different mutation (the catastrophic loss of a base), which occurred in an ancestor of these primates.⁵

	V	V	V	Y	I	P	V	X	I	R	T	R
human	...GTG	GTG	GTA	TAT	ATC	CCA	GTT	TAA	ATT	CGT	ACC	AGA...
chimp	...GTG	GTG	GTA	TAT	ATC	TCA	GTT	TAA	ATT	CGT	ACC	AGA...
bonobo	...GTG	GTG	GTA	TAT	ATC	CCA	GTT	TAA	ATT	CGT	ACC	AGA...
gorilla	...GTG	GTG	GTA	TAT	ATC	CCA	GTT	TAA	ATT	CGT	ACC	AGA...
orang	...GTG	GTG	GTA	TAT	ATC	CCA	GTT	TAA	ATT	CAT	ACT	AGA...
gibbon	...GTG	GTG	GTA	TAT	ATC	CCA	GTT	TTA	ATT	CGT	ACT	AGA...
baboon	...GTG	GTG	TA	TAT	ATC	CCA	GTT	TTA	ATT	CGT	ACT	AGA...
drill	...GTG	GTG	TA	TAT	ATC	CCA	GTT	TTA	ATT	CGT	ACT	AGA...
sooty mangabey	...GTG	GTG	TA	TAT	ATC	CCA	GTT	TTA	ATT	CGT	ACT	AGA...
rhesus macaque	...GTG	GTG	TA	TAT	ATC	CCA	GTT	TTA	ATT	CGT	ACT	AGA...
lion-tail macaque	...GTG	GTG	TA	TAT	ATC	CCA	GTT	TTA	ATT	CGT	ACT	AGA...
green monkey	...GTG	GTG	TA	TAT	ATC	CCA	ATT	TTA	ATT	CGT	ACT	AGA...
snub nosed mon	...GTG	GTG	TA	TAT	ATC	TCA	GTT	TTA	ATT	CAT	ACT	AGA...
	V	V	V	Y	I	P	V	L	I	H	T	R
marmoset	...GTG	GTG	GTA	TAC	ATC	CCA	GTT	TTA	ATT	CAT	ACT	AGA...
Ma's night mon	...GTG	GTG	GTA	TAC	ATC	CCA	GTT	TTA	ATT	CAT	ACT	AGA...
squirrel monkey	...GTG	GTG	GTA	TAC	GTC	CCA	GTT	TTA	ATT	CAT	ACT	AGA...
capuchin monkey	...GTG	GTG	GTA	TAC	ATT	CCA	GTT	TTA	ATT	CAT	ACT	AGA...
tarsier	...GTG	ACT	GCA	TAC	ATC	CCG	GTT	TTA	ATT	TAT	ACT	AGA...
galago	...GTG	GCG	GTG	TAC	ATC	CCA	CTT	TTA	ATT	TAT	ACT	AGA...
colugo	...ATG	GTG	GTA	TAT	ACC	CCA	GTT	TTA	ATT	TAT	ACT	AGA...

Figure 2. Inactivating mutations in the *ancVIR* gene

The gene has been pseudogenised independently in great apes (TTA to TAA, leucine to *stop*), lesser apes (CAA to TAA, Q to *stop*, not present in the sequence shown above) and Old World monkeys (GTA triplet reduced to

5 Hikoyu Suzuki et al., “A Single Pheromone Receptor Gene Conserved Across 400 Million Years of Vertebrate Evolution,” *Molecular Biology and Evolution* 35 (2018): 2928–2939, DOI: 10.1093/molbev/msy186.

TA, with all subsequent triplets shifted out-of-phase). The single letters above the human and marmoset gene sequences represent the amino acids constituting the encoded protein. Suzuki et al. (2018).

The presence of the *ancV1R* gene in our genome indicates that we are descended from distant forbears that signalled to each other by pheromones. The interpretation of *ancV1R* inactivation is that at some time, our ancestors lost the need to communicate through pheromones. If you don't use it, you lose it. Perhaps the development of an acute sense of vision superseded communication through chemicals.

Insectivores possess enzymes that digest the chitin exoskeletons of insects. It is believed that early mammals were largely insectivorous but with the end of the dinosaur era (66 million years ago), mammals diversified to occupy a multitude of ecological niches. New dietary habits included herbivory and carnivory. Many ceased to depend on insects, and chitin-digesting enzymes (chitinases) were no longer needed for nutrition. Genes for chitinases were not maintained by natural selection and tended to decay. A chitinase gene (*CHIA2*) relic possesses a *stop* mutation in all simian primates, including humans (Figure 3). An amino acid-specifying triplet (probably CGA, retained in tarsiers) has mutated into a gene-inactivating *stop* triplet, TGA. All simians possess the mutant, which arose in a unique event in an ancestor of simian primates.⁶

6 Christopher A. Emerling et al., "Chitinase Genes (*CHIAs*) Provide Genomic Footprints of a Post-Cretaceous Dietary Radiation in Placental Mammals," *Science Advances* 4 (2018): eaar6478, DOI: 10.1126/sciadv.aar6478.

human	...TGG	TTG	CTG	TAT	TGA	CCA	GAA	CCA...
chimp	...TGG	TTG	CTG	TAT	TGA	CCA	GAA	CCA...
bonobo	...TGG	TTG	CTG	TAT	TGA	CCA	GAA	CCA...
gorilla	...TGG	TTG	CTG	TAT	TGA	CCA	AAA	CCA...
orangutan	...TGG	TTG	CTG	TAT	TGA	CCA	GAA	CCA...
baboon	...TGA	TTG	CGG	TAT	TGA	CCA	GGA	CCA...
drill	...TGG	TTG	CTG	TAT	TGA	CCA	GGA	CCA...
green monkey	...TGG	TTG	CTG	TAT	TGA	CCA	GGA	CCA...
snub-nosed monkey	...TGC	TTG	CCG	TAT	TGA	CGA	GGA	CCA...
marmoset	...TTG	TTG	CAG	TAT	TGA	CCA	GAA	CCA...
Ma's night monkey	...TGG	TTG	CAG	TAT	TGA	CCA	GAA	CCA...
capuchin monkey	...TGG	TTG	CAG	TAT	TGA	CCA	GAA	CTA...
tarsier	...TGG	TCT	CAG	TAT	CGA	CCA	GAG	CCA...
galago	...TGG	TCT	CAG	TAT	TGG	CCA	GAA	TCA...
colugo	...TGG	TCT	CAG	TAT	TGG	CCA	GAA	TCA...
Chinese tree shrew	...TGG	TCC	CAA	TAT	CGA	CCA	GAT	GCA...
hedgehog	...TGG	TCT	CAG	TAT	CGA	CCA	GAA	CCA...
aardvark	...TGG	TCT	CAG	TAC	CGG	CCA	GAA	CCA...

Figure 3. Inactivating mutation in a chitinase (*CHIA2*) gene

The gene has been pseudogenised in all simian primates (CGA to TGA, arginine to *stop*). Emerling et al. (2018).

John the Baptist's diet of locusts would have provided protein, but he could not have extracted carbohydrates from the chitin that constitutes the locust exoskeleton. The *CHIA2* gene in John's genome had fallen into disrepair millions of generations before his time. His consumption of wild honey provided energy-sustaining sugars.

Transposable Elements

Another major class of genome-disrupting events (mutations) arises from the actions of parasitic units of DNA that inhabit and colonise the genomes of essentially all organisms. These entities are called *transposable elements*. Our genome includes four million segments of DNA derived from these parasites. They comprise at least fifty percent of our DNA content. Most reproduce themselves by a copy-and-paste

mechanism (DNA => RNA => DNA), and new instances are being added constantly to genomes (Figure 4).

Transposable elements reproduce in genomes haphazardly, but many are recruited to perform important functions. A study identifying some 25,000 types of transposable elements in placental mammals has described how these agents “have substantially influenced the evolutionary history of the organisms they occupy, even contributing to major evolutionary innovations.”⁷ Repeatedly, sequences present in transposable elements have been coopted into the vital role of regulating gene activity. Nearly all primate-specific regulatory sequences are located within transposable elements.⁸

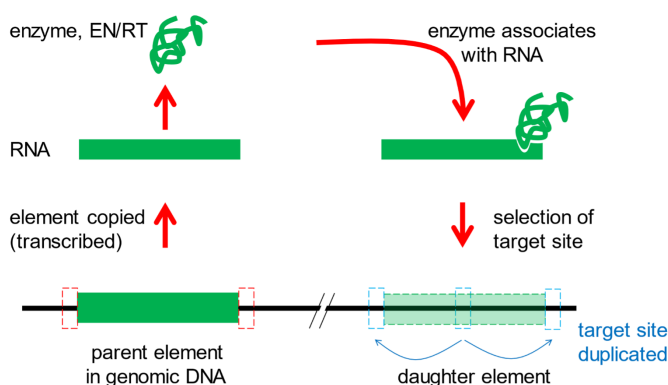


Figure 4. Mechanism by which transposons multiply in host genomes

- 7 Austin B. Osmanski et al., “Insights Into Mammalian TE Diversity through the Curation of 248 Genome Assemblies,” *Science* 380 (2023): eabn1430, DOI: 10.1126/science.abn1430.
- 8 Gregory Andrews et al., “Mammalian Evolution of Human Cis-Regulatory Elements and Transcription Factor Binding Sites,” *Science* 380 (2023): eabn7930, DOI: 10.1126/science.abn7930. These authors showed that for 367 gene-regulating DNA binding proteins, the genome had 15.6 million binding sites, of which 3.8 million were found only in primates, and 3.3 million overlapped transposable elements.

A transposable element (green box, lower left) in the genome (horizontal line) is copied by cellular enzymes into an RNA version. The RNA provides the directions to make an enzyme that can both cut DNA (an *endonuclease* function, EN) and copy RNA back into DNA (a *reverse transcriptase* function, RT). The enzyme associates with the original RNA molecule (or sometimes, with a bystander RNA molecule), selects a target site somewhere else in the genome, cuts the DNA and inserts a DNA copy of the transposable element into the genomic DNA. During this process, the target site (dashed boxes) is duplicated on each side of the new daughter element (lower right).

(i) SVA Elements and Neurogenesis

Human brains are larger, contain more cells, and have more intercellular connections than brains of other primates. During human development, neural *progenitor* cells reproduce vigorously but they do not have the properties of functional neurons (nerve cells). The proliferation phase of neural progenitor cells is extended relative to those of other species, enabling the production of more brain cells. Concomitantly, the maturation of progenitor cells into nerve cells (neurogenesis) is delayed. Delayed development is called *neoteny*.

Transposable elements known as SVA elements, found only in great apes, are often located near genes specifying proteins with neural functions. SVA elements can bind a repressor protein called ZNF91, which silences both the SVA element and also nearby genes. ZNF91 bound to an SVA_F element that is *human-specific* (found *only* in the human genome) silences the adjacent *CDK5RAP2* gene and suppresses maturation of nerve cells. When the progenitors mature into nerve cells, a distant SVA_B element is activated and generates an RNA copy, which both sequesters the ZNF91 protein, and intertwines itself into the SVA_F element. Consequently, the *CDK5RAP2* gene is activated and neurons form.⁹ This mechanism is shown in the upper part of Figure 5,

9 Monica J. S. Nadler et al., “Hominoid SVA-LncRNA AK057321 Targets Human-Specific SVA Retrotransposons in SCN8A and CDK5RAP2 to Initiate Neuronal Maturation,” *Communications Biology* 6 (2023): 647, DOI: 10.1038/s42003-023-04683-8.

with the insertion site of the regulatory SVA_B element being shown in the lower part.

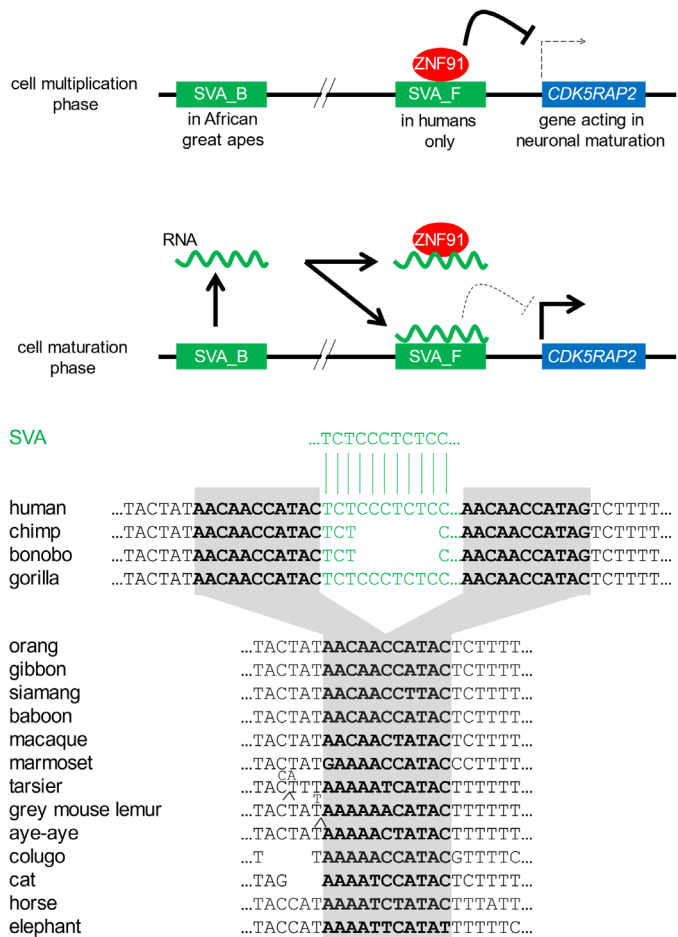


Figure 5. Involvement of an SVA transposable element in nerve cell maturation

Above: In proliferating neural cells, a repressor molecule (ZNF91) binds to human-specific SVA elements to silence genes (such as *CDK5RAP2*)

required for neurogenesis. At the proliferation-to-maturation decision point, an SVA element common to African great apes generates an RNA molecule that displaces ZNF91 from the human-specific SVA elements. The genes become active and neural development commences. Nadler et al. (2023). Sequences are from the UCSC Genome Browser (human); the NCBI Blast algorithm (non-human); Dfam database (SVA_B).

Below: The insertion site of the SVA_B element (green font) which generates the neurogenic RNA molecule. It entered the primate genome in an ancestor of the African great apes. The undisturbed target site is widely detectable in eutherian mammals, and its tell-tale duplications are in bold and shaded.

This example demonstrates that the African great apes (humans, chimps, bonobos, gorillas) are descendants of a common ancestor, and that SVA elements have been recruited to control genes implicated in human brain development. Human-specific SVA elements, adjacent to many genes that drive neurogenesis, may be significant contributors to human-specific brain anatomy.

(ii) Alu Elements and Adiposity

The accumulation of abdominal fat is associated with systemic (body-wide) inflammation and with chronic metabolic diseases. The deposition of abdominal fat is influenced by many genetic variants found in regulatory motifs that control genes involved in fat metabolism and adipogenesis (the development of fat cells).

Such regulatory sequences are often located in transposable elements—particularly, in Alu elements. A six-base sequence (AGGTCA; Figure 6), often present in Alu elements, recruits gene-regulating proteins that control the activity of nearby genes. An Alu element present in apes and monkeys (but not in prosimians or non-primate mammals) appears to regulate a set of nearby genes, including the *NICN1* gene. Perhaps regulatory motifs in Alu elements (which are found only in primate genomes) account for the distribution of body fat that is characteristic of humans relative to other great apes.¹⁰

10 Grace T. Hansen et al., “Genetics of Sexually Dimorphic Adipose Distribution in

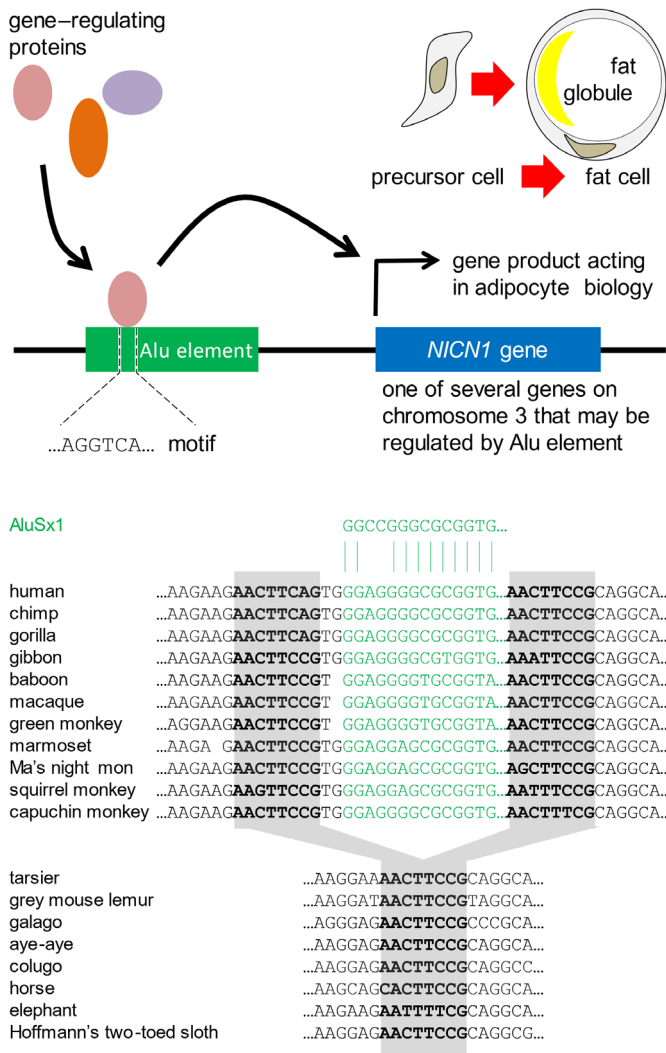


Figure 6. Involvement of an Alu transposable element in fat cell maturation

Humans,” *Nature Genetics* 55 (2023): 461–470, DOI: 10.1038/s41588-023-01306-0.

Above: An Alu element (green box) recruits proteins (ovals) that regulate adipogenesis.

Below: the insertion site in simian primates of the Alu element (green font) exerting control of the *NICN1* gene (Hansen et al. 2023).

(iii) MIR Elements and Cardiovascular Disease

In heart tissue, progenitor cells may develop into either specialised heart muscle cells (cardiomyocytes) or smooth muscle cells. Maturation into heart muscle cells occurs when several gene-regulating proteins (including *IRX1*) are produced. The alternative pathway to smooth muscle cells is selected when an RNA molecule, containing sequences from an ancient MIRc transposable element, is generated. The MIRc sequences recruit a protein (called REST) that represses cardiogenic genes (such as *IRX1*). The MIRc-containing RNA achieves this by forming a triple helix with the DNA near the cardiogenic gene such that the REST protein is positioned to exert its repressive effect (Figure 7, above). Recruitment of the REST protein suppresses the *IRX1* gene, as a result of which progenitor cells are directed to develop into smooth muscle cells.¹¹

MIRc elements colonised genomes early in mammal evolution. The site at which this element resides (Figure 7, below) lacks target site duplications, which have been obliterated with time. The insertion site is the same for all eutherian (fully placental) mammals shown, including elephants and armadillos. The insertion event occurred in a eutherian ancestor, but the MIRc element was incorporated into the regulatory RNA only in a primate ancestor.

11 Isabelle Plaisance et al., “A Transposable Element into the Human Long Noncoding RNA CARMEN is a Switch for Cardiac Precursor Cell Specification,” *Cardiovascular Research* 119 (2023): 1361–1376, DOI: 10.1093/cvr/cvac191.

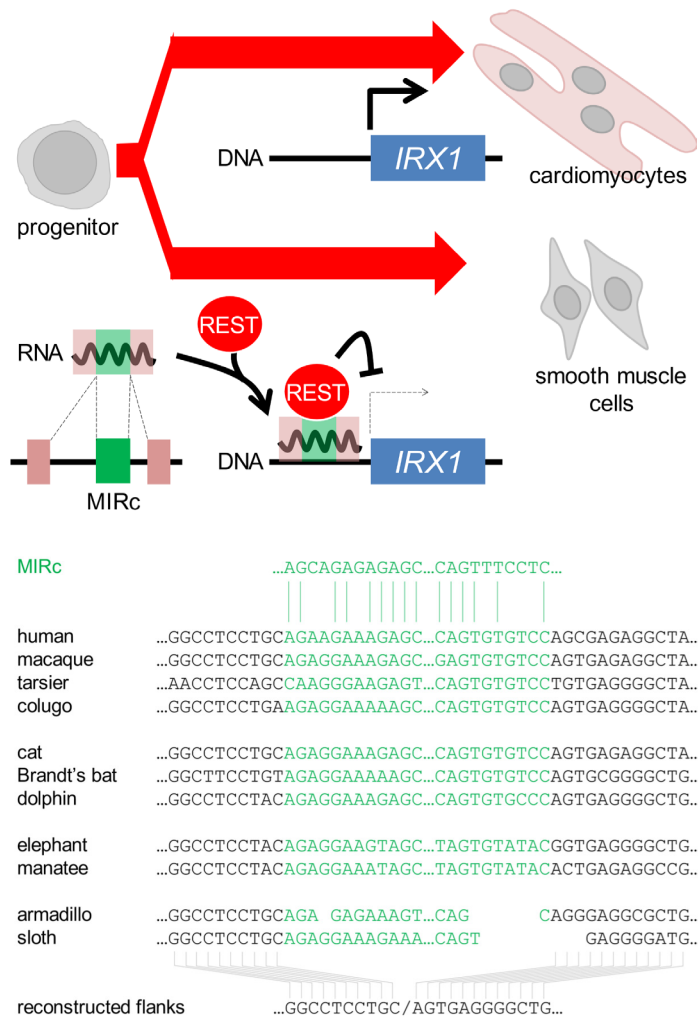


Figure 7. Involvement of a MIRc transposable element in smooth muscle development

Above: Genes such as *IRX1* are needed to form cardiomyocytes. An RNA molecule containing MIRc sequences recruits a repressor protein (REST)

to the *IRX1* gene so that smooth muscle cells are generated instead. Plaisance et al. (2023).

Below: The insertion site of the MIRc element. MIRc sequences are shown in green font. The reconstructed flanking sequence represents a sequence that might have been present in an ancestor of all eutherian mammals. However, the absence of target site duplications indicates that even this ancient sequence was markedly different from the target site into which the MIRc element was inserted in deep time.

Valuing History

It is axiomatic for Christian faith that God acts in history. The science of biological evolution seeks to elucidate the history of life—the richly complex development of Earth’s species. To complete the syllogism, evolutionary history must be a locus of God’s action, a backdrop or lead-in to God’s action in human history. It seems to follow that in a created world there should be features that are common to all histories.¹² For a start, mammalian phylogenetic trees can be depicted like those of biblical families. Figure 8 presents a partial mammalian dendrogram with the mutations described in this paper mapped on to it. It also shows a dendrogram illustrating the early history of the Hebrew people, as presented by Gordon Wenham.¹³

12 As has been argued: Graeme Finlay, “Evolution as Created History,” *Science and Christian Belief* 20 (2008): 67–89; *Evolution and Eschatology* (Eugene: Wipf and Stock, 2021), 142–158; “Evolution as History: Phylogenetics of Genomes and Manuscripts,” *Christian Perspectives on Science and Technology*, New Series 1 (2022): 150–174, DOI: 10.58913/JJHH2131.

13 Gordon Wenham, *Exploring the Old Testament Volume. 1: The Pentateuch* (London: SPCK, 2003), 46.

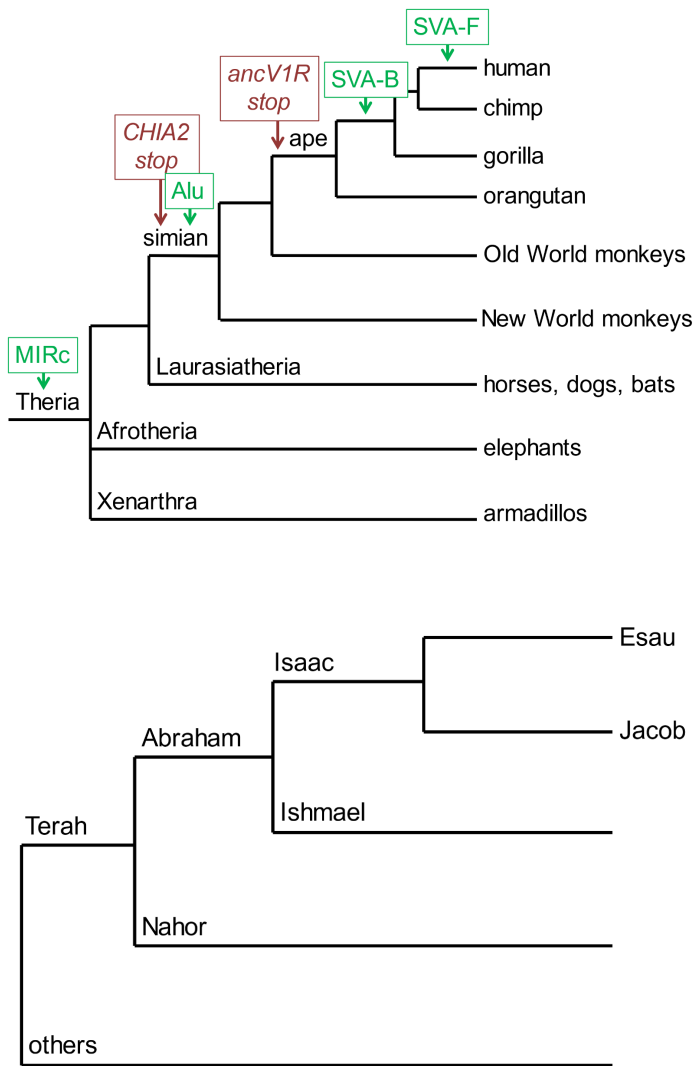


Figure 8. Partial family trees of mammals and Hebrew ancestors

Richard Dawkins' oft-repeated assertion that evolution (biological history) enables him to be a fulfilled atheist is egregious metaphysical naivety. Christian theism is rooted in history. Dawkins' confusion of categories can upset Christian faith only if people capitulate to the puerile presupposition that mechanistic descriptions of organic process (biological history) are a logical alternative to divine purpose and action (why there should be a biological history).

The Bible describes living organisms (including humanity and each individual), Israel and the church as divinely *created*.¹⁴ But each of these created realities incorporates *history* as part of its being. Biological createdness encompasses a history spanning several billion years; our own created human histories, a few decades. But those histories exist by God's will and, as aspects of the empirical world, invite investigation.

Richer Conceptions of Life

The three testaments represent stages of the one great metahistory through which the purposes of God would be achieved. They show how the phenomenon of life manifests increasing degrees of richness.

The Primal Testament, our genomic witness to biological evolution, describes the elaboration of organic life. Life is "curiously difficult to define," but two essential features are common to all descriptions. First, a living organism is capable of reproduction, at least potentially. Second, it maintains an internal environment in which biochemical reactions occur far from thermodynamic equilibrium.¹⁵ A living thing is a *dissipative* system: it maintains itself by assimilating usable (low entropy) energy and materials, and excreting them as high entropy energy (heat) and chemical waste.

The physicist Erwin Schrödinger asked the question (in 1944)

14 For example, Genesis 1:21; Psalm 104:30; Genesis 1:27; Psalm 139:13; Isaiah 43:1, 15; Ephesians 2:15.

15 Christopher Southgate et al., *God, Humanity and the Cosmos* (Edinburgh: T&T Clarke, 1999), 144.

“What is life?” and speculated as to the material embodiment of genetic information.¹⁶ Schrödinger’s musings probably expedited the discovery of DNA as the carrier of genetic information (also in 1944), and the understanding of this function in chemical terms (in 1953).¹⁷ The current paper illustrates how DNA acts as an amazingly stable but dynamically modifiable repository of life-sustaining instructions. The base sequences of DNA (Figures 2, 3, 5–7) and the lifeforms they specify through succeeding generations describe historical process.

But a scientific understanding of life is limited to *mechanism*. Polkinghorne memorably said that the “world of science contains highly complicated metastable systems with the power of replicating themselves, but it does not have any *people* in it.”¹⁸ Science is authoritative within its designated boundaries, but it “surveys a lunar landscape—clear, orderly, lifeless. The real gap is between talking of complex, metastable reproducing systems and talking of people.”¹⁹

The Old Testament provides a richer understanding of life that engages with personhood. A creature with life (*hayyim*) moves, and its existence is associated with light, gladness, fullness, order and activity.²⁰ The Hebrews used other terms also. Soul (*nephesh*) denoted *being* or *self* of human and non-human creatures, whether living or dead. Its “meaningful state” is *living soul* (*nephesh hayya*; Genesis 2:7). To die was to “breathe out one’s soul” (Jeremiah 15:9). Whether *soul* is paralleled with flesh, life, spirit, “I,” or self, the Hebrews understood that a human person was a psychosomatic unity, an animated body. The words spirit (*ruach*) and breath (*nesama*) distinguish the living from the dead and may also be used to indicate life. It follows that to die is to lose one’s spirit/breath (Psalm 104:29). *Long* life, a good gift from God, implied the *good* life (peace, prosperity, victory; Deuteronomy 30:15), but life

16 See Rob Phillips, “Schrödinger’s What is Life? at 75,” *Cell Systems* 12 (2021): 465–476, DOI: 10.1016/j.cels.2021.05.013.

17 As updated for the Watson-Crick-Wilkins-Franklin structure of DNA. See Matthew Cobb and Nathaniel Comfort, “What Watson and Crick Really Took from Franklin,” *Nature* 616 (2023): 657–660.

18 John Polkinghorne, *The Way the World Is* (London: SPCK, 1983), 16.

19 John Polkinghorne, *One World* (London: SPCK, 1986), 60.

20 J. D. Douglas, ed., *The Illustrated Bible Dictionary* (Leicester: IVP, 1980), 901–902.

leads inexorably to death (*Sheol*), at which time one's breath returns to God, and one's body to dust (Psalm 144:4; Genesis 3:19).

Transcending this understanding of mortal being was the conviction that Israel's God is the source and sustainer of all life (Jeremiah 17:13). Life is lived in relatedness to God. Resurrection life was pictured in material terms—restored prosperity, peace, and fulness—although this hope was not a major theme of the Hebrew Scriptures, and its realisation belonged to the future messianic deliverance (Isaiah 26:19; Deuteronomy 12:2).

The New Testament understanding of life incorporates those features described above: organic life (Greek: *bios*) and soul-life (*psyche*), but in addition celebrates the eschatological gift of resurrection-life (res-life; one of the meanings of *zoe*, especially in the writings of John and Paul). Jesus' words indicate how soul-life may be distinguished from res-life:

I have come that they might have life (*zoe*) and have it to the full.
I am the good shepherd. The good shepherd lays down his life
(*psyche*) for the sheep.²¹

Those who love their own life (*psyche*) will lose it; those who
hate their own life (*psyche*) in this world will keep it for life
(*zoe*) eternal.²²

Both soul-life and res-life are the life of the self, the whole person. "The latter does not displace the former but preserves and transforms it."²³ As in the Old Testament, life is properly the life of God, but this divine life is now manifested in Jesus²⁴ and concretely actualised in

21 John 10:10–11. See in Bernard Palmer, ed., *Medicine and the Bible* (Exeter: Paternoster, 1986), 133.

22 John 12:25.

23 Douglas, *Illustrated Bible Dictionary*, 903.

24 Most explicitly in the Gospel of John and the letters, as follows: John 1:4; 5:26; 14:6; 1 John 5:20.

history.²⁵ In the synoptic gospels, res-life is viewed in terms of the future Kingdom of God, but in John and Paul it is also a present possession.²⁶

In summary, the three testaments attest to life of different character and capacities. The Bible incorporates the scientific perspective: we are dust, chemistry, fully embedded in the natural order. As *nephesh*, organism, mind-body, we have continuity with the animal kingdom. But we may share in the divine life, *zoe aionios*, and anticipate the transformation of resurrection.²⁷

Inconspicuous and Humble Origins

The assertion of human descent from ape and monkey antecedents may elicit emotive responses. But we not only *share* a common ancestor with apes and monkeys—biologically we *are* in fact apes (hominoid primates), an offshoot of the infraorder Simiiformes (monkeys or anthropoid primates). We accept that we are vertebrates and mammals, but hubris seems to make us balk at the evidence of our more immediate affiliations with the (other) apes. We possess mutations that arose in ancestors of African great apes (Figure 5), great apes (Figure 2), anthropoid primates (Figures 3 and 6), and placental mammals that scurried around under the feet of dinosaurs (Figure 7).

We in our anthropocentric pride need to be reminded of our humble beginnings just as the ancient Israelites did. God did not love them because they were inherently important²⁸ or because they were particularly righteous.²⁹ “God loved Israel, not because they stood out as *better* than the rest of humanity, but precisely in spite of the fact that they exemplified (and amplified) all that is *worst* about humanity in general.”³⁰ Our value and our status arise purely from the grace of God.

25 1 Corinthians 15; Colossians 3:4.

26 Douglas, *Illustrated Bible Dictionary*, 904. See Mark 10:17; Matthew 25:46 cf John 5:24; 1 John 3:14; Ephesians 2:4.

27 Donald M. MacKay, *The Clockwork Image* (London: IVP, 1974), 70–71.

28 Deuteronomy 7:7–8.

29 Deuteronomy 9:4–6.

30 Christopher J. H. Wright, *The God I Don't Understand* (Grand Rapids: Zondervan, 2008), 113–115.

The gospels describe the coming of God's kingdom in history. As Bauckham observed, "Jesus evidently did not think that the kingdom was coming all at once. There was a process [a progressive unfolding—dare we say—an evolution]. From its small beginnings in Jesus' own teaching and activity, the kingdom would ultimately blossom into universal reality." God's kingdom would start as a minute mustard seed and grow into an impressive tree. In Jesus' own activities, "insignificant though they might seem in the grand perspective of world history, God really was sowing the seed of his coming kingdom."³¹ St Paul reminded the feuding Corinthian Christians that God "chose what the world looks down on and despises and thinks is nothing, in order to destroy what the world thinks is important."³² The "Christian paradox speaks of the king who reigns from the gallows."³³

Many people seem to be perturbed by the obscure origins and protracted meanderings of the history out of which humans arose. Such people should reflect on the equally anonymous, almost invisible histories that gave rise to God's people in the Old Testament and to God's newly created people in the New Testament. These histories are all of a piece. God does not love us because we are valuable; rather we are valuable because God loves us, and we rebellious apes had better get used to the fact—even as we await glorification in union with Christ.

Ambiguity

The genetic events constituting the Primal Testament inscribed in our DNA illustrate the ambiguities of our history. Our biological history is replete with amazing developments, albeit with the potential for harmful outcomes. As Tom Wright reminds us, "we are children of the present creation, which is simultaneously both glorious and shameful."³⁴

31 Richard Bauckham, *Jesus: A Very Short Introduction* (Oxford: Oxford University Press, 2011), 37.

32 1 Corinthians 1:28, GNT.

33 Polkinghorne, *The Way the World Is*, 77.

34 N. T. Wright, *Surprised by Scripture* (London: SPCK, 2014), 201–202.

Sequences in SVA elements may help control the delayed timing of the switch in human brain cells from the proliferation phase to the maturation phase, and so allow enlarged brains. But variants in such elements are associated with mental abnormalities.³⁵ Sequences in Alu elements have been coopted into regulating adipocyte (fat cell) biology—but associated variants may underlie metabolic (type-2 diabetes, chronic hepatitis) and cardiovascular disease.³⁶ An RNA molecule containing an ancient MIRc element acts at a decision point at which progenitor cells develop into either specialised heart muscle or smooth muscle cells—but following a myocardial infarct, the MIRc-containing RNA molecule may suppress desirable myocardial cell regeneration and favour smooth muscle cell production.³⁷

The Hebrew Scriptures describe how the Jewish people recognised the sea as part of God's good creation, but at the same time, a continuing source of chaos and terror.³⁸ The people themselves shared in this Jekyll-and-Hyde mix of beauty and horror. Christopher Wright has said that “in the Old Testament story the people of Israel displayed a terrible ambiguity. On the one hand, they represented God's *promise* to the world ... But on the other hand, Israel *rebelled* constantly against God, and in their sin and wickedness they sank even below the level of nations that had no covenant relationship with God.” They were at the same time “a people of promise and a people in rebellion.”³⁹

The third (New) Testament continues to describe the flawed characters of Jesus' followers, but also reveals how history's ambiguous character at last finds resolution. It is in Gethsemane and at the Cross that we may discover how God has purposed to address the sin, pain, and suffering that permeate God's good creation. As Tom Wright says: “The multiple ambiguities of God's actions in the world come together in the story of Jesus.”⁴⁰

35 Nadler et al., “Hominoid SVA-Lnc RNA,” 647.

36 Hansen et al., “Genetics of Sexually Dimorphic Adipose Distribution,” 461–470.

37 Plaisance et al., “Transposable Element into the Human,” 1361–1376.

38 Wright, *Surprised by Scripture*, 116.

39 Wright, *The God I Don't Understand*, 145–146 (*italics original*).

40 Wright, *Surprised by Scripture*, 120.

Contingency

The ambiguities of history reflect their common property of *contingency*. The details of history do not *have* to turn out the way they do. We cannot predict those future events that will impact upon our lives. We are subject to happenstance. The sites at which transposable elements insert into DNA cannot be predicted and will be affected by Brownian (thermal) motion that jostles DNA templates, RNA molecules, enzymes, and carrier proteins into unpredictable configurations. When a cell divides, its daughter cells may manifest markedly different behaviour depending on how certain regulatory molecules, present in only a few copies per cell, are distributed randomly into the daughters.⁴¹

Histories are open to the future, reflecting the influences of spontaneous, random events. Polkinghorne said that “chance is just a shuffling mechanism for exploring potentiality” and we live in a universe of open process.⁴² Osborn posits that we can describe God’s creative word in terms of *promise*. The structures inherent in creation manifest an open-ended “incomplete, contingent order which offers a framework for cosmic evolution.” The presence of suffering and evil suggests that the happenings in the world are not divinely micro-manipulated. The promise of God represents “a commitment to the maintenance and fulfilment of its structures.”⁴³ God faithfully upholds the creation, and so “guarantees the freedom of the creature and the contingency of nature as a whole,” all of which underlines creation’s “radically historical” nature.⁴⁴

Bible history also shows how the creatures act freely (so that history is contingent) even as God sovereignly achieves his ends through them. The very idea of the Covenant with Israel requires that

41 As Phillips points out, “partitioning errors in transcription factors are a demonstrable part of the reason for noisy gene expression” (“Schrödinger’s *What Is Life?* at 75,” 470).

42 Polkinghorne, *Science and the Trinity*, 78–79.

43 Lawrence Osborn, *Guardians of Creation* (Leicester: IVP, 1993), 114.

44 Osborn, *Guardians*, 115.

the people were responsible for their actions. The possibility of disobedience and the derailment of God's purposes were inherent in covenant. "The greater part of history (that of Israel, the church, the world) is in fact a violation of the will of God."⁴⁵

The actions of the Babylonians and Nebuchadnezzar "were wholly theirs and they bore moral responsibility" for their cruelty and violence. "God was acting through the actions of men."⁴⁶ It is the same with the cross. Jesus was killed by men whose behaviour was motivated by an evil lust for power, and yet he died by God's plan and foreknowledge.⁴⁷ "God acts through human actions—without turning people into puppets."⁴⁸

Cataclysmic Events and Extinction

We may rail against the idea of evolution because of its perceived (from our creaturely perspective) slowness, meandering character, and "wastefulness." Every biological ancestor evinced in Figures 2, 3, 5–7 and depicted in Figure 8 is now extinct. A created order in which historical process leads to new, increasingly complex, and integrated realities is wonderfully constituted, but it "has a necessary cost not only in the blind alleys and extinctions that are the inescapable dark side of the evolutionary process, but also in the very character of the processes of a world in which evolution can take place."⁴⁹

The catastrophes of biological and biblical history must be faced together. The biblical testaments attest to the same pattern of haunting extinctions. Consider the meandering trajectory and apparent wastefulness of the catastrophic events that occur regularly in the Hebrew Scriptures and the New Testament. There was the destruction of Samaria (722 BC, by Assyria) and of Jerusalem (587 BC, by Nebuchad-

45 Adrio Konig, *Here Am I: A Believer's Reflection on God* (Grand Rapids: Eerdmans, 1982), 130.

46 Wright, *The God I Don't Understand*, 147.

47 Acts 2:23.

48 Wright, *The God I Don't Understand*, 147.

49 Polkinghorne, *Science and the Trinity*, 72.

nezzar). The latter event represented the end of the kingship, the nation, the temple and its worship, and the form of the covenant which was based upon them. The cycle of cataclysms overwhelming Jerusalem continued in the centuries around the career of Jesus (167 BC, Antiochus; 63 BC, Pompey; 70 AD, Titus; 130 AD, Julius Severus). Such mass slaughter arises from the freedom exercised by sinful personal agents. We must believe that God grieves over every mutilated corpse, even as God gave solemn warning that such carnage was the inevitable result of the abuse of freedom in a world that is divinely structured according to a moral basis.

Holmes Rolston has said of evolutionary history that “the myriad creatures have been giving up their lives as a ransom for many.” The creation is cruciform.⁵⁰ So too, is God’s work in biblical (salvation) history. Transformation of the Messiah’s people by the Holy Spirit (Romans 8: 9–11) is cruciform “involving the constant life of putting to death the flesh and coming alive to the Spirit,”⁵¹ as indeed is the experience of apostleship.⁵² Overall, says Oord, God’s power to complete creation is cruciform. God will achieve God’s purposes in creation, not by overpowering and coercing the creatures, but by suffering for them.⁵³

Polkinghorne acknowledges that the suffering of the creatures in both biological and biblical history can be approached by the one reality: “Much recent theological thinking has acknowledged that God’s appropriate relationship with creation includes divine suffering in compassionate solidarity with the travail of creatures. This divine passibility implies an openness to mutability,” for suffering requires the capacity to be affected by another.⁵⁴ Ultimately, people who rail against death and extinction, and the God whose rule extends over them, are

50 Holmes Rolston III, *Genes, Genesis and God* (Cambridge: Cambridge University Press, 1999), 306–307.

51 N. T. Wright, *Paul and the Faithfulness of God* (London: SPCK, 2013), 1023.

52 2 Corinthians 4–6.

53 Thomas J. Oord, *The Uncontrolling Love of God* (Downers Grove, IL: IVP, 2015), 155.

54 Polkinghorne, *Science and the Trinity*, 109.

railing against creaturely mortality. The story of the New Testament, dependent as it is on the resurrection of Jesus and the conferral of res-life on human creatures, has news for them. Jesus “has ended the power of death and through the gospel has revealed immortal life.”⁵⁵

Convergence upon a Final Goal

Integral to the biblical worldview is the confidence that all histories—biological, Hebrew, or ecclesial—will culminate in a splendid climax.

The paleobiologist Simon Conway Morris has documented how diverse living forms, when faced with similar environmental challenges during phylogenetic history, frequently alight on (*converge upon*) similar adaptive solutions. Sharks, plesiosaurs, and dolphins have independently evolved similar streamlined shapes that confer hydrodynamic efficiency in aqueous environments. “Convergence is ubiquitous; the number of possibilities in evolution in principle is more than astronomic, but the number that actually work is an infinitesimally smaller fraction.”⁵⁶ Phylogenetic development is not a free-for-all; the structures and activities of organisms must comply with what physical law allows.

It seems that transposable elements are maintained in genomes because they provide endless variety upon which natural selection can act. Mutagenic agents are disruptive, but they work within a context of life-sustaining order. Conway Morris says, “the molecular architecture upon which mutations [the molecular dice] are imprinted—be it enzyme structure or gene networks—is rampantly convergent and greatly constrains what is possible.”⁵⁷ The phenomenon of convergence leads us to expect that “evolution perforce must follow a metaphorical map of highly restricted possibilities.”⁵⁸

55 2 Timothy 1:10.

56 Simon Conway Morris, *The Runes of Evolution* (Conshohocken: Templeton, 2014), 21.

57 Conway Morris, *Runes*, 22.

58 Conway Morris, *Runes*, 24.

But can the tendency to progress to convergent endpoints be overwhelmed by contingent effects? Analysis of rates of genomic mutation calibrated against fossil data has shown that placental mammals diversified rapidly following the Chicxulub meteorite impact 66 million years ago. The origin of rodents and primates occurred at this time, for example.⁵⁹ However, it has been argued that extreme, random events such as bolide collisions with Earth change rates but not the overall directions of phylogenetic history. Conway Morris has said that “megadisasters such as massive flood volcanism, oceanic crises, extreme global warming, and bolide impacts undoubtedly perturb ... the biosphere, but it is far less obvious that they radically redirect the course of evolution as against simply accelerating the inevitable.”⁶⁰

The implication of ubiquitous convergence is that a creature such as *Homo sapiens* is a likely product of evolution. As Conway Morris says, “biology travels through history but ends up at much the same destination.”⁶¹ So it is that “we may suppose that God can bring about determinate ends through contingent paths. Think of William James’s picture of the Grandmaster of cosmic chess, who will win the game whatever moves the creaturely opponent may make.”⁶² As Polkinghorne says of cosmic history, “final fulfilment, although arrived at through the contingencies of history, is guaranteed by the steadfast love of a God ceaselessly at work within that history.”⁶³

Osborn notes that as God covenants with nature, so God covenants with his people.⁶⁴ Their obedience has expected outcomes because of the moral structure of history. Their obedience to God is tantamount to a choice for life.

The biblical book of Revelation considers the painful happenstance of history in the light of the assured final victory of God. In one

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- 59 Nicole M. Foley et al., “A Genomic Timescale for Placental Mammal Evolution,” *Science* 380 (2023): eabl8189, DOI: 10.1126/science.abl8189.
60 Conway Morris, *Runes*, 22.
61 Conway Morris, *Runes*, 6.
62 Polkinghorne, *Science and the Trinity*, 108.
63 John Polkinghorne, *Science and Christian Belief* (London: SPCK, 1994), 66.
64 Osborn, *Guardians*, 90–91, 94–95.

vision, a sealed scroll appears that “stands for the meaning and purpose of history, the great plan of God for all time.”⁶⁵ To our creaturely perspective the meaning of history is a mystery. “Who is worthy to govern history, to interpret and carry out the plan of God? ... the Lamb who was slain!”⁶⁶

Apparent chaos will indeed emerge into beauty and order. “The whole biblical narrative, at every level, is an outworking in different ways of the sovereign providence of God in the complexities of human history.”⁶⁷

“History and theology need each other.”⁶⁸ Phylogenetic history, as much as that of Judaic and Messianic history, cries out for theological interpretation. Wright and Bird have emphasised that our contingent history will culminate in (converge upon?) a long-anticipated consummation. “Rooted in history, we are shaped by theology—not least the theological claim that God will put all things right at last” as our lives are transformed, directed to the time when “God himself, in the ultimate act of creative sovereignty, does for the whole creation what he did for Jesus when he raised him from the dead.”⁶⁹

Final Comments

The historical sciences have revealed that we live in a universe with a fruitful history.⁷⁰ That fact should make us look beyond science as to why this should be. Polkinghorne has said that: “It is a striking fact that that initial ball of energy has become the home of saints and mathematicians. This recognition in itself might raise the question of whether there has not been more going on in cosmic history than science alone can fully express. Might there not be some purpose behind it all?”⁷¹

65 Revelation 5 and succeeding chapters that describe the opening of the seals.

66 Wright, *The God I Don't Understand*, 64.

67 Wright, *The God I Don't Understand*, 97–98.

68 N. T. Wright and Michael F. Bird, *The New Testament in its World* (London: SPCK, 2019), 81.

69 Wright and Bird, *New Testament in its World*, 83.

70 Polkinghorne, *Science and the Trinity*, 65f.

71 Polkinghorne, *Science and the Trinity*, 66.

We need to reflect on the relationship between the messiness of history and the God who acts in it. This is as true of biological history as it is true of biblical history—or indeed of history at large. To Tom Wright, “The really interesting relation ... is between real history in all its complexity of hypothetical reconstruction, and real faith, in all its glory as the constant exploration of, and trust in, a God who Christians believe to be ... intimately and passionately involved in the historical process itself.”⁷²

But what theology can we develop from impersonal and nonmoral genetic processes?

(i) If we believe we are God’s creation, then our genomic text carries the authority of that God. The Primal Testament is sacred. It is incumbent upon us to take with the utmost seriousness the historical record that we read from our DNA. During the writing of this paper, DNA sequencing studies of unprecedented scope were published. The sequencing of the genomes of 241 placental mammal species⁷³ and of 233 primate species⁷⁴ has led to high-level resolution of mammalian and primate phylogenetic radiations. We really do know who is related to whom. To deny that this record compels our assent, and that God is supreme over phylogenetic history, is to misrepresent the God of creation in the same way that Marcion misrepresented the God of Israel, and Arius misrepresented the triune God of Jesus’ teaching.

(ii) Our genome is a typically primate, hominoid genome. This fact is ever a corrective to hubris. Our biological rootedness explains some of our weaknesses, both physical (cardiovascular) and temperamental. Perhaps the true original sin lies in behaviours inherited from our evolutionary past, and brought into sharp relief by

72 N. T. Wright, *Jesus and the Victory of God* (London: SPCK, 2016), 8–9.

73 Foley et al., “Genomic Timescale,” esp. Figure 1.

74 Lukas F. K. Kuderna et al., “A Global Catalog of Whole-Genome Diversity from 233 Primate Species,” *Science* 380 (2023): 906–913, DOI: 10.1126/science.abn7829; Yong Shao et al., “Phylogenomic Analyses Provide Insights into Primate Evolution,” *Science* 380 (2023): 913–924, DOI: 10.1126/science.abn6919.

the advent of a moral volition and the developing awareness of God's holy demands.⁷⁵

(iii) Our Primal Testament reads the same way as the Old and New Testaments. The stories show inauspicious beginnings, ambiguity, contingency, cataclysm and extinction, convergence and consummation. If people had approached Darwin's evolutionary paradigm through the spectacles of a historical framework (as described in Scripture) rather than through the spectacles of an ahistorical understanding of reality (static, made-to-order biota as described by Paley), evolution would have been accepted as a natural analogue of biblical history.⁷⁶

Science knows nothing of teleology. It cannot in principle affirm or deny that there is a purpose to evolution. But the Primal Testament highlights the reality of convergence and supports the theological *interpretation* that the randomness or contingency of evolution could be expected to lead to the appearance of creatures such as we are—a primate that can hear God's address and even feel after him.⁷⁷ Evolutionary history has in fact climaxed in a species of personal being, *Homo religiosus*. The Old Testament with its human history is deeply teleological. God's distinctive promises pointed his people to the future and anticipated the unlikely climax of this history—the appearance of a saviour, a Messiah, Jesus of Nazareth.⁷⁸

These two paradigms of realised fulfilment strengthen our confidence that the contingencies of New Testament and of church history—with their frequent failures and conflicts—will culminate in a denouement in which the people of the Messiah will witness the final establishment of God's kingdom.

(iv) Our genetic history should inspire worship. In the incarnation, the eternal Son assumed the body, not of a demigod, but of a

75 Polkinghorne, *Science and Christian Belief*, 15.

76 As indicated by Peter Harrison in Karl W. Giberson, ed., *Abraham's Dice* (Oxford: Oxford University Press, 2016), 278–279.

77 Acts 17:27.

78 1 Peter 1:10–12, 20.

territorial, aggressive ape⁷⁹ in desperate need of liberation. By his total obedience to the Father, and through the scandal of the crucifixion and the shock of the resurrection, God has purposed to share the divine life and nature with his creatures.⁸⁰ By God's grace we are more than apes, more than smart apes, more than morally aware apes. We are glorified apes, awaiting transformation.

To Polkinghorne, "our destiny beyond death is ... to live an ever-lastingly redeemed life within the 'time' of the new creation. This destiny will indeed be *theosis*, a sharing in the life of God."⁸¹ To Tom Wright, the Spirit of God is again leading God's people through the wilderness, the end result of which is *theosis*, being conformed to (convergent upon?) Jesus' death and resurrection.⁸²

To Osborn, the ultimate completion of the whole of created reality, is "the fulfilment of the divine promise" or "the eschatological Sabbath ... [which] represents the complete participation of creation on the triune life of God." This is the work of the Spirit of God and is cosmic *theosis*. Osborn sees it as involving both the nonhuman and the human creation.⁸³ Cosmic histories will have arrived at their single destination and "God will rule completely over all."⁸⁴

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79 José María Gómez et al., "The Phylogenetic Roots of Human Lethal Violence," *Nature* 538 (2016): 233–237, DOI: 10.1038/nature19758.

80 For example, John 3:14–16; 6:53–58; 11:25–26; 2 Peter 1:4.

81 Polkinghorne, *Science and the Trinity*, 115–116.

82 N. T. Wright, *Paul and the Faithfulness of God* (London: SPCK, 2013), 1023.

83 Osborn, *Guardians*, 127.

84 1 Corinthians 15:28; see also Romans 8:18–25; Ephesians 1:10; Col 1:20.

Appendix

A Freed Man's Worship: The Point of It All

Quantum Vacuum

When nothing exists there's a crowded quantum fuzz,⁸⁵
an emptiness filled with frenetic quantum buzz;
it's radically random with lawful compliance,
just what to expect from equations of science.
Such quantum mechanics: mere arcane abstraction,
of ceaseless invisible transient action
by quarks, leptons and bosons, weird species galore—
from such tenuous fields might we ever see more?
They blip into being, self-annihilate fast;
incessant activity—does anything last?
An ethereal gossamer-fine quantum field,
like a virtual reality—what can it yield?
Complex reality, quantum mechanics-defined,
world of a spooky, counter-intuitive kind,
must evince a creative and rational mind.
May we ask for what purpose is this brilliance destined?
Crowded quantum vacuums are lawful and are free—
might they have potential? No one but God can see.
So what, if anything, might ever be unfurled
from God's phantasmic e'er-dependent quantum world?

Big Bang

Then from the quantum void, a shattering Big Bang,

85 It has been said that Hawking described the cosmos “like a kind of fuzzy spacetime egg”; biblically, the Creator is to be understood “as the sustainer of the self-contained spacetime egg and as the ordainer of its quantum laws” (Polkinghorne, *Science and Christian Belief*, 73).

(so some say)⁸⁶ instant world, the whole working shebang!
 A cosmos emergent from the quantum vacuum,
 a singularity to space-time continuum!
 A fireball seeded at infinite density,
 blasting through nothing to cosmic immensity.
 An explosion that overcame gravity's shackles
 is evinced by pervasive CMB⁸⁷ crackles,
 and hydrogen-helium ratio, three-to-one,
 a proportion that serves as Big Bang's smoking gun.
 The cosmos resembles an expanding bubble;
 its age is inferred from the constant of Hubble:
 seventy km per sec for each megaparsec,
 giving vistas both ways of this cosmic star trek.
 Forces so terrible, and dimensions so vast,
 a realm of pure physics, searing superhot blast;
 can that fiery explosion forge anything new?
 Or perchance God has plans for that dense photon brew.
 Space-time's haunting magnitude: with what is this tasked?
 Without such size, duration, such questions can't be asked.⁸⁸

Stars

A cosmos pervaded with gas flying apart

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- 86 In quantum field theory, there "are no particles present, no permanent excitations, but there is a continual chaos of transient blips ... On this view we might be living in a grotesquely swollen quantum fluctuation," an idea that Polkinghorne describes as highly speculative. See John Polkinghorne, *Science and Creation* (London: SPCK, 1988), 58–60.
- 87 CMB, cosmic microwave background, discovered as static on a Bell Labs radio antenna (Arno Penzias and Robert Wilson, 1965).
- 88 It takes a multibillion year cosmic history to make humans, says Polkinghorne: "Without all those trillions and trillions of stars, we should not be here to be dismayed by them" (*One World*, 57). And Davison adds, "A connection between size and age [of the universe] and the possibility of the formation both of elements and of stars with their solar systems, is well established." Andrew Davison, *Astrobiology and Christian Doctrine* (Cambridge: Cambridge University Press, 2023), 93.

looks so very boring—not an interesting start!
Inhomogeneities and gravity lead
to hydrogen gas falling inwards at speed.
Huge pressures ignite thermonuclear fusion,
lights piercing the blackness in hyper-profusion,
perhaps ten to the twenty-three stars, say one mole,⁸⁹
Avogadro's number, each one named on God's roll.⁹⁰
In stars, mc^2 equals huge values of e^- —
but with ergs of such vastness can aught come to be?
A star, fuel exhausted, its lifetime being over,
may self-detonate as a bright supernova.
In its violent death-throes, it sheds ashes through space,
forming clouds of star clutter, its nebular trace.
This dust forms great shrouds that obscure cosmic features—
perhaps God will use it to make novel creatures.
Collapsed stars spawn black holes, hugely dense cosmic sinks,
with X rays emitted from their superhot brinks.
All matter is shredded in its mad inward rush—
light itself trapped in the gravitational crush.⁹¹
We ask what, if anything, such carnage portends:
the Creator may know, may have planned wondrous ends.
All the heavens display wondrous fireworks shows!
Is there more to this pageant? O, God alone knows.
Stars come and they go—mere cosmic futility?
Or does God's plan entail some stellar utility?

Earth

Around a star condensing, in its accretion disk,

89 In chemistry, one mole is 6.023×10^{23} atoms or molecules, and is of a similar order of magnitude to the estimated number of stars in the universe.

90 Isaiah 40:26; Psalm 147:4.

91 As told entertainingly by Heino Falcke, *Light in the Darkness* (London: Wildfire, 2021), 92–95.

planets—rocks or gas globes—elliptically whisk.⁹²
Many planets orbit in the Goldilocks zone,⁹³
but are UV-scorched without a layer of ozone.
Many planets, metal-rich stardust compactions,
have chemistry giving a wealth of reactions;
there's carbon aplenty, it's the strangest of things,
with tetrahedrality of long chains and rings;
a CO₂ blanket effects heating control,
an unseen but potent thermal greenhouse-like role.
And then there is water—a flood of surprises!
H-bonding, shows wetness, when freezing it rises.
an excellent solvent, high heat capacity:
strange curio—or from mind of sagacity?
Many planets are like this—but we *know* only one;
is Earth a mere odd-ball as it orbits the Sun?
It formed as hot desert, was asteroid-pelted,
had punishing windstorms,⁹⁴ volcanic rocks melted,
a speck in a cosmos of haunting dimension,
dust of no consequence—why give it a mention?
Are there prospects for Earth, roasting, sterile, so grim?
It's all of God's doing—we don't know, just ask Him!

92 The James Webb Space Telescope is providing unprecedented insights into planetary formation. See the news items by Alexandra Witze, “Life in the Cosmos: JWST Hints at Lower Number of Habitable Planets,” *Nature* (19 June 2023), <https://www.nature.com/articles/d41586-023-01983-1>; “How Worlds are Born: JWST Reveals Exotic Chemistry of Planetary Nurseries,” *Nature* (20 September 2023), <https://www.nature.com/articles/d41586-023-02922-w>.

93 Of the order of 10^{19} according to Andrew Davison, Cambridge Professor of Theology and the Natural Sciences, <https://biologos.org/podcast-episodes/andrew-davison-cosmic-incarnation> (accessed 30 November 2023).

94 Early Earth rotated faster than it does now (having slowed by interaction with the Moon), generating hurricane-force winds. See Simon Conway Morris, *Life's Solution* (Cambridge: Cambridge University Press, 2003), 90.

Organic Chemistry

Carbonaceous chondrites (a class of shooting star)
coat Earth with hydrocarbons (intractable tar),
and amino acids from interstellar space,
pyrogenic compounds from some cosmic cooking place.
Planet Earth a trashcan littered with amorphous junk—
is there any usefulness for aromatic gunk?
On the Earth's deep seabed, by hot volcanic vents,
organic compounds form, endothermic events.
Can there be potential in this organic gloom?
Can anything arise from this primeval soup?
“Precursors to life!” Prebiotic chemists plead,
but they cannot imagine where such crude mixtures lead.
No one can describe how to transform random gunge
into simple animals—ctenophore or sponge.
From high temperature muck underneath the sea
can the complex components of life come to be?
O God, is there promise in this gooey thick crud?
No-one else could have schemes for organic-laced mud.

Cells

Could cells assemble by unimagined processes,
in hot, fuming darkness of undersea recesses,
with metals and sulphides, to us highly toxic,
as chemotroph feeders where all is anoxic?
Start with an RNA world! It has been opined;⁹⁵
genetics and catalysis are here combined.
But RNA's primary ribozyme function
is phosphodiesterase-like self-destruction.

95 Francisco Prosdocimi and Savio Torres de Farias, “Origin of Life: Drawing the Big Picture,” *Progress in Biophysics and Molecular Biology* 180–181 (2023): 28–36.

Life is a marvel, e'en when prokaryotic;
a marvel compounded—endosymbiotic—
when free-living parents formed eukaryote cells
with specialised interdependent organelles.⁹⁶
Acellular polymers, randomly gelling,
to self-regulation? No scheme is compelling.
The perplexities truly are far from surmounted,
the gaps in our knowledge as yet can't be counted.⁹⁷
Empirical science needs a hypothesis base,
a plausible route through possibility space.
Could life come by pure chance? Near impossible odds⁹⁸
without natural laws from a mind that is God's.
If means God ordained transformed gunk to what's living,
our only response can be gobsmacked praise-giving.

Evolution

DNA embodies genetic information.
Finely tuned stability sustains speciation:
if too high—life will forego needed adaptation;
if too low—life fails by inborn debilitation.
Variants arise from changed sequence of bases:
transposons and viruses—mutagen aces—
colonise host genomes at sites randomly placed,

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- 96 It has been proposed that endosymbiosis underlies many phases in life's history. See Predrag Slijepcevic, "Serial Endosymbiosis Theory: From Biology to Astronomy and Back to the Origin of Life," *Biosystems* 202 (2021): 104353.
- 97 Charles Kocher and Ken A. Dill, "Origins of Life: First Came Evolutionary Dynamics," *QRB Discovery* 4 (2023): e4, 1–9, DOI: 10.1017/qrd.2023.2.
- 98 A thought adapted from Jim Brooks, *Origins of Life* (Tring: Lion, 1985), 87 and 103; this delightful book excited my interest nearly forty years ago.

gene control circuitry is facilely replaced.⁹⁹
A crucial question: whence promoters and enhancers?¹⁰⁰
Copy-paste transposons are evolution's answers.¹⁰¹
Random mutations with strict natural selection
constrain evolution's inherent direction;
brand new adaptations are often emergent—
but not anything goes—being widely convergent.¹⁰²
We may wonder, amazed, but should not look askance,
at the fruitful interplay, lawfulness and chance!
This should never be controverted mystery—
authentic God creates authentic history.
Can we expect newness from constrained happenstance?
Has God charted ways through this molecular dance?
Are chance and necessity *telos*-embedded?
Their Author must know where phylogeny's headed!

Bolide

Then a roadblock descends to phylogeny's rise:
asteroid megadeath screaming in from the skies.

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- 99 For example, retrotransposons have influenced brain development. See Raquel Garza et al., “L1 Retrotransposons Drive Human Neuronal Transcriptional Complexity and Functional Diversification,” *Science Advances* 9 (2023), eadh9543; Alexander Frohlich et al., “CRISPR Deletion of a SINE-VNTR-Alu (SVA_67) Retrotransposon Demonstrates its Ability to differentially Modulate Gene Expression at the *MAPT* Locus,” *Frontiers in Neurology* 14 (2023), 1273036, DOI:10.3389/fneur.2023.1273036.
- 100 Promoters are DNA motifs adjacent to genes upon which the enzymatic machinery responsible for gene expression is assembled. Enhancers are motifs widely scattered through the genomes, that control the cell type, time, and intensity of gene expression.
- 101 Liang Liang, Changchang Cao, Lei Ji et al. “Complementary Alu Sequences Mediate Enhancer–Promoter Selectivity,” *Nature* 619 (2023): 868–875, DOI: 10.1038/s41586-023-06323-x.
- 102 For a summary of the significance of evolutionary convergence, see Simon Conway Morris, “The Paradoxes of Evolutionary Convergence,” *Faraday Paper* 26 (2022), <https://www.faraday.cam.ac.uk/wp-content/uploads/2022/09/Faraday-Paper-26-Conway-Morris.pdf>.

Iridium spike twixt K-Pg rock strata¹⁰³—
asteroid impact-incriminating data.

A layer of glass spherules from condensed molten rock,
deformed crystalline quartz, sign of high pressure shock,
two hundred km crater—Earth obliquely whacked,¹⁰⁴
dinosaurs extinguished by asteroid impact,
that jolted the Earth sixty-six million years past,
nearly wiping out life by its staggering blast.
Organic forms of Earth are under cosmic fire:
are not future prospects dishearteningly dire?
Can life on Earth endure when it is bolide-zapped?
Dare we hope creation's God has a future mapped?
Is this roasted planet, with all its *sturm und drang*,
the reason why the angels at creation sang?
A blast one hundred thousand billion billion joules,¹⁰⁵
perhaps, just perhaps, is another of God's tools.

Mammals

Once nuclear winter, death-dealing, had resolved,
diverse furry creatures, warm-blooded, deft, evolved.
The asteroid event was a temporary glitch,
evolution stays on track—now at a higher pitch.
The dinosaurs have gone; there is a new refrain:
it is not size that counts, but versatile brain.
Small dinosaurs called *birds* sing sweetly in the trees.
The platypus lays eggs, a mammal if you please,
bats like birds flap crazily, wheeling through the breeze,

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- 103 K-Pg, Cretaceous-Paleocene (previously, K-T, Cretaceous-Tertiary) boundary.
104 Gareth S. Collins et al., “A Steeply-Inclined Trajectory for the Chicxulub Impact,”
Nature Communications 11 (2020), article no. 1480, DOI: 10.1038/s41467-020-
15269-x.
105 Joanna V. Morgan et al., “The Chicxulub Impact and its Environmental
Consequences,” *Nature Reviews Earth & Environment* 3 (2022): 338–354.

cattle now called dolphins leap gladly through the seas,
bamboo-chomping pandas are vegan carnivores,
providential squirrels lay up their winter stores.
Life is so fecund, its drive autopoietic,
vigorous, exuberant! Phylogenetic
radiation leads to myriad shapes and sizes,
alpine mice to benthic whales, manifold surprises.¹⁰⁶
Chirps and caws, grunts, and barks, cacophony of praise—
do the beasts *knowingly* their voice of worship raise?
Is there something lacking in all creation's throng,
creatures that *freely* lift to God adoring song?

Humanity

Look! A novel species of Euarchontoglires,
that makes tools for hunting, and cooks its food on fires,
useful thumb for grasping, mutant muscles in its face,¹⁰⁷
furless and altricial, moves from place to place.
These brainy killer apes make war upon their kind,¹⁰⁸
use tools and paint in caves, with ambivalent mind,
sometimes very tender; with kindness, love and truth,
but then sheer aggression, cruel war that knows no ruth.¹⁰⁹
Are human beasts destined to pillage, kill, and rape,
that tool-using biped, most devious great ape?

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- 106 See the news report by Elizabeth Pennisi, "Mountain Mice Break Altitude Record for Mammalian Life," *Science* 382 (2023): 360.
- 107 *MYH16* pseudogene, specific to humans. See George H. Perry et al., "Insights into Hominin Phenotypic and Dietary Evolution from Ancient DNA Sequence Data," *Journal of Human Evolution* 79 (2015): 55–63, DOI: 10.1016/j.jhevol.2014.10.018.
- 108 Polkinghorne, *The Way the World Is*, 19.
- 109 Hunter-gatherer settlements in Siberia show evidence of violent conflict (palisade protection, destruction by fire, projectile heads). See Henny Piezonka et al., "The World's Oldest-Known Promontory Fort: Amnya and the Acceleration of Hunter-Gatherer Diversity in Siberia 8000 years ago," *Antiquity* 97 (2023): 1381–1401, DOI: 10.15184/aqy.2023.164.

The human brain does not arise by genes alone;
the social brain appears in those lovingly known.
Neural gene transcription needs personal relation,
human mind depends on love's sure regulation.
If there's Creating Being, of which none can conceive,
Its Word transforms life, mind, in all who dare believe.
There's more than mere brute cunning in this hominoid:
a haunting new awareness of a God-shaped void.
Innate to the cognition of this hominin,
is instinct led by reason, wilfully, called sin.
Even now, in hedonist consumerist folly,
self-styled *Homo sapiens*, quintessential wally,
is trashing the planet with greed, never heeding,
crassly disregarding God's kind, just, patient pleading.
God, what were you thinking when you brought forth this critter—
such powers, such skills, but its prospects so bitter?
When it comes to virtue it can't do very well.
Is extinction looming, is its end soon and fell?
Is the use-by date close for woman and for man?
Or do surprises lurk in God's mysterious plan?

Israel

From Ur, mighty city, a princeling Abram fled,
a new, inspired vision, stirring in his head:
weary of the Moon god, a new God he confessed,
who said that through his faith all people would be blessed.¹¹⁰
Through Abraham, God would address the human plight;
darkness is not forever—God will make things right.¹¹¹
To the Hebrew folk by cruel slavery broken,

110 Genesis 12:3; 18:18; 22:18.

111 "God had chosen Israel ... to be the means of rescuing humans and the whole creation" (Wright and Bird, *The New Testament in Its World*, 511; also 259).

Moses, leading them, God's Covenant had spoken:
 "I will be your God; my people you will be."¹¹²
 Obey my holy Law and then you will be free.
 A Covenant of grace¹¹³—see God's will embedded!
 YHWH and his bride in joy were truly wedded.¹¹⁴
 David sang, the Lord's my shepherd, I will have no needs,
 He comforts, waters, cares; and he most surely feeds.
 But soon the people spurned God's loving wise commands;
 Solomon the Stupid ignored God's just demands:
 eschew Egyptian horses, great wealth, pagan brides,¹¹⁵
 choose YHWH, not idols—you simply must take sides!
 When true worship falters, catastrophe runs rife,
 nation sinks in turmoil, injustice grows, and strife;
 Jeremiah thunders, the people block their ears,
 place their hope in armies, the surest way to tears.
 Jerusalem is razed, the Covenant is shredded,
 to exilic torment the people now are headed.
 Think upon the future—could New Covenant arise
 from Israel's creator, God of sea and skies?
 Could minds and hearts express a law that is God's own?
 From the smallest to the greatest, could Godself be known?¹¹⁶
 Could thoughts of redemption and forgiveness be pulsing
 through traumatised hearts when the world is convulsing?
 Has the Hebrew project come to end in acrid smoke?
 Were all of YHWH's promises just a bitter joke?
 Oppressed by cruel Babylon, Hellenisers, Rome—
 has YHWH turned away forever from his home?

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- 112 Adrio Konig, *The Eclipse of Christ in Eschatology* (Blackwood: New Creation, 1999), 54, 82, 95; 240; and see Leviticus 26:12; Hosea 2:23; Jeremiah 7:23; 11:4; 24:7; 30:22; 31:1; 31:33; 32:38; Ezekiel 11:20; 14:11; 37:23; 37:27; Zechariah 8:8; 13:9; 2 Corinthians 6:16; Romans 9:25–6; Hebrews 8:10; Revelation 21:3.
- 113 Exodus 34:6; Psalm 103:8; 145:8–9
- 114 Hosea 2:14–23.
- 115 Deuteronomy 17:16–17; cf. 1 Kings 10:14–11:13; 2 Chronicles 2: 14–17; 8:11; 9:13–28.
- 116 Jeremiah 31:31–34; for the sequel, Hebrews 8:7–13.

Exile—six hundred years—with racked anticipation,¹¹⁷
the faithful wait yearning for God's emancipation.
Dare they hope for freedom and that YHWH has planned
to bring life to dry bones and a desolate land?
Was God's pledge to humanity just a sick dream,
Israel, channel of blessing? A parched and dried-up stream!
The great Hebrew story: does it lie dead in the dust,
their history so dark, that we can't sanely trust
there is hope of a sequel and that God has it sussed?
Can beauty come from ashes¹¹⁸—please act God, you must!

Jesus

Then in the most radiant, mellifluous morning
comes Jesus announcing the joyous new dawning;
God's kingdom is imminent,¹¹⁹ hope rises anew,
is this God's great moment, please what will God do?
He welcomed the outcasts, poor, lepers, lame, and blind,
gentiles, women, children, not one was left behind.
He soon provoked fury: "the riff-raff don't belong
to YHWH's holy kingdom—rabbi, you've got it wrong!"
Jesus and his friends came at Passover, to dine
on icons of himself, familiar bread and wine;
to release sun's trapped energy, grain must be crushed,
to free up solar power stores, grapes must be mushed,
to liberate God's life-force, remove human guilt,
Jesus' body must be broken, his life-blood spilt.
Holy loving teacher, now bloodied, bruised, and torn,
on two rough-hewn wood beams, reviled in deepest scorn,

117 The Jews considered their exile to continue, even after returning to their own land, as they faced continued oppression. See N. T. Wright, *The New Testament and People of God* (Minneapolis: Fortress, 1992), 268–272.

118 Isaiah 61:3.

119 Mark 1:15; Matthew 4:17, 23; Luke 4:16–21, 47; John 3:3, 5.

bearing Israel's anguish, abandoned and forlorn—
is darkness back forever, with no hope of morn?
The One who's the good shepherd, light, truth, living bread,
is killed by a crazed mob, a joke crown on his head.
Many people thought he would set Israel free;
this hope seems extinguished by the gore on the tree—
from a callous spear-thrust, blood and water released,¹²⁰
his heart has stopped beating, truly he is deceased.
Jesus' autolysed corpse moulders in a dark tomb;
surely nothing's forthcoming from cold silent gloom.
Can even God see past the rank horror of death?
Can even God's Spirit instil vital new breath?
To cultured despisers, a dead crim on a cross
is laughingstock only, a pathetic dead loss,
devoid of all value, lowest scum of the earth—
God, don't you like winners, surely this farce lacks worth?
Must nature and humans, as if under a curse,
face only extinction in a heat-dead universe?

New Creation

Then on Easter Sunday a brand new world appears,
death and sin are vanquished, the end of human fears!
Now Jesus has been raised, his body is transformed;
every proud and hateful stronghold truly has been stormed.
Evil, death and sorrow do not have the final say;
God will make all things new!¹²¹ Rejoice in the new day!
Maria, first to hear the Lord's voice, precious sound,
he called her Miriam, her true self had been found.¹²²

120 John 19:34; "blood," sedimented erythrocytes, "water," cell-free plasma, indicating decomposition of blood.

121 Revelation 21:5.

122 John 20:11–18; Mary Magdalene was usually called by her name in Greek, Maria; but when she met Jesus resurrected, he addressed her by her birth name, Miriam. See Wright, *Surprised by Scripture*, 216.

Cleopas and his mate, whose grieving minds were churning,
 heard Jesus on the road, with joy their hearts are burning.¹²³
 Thomas scorned his colleagues' tale with incredulity;
 seeing Jesus was the first to see his deity.¹²⁴
 Unprecedented sign! What's the indication?
 Jesus has the Father's utter vindication.
 Jesus resurrected? Are nature's laws deranged?
 The world is recreated, ontology is changed!
 God is always faithful: this world's laws aren't repealed;
 but in resurrection, the new world's laws, revealed.
 The law of the Spirit supersedes the law of death,¹²⁵
 eternal life is here, infused by God's own breath.
 The strife of cosmic history makes brilliant sense at last,
 creation's winding journey, its travail, pain, now past;
 cross and resurrection unleashed life-giving force
 from God into creation to chart a whole new course.

Church

The church bursts into life—no languid evolution—
 the worth of all affirmed, the Christian revolution,
 proclaiming to all folk, peace, justice, charity,
 sexes, races, classes, one in perfect parity.
 God's mercy reaches all, there is not one exception,
 we're equal in God's sight—true human rights inception.¹²⁶
 The church must serve in love that humankind be blest,
 and that God's healing power will truly be confessed.
 And yet the church so fails God's grace to manifest,
 therefore, *ecclesia semper reformanda est*.¹²⁷

123 Luke 24:13–35, esp. 14, 32.

124 John 20:24–29.

125 Romans 8:2.

126 David Bentley Hart, *Atheist Delusions* (New Haven: Yale University Press, 2009), 166–182.

127 “The church must always be reformed.”

United in love, we proclaim Whom we follow;
with rancour, division, that rings very hollow.
The church is so plagued by abundance of “isms”—
its witness is damaged by fragmenting schisms.
Feebly we model Your indiscriminate grace,
Your surpassing mercy to each child of each race;
O Lord, has the plan for your world been aborted?
Your righteous demands have been widely distorted.
We say we’re disciples—but, recalcitrant breed,
cannot extirpate the rampant selfishness weed;
Your people sink helpless in a morass of greed,
so small our compassion for your poor in great need;
we so blindly pursue the consumerist creed—
is there hope in our time? Lord please speak, help us heed.

Science

In tribal myth—spirits, gods, trees, sky are blended,
and should not be disturbed—the gods might be offended.
For Hebrew tribes only, creation’s transcended,
de-deified; God’s world may be comprehended.¹²⁸
The gods of the Greeks are conniving, capricious;
but Israel’s God, sovereign, truthful, judicious.
Consistent and lawful, the world God created:
a gift of the Gospel—science is gestated!¹²⁹
The Stoic world cycles through endless reversions,
so lassitude undermines research exertions.
But the God who redeems acts through history’s flows,

128 Harold Turner, *The Roots of Science* (Auckland: DeepSight Trust, 1998), 54–78.
129 Mark Worthing, *Unlikely Allies: Monotheism and the Rise of Science* (Eugene: Wipf & Stock, 2019); Peter Harrison, “Religion and the Rise of Science,” *Faraday Paper 21* (2021), <https://www.faraday.cam.ac.uk/wp-content/uploads/2021/03/Faraday-Paper-21-Harrison-web.pdf>.

the cause-and-effect linear time that science knows.¹³⁰
 God's nature is goodness, and God's world must be good;
 our glad confidence in the world's preciousness would
 enhance nature's beauty before wondering eyes,
 to aid and abet growth of the science enterprise.
 God made nature in freedom, the world is contingent,
 so researchers explore, humbly and with most stringent
 empiricality and hypothesis testing
 to reveal nature's laws, the prized fruit of their questing.
 "The glory of God and the good of humanity,"
 underlie science; which may sink to inanity
 by the pursuit of prestige and of monetary gain;
 science is God's gift; is divine largesse in vain?
 Lord you are the Truth, and when you are rejected,
 integrity needed for science is neglected.¹³¹
 When deaf to your *Logos*, existential thought rules,
 we create our own "truth"—will we wink out like fools?¹³²
 Conspiracy theories pollute even God's church;
 Where's the Spirit of Truth? Are we back in the lurch?
 Addicted to falsehood, reckless ideation,
 dare we hope "God will not abandon creation"?¹³³

Eschaton

Quantum void, hot Big Bang, stellar fires—God ordained,

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- 130 Stanley L. Jaki, *Science and Creation* (Edinburgh: Scottish Academic Press, 1986), 102–137.
- 131 Scientific integrity is being eroded by corrupt practices. Perhaps 400,000 papers published over the last twenty years (up to 2% of the whole) are fraudulent. See Richard Van Noorden, "How Big is Science's Fake-Paper Problem?" *Nature* 623 (2023): 466–467.
- 132 For a comment on the dangers of disinformation to human survival, see Volker Turk, "Protect the 'Right to Science' for People and the Planet," *Nature* 623 (2023): 9.
- 133 A hope-filled assertion given by Professor Sir John Houghton at a public lecture on climate change I attended, Auckland.

desert Earth, complex goo, simple cells—God maintained,
 life, beasts and then people, Israel, church—God sustained,
 in them God's plan was gestated, good purpose contained.
 Now God's kingdom's concealed, it seems merely latent;
then wondrous surprise, God's just rule will be patent.
 Now beauty is haunting, and we cannot hold it;
then beauty is lasting, with joy we'll enfold it.
 Whilst first sight of mountain, forest, coastline enthrals,
 with subsequent seeing, the high ecstasy palls;
 but Father-Son glory, creation transcending,¹³⁴
 we'll witness enraptured, in awe never-ending.
 Lord, your ways with people, show uniformity—
 not of despotic might—of cruciformity.
 New Creation's cost to you, profound enormity;
 till then, help us follow you in full conformity.
 You make things of wonder from the crudest of dross,
 the supreme paradigm, that most hideous cross;
 to us, cogent symbol of love fully expressed,
 of your mercy supreme, grace by which we are blessed.
 As players in your saga of suffering to glory,¹³⁵
 we'll see the denouement of your cosmic story.
 Your plan for the ages, from mute matter begun,
 is to fill New Creation with folks like your Son!¹³⁶
 The point of the journey, this painful biosis,
 imbued with your life by the Son's great *kenosis*,¹³⁷
 to arrive at a creaturely apotheosis:
 a dull primate enwrapped into loving *theosis*!
 The Spirit's vitality, end of all thirsting,
 the spring of the water of life, gushing, bursting

134 John 17:4–5, 24.

135 John 12:27; Luke 24:26; Acts 3:13, 18; Romans 8:18; Hebrews 2: 9, 10; 1 Peter 1:11; 4:13; 5:1, 10.

136 A big-picture summary learned from my Father Matthew.

137 Philippians 2:7.

forth, filling us, as the pure source of our being,
with your truth, fully known, with acuity seeing.
In full obedience, Jesus went to the cross,
to offer all people *zoe aionios*;
for groaning creation, he's *Omega, Telos*,
the true goal and purpose, the final *Eschatos*.¹³⁸
The most wondrous secrets inhere in the Trinity,
we'll learn, rejoice, worship through time's great infinity.
To wonder at those eternal scars on the Lamb
To rejoice in the love of the triune I AM.

138 Revelation 1:17; 2:8; 22:13.

A Reassessment of Scientific Evidence for the Exodus and Conquest

Alan Dickin

Abstract: Archaeological evidence records the sacking of the city of Jericho, but radiocarbon dating of this event puts it much earlier than the generally accepted dates for the exodus of the Israelites from Egypt. Since the Bible claims that Jericho was destroyed forty years after the exodus, this discrepancy has led most scholars to question the historicity of the biblical account. Many have concluded that the exodus from Egypt and the Israelite conquest of Canaan were not real events. Surprisingly, radiocarbon dating of the Late Bronze Age is also in question, because at several critical sites such as Akrotiri, Avaris, and Jericho, radiocarbon ages are consistently older than dates from pottery stratigraphy. These discrepancies are a huge problem for both biblical and secular archaeology. On the one hand, there is a lack of evidence to support the historicity of the biblical account; on the other hand, secular archaeologists have failed to explain the Middle Bronze Age “collapse” in Canaan, of which the fall of Jericho was a part. This paper reviews radiocarbon constraints for several important sites, and concludes that the coherence of biblical and archaeological accounts would be greatly improved by adopting an early sixteenth-century date for the biblical exodus.

Keywords: Avaris; Jericho; Middle Bronze Age; radiocarbon dating; Thera

Alan Dickin (DPhil, Oxford) is Emeritus Professor of Isotope Geochemistry at McMaster University, Ontario, Canada, where he worked in the School of Earth Environment and Society. His books include *A Scientific Commentary on Genesis 1–11* (2015) and *From the Stone Age to Abraham: A Biblical History of the Ancient World* (2021).

The exodus of the Israelites from Egypt is one of the most important narratives of the Old Testament. It is pivotal to Jewish faith, since the Law itself was given at Sinai, shortly after the exodus. The event is also pivotal for Christian faith, since Jesus identified himself as the Passover Lamb whose sacrifice would save all believers. Traditionally, the biblical exodus was regarded as a historical event, but according to the Documentary Hypothesis the book of Exodus was not assembled until the Jewish exile in Babylon at the earliest.¹ This has led many scholars to wonder how much of a historical nucleus in the Exodus account might actually be original.²

With the development of scientific archaeology in the early twentieth century, William F. Albright saw the opportunity to test and hopefully verify the Old Testament as a largely historical account of the origins of Israel.³ Hence, the discipline of Biblical Archaeology was conceived, and for a while it appeared to deliver on Albright's expectations.⁴ However, as scientific evidence accumulated, conflicts with the biblical record began to appear, and one of the main areas of disagreement was the biblical account of the exodus and conquest.⁵ These difficulties have now become so great that many scholars doubt that the exodus occurred in the form described in the Bible, and even those who believe it happened disagree about its timing.⁶

Amongst those who believe in a real historical exodus there are two main scholarly camps, arguing for either an early or a late exodus.⁷ One faction argues for an early exodus, at about 1450 BC, during the

1 Thomas B. Dozeman, *Exodus* (Grand Rapids, MI: Wm. B. Eerdmans Publishing, 2009), 25–30.

2 Terence E. Fretheim, *Exodus: A Bible Commentary for Teaching and Preaching* (Louisville, KY: John Knox Press, 1991), 6–9.

3 Thomas W. Davis, *Shifting Sands: The Rise and Fall of Biblical Archaeology* (Oxford University Press, 2004), 85.

4 Davis, *Shifting Sands*, 95–122.

5 William G. Dever, "Biblical Theology and Biblical Archaeology: An Appreciation of G. Ernest Wright," *Harvard Theological Review* 73:1–2 (1980): 1–15.

6 Graham I. Davies, "Was There an Exodus?" in *In Search of Pre-Exilic Israel*, ed. John Day (London: Bloomsbury, 2004): 23–40.

7 Lawrence T. Geraty, "Exodus Dates and Theories," in *Israel's Exodus in Transdisciplinary Perspective: Text, Archaeology, Culture, and Geoscience*, ed. Thomas E. Levy et al. (New York: Springer, 2015): 55–64.

Egyptian eighteenth dynasty. The other argues for a later one, at about 1250 BC, during the nineteenth dynasty.⁸

According to the biblical books of Exodus and Joshua, the Israelites invaded Canaan forty years after the exodus from Egypt, and by far the most important of the early conquests was the battle of Jericho. Joshua 6 claims that the walls of Jericho fell down after the Israelites marched round them for seven days, and having taken the city they burned it to the ground. Joshua then cursed the city, saying that its rebuilders would pay with their sons' lives. Hence, this account should provide an ideal archaeological dating target: evidence for the collapse of the city walls, followed by the burning of the whole city, and a long period of abandonment.

When major archaeological excavations were carried out at Jericho in the 1930s, the evidence initially appeared consistent with the biblical account based on an early exodus. Thus, it appeared that the city walls had indeed fallen down, followed by the burning of the city, and this event was dated to around 1400 BC based on pottery stratigraphy.⁹ However, when Kathleen Kenyon excavated Jericho in the 1950s, she reinterpreted the pottery dating evidence, arguing that the destruction occurred about 150 years earlier, around 1550 BC.¹⁰

Some evangelical authors have attempted to rescue the situation by arguing that the Israelite conquest of Jericho does not correspond to the destruction event excavated by Kenyon, but to a much later event (in the late thirteenth century BC), following the late exodus mentioned above. For example, Kenneth Kitchen argued that the Israelites destroyed a Late Bronze Age city, but the debris was removed by erosion. He even suggested that the remains might be buried under the modern road.¹¹ However, Kenyon excavated 20m upslope

8 Mark D. Janzen et al., *Five Views on the Exodus: Historicity, Chronology, and Theological Implications* (Grand Rapids, MI: Zondervan Academic, 2021).

9 John Garstang, "A Third Season at Jericho: City and Necropolis," *Palestine Exploration Quarterly* 64:3 (1932): 149–153.

10 Kathleen M. Kenyon, *Digging Up Jericho: The Results of the Jericho Excavations, 1952–1956* (London: Praeger and Benn, 1957), 261–262.

11 Kenneth A. Kitchen, *On the Reliability of the Old Testament* (Grand Rapids, MI: Eerdmans, 2003), 187.

from the road (inside the city), and found that Iron Age deposits lay directly on eroded Middle Bronze Age levels, revealing no evidence for Kitchen's proposed Late Bronze Age destruction layer.¹² Alternatively, others have argued that Late Bronze Age Jericho was not a city at all, since the Hebrew word used to describe Jericho as a city (*iyr*) can also mean a military fort. As an example of such usage, Richard Hess argued that the "City of David" is equated with the "fortress of Zion" in 2 Samuel 5:7–9.¹³ However this is misleading because the City of David was a real city, not just a fortress, as spelled out by Josephus.¹⁴ In fact, there are 1089 usages of the Hebrew word *iyr* in the Old Testament, the great majority of which are translated as "city" or "town," so this argument is actually quite weak.

Further serious problems with the late date exodus arise from the poor fit of the biblical account to the history of the nineteenth dynasty. For example, if the Israelites were enslaved for many years to build the store city of Rameses (Exodus 1:11), it could have been during the long reign of Rameses II. But the exodus reportedly occurred *after* the death of the pharaoh of the enslavement (Exodus 2:23), implying that it occurred during the reign of his son Merneptah (= Merenptah). However, the "stele of Merneptah" describes the Israelites as being already in Canaan by the fifth year of Merneptah's reign, so this chronology does not work.¹⁵

These contradictions represent a huge problem for the historicity of early Israel, and a major embarrassment for the discipline of Biblical Archaeology. In fact, the problem is so bad that most scholars of Middle Eastern archaeology no longer believe the biblical account of the exodus and conquest, whereas many Bible believers have given

12 Kathleen M. Kenyon, "Excavations at Jericho, 1957–58," *Palestine Exploration Quarterly* 92:2 (1960): 88–113.

13 Ricard S. Hess, "The Jericho and Ai of the Book of Joshua," in *Critical Issues in Early Israelite History*, ed. Richard S. Hess et al. (Winona Lake, IN: Eisenbrauns, 2008), 33–46.

14 Flavius Josephus, *Antiquities of the Jews* 7.3.2, in *The Works of Josephus*, trans. William Whiston (Peabody, MA: Hendrickson Publishers, 1987).

15 Michael G. Hasel, "Israel in the Merneptah Stela," *Bulletin of the American Schools of Oriental Research* 296:1 (1994): 45–61.

up trying to solve the scientific problem and have fallen back on justifications of the exodus from a faith basis alone.¹⁶

An alternative solution to the problem of the exodus was proposed by Hendrik Bruins and Johannes Van Der Plicht,¹⁷ but although their paper has been cited more than fifty times in the scholarly literature, it has been given little credence by archaeologists. Bruins and Van Der Plicht argued that the Israelite exodus actually occurred around 150 years before the so-called early date discussed above, and coincided with the eruption of Thera volcano (Santorini). This eruption arguably created such a thick dust cloud that it led to “darkness that could be felt” in Egypt for three days (Exodus 10:21). Bruins and Van Der Plicht argued that this event dates the exodus to around 1630 BC, so that after a forty-year period in the wilderness the Israelites would have sacked Jericho around 1590 BC. This age agreed with preliminary radiocarbon dating of the Jericho destruction layer to the early sixteenth century BC.¹⁸ However, radiocarbon dating of the Thera eruption is in considerable doubt, because a date nearly a hundred years later has also been proposed. This younger date is based on correlations between Late Minoan pottery buried under the ash at Akrotiri and pottery from the palace of Knossos in Crete.¹⁹ This Cretan pottery was itself correlated with the eighteenth dynasty in Egypt, beginning after 1550 BC.²⁰

Archaeological excavations at the ancient Egyptian city of Avaris (modern Tell el-Daba) in the Nile Delta may also constrain the date of the exodus, since Avaris was the capital of the Semitic Hyksos dynasty, and has been associated with the Israelite sojourn in Egypt since the

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- 16 William G. Dever, “Is There Any Archaeological Evidence for the Exodus?” in *Exodus: The Egyptian Evidence*, ed. Ernest S. Frerichs and Leonard H. Lesko (Winona Lake, IN: Eisenbrauns, 1997): 67–86.
 - 17 Hendrik J. Bruins and Johannes Van Der Plicht, “The Exodus Enigma,” *Nature* 382:6588 (1996): 213–214.
 - 18 Hendrik J. Bruins and Johannes Van Der Plicht, “Tell es-Sultan (Jericho): Radiocarbon Results of Short-Lived Cereal and Multiyear Charcoal Samples from the End of the Middle Bronze Age,” *Radiocarbon* 37:2 (1995): 213–220.
 - 19 Denys L. Page, *The Santorini Volcano and the Desolation of Minoan Crete* (London: Society for the Promotion of Hellenic Studies, 1970), 1–44.
 - 20 Vronwy Hankey and Peter Warren, “The Absolute Chronology of the Aegean Late Bronze Age,” *Bulletin of the Institute of Classical Studies* 21 (1974): 142–152.

time of Josephus.²¹ This theory is based on the location of Avaris in the immediate vicinity of the later city of Rameses mentioned in Exodus. Avaris suffered an “abandonment” event around the same time as the Thera eruption, which might be correlated with the departure of the Israelites. However, the chronology of the Avaris archaeological section is also disputed.²²

Part of the background to this problem is a perceived (or real) lack of reliability of radiocarbon dating in the period in question, which is generally described as the transition from the Middle to Late Bronze Age, around 1550 BC. However, recent improvements in the radiocarbon calibration curve during this period should dispel these uncertainties. They are the justification for revisiting this problem here, with the hope of resolving some of the dating issues.

Radiocarbon Dating in the Mid/Late Bronze Age

Radiocarbon dating is a mature technology, and normally we expect the results to be consistent (within analytical error) with other well-dated material contexts in the archaeological record. Unfortunately, there are several instances in the Mid/Late Bronze age where this is apparently not the case. The problem arises from two principal considerations. The first is that within this period, other dating methods (such as those based on king lists) appear sufficiently precise to challenge radiocarbon dating, but not sufficiently accurate to allow dating certainty (as we might claim for many dates AD). The second factor arises from the process of radiocarbon age calibration, which leads to variable and uncertain degrees of historical accuracy, even for analytically precise dates. This problem needs to be carefully understood before we can evaluate radiocarbon dates critically.

It is a fundamental premise of modern radiocarbon analysis that the dating procedure is done in two stages: a first analytical stage to

21 Flavius Josephus, *Antiquities of the Jews* 2.15:2.

22 Walter Kutschera et al. “The Chronology of Tell el-Daba: A Crucial Meeting Point of ¹⁴C Dating, Archaeology, and Egyptology in the 2nd Millennium BC,” *Radiocarbon* 54:3–4 (2012): 407–422.

determine a “conventional” age “before present” (BP), and a second calibration stage where the conventional age is translated into a calibrated age, usually expressed as BC or AD. The calibration stage is not a simple process, because the past production of atmospheric radiocarbon (the starting point for the dating procedure) varied through time.²³ Radiocarbon production is from the flux of galactic cosmic rays reaching the earth and colliding with air molecules to produce neutrons. After being slowed by collisions, these neutrons can be absorbed by atmospheric nitrogen atoms to produce radiocarbon (C-14). Although the flux of galactic cosmic rays is expected to be constant, it is modulated by variable deflection away from the earth by the solar wind.

Two separate processes control the solar modulation of galactic cosmic rays. The first is the variable activity of the sun itself, which is inversely related to the number of sunspots. The second is the earth’s geomagnetic field, which partially deflects the solar wind and therefore affects the penetration of galactic cosmic rays. The solar intensity cycle follows the well-known eleven-year sunspot cycle, but this cycle is superimposed on longer-term changes in solar activity lasting for tens to hundreds of years. In turn, geomagnetic field variations occur over hundreds to thousands of years. The combined result is the complex curve seen in Figure 1, which shows past atmospheric C-14 activity relative to 1950s wood, expressed as the delta function (parts per thousand deviations).

Although Figure 1 displays the actual variation of atmospheric C-14 activity through time, for dating purposes it is more useful to plot the same data on a graph of conventional radiocarbon age versus calendar age (Figure 2). If there were no atmospheric C-14 variations, the result would be a smooth curve with negative slope. On the other hand, the wiggles are caused by atmospheric C-14 activity variations through time, as discussed above.

23 Alan P. Dickin, *Radiogenic Isotope Geology* (Cambridge University Press, 2018), 366.

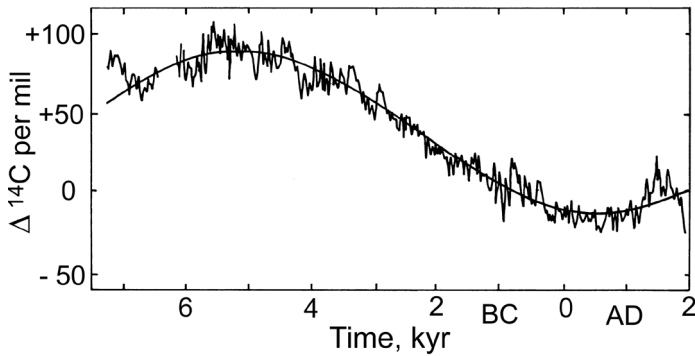


Figure 1. Changes in atmospheric C-14 activity in the last 9000 years, presented in the form of isotopic fractionation per mil, based on Bristlecone Pine and European Oak chronologies. (The smooth sine wave was an approximation later proved wrong). After Bruns et al.²⁴

Some of these wiggles reinforce the effect from radiocarbon decay, increasing the negative slope. For example, a conventional radiocarbon age of 3250 years BP intersects a steep segment of the curve (see arrow in Figure 2). Because it intersects a steep section, the calibrated age for this sample would be precise, yielding a reliable result with a small error. However, a conventional age of 3350 years BP yields a very different result.

This age intersects a section of the calibration curve with several wiggles in a sub-horizontal segment. Bearing in mind the analytical uncertainty represented by the Poisson distribution on the left, the probability function for the calibrated age is complex (black distribution), with a large uncertainty from ca 1530 to 1690 BC.

24 Michael Bruns et al., “The atmospheric ^{14}C level in the 7th Millennium BC,” in *Proceedings of the First International Symposium ^{14}C and Archaeology*, Groningen, 1981, vol. 8 (1983): 511–516.

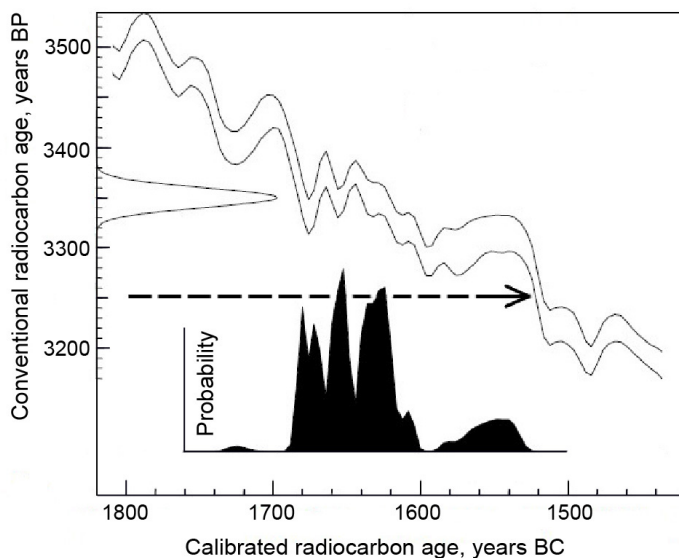


Figure 2. Plot of the IntCal 1998 radiocarbon calibration curve for the Mid/Late Bronze Age, showing the effect of wiggles on C-14 age calibration. Modified after Bronk Ramsey et al.²⁵

To help solve the complex nonlinear process of radiocarbon age calibration, Bayesian analysis was introduced into radiocarbon dating.²⁶ As well as handling the nonlinear calibration process, Bayesian analysis also allows the use of additional dating constraints to reduce the uncertainties of calibrated ages. These additional constraints, called “priors,” are particularly important for calibrating stratigraphic sequences of dated objects. By insisting that the resulting radiocarbon ages must be in chronological order, the procedure allows good quality calibrated ages to be determined, even from a “bad” section of the calibration curve, provided the sequence is long enough to span several

25 Christopher Bronk Ramsey et al., “Dating the Volcanic Eruption at Thera,” *Radiocarbon* 46:1 (2004): 325–344.

26 Caitlin E Buck et al., “Calibration of Radiocarbon Results Pertaining to Related Archaeological Events,” *Journal of Archaeological Science* 19:5 (1992): 497–512.

wiggles. Of course, the process is carried out by a computer program, of which the Oxcal package is one of the most used.²⁷ The only disadvantage is a tendency for Bayesian analysis to be a “black box” process that yields little intuitive evidence for the robustness of the resulting ages. For this reason, the age calibrations discussed below will be analysed using the calibration curve alone, in order to give a better visual impression of the reliability of different age results.

Dating the Thera Eruption

As noted above, Bruins and Van Der Plicht proposed an earlier date for the Exodus, in the late seventeenth century BC, based on the possibility that it was connected with the eruption of the Thera (Santorini) volcano. However, radiocarbon ages for the Thera eruption are in conflict with pottery-dating evidence, causing this to become something of a test case for the accuracy of radiocarbon dating.

In fact, “pottery stratigraphy” was the original means of dating the eruption, so when radiocarbon dating gave ages about one hundred years older, they were greeted with suspicion.²⁸ However, additional radiocarbon measurements generally supported the older dates. For example, Bronk Ramsey and coworkers presented sixteen radiocarbon dates for charred seeds from the volcanic destruction layer at Akrotiri.²⁹ These data gave a conventional radiocarbon age of 3350 $\pm$ 20 years before present, yielding the calibrated age probabilities (black shading) shown in Figure 2. Because the charred seeds could only be a few months or years old when they were carbonised by the eruption, this avoids a common problem with dating charcoal, which can be from timber many decades older than the destruction layer. Therefore, Bronk Ramsey and coworkers assessed a high probability that the

27 Christopher Bronk Ramsey, “Radiocarbon Calibration and Analysis of Stratigraphy: The OxCal Program,” *Radiocarbon* 37:2 (1995): 425–430.

28 Philip P. Betancourt and Gail A. Weinstein, “Carbon-14 and the Beginning of the Late Bronze Age in the Aegean,” *American Journal of Archaeology* 80:4 (1976): 329–348.

29 Bronk Ramsey et al., “Dating the Volcanic Eruption at Thera,” 326.

eruption occurred in the late seventeenth century. However, several other researchers have suggested reasons why the radiocarbon age might have been overestimated.

These objections principally concern the reliability of the calibration process, based on several different factors. Firstly, there were suggestions that the calibration curve in the Mid/Late Bronze Age might be inaccurate due to reliance on older (pre accelerator-based) radiocarbon analyses.³⁰ Therefore, attempts were made to improve the quality of the calibration curve in this period, based on the analysis of single annual growth bands from dendrochronologically dated Bristlecone Pine and European Oak sample sequences.³¹ These new samples were used in the 2020 international calibration exercise (IntCal 2020), and were found to cause substantial increases in the apparent age of the calibration curve in the interval of interest (Figure 3). The most dramatic change is the removal of the low wiggly part of the curve between 1650 and 1690 BC. The resulting probability distribution (pale pink shading) greatly reduces the likelihood of calibrated Thera ages over 1650 BC, relative to IntCal 1998. The new calibration also creates a steeper section of the curve between 1640 and 1610 BC, which will have important implications for new dating approaches to be described below.

Although the new international calibration is clearly important, we also need to examine whether various more localised effects could have perturbed the radiocarbon signature of the Mediterranean atmosphere relative to the international curve. The IntCal curve is based on worldwide (Northern Hemisphere) averaging of tree-ring data, assuming global atmospheric radiocarbon homogenisation. The evidence for this homogenisation comes from analyses of atmospheric C-14 in the months and years after the atmospheric nuclear tests of the early 1960s, which indicated worldwide atmospheric homogenisation within three

30 Johannes Van Der Plicht et al., “Recent Developments in Calibration for Archaeological and Environmental Samples,” *Radiocarbon* 62:4 (2020): 1095–1117.

31 Charlotte L. Pearson et al. “Annual Radiocarbon Record Indicates 16th Century BCE Date for the Thera Eruption,” *Science Advances* 4:8 (2018): eaar8241.

years.³² However, it has been suggested that local atmospheric contamination effects could have perturbed the global record.

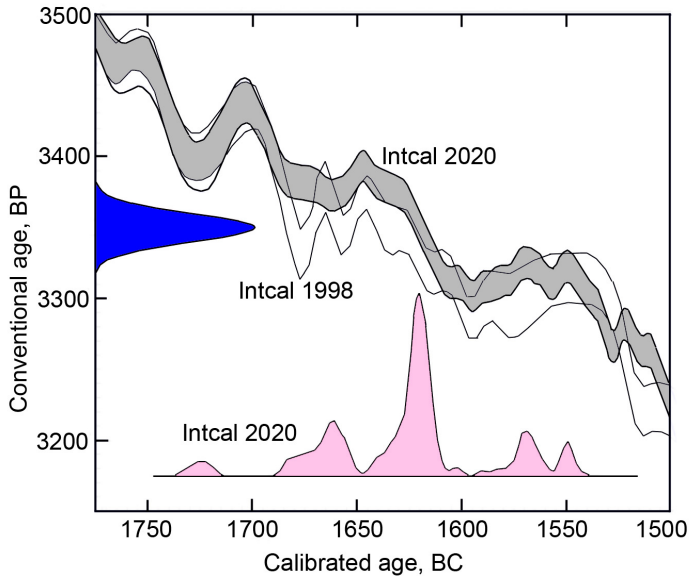


Figure 3. Comparison of the IntCal 1998 and 2020 calibration curves, showing the probability distribution of calibrated ages (pale pink shading) for a 3350 BP conventional age using the more recent curve. Modified after Van Der Plicht et al. (2020).

Firstly, it was argued that the volcanic eruption, which was doubtlessly preceded by fumarole activity, might have polluted the local atmosphere with volcanic carbon dioxide carrying “dead” radiocarbon, thus increasing apparent C-14 ages by an unknown amount.³³ Such a criticism might have applied to the early radiocarbon data, which were quite noisy, possibly reflecting local perturbation effects. However, it is

32 Willard F. Libby, “Ruminations on Radiocarbon Dating,” in *Radiocarbon Variations and Absolute Chronology: Proc. 12th Nobel Symp.*, ed. I. U. Olsson (Wiley, 1970): 629–640.

33 Malcolm H. Wiener, “Problems in the Measurement, Calibration, Analysis, and Communication of Radiocarbon Dates (with Special Reference to the Prehistory of the Aegean World),” *Radiocarbon* 54:3–4 (2012): 423–434.

very hard to see how volcanic CO₂ could have perturbed the much more consistent data of the past twenty years.³⁴ A more serious objection is that the global calibration curve might not be representative of local interactions between vegetation and radiocarbon in the Mediterranean atmosphere. For example, global homogenisation of radiocarbon within a few years does not preclude seasonal changes in atmospheric radiocarbon, which might lead to offsets in radiocarbon activity in different kinds of plants, if they have different growing seasons. To test this possibility, Michael Dee and coworkers analysed short-lived plant specimens of known age collected over the past three hundred years in Egypt.³⁵ They found an offset of about 20 years between the radiocarbon ages and collection dates, implying that such an offset might also have affected ancient samples.

To test this effect for the period of interest concerning the Thera eruption, some labs, most notably the Arizona radiocarbon lab, established local Mediterranean calibration curves for the Mid/Late Bronze Age. These curves imply that indeed there might be local offsets within the period of interest, even from the IntCal 2020 curve. In line with the data for the recent Egyptian samples, the new Mid/Late Bronze Age calibration for the eastern Mediterranean suggests a fourteen-year increase in the apparent age of the calibration curve, relative to IntCal 2020.³⁶ The result is that the best fit curve for the regional calibration now runs almost exactly along the upper envelope of the IntCal 2020 uncertainty band (Figure 3). We do not need to reprocess the data completely in order to see the expected result of this change on the Thera data discussed above: the effect is to reduce further the likelihood of calibrated age-peaks above 1650 BC, and correspondingly to increase the likelihood of calibrated ages below 1600 BC. This means

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- 34 Sturt W. Manning et al., “Chronology for the Aegean Late Bronze Age 1700–1400 BC,” *Science* 312:5773 (2006): 565–569.
 - 35 Michael W. Dee et al., “Investigating the Likelihood of a Reservoir Offset in the Radiocarbon Record for Ancient Egypt,” *Journal of Archaeological Science* 37:4 (2010): 687–693.
 - 36 Charlotte Pearson et al., “Olive Shrub Buried on Therasia Supports a Mid–16th Century BCE Date for the Thera Eruption,” *Scientific Reports* 13:1 (2023): 6994.

that, based on a single conventional age such as the one shown in Figure 3, it is impossible to achieve a precise calibrated age for the Thera eruption, due to the long plateau in the calibration curve between 1610 and 1550 BC.

Dating Thera Olive Branches

This is clearly an unsatisfactory situation, but it can be overcome by dating samples with internal age structure spanning a known period, such as pieces of wood with many annual growth rings. For such a sample, the outer (bark) layer dates the destruction event when the tree died, but the inner tree rings are several decades older, and can therefore “anchor” the radiocarbon age of the bark to a steep part of the calibration curve that gives precise calibrated ages. In the case of Thera, this means analysing wood from a tree that was actually alive when the eruption occurred.

Such a sample was obtained by Walter Friedrich and coworkers from the branch of an olive tree, found in situ within the ash deposit of the volcano near the top of the caldera wall on the island of Thera.³⁷ Since the branch is “suspended” within the tephra layer, it cannot represent dead wood lying on the pre-eruption land surface. It must have been standing, and the fact that dead leaves were found below the ash layer under the tree suggests that the tree (and another one nearby) were still alive when the eruption began (unfortunately the leaves were too small for radiocarbon analysis).³⁸ Friedrich et al. cut a section of the branch into four contiguous blocks, spanning an estimated seventy-two years of annual rings, identified by X-ray tomography. The resulting “floating sequence” of conventional radiocarbon ages was a good fit to the IntCal 1998 curve, but a bad fit to the IntCal 2020 curve and the new Mediterranean calibration curve in Figure 4a (open symbols).

37 Walter L. Friedrich et al., “Santorini Eruption Radiocarbon Dated to 1627–1600 BC,” *Science* 312:5773 (2006): 548–548.

38 Jan Heinemeier et al., “The Minoan Eruption of Santorini Radiocarbon Dated by An Olive Tree Buried by the Eruption,” *Antiquity* 88:339 (2014): 285–293.

Other researchers disputed the ability of Friedrich et al. to count annual growth bands in olive wood, due to the weak seasonality of Mediterranean growing conditions.³⁹ In response, Friedrich suggested that since the four analysed sample blocks were contiguous, their conventional ages could be directly fitted to the new calibration curve, ignoring the counted “annual” rings.⁴⁰ The result of this procedure is shown by the solid symbols in Figure 4a. The four radiocarbon analyses define a good fit to one of the few straight sections of the calibration curve, firmly anchoring the youngest of the wood samples, so that its bark surface (arrow) defines a calendar age of 1608 (+/- 10 years) BC. However, the age span of the blocks calculated in this way (twenty-three years on the x-axis) is less than a third of the seventy-two rings estimated by X-ray analysis of the wood.⁴¹

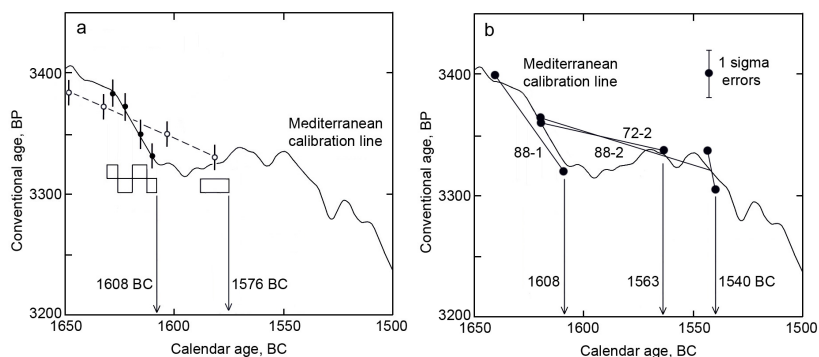


Figure 4. Attempted fitting of floating radiocarbon data sets for olive branches from (a) Thera and (b) Santorini, relative to the latest eastern Mediterranean calibration curve of Pearson et al. (2023).

To test these results, Pearson et al. analysed branches from an “olive shrub” on the island of Santorini that was buried under the same ash

39 Paolo Cherubini et al., “The Olive-Branch Dating of the Santorini Eruption,” *Antiquity* 88:339 (2014): 267–273.

40 Walter L. Friedrich et al., “The Olive Branch Chronology Stands Irrespective of Tree-Ring Counting,” *Antiquity* 88:339 (2014): 274–277.

41 Friedrich et al., “The Olive Branch Chronology,” 548.

deposit.⁴² Samples were collected from the central and outer tree-rings of four branches, but only three of the pairs gave a usable spread of conventional ages for fitting to the calibration curve. Results for the three usable branches are plotted in Figure 4b. In all three cases, conventional ages for the core of the branch can be anchored in the steep section of the calibration curve (> 1610 BC). Then, based on counted “annual” rings, calibrated ages can be determined for the outermost/bark layer for the three branches, yielding ages of ca 1540, 1563, and 1608 BC (Figure 4b). Clearly, these ages are in substantial disagreement, but before discussing them further it is helpful to examine ice-core evidence from polar regions.

Ice Core Records of Volcanic Eruptions

Since large explosive eruptions such as Thera launch dust and aerosols into the stratosphere, these materials can be distributed globally and then accumulated in ice cores from Greenland and Antarctica. In both locations, drill cores through the ice can be dated to individual calendar years based on ice stratigraphy, a method analogous to dendrochronology. A few dozen “event horizons” have been identified for the past few thousand years, based on concentrations of sulphate aerosols (Figure 5).⁴³ The largest of these sulphate deposits in the period of interest, at 1628 BC, had previously been speculatively linked with the Thera eruption, and also with a poor growth year in Irish dendrochronology records.⁴⁴ However, analysis of dust from the 1628 BC horizon showed that this signal was actually caused by the eruption of an Aleutian volcano, Aniakhak. A link between Thera and the second-largest signal (at 1654 BC, Figure 5) can also be excluded, because radiocarbon dating of Thera-related tsunami debris from SW Turkey gives a maxi-

42 Pearson et al., “Olive Shrub Buried on Therasia,” 6994.

43 Charlotte Pearson et al., “Geochemical Ice-Core Constraints on the Timing and Climatic Impact of Aniakhak II (1628 BCE) and Thera (Minoan) Volcanic Eruptions,” *PNAS nexus* 1:2 (2022): pgac048.

44 Michael G. L. Baillie and Mackenzie A. R. Munro, “Irish Tree Rings, Santorini, and Volcanic Dust Veils,” *Nature* 332:6162 (1988): 344–346.

imum age of 1612 BC for the eruption.⁴⁵ However, one of several smaller sulphate horizons in Figure 5 might be correlated with the Thera eruption.

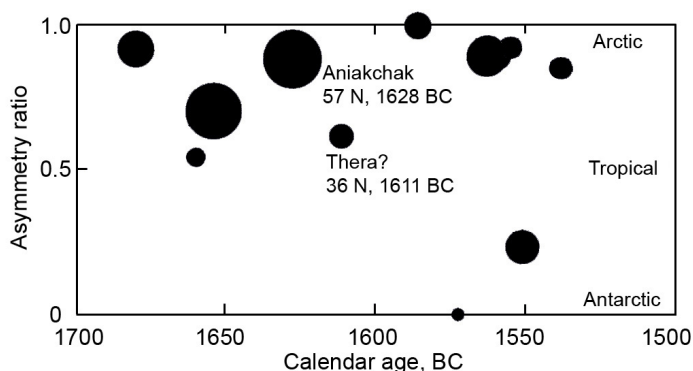


Figure 5. Black spheres representing the relative sizes of sulphate aerosol deposits in polar ice cores are plotted against ice core stratigraphic ages for the late Middle Bronze Age. The “asymmetry ratio” plotted on the y-axis is discussed in the text. Modified after Pearson et al. (2022).

To provide further constraints on the possible sources of sulphate signals in Greenland and Antarctic ice cores, Pearson et al. developed an index they termed the “asymmetry ratio” (AR), plotted on the y-axis in Figure 5. This AR index expresses the relative magnitude of sulphate horizons observed in three Greenland ice cores relative to two Antarctic cores. The AR index is a rough guide to the latitude of the eruption, such that values near unity indicate Arctic events, values near zero indicate the Antarctic, while intermediate values indicate tropical eruptions. However, the direction of volcanic ejecta lofting may have affected these values. For example, Aniakchak has a larger AR value than we might expect from its latitude of 57 N, but the distribution of

45 Vasif Şahoğlu et al., “Volcanic Ash, Victims, and Tsunami Debris from the Late Bronze Age Thera Eruption Discovered at Çeşme-Bağlararası (Turkey),” *Proceedings of the National Academy of Sciences* 119:1 (2022): e2114213118.

its ash deposits indicates a strong northward trajectory of the eruption products.⁴⁶ This would have fed material directly into the Canadian Arctic jet stream, to be directly deposited in Greenland. In turn, Thera ash deposits indicate an easterly ejecta plume,⁴⁷ which would most likely have fed into the Middle Eastern jet stream.⁴⁸ This would have distributed aerosols more globally, generating a relatively low AR value, consistent with the 1611 eruption in Figure 5. In fact, the 1611 event is the only one after 1650 BC that has a signature consistent with a Mediterranean (subtropical) eruption, whereas the other eruptions all have Arctic or Southern Hemisphere signatures.

For the data of Friedrich et al. (Figure 4a), the 1611 BC ice-core date provides by far the best fit to the radiocarbon data. A model based on the counted rings (open symbols) is excluded by the very bad fit of the third sample block to the calibration curve, thus favouring a direct fit to the calibration curve (solid symbols). This approach was advocated in the 2014 paper by Friedrich et al., suggesting that they were aware of having misjudged the growth banding in their 2006 paper. But the study of Pearson et al. (Figure 4b) suffers from inadequate sampling. Ages from the three different branches support each of the possible ice-core dates for the eruption (ignoring the latitude evidence). However, these cannot be resolved because two-point sampling of each olive branch is not sufficient to provide adequate “wobble matching” with the calibration curve (compared with other similar investigations).⁴⁹ A conclusive test of the data would require the analysis of intermediate samples for branches 72–2 and 88–2 to allow better wiggle matching. In the meantime, the present author considers that

46 James Begét et al., “Age, Extent and Climatic Significance of the c. 3400 BP Aniakchak Tephra, Western Alaska, USA,” *The Holocene* 2:1 (1992): 51–56.

47 Emma N. Johnston et al., “Reconstructing the Tephra Dispersal Pattern from the Bronze Age Eruption of Santorini Using an Advection–Diffusion Model,” *Bulletin of Volcanology* 74 (2012): 1485–1507.

48 Qiaoling Ren et al., “Dynamical Analysis of the Winter Middle East Jet Stream and Comparison with the East Asian and North American Jet Streams,” *Journal of Climate* 35:14 (2022): 4455–4468.

49 Carla S. Hadden et al., “‘Approximate’ Wiggle-Match Dating Applied to Early American Museum Objects,” *Radiocarbon* (2023): 1–14.

the balance of the evidence supports the 1611 eruption age. According to the theory of Bruins and Van Der Plicht, this means that the Israelite exodus from Egypt was in 1611, and therefore the sack of Jericho was forty years later, around 1570. However, we need to compare this hypothetical date with evidence from Jericho itself.

The Sack of Jericho

Jericho was excavated in the early twentieth century by Sellin and Watzinger, and the overall structure of the city was confirmed in two subsequent excavation programs, by John Garstang and Kathleen Kenyon. These expeditions showed that Middle Bronze Age Jericho was surrounded by a large stone revetment, on top of which a mud brick wall had been erected. This mud brick wall had evidently suffered a catastrophic collapse, presumably due to a major earthquake event. The city was subsequently consumed by fire, as demonstrated in an excavation trench on the east side of the city, which contained collapsed building material, broken pottery, charcoal, and ash.⁵⁰

In a review of his early twentieth century excavation work, Watzinger dated the destruction event to the Middle Bronze Age (before 1600 BC), whereas Garstang placed it in the Late Bronze Age, around 1400 BC, both based on different interpretations of pottery stratigraphy.⁵¹ Kenyon reversed this assignment back to 1550 BC, also based on pottery evidence, because she considered the newly available radiocarbon method too inaccurate to yield a reliable result.

The pottery evidence is equivocal because it is based on gradual changes in style, which cannot necessarily be dated with a precision of less than a hundred years. For example, Byers et al. acknowledged that

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- 50 Titus Kennedy, "The Bronze Age Destruction of Jericho, Archaeology, and the Book of Joshua," *Religions* 14:6 (2023): 796.
 - 51 Carl Watzinger, "Zur Chronologie der Schichten von Jericho," *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 80:2/3 (1926): 131–136; John Garstang, "The Date of the Destruction of Jericho," *Palestine Exploration Quarterly* 59:2 (1927): 96–100.

Middle Bronze III pottery styles continued into Late Bronze I.⁵² Nevertheless, there is one type of artefact that can be linked to the reign of individual Egyptian pharaohs, and may therefore give precise historical ages. This is the evidence from Egyptian scarabs. The Egyptian scarab amulet was an artistic representation of a dung beetle, whose flat underside was used as a form of “stamp seal.”⁵³ So-called “royal scarabs” bearing the symbol or name of a specific pharaoh began to appear in the Second Intermediate Period of Egyptian history (ca 1850–1550 BC).⁵⁴ However, these scarabs quickly evolved from a personal seal of the pharaoh into a symbol of royal patronage. This trend continued into the New Kingdom (eighteenth to twentieth dynasties) with increasingly widespread royal scarab distribution up until the time of Amenhotep IV (Akhenaten), when the system temporarily collapsed.

With their distribution spreading beyond Egypt, royal scarabs became popular as burial goods in Canaan. Furthermore, because each pharaoh used a consistent design, scarabs found in tomb contexts can be identified with a particular pharaoh, and can therefore provide dating evidence. Specifically, since pharaonic reigns of the New Kingdom can be dated to within about ten years, they provide a maximum age for a burial, corresponding to the beginning of that pharaoh’s reign. However, as prized personal items, it is highly unlikely that scarabs deposited as grave goods would date much before the end of a pharaoh’s reign, and there is evidence that the scarabs of some long-reigning pharaohs (such as Thutmose III) were produced posthumously.⁵⁵ Hence, their incorporation into a tomb context could be many decades after the start-date of the reign in question.

At Jericho, most of the tombs are located outside the city walls. Garstang excavated many such tombs in what he called a necropo-

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- 52 Gary A. Byers et al., “Excavations at Khirbet el-Maqatir: The 2009–2011 Seasons,” *Judea and Samaria Research Studies* 25:2 (2016): 69.
 53 Regine Schulz, “Seals and Scarabs,” in *The Oxford Handbook of Egyptology*, ed. Ian Shaw and Elizabeth Bloxam (Oxford University Press, 2015), 367–408.
 54 Kathryn M. Cooney, “Scarab,” *UCLA Encyclopedia of Egyptology* 1:1 (2008).
 55 Cooney, “Scarab.”

lis, about 250m west of the city.⁵⁶ The more elaborate of these tombs consisted of a shaft about 3m deep, cut through superficial gravel deposits into bedrock, from which a chamber was excavated on one side of the shaft. When the tomb went out of use, the opening of the chamber was blocked with large rocks. However, the contents of the tombs show that they were used over long periods of time, with older disarticulated skeletons being cleared to the sides of the chamber in rough heaps so that space could be created at the front for new internments.⁵⁷ The result is that the deposits in each tomb generally lack stratigraphy, and can only provide approximate age ranges for human occupation at Jericho.

Garstang's Tomb 4 is particularly important, as it contained two scarabs of Amenhotep III (Figure 6), whose reign was dated at the time from 1411 to 1385 BC. This led Garstang to argue that the Jericho IV city that ended with a conflagration was occupied up to near the end of the reign of Amenhotep III, probably between 1400 and 1385 BC.⁵⁸ Backdating 40 years from these ages led to an estimated date for the exodus between 1440 and 1425 BC. Garstang considered this to be adequately close to the date of 1446 BC that can be derived from 1 Kings 6:1 by adding 480 years to the date of Solomon's temple. This therefore became part of the basis for the early exodus noted above.

An important factor in Garstang's argument was that no seals of Amenhotep IV (Akhenaten) were found in any of the Jericho tombs, making 1385 BC his lower age-limit for the period of occupation. However, it has since been found that production and distribution of royal scarabs declined markedly during the reign of Akhenaten, so the absence of such scarabs from Jericho does not mean that occupation of the site must have ended before his reign.⁵⁹

56 John Garstang, "Jericho, City and Necropolis," *Palestine Exploration Quarterly* 64:3 (1932): 149–153.

57 Kathleen M. Kenyon, "Some Notes on the History of Jericho in the Second Millennium BC," *Palestine Exploration Quarterly* 83:2 (1951): 101–138.

58 John Garstang and J. B. E. Garstang, *The Story of Jericho*, revised edition (London: Marshal & Morgan, 1948), 125.

59 Schulz, "Seals and Scarabs," 396.



Figure 6. Royal scarabs and seals excavated from Jericho. Modified from Garstang.⁶⁰ 1: Hatshepsut; 2: Thutmose III (with throne name); 3: Thutmose III; 4, 5: Amenhotep III (in cartouche).

With subsequent revisions to Egyptian dynastic chronology, the best estimate for the reign of Amenhotep III has been lowered considerably, to 1390–1352 BC.⁶¹ In addition, we must remember that these scarabs are in a mortuary context. They were placed in the tombs of their deceased owners, probably after a lifetime of usage. It is therefore inconceivable that they date from near the beginning of Amenhotep's reign. Hence, far from providing support for the destruction of Jericho by the Israelites in 1406 BC, the Amenhotep III scarabs actually refute this date, by showing that Jericho was occupied fifty years later, around the mid-fourteenth century BC.

If these scarabs do not date the occupation of Jericho before the destruction and conflagration caused by the Israelites, what do they represent? The best clue is given by the Middle Building, which was constructed on top of a talus slope of debris from the earlier destruction of the city. Garstang dated this building to the fourteenth century BC, and attributed it to an Egyptian vassal king, probably Eglon, King of Moab. He is recorded in Judges 3:12–14 as having defeated the Israelites and taken possession of Jericho (the City of Palms).⁶² On this basis, Kenyon attributed the post-destruction material found in the

⁶⁰ Garstang and Garstang, *The Story of Jericho*, 117.

⁶¹ Mark D. Janzen, "The Exodus: Sources, Methodology and Scholarship," in *Five Views on the Exodus: Historicity, Chronology, and Theological Implications*, ed. Mark D. Janzen et al. (Grand Rapids, MI: Zondervan Academic, 2021), 13–24.

⁶² John Garstang, "The Story of Jericho: Further Light on the Biblical Narrative," *The American Journal of Semitic Languages and Literatures* 58:4 (1941): 368–372.

tombs to the reuse of these tombs during the occupation of the Middle Building.⁶³ However, after a brief occupation (perhaps eighteen years, as described in Judges), Jericho again fell into ruin and was abandoned until the Iron Age.

It has been argued by early exodus advocates that the presence of a Hatshepsut seal in one of the (reused) tombs indicates an earlier (mid-fifteenth century) occupation of the site. The argument is that since most of Hatshepsut's hieroglyphic carvings in Egypt were defaced after her death, her scarabs would no longer have had protective power as amulets after her death, and would therefore have been useless as grave goods. However, this argument is based on a misunderstanding of the nature of the iconoclasm to which Hatshepsut was subjected. Betsy Bryan suggested that Hatshepsut's monuments were not defaced until twenty-five years after her death, implying that this was motivated by the politics of succession (by Amenhotep II, son of Thutmose), and not due to an attempt to erase her role as an Egyptian deity.⁶⁴ This suggests that the scarabs of Hatshepsut would still have been valuable as amulets in faraway Jericho well after her death. Therefore, these artefacts do not provide a minimum age for the occupation of the site, but a maximum age (given that time must pass between the veneration of the scarab and the death and interment of its owner). Therefore, since pottery and scarab evidence cannot reliably date the destruction of Jericho, we turn to radiocarbon evidence.

Radiocarbon Evidence from Jericho

Detailed radiocarbon dating of the Mid/Late Bronze Age destruction layer at Jericho was not undertaken until the work of Bruins and Van Der Plicht in 1995. These authors analysed both charcoal and carbonised remains of short-lived plant material, with the resulting conventional radiocarbon ages presented in histogram form in Figure 7.

63 Kenyon, "Some Notes," 261.

64 Betsy M. Bryan, "The 18th Dynasty before the Amarna Period (c.1550–1352 BC)," in *The Oxford History of Ancient Egypt*, ed. Ian Shaw (Oxford University Press, 2000), 241.

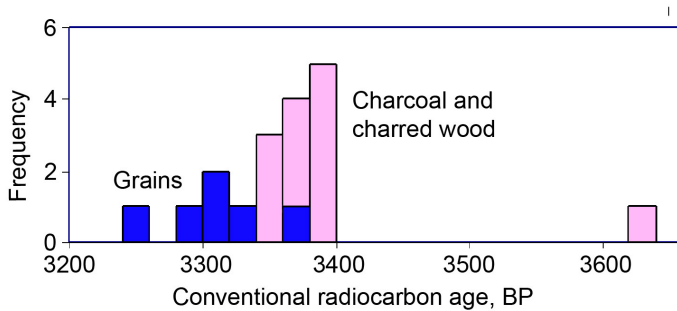


Figure 7. Histogram of conventional radiocarbon ages for carbonised grains and charcoal from Jericho. Data from Bruins and Van Der Plicht.

As discussed above, woody samples can only give accurate ages for a destruction layer if they show evidence of being felled near the time of destruction. However, they are important for testing the results of short-lived material. As such (and omitting the early outlier) the charcoal samples from Jericho are important in yielding a consensus of conventional ages around 3370 BP. Based on its intersection with a steep section of the new Mediterranean calibration curve (Figure 4), this gives the age of the Jericho conflagration a secure upper limit in the late seventeenth century BC.

In comparison, six samples of carbonised grain yielded a consensus of conventional ages around 3300 BP, with an outlier on either side. However, the outliers are within two sigma confidence limits of the mean, suggesting a normal error distribution, so they should be included in the average. A weighted average yielded a conventional age of 3306 $\pm$ 14 years BP at the 95% confidence level (2 sigma).⁶⁵ The significance of this result is evaluated in Figure 8, relative to the same Eastern Mediterranean calibration line used for the Thera data (Figure 4).

The conventional age of 3306 years BP is slightly below the long plateau in the calibration curve, yielding a maximum likelihood of cali-

65 Bruins and Van Der Plicht, "Tell es-Sultan (Jericho)," 216.

brated ages between 1530 and 1540 BC (i.e., 1535 $\pm$ 5 years). However, based on two intersections with low but non-zero likelihood, the possible age range is much wider, and could extend from 1520 to 1600 BC (Figure 8).

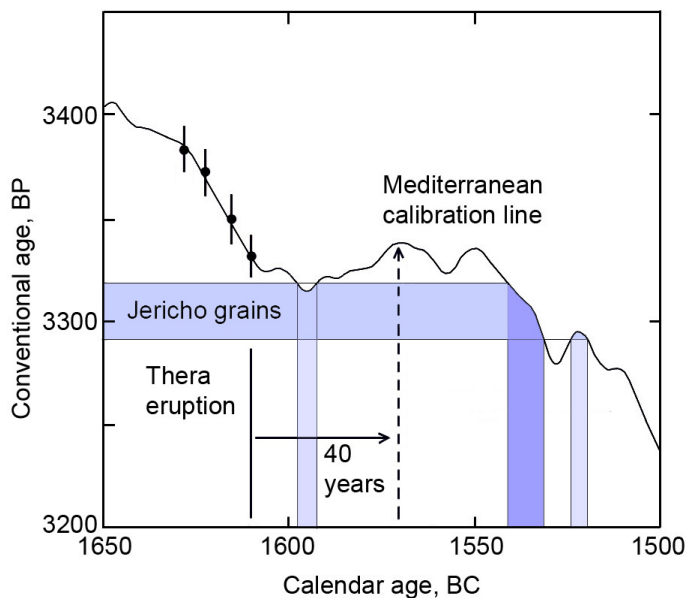


Figure 8. Comparison of the 95% confidence limits for six carbonised grains from the destruction layer at Jericho, relative to the new Mediterranean calibration curve,⁶⁶ showing possible calibrated age solutions relative to an age derived from an Israelite exodus at the time of the Thera eruption.

Based on the biblically stated interval of forty years between the exodus and the sack of Jericho, this wider age range would be consistent with an exodus in 1611 BC. However, if we date the sack of Jericho from a hypothetical exodus in 1611 BC, we find that the hypothetical date of 1571 BC coincides with a local age maximum in the calibration curve that is well outside the confidence limits of the Jericho grains

66 Pearson et al., “Olive Shrub Buried on Therasia,” 6.

determined by Bruins and Van Der Plicht. This means that the 1611 date for the exodus is relatively unlikely, and the exodus was therefore probably *not* associated with the Thera eruption. On the other hand, based on an age of 1535 for the Jericho destruction layer, we determine a most likely date of 1575 BC for the exodus.

At this point it is necessary to comment on claims that the radiocarbon date of the Jericho destruction layer is unreliable, since other researchers have apparently obtained much less consistent age results.⁶⁷ This argument is invalid, because it treats the precise data of Bruins and Van Der Plicht equally with the aberrant data obtained by other researchers. The whole point of the very carefully controlled investigation of Bruins and Van Der Plicht was to exclude such uncertainty. Firstly, a significant number of grain samples (six) were analysed, and the consistency of their data provided internal evidence of their reliability. For example, this consistency excludes the type of occasional low ages measured by other researchers, which are most likely due to contamination of the context and/or the samples themselves.

Secondly, external control was provided by the analysis of wood samples from the destruction layer. Although such samples cannot give accurate ages for the destruction layer itself, they do provide strong circumstantial evidence for the validity of the grain ages. The average conventional age of 3370 BP for this material falls well on the upper steep section of the calibration line (Figure 8), providing a reliable calibrated age of ca 1620 BC. This is 85 years older than the age of the destruction layer obtained from the grains, a difference within the range of excess ages normally obtained from construction timbers.⁶⁸ In contrast, the next oldest of the “conventional” scholarly dates for the exodus (1446 BC) leads to a proposed date for the sack of Jericho (1406 BC) that is ca 130 years younger than the calibrated radiocarbon age for the Jericho destruction layer, which is vanishingly unlikely from a scientific point of view.

67 Kennedy, “The Bronze Age Destruction of Jericho,” 14.

68 Michael W. Dee and C. Bronk Ramsey, “High-Precision Bayesian Modeling of Samples Susceptible to Inbuilt Age,” *Radiocarbon* 56:1 (2014): 83–94.

Compared with the high degree of certainty with which a 1446 BC date for the exodus is rejected, the exclusion of the 1611 BC (Thera) date is less certain. However, the effect of Thera in causing the plagues that preceded the exodus can more definitely be excluded. Suggestions of such an association were based on the belief that volcanic ash from Thera would have acidified the waters of the Nile, creating toxic effects for various life-forms.⁶⁹ However, studies of the distribution of the Thera ejecta blanket over the eastern Mediterranean show that the main direction of ash dispersal was eastwards (as discussed above) rather than southwards to Egypt. Therefore, the suggestion that the plagues of blood, boils, and animal death were due to the Thera eruption is unlikely, in view of the mismatch in both the age determinations and the ejecta distribution.

The Israelite Sojourn at Avaris

It is important to see how the new proposed date of 1575 BC for the exodus fits into what is known of Egyptian history in the early sixteenth century. To do this, it is first necessary to identify the probable location of the Israelite sojourn in the Egyptian delta region. In the Bible, it is claimed that the Israelite slaves built the Egyptian store cities of Pithom and Rameses (Exodus 1:11). The link with Rameses is one of the major reasons for the popular mid-thirteenth century date for the Exodus (placing the exodus during or after the reign of Rameses II). However, we have seen that this date is completely incompatible with the archaeological evidence from Jericho.

If the exodus occurred around 1575 BC but the Israelites were building a city named after a pharaoh who reigned over 300 years later, this would clearly be an anachronism. However, it is common in the Pentateuch for editorial updates to have substituted a more recent name for an original place name that had gone out of use. For example,

69 Siro I. Trevisanato, "Treatments for Burns in the London Medical Papyrus Show the First Seven Biblical Plagues of Egypt are Coherent with Santorini's Volcanic Fallout," *Medical Hypotheses* 66:1 (2006): 193–196.

Bryant Wood has shown that when biblical place names were updated, it was more common to replace the older name altogether rather than add the new name to the text in addition to the old one.⁷⁰ A case in point is Genesis 47:11, which refers to the “land of Rameses” anachronistically in the time of Joseph.

The original name of the city of Rameses was Avaris, which lies immediately adjacent to the later city.⁷¹ Ancient Avaris (modern Tell el-Daba) has been excavated over many years by an Austrian expedition led by Manfred Bietak.⁷² It was a large city on the eastern tributary of the Nile delta, and the capital of Egypt during the Semitic “Hyksos” dynasty in the Second Intermediate Period (SIP) of Egyptian history. However, there is good evidence that Semitic immigration to Avaris began in the twelfth dynasty (late Middle Kingdom), since Semitic burial practices and house architecture are already seen in the oldest (twelfth dynasty) parts of the city. Widespread excavation of the ancient city also shows the establishment of new neighbourhoods during the early SIP, and especially during the Hyksos (fifteenth) dynasty in the second half of the SIP (Figure 9).

Avaris has been divided into excavation horizons based on the usual principle, namely, that the notation begins at the surface and progresses downwards, and therefore moves backwards through time. These excavation levels (C to H in Figure 9) were dated by pottery stratigraphy, leading to the age calibration shown on the left side of Figure 9. However, when a comprehensive radiocarbon dating program was applied to Tell el-Daba, it yielded ages for the same excavation horizons averaging 120 years older than the pottery stratigraphy (right hand side of Figure 9).

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- 70 Bryant G. Wood, “The Biblical Date for the Exodus Is 1446 BC: A Response to James Hoffmeier,” *Journal of the Evangelical Theological Society* 50:2 (2007): 249.
- 71 Manfred Bietak, *Tell el-Dab’a II* (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1975).
- 72 Manfred Bietak, *Houses, palaces and development of social structure in Avaris*, Part I, vol. 60 (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 2010), 11–68.

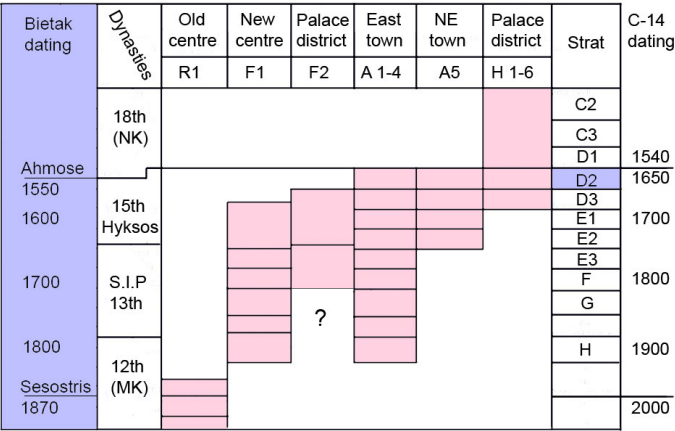


Figure 9. Chronology of Tell el-Daba (Avaris) neighbourhood occupation history based on pottery and radiocarbon dating. MK = Middle Kingdom; NK = New Kingdom. Modified from Bietak.

Bietak has engaged in a “dialogue” with the radiocarbon evidence for several years. However, this “dialogue” is very one-sided, in that it consists of proposing every possible reason why the radiocarbon dates might be wrong, while never questioning the pottery dating stratigraphy. For example, since Bietak was a coauthor of the principal radiocarbon dating paper on Tell el-Daba, the presentation of the radiocarbon evidence seems designed to skew the reader’s perception that it is the radiocarbon dates that are anomalous (Figure 7 in their paper).⁷³ Bietak’s real position is revealed by his celebratory tone when it appeared (erroneously) that the radiocarbon evidence was refuted.⁷⁴ This impression was principally based on the long saga of dating the Thera eruption, which was argued above to be a test-case for the

73 Kutschera et al., “The Chronology of Tell el-Daba,” 418.
74 Manfred Bietak, “Recent Discussions about the Chronology of the Middle and the Late Bronze Ages in the Eastern Mediterranean: Part II: The End of High Chronology in the Aegean and the Levant?” *Bibliotheca Orientalis* 78:3-4 (2021): 282-318.

application of radiocarbon dating to the Mid/Late Bronze Age, including Tell el-Daba. In turn, Bietak's pottery dating stratigraphy makes the unproven assumption that most of the Tell el-Daba excavation levels in Figure 9 had the same thirty-year duration.⁷⁵

The robustness of the radiocarbon dating chronology for Tell el-Daba rests on the application of Bayesian modelling to a sequence of dates on stratigraphically secure samples of short-lived plant material.⁷⁶ The use of short-lived material such as carbonised seeds avoids the problem of excess ages derived from samples of old wood. In turn, the use of Bayesian modelling turns a series of short-lived samples into a kind of long floating sequence that can essentially be “wiggles matched” with the calibration curve. This works by specifying that the radiocarbon calibration process must produce dates that are in the correct stratigraphic order.⁷⁷ This procedure acts to exclude the extreme age outliers that are otherwise generated as possible solutions to the calibration process. In other words, the wiggles of the calibration curve are turned into a strength rather than a weakness, by using a long radiocarbon sample sequence that spans several of the short-term wiggles in the calibration curve that caused so much trouble for dating the Thera eruption.

The result of this process is the radiocarbon age calibration shown on the right side of Figure 9. However, Bayesian modelling is only as good as the “priors” (i.e., dating constraints) used. These constraints are usually much weaker at the ends of the sequence, resulting in larger calibration uncertainties. Furthermore, there is an additional problem at the top of the sequence, due to errors in the calibration curve itself. Thus, Kutschera et al.⁷⁸ used the IntCal 2009 curve, which significantly misrepresented Mediterranean atmospheric radiocarbon at the end of the Middle Bronze Age (ca 1600–1500 BC). The Tell el-Daba data have not yet been recalibrated for the IntCal 2020 curve or

75 Bietak, “Recent Discussions about Chronology,” 296.

76 Kutschera et al., “The Chronology of Tell el-Daba,” 416–417.

77 Christopher Bronk Ramsey et al., “Radiocarbon-Based Chronology for Dynastic Egypt,” *Science* 328:5985 (2010): 1554–1557.

78 Kutschera et al., “The Chronology of Tell el-Daba,” 411.

the new Mediterranean calibration line. However, conventional radiocarbon ages for the units above and below the critical “abandonment horizon” can be compared with the calibration line shown in Figures 4 and 8.

The average conventional age for the unit below the abandonment (D2) is 3399 $\pm$ 37 years BP, whereas the average for the units above the abandonment (C2/3 and D1) is 3313 $\pm$ 25 years.⁷⁹ Based on the shape of the calibration curve, we can see that the calibrated age for the unit below the abandonment horizon is securely within the seventeenth century (ca. 1650 BC), whereas the most probable date for units above the abandonment is 1540 BC, consistent with the radiocarbon corroborated reign of the first king of the eighteenth dynasty (Ahmose), beginning around 1550 BC.⁸⁰ In other words, the radiocarbon data for the top of the Avaris sequence are consistent with the established Egyptian dynastic chronology, but the levels immediately below may be compressed date-wise, contrary to Bietak’s assumption of equal durations for each excavation level.

Bietak equated the abandonment of Avaris with the conquest of the Hyksos (fifteenth) dynasty by Ahmose, twenty years into his reign (ca 1530 BC). This is shown by the twenty-year step in the horizontal line (Figure 9) that marks the beginning of the New Kingdom and the abandonment of Avaris. However, no direct linkage is necessary between the Hyksos defeat and the abandonment of Avaris.⁸¹ For example, the “palace district” in the west of the city continued to be occupied after the abandonment of the eastern part of the city. Therefore, large areas of the city could have been abandoned in the early sixteenth century, before the final fall of the Hyksos dynasty around 1530 BC. With this in

79 Kutschera et al., “The Chronology of Tell el-Daba,” 412.

80 Bronk Ramsey et al., “Radiocarbon-Based Chronology,” 1556.

81 Felix I. Höflmayer et al., “An Early Date for Khyan and Its Implications for Eastern Mediterranean Chronologies,” in *The Hyksos Ruler Khyan and the Early Second Intermediate Period in Egypt: Proceedings of the Workshop of the Austrian Archaeological Institute and the Oriental Institute of the University of Chicago, Vienna*, ed. Irene Forstner-Müller and Nadine Moeller (Vienna: Österreichisches Archäologisches Institut, 2014), 159.

mind, the major abandonment of Avaris at the end of horizon D2 could be linked to an Israelite exodus around 1575 BC.

The Pharaoh of the Exodus

Important information about the dynastic history of ancient Egypt comes from Flavius Josephus, quoting from the lost account of Manetho, an Egyptian priest who wrote a summary of Egyptian history in Greek.⁸² In this work, Josephus identifies a date for the exodus near the beginning of the New Kingdom (in the eighteenth dynasty), but he also suggests that Manetho's account seems to be contradictory and to some extent fictitious.⁸³

Josephus quotes Manetho as saying that Egypt was earlier conquered without a battle by eastern peoples, whom we would call Semitic. He names them as the Hyksos, which he translates as Shepherd Kings or Captive Shepherds. These rulers apparently established a dynasty of six kings who ruled from Avaris in the Nile Delta, reputedly for a total of 254 years.⁸⁴ However, Manetho is quoted as saying that the Hyksos had possessions in Egypt for 511 years, which implies that they were living in Egypt before they became its rulers. Although these time periods appear inflated, the overall concept that the Hyksos lived in Egypt for a period of time during the SIP before they established their own (fifteenth) dynasty seems reasonable.

Manetho may have used a source similar to the Turin Canon of kings to obtain his information about the SIP.⁸⁵ Unfortunately, the Turin Canon is damaged in the section that describes the Hyksos dynasty. Only one king, Khamudi, is clearly named, and another five entries seem to have been lost. Table 1 gives a reconstruction of the

82 Flavius Josephus, *Against Apion* 1.14, trans. William Whiston (Project Gutenberg EBook).

83 Josephus, *Against Apion* 1.26.

84 Josephus, *Against Apion* 1.14.

85 David A. Aston, "How Early (and How Late) Can Khyan Really Be: An Essay Based on ›Conventional Archaeological Methods‹," in *The Hyksos Ruler Khyan* (2014), 159.

Hyksos dynasty based on various epigraphic fragments, and shows how this could be related to the account of Manetho and a Semitic source, except that the order in Manetho is based on Sextus Africanus (in Eusebius) rather than Josephus.⁸⁶

Regarding the end of the Hyksos rule, Josephus quotes Manetho as saying that the Egyptian dynasty of Thebes under king Alisphragmuthosis rose up against the Hyksos and confined them to Avaris, after which his son Thummosis laid siege to Avaris (Thummosis is evidently Thutmose—probably Thutmose I). He was apparently unable to take the city, but supposedly negotiated a settlement whereby the Hyksos would leave Egypt and go back to Syria. Manetho supposedly said that 240,000 of the Hyksos left Egypt, and went via the wilderness to Judea, but stopped there because of fear of the Assyrians. This account seems to be based on conflating the Hyksos with the Hebrews, and this is borne out when Josephus quotes Manetho as saying “in another book” that the Hyksos were called Captive Shepherds because they tended sheep, and because their ancestor Joseph had been a captive in Egypt.⁸⁷

	Manetho	Reign	Semitic	Epigraphy	Turin Canon
1	Salitis	13	Shara-Dagan	?	-----
2	Bnon	44	Bin-Anu	?	?
3	Apachnan	37	(Apaq)-Hajran	Khyan	?
4	Jannas	50	Jinassi-Ad	Yanassi	?
5	Assis	49	Sikru-Haddu	Seker-Her	?
6	Apophis	61	Apapi	Apophis	?
7	-----		Halmudi	Khamudi	Khamudi
	Total years	254			108

Table 1. Kings of the Hyksos dynasty (and possible reigns) in various sources

86 Thomas Schneider, “The Relative Chronology of the Middle Kingdom and the Hyksos Period (Dyns. 12–17),” in *Ancient Egyptian Chronology*, ed. Erik Hornung (Leiden: Brill, 2006): 168–196.

87 Josephus, *Against Apion* 1.14.

A way in which this chronology could fit with the biblical account was proposed by John Rea.⁸⁸ He suggested that the “king who did not know about Joseph” was at the beginning of the Hyksos (fifteenth) dynasty rather than during the New Kingdom (eighteenth and nineteenth dynasties). He argued that the Hebrew expression in Exodus 1:8 that a new king “arose over Egypt” can have the meaning of “rose against” (e.g., Deuteronomy 28:7 and 2 Samuel 18:31). This may suggest a violent rather than a peaceful transfer of power, consistent with the establishment of a new dynasty. Furthermore, the Hyksos could have had good reason to fear the Israelites (Exodus 1:10), because if the Israelites allied themselves with the Egyptians, they could together have driven out the Hyksos (as the Egyptians eventually did).

Manetho, cited by Josephus, actually accuses the Hyksos of being extremely cruel rulers, and enslaving the population.⁸⁹ This description of the Hyksos is usually attributed by scholars to an error by Manetho, whereby he conflated the Hyksos with later cruel Egyptian pharaohs.⁹⁰ The logic seems to be that the Hyksos cannot have oppressed the Israelites, since they were both “Asiatics.” However, this idea is completely refuted by the Bible’s universal anathema against the Canaanites. In fact, if the Canaanite Hyksos attempted genocide against the Israelites in Egypt (Exodus 1:16, 22), the subsequent annihilation of Canaanite cities by the Israelites makes much more sense.

The biblical account of pharaoh’s army and possibly the pharaoh himself being drowned in the Sea of Reeds also provides evidence relevant to dating the exodus. According to this account, the pharaoh of the Exodus or his immediate successor are required to be weak kings whose power had been decimated. However, the early 1446 BC date for the exodus falls within the reign of Thutmose III (1479 to 1425 BC), one of the most powerful pharaohs of the eighteenth dynasty. Thutmose is

88 John Rea, “The Time of the Oppression and the Exodus,” *Bulletin of the Evangelical Theological Society* 3:3 (1960): 58–66.

89 Josephus, *Against Apion* 1.14.

90 Peter Feinman, “The Thirteenth-Century Hyksos/Levite-Led Exodus View,” in *Five Views on the Exodus: Historicity, Chronology, and Theological Implications*, ed. Mark D. Janzen (Grand Rapids, MI: Zondervan Academic, 2021), 135–160.

credited in contemporary inscriptions with several successful invasions of Canaan, while his son Amenhotep II was also fairly successful, with two campaigns in Syria mentioned on stelae at Amada, Memphis, and Karnak.⁹¹

The alternative nineteenth dynasty of the late exodus is even more problematical to look for a pharaoh weakened by the exodus. Archaeological evidence suggests that Rameses II and his son Merneptah gained complete control over the coastal plain of Canaan, establishing it as a virtual “Egyptian highway.”⁹² In contrast, we know that the Hyksos were weakened in the mid-sixteenth century BC, since they were defeated shortly after by Ahmose, founder of the eighteenth dynasty.

Implications for the Conquest of the Promised Land

How would an exodus in the early sixteenth century BC affect our understanding of the biblical claim of an Israelite conquest of the Promised Land? It should be noted that practically all archaeologists of ancient Israel deny that the “conquest” ever happened.⁹³ This is because (apart from the failure to explain the radiocarbon dates from Jericho), the thirteenth and fifteenth century dates for the exodus are in conflict with archaeological evidence from several other Canaanite cities. In contrast to limited evidence for an Israelite conquest at these later dates, Canaanite cities record a “collapse” at the end of the Middle Bronze age (ca 1550 BC). However, this collapse has traditionally been attributed to an invasion by the Egyptians, following their defeat of the Hyksos.

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- 91 Betsy M. Bryan, “The 18th Dynasty before the Amarna Period (c. 1550–1352 BC),” in *The Oxford History of Ancient Egypt*, ed. Ian Shaw (Oxford University Press, 2000), 207–264.
 - 92 Itamar Singer, “Merneptah’s Campaign to Canaan and the Egyptian Occupation of the Southern Coastal Plain of Palestine in the Ramesside Period,” *Bulletin of the American Schools of Oriental Research* 269:1 (1988): 1–10.
 - 93 William G. Dever, *What Did the Biblical Writers Know and When Did They Know It? What Archeology Can Tell Us about the Reality of Ancient Israel* (Grand Rapids, MI: Eerdmans, 2001), 99.

The theory that the Middle Bronze Age collapse was caused by the Egyptians was espoused by both William Albright and Kathleen Kenyon.⁹⁴ Subsequently, it was also aggressively championed by James Weinstein and William Dever.⁹⁵ However, several scholars, beginning with William Shea and more recently followed by James Hoffmeier and Felix Hoflmayer, have argued that the “archaeological model” for the Middle Bronze Age collapse is seriously flawed.⁹⁶ There is no evidence that the invasion of the first eighteenth dynasty pharaoh (Ahmose) got further north than Sharuhēn, in the Negev. Instead, Egyptian sources attribute the conquest of Canaan to Thutmose III, in the mid-fifteenth century, which is several decades later. For example, the Karnak inscription of Thutmose III, which describes the battle of Megiddo, places it in the twenty-third year of his reign, and therefore sometime around 1460 BC.⁹⁷

Based on these difficulties, Hoflmayer posed the Middle Bronze Age collapse as a serious conundrum.⁹⁸ However, an early sixteenth-century exodus solves this problem by attributing the Canaanite “collapse” to the Israelites, as suggested for example by Barbara Sivertsen.⁹⁹

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- 94 William F. Albright, *The Archaeology of Palestine* (London: Penguin Books, 1960); Kathleen M. Kenyon and Iorwerth ES Edwards, “Palestine in the Middle Bronze Age,” in *The Cambridge Ancient History*, 2:1: *History of the Middle East and the Aegean region c. 1800–1380 B.C.*, ed. I. E. S. Edwards et al. (Cambridge University Press, 1973), 77–116.
- 95 James M. Weinstein, “The Egyptian Empire in Palestine: A Reassessment,” *Bulletin of the American Schools of Oriental Research* 241:1 (1981): 1–28; William G. Dever, “Archaeological Sources for the History of Palestine: The Middle Bronze Age: The Zenith of the Urban Canaanite Era,” *The Biblical Archaeologist* 50:3 (1987): 149–177.
- 96 William H. Shea, “The Conquests of Sharuhēn and Megiddo Reconsidered,” *Israel Exploration Journal* (1979): 1–5; James K. Hoffmeier, “Reconsidering Egypt’s Part in the Termination of the Middle Bronze Age in Palestine,” *Levant* 21:1 (1989): 181–193; Felix Höflmayer, “The Expulsion of the Hyksos and the End of the Middle Bronze Age: A Reassessment in Light of Recent Chronological Research,” *Journal of Ancient Egyptian Interconnections* 21 (2019): 20–30.
- 97 *Asiatic Campaign of Thutmose III*, in *Ancient Near Eastern Texts (ANET)*, ed. James B. Pritchard, trans. John A. Wilson (Princeton University Press, 1958).
- 98 Hoflmayer, “The Expulsion of the Hyksos,” 27.
- 99 Barbara J. Sivertsen, *The Parting of the Sea: How Volcanoes, Earthquakes, and Plagues Shaped the Story of Exodus* (Princeton University Press, 2009), 112.

The book of Joshua does indeed claim the conquest of many Canaanite cities and their kings (Joshua 12). However, there is no claim that the Israelites settled these cities. They defeated the Canaanites, and even annihilated them, in order to forestall future attacks against Israel, but the Israelites themselves withdrew to the hill country on either side of the River Jordan (Joshua 12–17).

The consequence of this was that when the Egyptian invasion began several decades later, there was little or no direct conflict between the Egyptians and the Israelites. The Egyptians were mainly interested in the coastal plain, which could control trade from the north and supply tribute.¹⁰⁰ In contrast, the hill country would have been regarded by the Egyptians as too poor.¹⁰¹ Here, even the famous claim that Canaan was the “land of milk and honey” has misled scholars. Literally, this description refers to the wild steppe, which is pasture-land (not arable), and whose wildness is indicated by the availability of honey, which is mainly harvested from scrubland and open woodland.

One of the most well-dated Canaanite cities that displays a clear Middle/Late Bronze Age transition is Megiddo. Although there is no evidence for a destruction layer at this horizon, there is a clear cultural break between well-dated sequences.¹⁰² A recent intensive campaign of excavation and radiocarbon dating at Megiddo has given a precise date for the Mid/Late Bronze transition of 1536 BC, modified from 1554 BC based on the IntCal 20 calibration curve.¹⁰³ This is seventy-five years before the expedition of Thutmose III. Similar evidence is also being obtained at Lachish, another important Canaanite city which shows evidence of a Mid/Late Bronze Age collapse. Here, radiocarbon dating

100 Nadav Na'aman, “Economic Aspects of the Egyptian Occupation of Canaan,” *Israel Exploration Journal* 31:3/4 (1981): 172–185.

101 Etan Levine, “The Land of Milk and Honey,” *Journal for the Study of the Old Testament* 25:87 (2000): 43–57.

102 Mario A. S. Martin et al., “Radiocarbon-Dating the Late Bronze Age: Cultural and Historical Considerations on Megiddo and Beyond,” *Bulletin of the American Schools of Oriental Research* 384:1 (2020): 211–240.

103 Martin et al., “Radiocarbon-Dating the Late Bronze Age,” Appendix B.

of the transition horizon is not yet complete, but it seems likely that a mid/late sixteenth century date will be obtained.¹⁰⁴

Conclusions

The failure of Biblical Archaeology was caused in part by attempts to place the Israelite exodus in the wrong age setting. In contrast, an early sixteenth-century exodus satisfies many lines of evidence, including radiocarbon, archaeological, and historical data, and explains the mystery of the Middle Bronze Age collapse at several Canaanite cities. Unfortunately, space does not permit a comparison with the account of the conquest in the book of Judges. However, I hope that enough evidence has been given to show that a sixteenth-century exodus offers a new hope for understanding the origins and history of ancient Israel.

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104 Katharina Streit and Felix Höflmayer, “Tel Lakhish (Tel Lachish),” *Hadashot Arkheologiyot: Excavations and Surveys in Israel* 134 (2022): 8.█

A Philosophical Theologian's Review Essay of Judith Butler's *Who's Afraid of Gender?*

Paul Tyson

Abstract: Judith Butler's work relates directly to science and religion concerns. Scientific questions regarding the nature of male and female sex, and the relation of biological sex to Butler's conception of gender are important concerns in her work. Butler also has an abiding disdain for traditional Christian anthropology with its binary heteronormative sexual ethics. Conservative Christian religion is thus seen by Butler as a moral and political enemy of progressive humanity and reason. For these two reasons, as well as the fact that Butler has had an enormous impact on contemporary culture and law through her gender studies work, it is important that Christians who are interested in science and in the cultural and political currents of our times, understand her work. People who do not usually read post-modern gender theory will find the terrain demanding. Indeed, Butler's writing is difficult even for professional philosophers to decipher. However, her 2024 book—*Who's Afraid of Gender*—is remarkably accessible. Considering the importance to science, religion, and contemporary culture that these matters are, and considering that this is an unusually accessible text by Butler, I here offer a philosophically engaged and theologically critical review essay of Butler's latest book.

Keywords: Christian heteronormativity; gender critical feminism; Judith Butler; queer theory; science and religion; sex and gender

Dr Paul Tyson is an Honorary Senior Research Fellow with the School of Historical and Philosophical Inquiry at the University of Queensland. He works across philosophy, theology, and sociology. He has been working in the “science and religion” domain for the past decade, and recently coordinated the “After Science and Religion” project with such contributing luminaries as William Desmond, Peter Harrison, John Milbank, and Charles Taylor. His most recent book in this domain is *A Christian Theology of Science* (Grand Rapids: Baker Academic, 2022).

Professor Judith Butler is arguably the most influential gender studies academic of the past four decades. Her work relates directly to science as Butler maintains that humans are not a definable male/female sex-binary species, but humans exemplify culturally, politically, and psychologically dynamic sex-spectral fluidity.¹ Her work also relates directly to the Christian faith as Butler argues that the sexual ethics of traditional Christianity is psychoanalytically “toxic,”² as it is definitionally phobic, morally and conceptually indefensible, and integral with fascism.³

Overview

Unlike her earlier texts, Butler's latest book—*Who's Afraid of Gender?*—is no technical work of theoretical arcana, but is a clearly written and broadly accessible text for a general readership. This makes for refreshingly easy reading, but difficulties discerning what Butler really means by the words “gender” and “sex” remain.⁴

Putting central definitional difficulties to one side for the moment, the core thrust of Butler's text is crystal clear. Indeed, her primary claim is arguably clearer than would be allowed by any reasonable analysis of the speculative complexities of psychosocial phenomena and the great

1 Judith Butler, *Who's Afraid of Gender?* (London: Allen Lane, 2024), 153–154, 190.

2 Butler, *Who's Afraid*, 168, in agreement with a citation of Gail Lewis.

3 Butler, *Who's Afraid*, 73–92.

4 Even among philosophically trained academic readers Butler has a reputation for convoluted terminological opacity. In the prime of her rise to prominence (1999), the scholarly journal *Philosophy and Literature* awarded Judith Butler the first prize for its International Bad Writing Contest, for this sentence: “The move from a structuralist account in which capital is understood to structure social relations in relatively homologous ways to a view of hegemony in which power relations are subject to repetition, convergence, and rearticulation brought the question of temporality into the thinking of structure, and marked a shift from a form of Althusserian theory that takes structural totalities as theoretical objects to one in which the insights into the contingent possibility of structure inaugurate a renewed conception of hegemony as bound up with the contingent sites and strategies of the rearticulation of power.”—as cited in “The World's Worst Writing,” *The Guardian*, 25 December 1999, <https://www.theguardian.com/books/1999/dec/24/news>.

range of political stances people can have. Centrally, Butler is claiming that people who are “afraid of gender”⁵ are—explicitly or implicitly—hate-motivated⁶ fascists.⁷ Persuading us that this is so, and proposing how to combat this moral pathology is what Butler is seeking to achieve in her book. This being the case, the genre of her latest book does not properly belong to academic theory, but—in technical terms (implying no value judgement)—it is at least akin to political propaganda. *Who’s Afraid of Gender?* is centrally concerned with how good progressive humanists of the Left can identify and resist the reactionary and destructive gender-fearful politics of the Right.

Using the psychosocial speculations of Jean Laplanche,⁸ Butler claims that gender has become a seething political black hole of fear, drawing in and transforming a large array of serious anxieties and insecurities endemic to our distressing times. Accordingly, Butler maintains that those who are afraid of gender now threaten to plunge all our political landscapes into a reactionary and fascist revolt against the important gains that gender theory has recently made. These gains are expressed in the recently acquired social, educational, and legal

5 Butler, *Who’s Afraid*, 3.

6 Butler claims that an aggressive and violent hatred is what characterises the largely religious promoters of anti-gender reactionism. “Hatred is stoked and rationalized by moral righteousness, and all those damaged and destroyed by hateful movements are cast as the truer agents of destruction. These projections and reversals structure the phantasmatic scene of ‘gender’” (Butler, *Who’s Afraid*, 11).

7 Appropriating Jean Laplanche’s enigmatic and speculative gender assignment psychosocial theories about collective phobias, Butler informs us that we can best “understand the anti-gender movement as part of fascism” (Butler, *Who’s Afraid*, 25). That is, Butler assumes that anyone who disagrees with queer gender identity theory does not disagree because the theory is inherently hard to believe and defies obvious scientific facts about the human sex binary, but because they are pathologically phobic and hateful. This is an emotive rhetorical method that has thus far proved very successful in closing down the question of whether normal factual biological realities have anything to do with the significant legal question of whether a transwoman should be treated as in all regards a *real* woman in relation to female-sex only spaces (such as change rooms, toilets, shelters, maternity wards, prisons) and arenas (such as sport).

8 Butler, *Who’s Afraid*, 10.

influence of the diversity, inclusion, and equality movement (hereafter referred to as the rainbow movement).

Practically, the rainbow movement claims to uphold the pride and non-discrimination rights of lesbian, gay, bisexual,⁹ queer, trans, and other non-heteronormative people. Theoretically the rainbow's contemporary gender theories justify the liberation of feminism—and the Australian Sex Discrimination Act,¹⁰ and all of us—from what Butler argues are indefensible second-wave-feminist sex-binary assumptions. Butler is determined that these practical and theoretical gains will not be undermined by the reactionary, antiscientific, and hateful politics of the fear of gender.

For all her nonpolarising fluidity, Butler presents us with a strictly binary political landscape where “the Left” (those who do not fear gender) is implacably, but futilely, opposed by “the Right”¹¹ (those

9 The LGB Alliance does not believe the rainbow movement represents same-sex attracted people. The LGB Alliance upholds the reality of the biological sex binary and opposes “affirmative” sex-presentation hormonal and surgical interventions for minors. See LGB Alliance UK, <https://lgballiance.org.uk/policies/>. From this website, under “Purpose”: “We work to protect children from harmful, unscientific ideologies that may lead them to believe either their personality or their body is in need of changing... We recognise that sex is binary, female and male, and that (for the vast majority of people) sex is determined at conception, observed at birth (or in utero), and recorded.” Indeed, lesbians in particular are finding the rainbow movement actively opposes any female-only definition of lesbian. Investigative reporter Julie Szego has written the below linked carefully documented piece on the failed attempt of the Lesbian Action Group to hold a Lesbians Born Female event at the publicly funded Victorian Pride Centre in October 2023. The Lesbian Action Group applied to the Australian Human Rights Commission for a temporary exemption from anti-discrimination legislation so that they could hold an event for exclusively same-sex attracted biological women. Opposing their application was LGBTQI+ advocacy group Equality Australia, who successfully fought against the Lesbian Born Female application, which the Commission denied. See Julie Szego, *Szego Unplugged*, 2 September 2023, “LGBTQ is really QTbGL”, <https://szego unplugged.substack.com/p/lgbtq-is-really-qtbgl>.

10 The Australian Federal Sex Discrimination Act (1984) was amended in 2013 to remove from the Act the following legal definitions: “‘man’ means a member of the male sex irrespective of age,” and “‘woman’ means a member of the female sex irrespective of age.”

11 Butler uses these catchall designations “the Left” and “the Right” repeatedly throughout her book in a manner inimical to any political science I have read.

who fear gender). *Who's Afraid of Gender?* is thus an unashamed apology for “the Left” against “the Right.” As already mentioned, this book is best understood as a polemic work of political advocacy—with all the partisan and rhetorical techniques of this genre—and not a work of scholarship as such.

Two Types of Gender Fearers: Religious Traditionalists and Gender Critical Feminists

In advancing her political apology, Butler identifies two chief opponents. Firstly, there are religious believers in a natural sex binary and in heteronormative Christian sexual ethics, which she implacably opposes.¹² For her, this politico-religious opposition to “the Left” is largely energised by an unholy alliance between the Vatican and American Evangelical Christians, as well as some Muslims and other reactionary religious groups around the globe. Religious conservatives are seen by Butler as integral with the political far-Right which is

For but two examples, see Butler, *Who's Afraid*, 15 (for “the Right”), 24 (for “the Left”).

- 12 According to Butler, gender fear is deeply rooted in traditional biblical and Christian natural law conceptions of human sexuality. Hence, to her, traditional Roman Catholic sexual doctrines are particularly phobic towards gender. Butler explains: Gender-phobic Christians believe that “God made the sexes in a binary way, and it is not the prerogative of humans to remake them outside of those terms... [Here,] sex differences are established in natural law; that is, that the content of that law is established by nature and therefore, presumably, has universal validity. Since nature is understood to be created by God, to defy natural law is to defy God. What follows from this set of beliefs is that if one has a will, or acts wilfully, then one not only defies God and the natural order he created but also threatens to take over his will ... Joseph Ratzinger warned that gender theorists were imperilling the family by challenging the proposition that Christian family roles could be and should be derived from biological sex ... The integrity of the family, understood as both Christian and natural, was said to be imperilled by a spectre looming on the horizon: ‘gender ideology’” (Butler, *Who's Afraid*, 37–38). That is, traditional Catholics who adhere to the natural law sexual ethics of the church are necessarily afraid of gender. It is significant that Butler completely ignores careful Roman Catholic critiques of her gender theory, such as put forward in Abigail Favale, *The Genesis of Gender: A Christian Theory* (San Francisco: Ignatius Press, 2022).

now unabashedly fascist, as seen in Bolsonaro, Putin, Meloni, Abascal, Orbán, and Trump.¹³

Secondly, there are misguided scholars who call themselves gender critical feminists, though Butler prefers to call them “trans-exclusionary feminists”¹⁴ (a shortening of the derogatory term TERF, i.e., “trans-exclusionary radical feminists”). Butler holds that such misguided “feminists” are unwittingly acting in alliance with religious conservatives of the far-Right. She does not find gender critical feminists to be critical, feminist, Left, or radical.¹⁵ Further, even though the prominent gender critical feminist Kathleen Stock is a lesbian, an atheist, and of liberal Left political and moral commitments, Stock—under Butler’s polemic rubric—fears gender and is thus named a tacit supporter of both homophobic reactionary religion and the fascist Right.¹⁶

Leaving gender critical feminists to make their own response to Butler’s book,¹⁷ let us look more closely at how she understands religion and gender.

13 Butler, *Who's Afraid*, 37–72.

14 Butler, *Who's Afraid*, 137.

15 Butler, *Who's Afraid*, 22: “To be ‘gender critical’ is thus a misnomer deployed by some feminists who make implicit or explicit alliances with the right-wing opposition to gender.” And, at 137: “transphobic feminism is not feminism.” See also chapter 5, titled “TERFs and British Matters of Sex: How Critical Is Gender-Critical Feminism?” (134–169).

16 Butler critiques Stock directly at 150–160. More often, Butler attacks gender critical feminists in general and undocumented categories.

17 Kathleen Stock, “What is Judith Butler Afraid of?” *UnHerd*, 14 March 2024, <https://tinyurl.com/583d3pr4>. Regarding Butler’s critique of herself, Stock notes: “Though at times [Butler] feigns charitable curiosity about some of her argumentative targets, the attitude never lasts. A sentence about gender-critical feminists that starts with ‘To be fair’ ends up, a mere clause or two later, talking about their supposed affinities with ‘fascist politics.’ There isn’t a single objection lodged against opponents that does not come freighted with the implication of moral taint and/or stupidity. Of course, painting one’s intellectual enemies as cartoon characters is a known tactic of modern transactivism; still, it is shocking to see it done so crudely by someone who retains a high reputation in many quarters.” Even so, Stock thinks Butler is correctly identifying deep and serious anger at the way gender theories have been socially, legally, therapeutically, and educationally implemented in

Butler on Religion and Gender

In the wake of Butler's four-decade career, there is now a thriving field of study that goes under the banner of queer theology within liberal Christian domains. Butler shows some awareness of this movement but does not draw on it. Using her rubric, queer theology is not "afraid of gender" and should be included by Butler in the progressive Left. But when it comes to the Vatican and any theologically and morally conservative Christian opposition to Butler's third wave gender theory and its contemporary evolution in the queer and trans domains, she has some sharp attacks to make, although she has no interest in engagement. Clearly, theologically and morally conservative Christians are the core constituency containing those who are afraid of gender. Butler wants to convert or anathematise gender critical feminists, but she is simply opposed to conservative religion.

Further, she expects nothing but irrational and defeatist rage from any Christian adhering to theologically and morally conservative sexual ethics. She notes: "Those who should be most enraged by my argument are those who believe that the gender binary is mandated by a version of natural law referenced or occasioned by the Bible ... They have a great deal to lose, and they should start [the] process of mourning. Let's hope their destructive rage turns to productive grief."¹⁸

I am a Christian philosopher, situated within theologically conservative and liturgically high Anglicanism. I believe in a natural law conception of the meaning of human sexuality, as referenced by the Bible. Three things become immediately apparent when I read Butler's above cited quote.

Firstly, one wonders how inclusive and diverse Butler's conception of a non-gender-phobic global future really is. Using round figures,

the past decade. Stock notes: "It is obvious that many across the world have become angered by the grandiose, narcissistic overreach of academics [like Butler]: thinkers indifferent to the real-world havoc wrought by their barmy ideas and impenetrable speech codes, and who pillory all objectors as badly intentioned or deeply confused, no matter what the background reasoning."

18 Butler, *Who's Afraid*, 237.

Butler obviously believes that 1.4 billion Roman Catholics, most of about 650 million Charismatic and Pentecostal Christians, the strong majority of 220 million Eastern Orthodox Christians, an unspecifiable but large number of evangelical and theologically conservative Protestants, most of the world's 1.9 billion Muslims, and most orthodox Jews—in aggregate, somewhere around 50% of the globe's population—are simply wrong about sex and gender, and need to abandon their indefensible fealty to their holy books and religious authorities, and until then, they are dangerous genderphobes with whom there can be no reasonable discourse.¹⁹

In a Butler versus divine revelation contest on sex and gender, Butler has no doubt that she has won hitherto and will ultimately win. However, in social scientific terms, particularly on a global scale, this seems highly unlikely. If Butler is hoping that the secularisation thesis will come to her aid and rid the world of religion, this is simply not supported by the evidence.²⁰

Secondly, whatever my emotional response to Butler's arguments may be—rage or otherwise—perhaps I can be reasoned with.

19 Buddhism and Hinduism are outside of my field of scholarly expertise, so I am only commenting on the three Abrahamic world religions here, all of whom traditionally reference their understanding of the nature and meaning of human sexuality, and sexual and familial ethics, to the Hebrew Bible. I do not mean to imply here that there is a 50/50 global divide between those who embrace Butler's queer gender theory, and those who have traditional heteronormative views about human sex and gender. Clearly, contemporary queer gender theory is very much a recent and Western development, and within the West it is a nonconformist and small minority movement. It is a strange feature of Butler's polemic stance that she wants to claim persecuted minority status for non-heteronormative people, at the same time as expecting that all sensible and nonphobic people will be entirely on board with the queer Diversity Equality and Inclusion movement the world over, and indeed that it is largely traditional Western Christians who have imposed a false heteronormative filter on how non-Western people understand sex and gender.

20 See Peter L. Berger (ed.), *The Desecularization of the World: Resurgent Religion and World Politics* (Grand Rapids: Eerdmans, 1999). Berger notes: "the assumption that we live in a secularized world is false. The world today, with some exceptions ..., is as furiously religious as it ever was, and in some places more so than ever. This means that a whole body of literature by historians and social scientists loosely labelled 'secularization theory' is essentially mistaken" (2).

Certainly from my side, I have *reasons* to find Butler's account of sex and gender unpersuasive.

Thirdly, on many political issues—in the evangelical tradition of William Wilberforce, Hannah Moore, and Lord Shaftsbury, and in continuation with nineteenth-century Presbyterian environmentalism, Methodist unionists, Catholic Rerum Novarum Labor Party supporters, Dietrich Bonhoeffer, Martin Luther King, etc.—many deeply religious Christians have, and always will oppose fascism, racism, environmental degradation, neoliberalism, antisemitism, islamophobia, asylum-seeker rejection, and so forth. To imply that such Christians are fascists if they adhere to traditional Christian sexual ethics is simply false. Was Bonhoeffer a fascist because he adhered to a traditional Christian sexual ethic?

I am unpersuaded by Butler's characterisation of a sharply binary Left versus Right war between those who allegedly fear and those who do not fear what she inconclusively means by "gender." On what grounds does she imply that all theologically conservative Christians who do not accept her gender ideology are either overtly or tacitly fascist? Must all gender critical feminists be overt or tacit Trump supporters? Leaving aside psychosocial speculative theories, Butler provides no *evidence* which shows that being a conservative Christian or a gender critical feminist inevitably places one's political loyalties firmly within "the Right."

Empirically, Butler's assertion of a necessary binary Left/Right polarisation on the basis of one's stance on contemporary gender theory/ies is demonstrably untrue, taking gender critical feminists such as Kathleen Stock, and Christians of the Left who do not embrace Butler's gender theory, such as myself, as examples. But Butler claims that the fact that people such as Stock and myself (for different reasons) do not agree with the validity of her account of gender and sex, means that we *fear* gender and are hence irrational and dangerous fascists. Unconsciously, I really must be of the far-Right, however I vote, whatever causes I donate to, whatever I might do and profess. This is a standard rainbow activist line, where even a progressive atheist Jew

can be denounced for holding a “far-Right Nazi ideology”²¹ because she has concerns about the mandatory affirmation of hormonal and surgical sex-presentation interventions for minors. In like manner, Butler believes she knows my evil Christian motivations better than I do myself because she understands how gender has become a “psycho-social fantasy,”²² particularly for people like me who have a sacramental natural law understanding of the nature and meaning of human sexuality.

Butler's assertions that global traditional religion is a necessary force for fascism and bigotry, that committed theological conservatives cannot be reasoned with, and that all theological conservatives are definitionally of the regressive and irrationally phobic Right, strikes me as lacking in any sort of serious credibility. But leaving this to one side, I would now like to critically explore what Butler means by “gender” and “sex” in relation to science and Christian faith. This is no easy task because in this text Butler often assumes rather than defends her main theoretical commitments. We must, then, do some exploration of Butler's first-order presuppositions before proceeding further.

Epistemology and Sophistry

Some time back Professor Martha Nussbaum argued that Butler is not a philosopher at all, but she is a sophist.²³ This need not be taken as an

21 This is a direct quote by Natalie Feliks—a trans activist—on the Australian Broadcasting Corporation's *Media Watch* (26 June 2023) hurled against Julie Szego, who is a politically Left Jew, and a legally trained investigative journalist, who thinks we should be cautious and slow rather than rapidly “affirming” gender dysphoric children towards irreversible sex-presentation transition, <https://tinyurl.com/nfhsan34>.

22 Butler, *Who's Afraid*, 24.

23 Martha C. Nussbaum, “The Professor of Parody: The Hip Defeatism of Judith Butler,” *The New Republic*, 23 February 1999, <https://newrepublic.com/article/150687/professor-parody>. As someone who has carefully worked through Butler's earlier theoretical works, Nussbaum notes: “It is difficult to come to grips with Butler's ideas, because it is difficult to figure out what they are. Butler is a very smart person. In public discussions, she proves that she can speak clearly and has a quick grasp of what is said to her. Her written style,

insult as pre- and post-Socratic sophists have been much admired in Western academic circles for most of the modern and all of the post-modern intellectual periods. The decisive difference between a philosopher and a sophist—according to Nussbaum and Pieper²⁴—is that

however, is ponderous and obscure. It is dense with allusions to other theorists, drawn from a wide range of different theoretical traditions. In addition to Foucault, and to a more recent focus on Freud, Butler's work relies heavily on the thought of Louis Althusser, the French lesbian theorist Monique Wittig, the American anthropologist Gayle Rubin, Jacques Lacan, J. L. Austin, and the American philosopher of language Saul Kripke. These figures do not all agree with one another, to say the least; so an initial problem in reading Butler is that one is bewildered to find her arguments buttressed by appeal to so many contradictory concepts and doctrines, usually without any account of how the apparent contradictions will be resolved." This shifting linguistic web of hard to tie-down assertions is no accident in Butler. As regards sophism, Nussbaum note: "Butler gains prestige in the literary world by being a philosopher; many admirers associate her manner of writing with philosophical profundity. But one should ask whether it belongs to the philosophical tradition at all, rather than to the closely related but adversarial traditions of sophistry and rhetoric. Ever since Socrates distinguished philosophy from what the sophists and the rhetoricians were doing, it has been a discourse of equals who trade arguments and counter-arguments without any obscurantist sleight-of-hand. In that way, he claimed, philosophy showed respect for the soul, while the others' manipulative methods showed only disrespect."

- 24 Josef Pieper, *What Does "Academic" Mean?* (South Bend: Saint Augustine Press, 2015). Pieper explains that the defining feature of philosophy in the Western academic tradition is a commitment to theoretical truth. In his words, "philosophical' amounts to 'theoretical' ... What, namely, is the original meaning of 'theoretical'? What is meant is an attitude towards the world which is only concerned with the fact that things reveal themselves as they are—which is what truth actually consists of. To be aiming at truth and nothing else is the essence of *theoria*" (8). In contrast, the sophist aims at power. And, then, he adds: "The sophist is a timeless figure, and the battle fought by Socrates-Plato against Protagoras and Gorgias is never-ending ... What all [the many varieties of] sophistry have in common is exactly that which separates them from the striving after knowledge which has its greatest witness in Socrates and Plato. It is the striving, identical down through the centuries, to discover the foundation of reality and existence ... [This can only be achieved] in an attitude of silent *theoria*—concerning himself with truth and nothing else, like a listener receiving his way of measuring things from the reality of the world which has been there before him—this is something the sophist will never accept. He [the sophist] will reject even more the idea that there could be such a thing as 'sacred tradition,' based on a message about the world and existence as a whole, from a higher than human source which also sustains that message. He [the sophist] chooses freedom—however empty it is—and achieves it by forgetting long established tradition. Commitment to 'tradition' seems to the critical

the philosopher aims at truth and believes it can, in some measure, be known. In contrast, the sophist does not believe truth can be known, and thus knowledge is reduced from being genuinely truth-concerned and becomes intrinsically interested, useful, and poetically constructed. To the sophist, knowledge is power and poetry (i.e., of human making) only. Essential truth is anathema to sophistry.

The unknowability and indefinability (philosophically speaking, the non-essentialism) of “gender” is firmly upheld by Butler on the opening page of her book. She explains: “The myriad, continuing debates about the word shows that no one approach to defining, or understanding gender reigns.”²⁵ Clearly, those who are not afraid of gender accept that there is no definable truth about what gender is, hence gender pluralism and unlimited gender identity complexity must be upheld, whereas those who are afraid of gender falsely (according to Butler) think they know what gender essentially is.

Here, the non-essentialist and plural constructions of gender that Butler celebrates, replace phantasmal and phobic essentialist beliefs. As a result, traditional Christians find the “truth” of gender non-essentialism profoundly threatening as regards their own sense of sex and gender identity. The horror traditional Christians experience on exposure to Butler’s non-essentialist understanding of gender is a function of the unmasking of the Christian delusion of sexual essentialism, and the delusion of sex-tied gender essence. Hence, Christian traditionalists are irrationally enraged by Butler’s work. There are a range of things that can be said here.

Firstly, it seems likely to me that gender really is an entirely non-essential and poetically constructed word/idea/ideology and what conservative Christians do not like is that a non-essential linguistic and performative construction is being used to displace an entirely different category of meaning, which is the essential meaning of the natural kinds of male and female sex in humans. If this is the case then Chris-

autonomous subject to be unjustified and, above all, unbearable” (27–28).

25 Butler, *Who's Afraid*, 3.

tians are not “afraid of gender,” but they are dismayed that what they understand to be an essential reality (male and female sex) is being laid aside in favour of a non-real constructed idea (gender identity) that promotes queer sexual ethics in direct opposition to traditional Christian sexual ethics. Of course, Butler has sophisticated arguments as to why gender *and* sex are always co-constructed, and why sex also cannot be an essential natural category, which we shall examine below.

Leaving whether sex is definable or not to one side, the point I am making here is that Butler imposes the category of gender-phobia on conservative Christians when that is not at all how Christians understand themselves.²⁶ Butler is playing a political naming game with traditional religious people (who take God to have created human sex, as male and female) where Butler is seeking to impose normative meanings on others that they do not accept for themselves. Clearly, rainbow “inclusion” is just as exclusionary towards people of heteronormative sexual ethics as it complains heteronormative sexual ethics is exclusionary of heteronormative deviance.

As an aside, it seems strangely naïve of Butler to be so confident that a global revolution in gender normativities overthrowing traditional religiously framed sex and gender familial structures will necessarily occur. Upwards of half the globe’s population adhere to religiously framed heteronormative sexual ethics within the Abrahamic frameworks. Further, the idea that heteronormativity is only native to Abrahamic religious frameworks is obviously false as the vast majority of all humans are brought up in reasonably stable heteronormative families (with a female mother and a male father), and do not live in sex and gender pluralist enclaves like West Hollywood (where highly visible and proudly non-heteronormative people are *still* a minority). Butler seems to be unrealistically expecting that most people will simply drop the normative frameworks they have been deeply formed by, and joyfully or grudgingly adapt to rainbow sexual normativities.

26 Butler recognises this dynamic on page 112, but deflects it by arguing that it is impossible to know what “sex” means outside of the ever-fluid and variable cultural, subjective, and self-defined categories of gender.

Butler's confidence that a global gender normativity revolution is inevitable reminds me of Marx's historical materialist confidence in the inevitable victory of religion-discarding class war, resulting in atheist global communism in short order after the publication of the Communist Manifesto in 1848. Upheaving long established traditions that are integral with such basic human realities as sacred sexually reproductive heteronormative familial beliefs and practices is perhaps something only progressive academics in their arcane discourse echo-chambers can imagine as an obvious and necessary development in global human affairs.

Secondly, there are, as already indicated, two broad trajectories within Western intellectual traditions—philosophy and sophistry—and Butler is presupposing that only sophistry is valid.

The relationship between contingency and flux on the one hand and essential meaning on the other hand, admits of two basic approaches in the Western intellectual tradition. Classical philosophy is deeply aware of epistemic complexity,²⁷ and yet finds transcendent Goodness, Beauty, Truth, Reason, and Unity to have divine warrants such that human knowledge partially admits of a true knowledge of the nature and meaning of reality. In contrast, sophistry says that all categories of essential meaning are illusions and the “truth” is that there is no Truth.²⁸ Here, all meaning is contingently co-constructed out of

27 See Lloyd P. Gerson, *Ancient Epistemology* (Cambridge: Cambridge University Press, 2009).

28 Truth is an essentialist category. The very idea of truth as regards morals and religion presupposes that there are essential qualitative intellectual realities independent of human subjectivity and cultural construction that can be partially known. The very idea of truth as regards scientific and historical facts presupposes that there are real quantitative material realities, independent of human subjectivity and cultural construction, which present essential intellectual features to our minds via our senses, that can also be methodically verified beyond reasonable doubt. Human knowledge that is truth-seeking is thus more or less *true*, depending on how well the essential realities of quality and quantity are grasped in the human epistemic process. Truth is *found* rather than made, even though the process of partially finding truth requires the use of culturally and historically situated words and ideas, that are indispensable to the truth-seeking process.

the raw (in itself, meaningless) givenness of material existence and the poetic human meaning categories of cultural norms and political power. Hence in the first wave of classical sophistry Protagoras claimed that the human being is the measure of all things (all “truths” are measured by humanly constructed meaning); Thrasymachus claimed that justice is whatever is in the interest of the strong (power is just power, justice is an illusion);²⁹ Gorgias held that with the right linguistic manoeuvres you could make any argument win or lose (words are not carriers of truth but wonderfully pliable tools of interest), and Democritus’ materialism held that there is no intellective essence in natural reality (or anywhere), but only atom, motion, and void exist (essential intellective truth is an illusion). A more developed scepticism is integral with the hedonic and materialist forms of sophistry in late antiquity,³⁰ and it is the early modern revival of antique sceptical materialist, naturalist, and hedonic thinkers—Sextus Empiricus, Lucretius, Epicurus—that influenced modern science in a sophistic direction right from the seventeenth century.

With the Enlightenment of the eighteenth century, Hume established a sceptical stance as regards faith-free sensory knowledge, such that sense perception did not give one Truth, but only solipsistic *a posteriori* impressions of an unverifiable external “reality.” Equally, the rationalists of the Enlightenment sought to make reason self-justifying without divine or faith-based warrants, and they discovered that theologically purified reason had no metaphysical leverage on observable material reality, as human reason—viewed only as of human origin—is entirely circular and linguistically enclosed. In Kant, faith-free Enlightened rationalism and empiricism were synthesised in a

29 This is Plato’s characterisation of the sophistic view that justice is an entirely socially and politically constructed gloss on mere wealth and violent power, as found in *The Republic* 1.

30 I am here using “sophistry” in contrast with “philosophy,” where philosophy refers to the academic mainstream of the middle- and neo-Platonist search for high truth in Greco-Roman antiquity, and where sophistry abandons that search and seeks rather practical usefulness and resigned accommodation to the absurdities and vicissitudes of life.

manner that was entirely epistemically sceptical about metaphysical truth, by means of a shift in focus from reality itself (*noumena*) to reality as it *appears* to human knowledge (*phenomena*). From here modern Western “philosophy” became increasingly sophistic until the categories of scientific positivism were entirely dismissed by the postmodern critique of the metanarrative of scientific truth in the work of Jean-François Lyotard.³¹

Butler's rejection of both gender and sex as having any knowable essential meaning is a function of her sophistic rejection of essential meaning itself, and this is firmly continuous with sophistic trends in modern “philosophy” from the Enlightenment to the present. But there is another tradition that Butler simply dismisses. She notes that “sex can be both real and mutable, unless we believe that ‘the truth’ is always immutable and never historical.”³² But this dismissal is unjustified polemical rhetoric: serious philosophical essentialism does not deny the historical situatedness of the human condition, it rather denies that the human condition is *only* defined by contingent historical flux.³³

Theologically framed essential Realism maintains that whilst Truth cannot be epistemically proven in terms of reductive human sense-perception and logic alone (the two sacred *sola* of the secularising Enlightenment), those who do not presuppose the reality of objective Meaning (the divine *Logos*)³⁴ can simply not be reasoned with.

31 Jean-François Lyotard, *The Postmodern Condition: A Report of Knowledge* (Manchester: Manchester University Press), 1984.

32 Butler, *Who's Afraid*, 153.

33 That is, the natural kinds of male and female sex are both immutable essential realities *and* historically located facts to a Realist stance. This is neatly the opposite of Butler where the mutable non-essentialism of “sex” is given contingent and ever-changeable “real” historical meanings.

34 It is clear that both Plato and Aristotle uphold the divine and revelatory nature of cosmic Truth, and that this commitment is the grounds of the Western academic tradition in its middle- and neo-Platonist trajectories, as taken up by the Byzantine Christian university initiated by empress Eudocia in the fifth century AD, and as the founding principle of the Western universities, the origins of the contemporary university, in the high Middle Ages. On Plato's philosophical religion, see Walter Burkert, *Greek Religion* (Oxford: Blackwell,

³⁵ This tradition as taken up by Western Christian philosophers is a good faith enterprise in the reasonably adequate but never totalising truth-seeking powers of valid human reasoning (logic) and sense-derived natural philosophy (science). But this tradition is premised on the conviction that the world is an ordered unity (a cosmos) produced by the divine *Logos* and upheld in its essential ontological categories by the divine Mind. Temporal existence is thus embedded in divinely gifted eternal essence in the Christian Realist intellectual tradition. Admittedly, there are dis-embedding influences against such Realism acting on natural philosophy from well before the modern era (notably Franciscan nominalist and voluntarist traditions from the fourteenth century, and the *natura pura* tradition of sixteenth century). However, it is still the broad assumptions of the older Realist tradition out of which early modern science arises. In this Realist tradition natural quantitative materiality is saturated in qualitative and intellective spiritual meaning and purpose. Here, the flux and contingency of temporal existence yet admits of genuine intelligibility because God gifts

1985), 305–338. Aristotle understands the quest for a knowledge of being itself as the “science that deals with divine objects” (*Metaphysics* 1.2) and uses the term “first philosophy” (what we now call metaphysics) and “theology” (reasoning about the divine) interchangeably (*Metaphysics* 6.1).

- 35 “Reasoning” that is just about winning arguments, that uses words as tools of power, is sophistry, it is not the philosophical search for truth. This is very powerfully set forth in Book One of Plato’s *Republic* where Thrasymachus argues that justice is defined only by the interests of the powerful. When Socrates argumentatively manoeuvres Thrasymachus into undermining his own argument, Thrasymachus does not admit he is in the wrong, he treats Socrates as if he is only using words as tools of power over Thrasymachus, and simply stops arguing. If your words don’t work to win, and you only “reason” to win, then your “reason” to dialogue evaporates if either the truth is not on your side or if truth cannot be made to appear to be on your side. Josef Pieper looks at this phenomenon closely in his short book *Abuse of Language—Abuse of Power* (San Francisco: Ignatius, 1992). One cannot have a meaningful truth-seeking dialogue with someone like Judith Butler without accepting her ground rule, that there can be no essential and knowable truth. She is not looking for truth as she does not believe it exists or could ever be found. She is looking to construct frames of meaning and governmental norms that allow her to be and do whatever she wants to be or do, and she thinks all her interlocutors are doing that as well. Sophistry is not philosophy. Sophistry is at times sparkling and brilliantly sophisticated, but it has no interest in truth-seeking dialogue.

essential natural kinds to the cosmos and upholds the entire created order with the Divine Word.

As Funkenstein notes, the early modern period gave rise to “a secular theology ... [where] science, theology, and philosophy [were] seen as almost one and the same occupation.”³⁶ Good faith in partially apprehended transcendent essence is here—in the academic tradition established by Plato—the grounds of truth-seeking reason. Yet Funkenstein also notes that this period is decisively closed by Kant’s move in secularising knowledge.³⁷ Intriguingly, historians working on the deep impact of the Bible and Christian theology on early modern science make it reasonable to assume that there was no such thing as naïve secular empiricism (ironically) until *after* Hume.³⁸ Culturally assumed theological commitments made early modern positivism possible, but that early modern positivism was theologically grounded, unlike post-Enlightenment and secularised positivism. That is, positivism not grounded in good faith that our senses in some manner reveal true created essences in the world becomes philosophically unsustainable after the secularisation of knowledge with the Enlightenment.

What I am getting at is that Butler refuses to even acknowledge the serious intellectual heritage of the Realist philosophical tradition in which traditional Christian understandings of the sacred meaning of human sexuality and the essential natural kinds of male and female humans (as divine image bearers, hence icons, hence not to be sexually defaced or sexually violated) is located. By her view, all philosophy is sophistry. But that becomes problematic for her as well.

If one is a non-essentialist as Butler is, on what grounds can (in her view) the *construction* of essential divine meaning that under-

36 Amos Funkenstein, *Theology and the Scientific Imagination* (New Jersey: Princeton University Press, 1986), 3.

37 Funkenstein, *Theology and the Scientific Imagination*, 346–364.

38 See, for example, Peter Harrison, *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press, 2007); Peter Harrison, *The Bible, Protestantism and the Rise of Natural Science* (Cambridge: Cambridge University Press, 1998); Reijer Hooykaas, *Religion and the Rise of Modern Science* (Vancouver: Regent, 2000).

pins a performative belief in the natural sex binary be dismissed as invalid? That is, Butler is privileging only non-essentialist sex and gender constructions (as if non-essence is itself essentially true) over traditional essentialist sex constructions, be they grounded in religion and Realism or not. But post-Enlightenment non-essentialism does not allow for any real distinction in truth between *any* meaning construction. So why should “born woman”—as an exclusively sex-defined gender-identity category—now be inadmissible? Butler unjustifiably and incoherently simply *presupposes* that essentialist sex constructions are false and non-essentialist sex constructions are true.

But here is her problem. Only an essentialist approach to truth is consistently able to claim that some sex-related behaviour normativities align with moral truth, and other sex-related behaviour normativities do not align with moral truth. If you accept the divine revelation status of the Bible and you combine that with a broadly Aristotelian natural law outlook as regards human reproduction and family life, then you have a coherent normativity basis which is always expressed in some degree of culturally specific manners, but which is authoritative for Christians regarding what is sexually moral and what is sexually immoral. No such basis can be asserted by the anarchic pluralism of gender and sex non-essentialism.

Butler’s anti-essentialism has no conception of *real* moral truth which can justify her supposedly moral opposition to Christian heteronormative sexual ethics. But Butler *does* exclude Christian heteronormative sexual ethics because it is incompatible with the normativity structures of dogmatically non-essentialist queer sexual ethics. This, as already hinted at, is an unavoidable feature of any normativity structure; any non-normative outlook will be excluded from any given normative framework. Rainbow morality *cannot* be inclusive of Christian sexual ethics if it is to be legally used as normative for all people under any specific legal jurisdiction.

This point needs to be underscored. Queer sexual ethics is incompatible with any divinely revealed and natural law conception of a real natural sex binary. Hence, traditional Christian sexual ethics must be

excluded from the rainbow reformation.³⁹ The way the rainbow fudges its intolerance of traditional Christian sexual ethics is by means of the naming game of cis gender. Butler implies that if you want to live in a heteronormative family, you can still do that, provided you play a naming game with yourself where you drop the idea that heterosexual marriage or celibacy is or should be (even just for Christians) divinely designated as sexually normative. Further, you must no longer define masculinity—however broad the category—as a cultural function of being of the male sex, or femininity—however broad the category—as a cultural function of being of the female sex. Being cis gendered is hence included in rainbow gender pluralism and sex fluidity.

Such gender-sex constructions (cis gendered people) now accept that there are no categories of deviance from heterosexual norms that are either unnatural or contrary to divinely revealed sexual ethics. That is, accepting the designation of cis gender is incompatible with

39 Human sexuality, heteronormativity, and “gender identity” (whatever that might mean) are not ultimate concerns for Christian theology. There will be no marriage in the resurrection and the sacramental meaning of human sexuality is defined by the love of the Groom (Christ) for the Bride (the Church), such that human sexuality will be transformed and taken up into a higher and (non-biologically reproductive) spiritual plane. So far this sounds a bit similar to some aspects of queer gender theory. But it is in fact opposite. Whilst sex and gender identity indeed are not ultimate and eternal for the Christian, for this life they really matter, and matter as gifts of God. Saint Paul explains that our bodies are temples of the Holy Spirit and for this reason we must not sin sexually (1 Corinthians 6:12–20). Jesus notes that God made us male and female and it is for this reason that the sacred unity of monogamous lifelong, sexually exclusive, heterosexual marriage—where the man and the woman are joined through sexual union by God—is to be respected by all (Matthew 19:3–6). As God’s creatures, we do not determine who we are, but are gifted to the world as—for the very large majority—unambiguously a male or a female. But transgenderism posits modern technology as the means of creating our bodies to be what “sex” we determine (though sex cannot be surgically or hormonally changed from male to female or from female to male), and to give ourselves any gender identity we determine or somehow innately know (whatever body God gave us). And queer theory explicitly celebrates sexual acts and relationships that are incompatible with traditional Christian marriage, and explicitly affirms what Christian heteronormativity defines as deviant from the God-ordained norm. The rainbow reformation is incompatible with traditional Christian sacred meanings, Christian social normativities, and Christian ethical frameworks as regards human sexuality.

traditional Christian sexual ethics. A traditional Christian cannot accept the naming game of being cis gendered and still be faithful to Christian sexual ethics and the Christian belief that—to quote Jesus of Nazareth—“from the beginning God made them male and female”⁴⁰... for this reason a man shall leave his father and mother and be joined to his wife” (Matthew 19:5). The natural and iconological kinds of male and female sex, and the sacred covenantal relationship of heterosexual marriage are integral features of Christian sexuality.

This is not compatible with queer inclusion, and queer inclusion is now determined to exclude Christian sexual ethics and any Christian understanding of the meaning of heterosexual marriage from the domains of legal, educational, institutional, and socially normative life. No wonder Butler expects traditional Christians to respond to her assertions with rage.⁴¹

Radical liberalism without any mandated norms, where people do as they please, in theory allows Christians to have Christian heteronormative sexual ethics in their own communities and does not require them to adhere to queer sexual ethics performative and virtue signalling norms. But that is not what rainbow *normativity* imposes.

Rainbow normativity means that even if I am a Christian I am required to use gender categories for people that are incompatible with my own natural law conception of the reality of a person's gender being tied to their sex.

I am required to let transwomen into women's only spaces even if I think this is a sexual deviance, an affront to the modesty codes of my faith, and a danger to the sexual safety of vulnerable women and girls. Normativity structures are *always* exclusionary, be they Christian or rainbow.

In sum, Butler presupposes the unassailable validity of sophistry

40 Jesus is quoting Genesis 1:27 (“So God created man in his own image, in the image of God he created him: male and female he created them”). Binary human sexuality is an express aspect of the sacred iconography of the human body in Hebraic and Christian sexual ethics.

41 Butler, *Who's Afraid*, 237.

and the obvious impossibility of philosophy. She has a non-essentialist commitment to radical epistemic undefinability which is the basis for her preferring “complexity” over clear—if never total—definitions, which also entails that entirely poetic (simply made up) human meanings are always inescapably entailed (“co-constructed”) in any so-called positive knowledge of any natural “reality” (such as “sex”). She does not argue *for* this position, she argues *from* this position, maintaining the rhetorical and polemic anti-essentialist stance that the point of language and reasoning is to get other people to play your naming game, rather than the common search for truth. Anyone who refuses to accept the meanings of her normative and “factual” naming game is simply attacked as immoral and stupid,⁴² but never seriously engaged with in the process of truth-seeking. This is because Butler does not believe there is any essential truth to be known about anything. Rather, language is—in the final analysis—nothing but a medium of governance, of power, and of normative assertion.

In contrast to Butler's sophistic anti-essentialist conception of gender, Christian sexual ethics and sacramental understandings of the meaning of the sexed human body have theological kinship with the Platonist and Aristotelian philosophical trajectory in the West.

There is indeed an epistemic and ontological incommensurability between Christian sexual ethics and queer gender normativities. Butler is riding this incommensurability politically, using “the Left” and “the Right” as catchall ideological tools to paint all opponents of queer gender normativity as irrationally phobic and morally despicable. This is consistent with sophistic conceptions of power, but it has no interest in truth (as truth is an essentialist category) and it is determined to exclude Christian and all traditional sex essentialism from its Left utopia of humanity and kindness. Bearing this in mind, it will now be relatively straightforward to engage with the main points put forward by Butler in her book.

42 See Kathleen Stock's comments in footnote 17.

Butler's Conception of Gender (Culture/Subjectivity) and Sex (Nature) Co-Construction

As already mentioned, Butler holds that the only final truth about gender is that there is no essential truth about what it is. Anyone who disagrees with this is an immoral and ignorant sufferer from the psychosocial condition of gender phobia. Gender identity is thus radically subjective in the sense that we must allow people to self-define their gender identities, but it is also integral with the malleability of the human body (which we must be able to alter to conform to our gender-identity should we wish) and with normative social governance structures (which we must shape to align with queer sexual ethics and identity politics). Trawling through her book for some clear descriptions of this stance, I have found the following: "Whatever else gender means, it surely names for some a felt sense of the body, in its surfaces and depths, a lived sense of being a body in the world *in this way*."⁴³ This is about as specific as Butler gets regarding any definition of gender. This is because her radically contingent⁴⁴ non-essentialism *requires* gender to be undefinable, but also (ironically) gender must non-essentially *define* the meaning and facts of the sexed body. Embracing gender-and-sex non-essentialism is the same thing to Butler as not fearing gender. Consider the following quotes:

Nature is not the ground upon which construction of gender happens. Both material and social dimensions of the body are constructed through an array of practices, discourse, and technologies. This process of co-construction brings attention to how materiality of the body is formed.⁴⁵

If sex is framed within cultural norms, then it is already gender.⁴⁶

43 Butler, *Who's Afraid*, 29.

44 Butler, *Who's Afraid*, 234: "every way of referring to gender has a certain contingency." Emphasis added.

45 Butler, *Who's Afraid*, 33.

46 Butler, *Who's Afraid*, 119.

Gender is made through certain structures of power, which means ... that gender is constructed.⁴⁷

[Citing Katherine McKinnon] "Sexuality, then, is a form of power. Gender, as socially constructed, embodies it, not the reverse."⁴⁸

Gender is not to culture as sex is to nature: co-construction is a better way to understand the dynamic relation between the social and the biological in matters of sex.⁴⁹

Sex and gender constitute one another.⁵⁰

The social *produces* the biological.⁵¹

In other words, Butler maintains that as cultural meanings and political governance structures change, so too do gender *and* sex. This presents a considerable problem to the very idea of validly verified scientific classification. However complicated this matter really is, the Aristotelian notion of objective natural kinds remains basic to modern scientific classification.⁵² To quote the *Stanford Encyclopedia of Philosophy*: "Scientific disciplines frequently divide the particulars they study into *kinds* and theorize about those kinds. To say that a kind is *natural* is

47 Butler, *Who's Afraid*, 139.

48 Butler, *Who's Afraid*, 140.

49 Butler, *Who's Afraid*, 188.

50 Butler, *Who's Afraid*, 207.

51 Butler, *Who's Afraid*, 216. Emphasis in original.

52 For a very helpful book on how demanding this domain really is, see Stewart Umphrey, *The Aristotelian Tradition of Natural Kinds and Its Demise* (Washington, DC: Catholic University of America, 2018). For a very accessible, yet richly researched text on the ongoing indebtedness of modern science to ancient and medieval Aristotelianism, see Richard Rubinstein, *Aristotle's Children* (New York: Harvest, 2003). Of course, modern science from Bacon on illustrates a powerful revolt against the Aristotelian hylomorphism and his formal and final causation. However, the great Greek sages never really go away. See David Roochnik, *Retrieving Aristotle in an Age of Crisis* (New York: State University of New York Press, 2013).

to say that it corresponds to a grouping that reflects the structure of the natural world rather than the interests and actions of human beings.”⁵³ Butler is, of course, proudly opposed to Aristotle, and to natural kinds, but despite her claim that she does not deny “the facts of ‘sex’”⁵⁴ (note that “sex” is expressed by Butler in quotation marks), if she maintains that scientific facts are intrinsically co-constructed by nature and “the interests and actions of human beings,” then she *in fact* denies the normal meaning of scientific classification.

On what a humanly rich and complex enterprise science actually is, scholars such as Polanyi, Kuhn, Feyerabend, and Latour⁵⁵ have provided those of us who think about the meaning of scientific knowledge with much needed corrections to the sort of simplistic scientific positivism assumed by the likes of Bertrand Russell and A. J. Ayer. Whilst this correction can indeed be read in a postmodern sophistic direction, it can also be read in a philosophical manner that reopens the traditional Western metaphysical appreciation of natural knowledge where the contingent is a viable partially revealing medium of essential intelligible truths.⁵⁶ I shall not attempt to adjudicate which way science should be read here, but it is simply facile of Butler to assume and assert that traditional Realist accounts of natural knowledge are

53 Alexander Bird and Emma Tobin’s entry “Natural Kinds,” *Stanford Encyclopedia of Philosophy*, 28 January 2022, <https://plato.stanford.edu/Entries/natural-kinds/>.

54 Butler, *Who’s Afraid*, 170.

55 Michael Polanyi, *Personal Knowledge* (Chicago, IL: University of Chicago Press, 1974); Thomas Kuhn, *The Copernican Revolution* (Cambridge, MA: Harvard University Press, 1992); Paul Feyerabend, *The Tyranny of Science* (Cambridge: Polity, 2011); Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993).

56 For some examples of metaphysical theologians who embrace both the human poetic side of knowledge and the divine revelation of essence through sense and reason, as partially grasped, see: William Desmond, *Being and the Between* (New York: State University of New York Press, 1995); John Milbank and Catherine Pickstock, *Truth in Aquinas* (London: Routledge, 2001); John Betz, *Christ the Logos of Creation* (Steubenville: Emmaus Academics, 2023); Paul Tyson (ed.), *Astonishment and Science: Engagements with William Desmond* (Eugene: Cascade, 2023); Adrian Pabst, *Metaphysics* (Grand Rapids: Eerdmans, 2012); Paul Tyson, *Returning to Reality* (Eugene: Cascade, 2014); Peter Kreeft, *The Platonic Tradition* (South Bend: Saint Augustine’s Press, 2018).

impossible for intelligent and truth-concerned people to pursue today. But let us look more closely at the co-constructivist relation between culture and science that Butler presupposes.

Butler's Relation to the "So-Called Facts" of Science

The way Butler uses scientific facts is slippery. This makes sense if the meaning that "sex" culturally, personally, morally, and politically *needs* to have is determinate of what the relevant scientific facts are (recall "the social *produces* the biological").⁵⁷ Butler claims:

In debates about who can compete in women's sport the matter of sex becomes quite complicated ... In a study funded by the International Olympic Committee in 2014 ... testosterone levels were tested in nearly seven hundred athletes ... The *New York Times* reported that the study found "that 16.5 percent of men had low testosterone levels and 13.7 percent of women had high testosterone levels with considerable overlap between the two groups."⁵⁸

Butler makes this observation in advancing her argument that "sex" (she often puts the word in quotation marks) should really be thought of as "a spectrum or a mosaic, as some scientists have argued, [hence] the so-called facts of sex prove to be more complicated than the simple binary would imply."⁵⁹ The "some scientists" Butler is here referring to⁶⁰ are people like Anne Fausto-Sterling whose innovative work blends Butler's political gender theory with biology.⁶¹ Here I agree with Richard Dawkins, who is an Emeritus Professor at Oxford University,

57 Butler, *Who's Afraid*, 216.

58 Butler, *Who's Afraid*, 190.

59 Butler, *Who's Afraid*, 190.

60 Butler here cites Daphna Joel, a neurofeminist with undergraduate qualifications in medicine and a doctorate in psychobiology, and Luba Vikhanski, who has a diploma in translation and an MA in journalism. Fausto-Sterling is mentioned throughout this chapter.

61 See Anne Fausto-Sterling, *Sexing the Body: Gender Politics and the Construction of Sexuality* (New York: Basic Books, 2020).

in evolutionary biology. The biological point of sex is reproduction. In humans, people cannot change their reproductive sex. In humans, to get reproduction you need a fertile female to successfully mate with a fertile male. In this functional biological sense, Dawkins is right; sex is a simple binary, for no matter how hard you co-constructively try, no transwoman can be a fertile female, and no transman can be a fertile male.⁶² To biologists such as Dawkins (who is emphatically *not* of the Religious Right), sex is biologically binary and there is a real biological difference between a transwoman and a woman. But back to Butler.

Reading the footnotes and the page following, it seems likely that Butler has read not only the *New York Times* piece cited above, but she has also looked at the study itself.⁶³ Both the *New York Times* article and Butler's citing of that article, leave the reader with the impression that male and female athletes have a "considerable overlap" in their testosterone levels, with the unstated impression that the 16.5% of men and 13.7% of women illustrate this "considerable overlap."

This is a misleading impression. What the study actually says is this:

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- 62 Richard Dawkins on X: "The way the non-binary faithful obsess about intersexes, and about individuals who can't produce gametes, amounts to a pathetic clutching at straws while they drown in postmodern effluent. Yes, some fish change from sperm-producing male to egg-producing female (or vice versa). That very statement relies on the gametic definition of male & female. Ditto hermaphroditic worms & snails who can produce both male & female gametes. In any case, the existence of intersexes is irrelevant to transexualist claims, since trans people don't claim to be intersexes. Also, as if it matters, humans are not worms, snails, or fish. The rare tetra-amelia syndrome (babies born without limbs) does not negate the statement that *Homo sapiens* is a bipedal species. The rare four-winged bithorax mutation does not negate the statement that *Drosophila* is a Dipteran (two winged) fly. Similarly, the occasional individual who can't produce gametes doesn't negate the generalisation that mammals come in only two sexes, male and female, defined by gamete size. Sex is binary as a matter of biological fact. 'Gender' is a different matter and I leave that to others to define." 1 Feb 2024, <https://tinyurl.com/mr44yeac>.
- 63 That study being: M. L. Healy et al., "Endocrine Profiles in 693 Elite Athletes in the Postcompetition Setting," *Clinical Endocrinology* 81:2 (2014): 294–305, doi:10.1111/cen.12445.

Hormone profiles from elite athletes differ from usual reference ranges.

The influence of sporting activity on endocrine physiology has become of increasing interest in recent years. The reasons include widespread abuse of hormones, particularly anabolic steroids (AS), erythropoietin (EPO), and human growth hormone (GH) as performance-enhancing agents.

The testosterone values show a complete overlap between men and women although the mean values differ. There were 74 of 446 (16.5%) men with a serum testosterone below 8.4 nmol/l, the lower limit of the normal reference range. There were 32 of 234 (13.7%) women with a testosterone level >2.7 nmol/l, the upper limit of the normal reference range.⁶⁴

I am a social scientist. I am trained in the accurate interpretation of social data. This is an important skill, for statistics are often selectively used to advance a claim, and the details of the study are usually very important in understanding what the findings really mean.

Digging into the data for this sample of athletes (and I had to pay to see the data) we find that the mean testosterone level for males is 14.6 nmol/l and the mean testosterone levels for females is 2.7 nmol/l. This shows a totally unmistakable differentiation between average testosterone levels in the men and women of this sample, which is itself within the normal range for men and women. Let us assume that by “overlap” the *New York Times* piece means a range where men and women in the sample illustrate statistically indistinguishable testosterone levels. Drilling down into the data further we find that five men (1.1 % of the 446 men) had testosterone levels of 2 nmol/l and below, whereas 209 women (89.3% of the 234 women) had testosterone levels of 2 nmol/l and below. There is a *very small* statistical overlap between men and women here. Let us call this the female majority set, with the upper normal testosterone level of females setting the boundary. We then see

64 Healy et al., “Endocrine profiles,” 294–295.

that 394 men (88.3% of the 446 men) had testosterone levels between 8 nmol/l and an astonishing 41 nmol/l (the normal upper limit is 30 nmol/l, and only five men were over 30 nmol/l in this sample), whereas thirteen elite women athletes (5.5% of the 234 women) had testosterone levels that overlapped with the normal male range, including one female at 32 nmol/l, which is over ten times the normal upper female range. (I'm not the IOC, but that doesn't look natural to me.) Let us call this the male majority set with the lower boundary catching men in the 8 nmol/l range, which is considered the bottom of the normal range. Again, there is a *small* overlap here between men and women.

The only other data set is that set between the normal female range and the normal male range. Here we do see *some* overlap, but it is strongly overrepresented by men by a ratio of two to one. In the between set (between 3 nmol/l and 7 nmol/l) we have 47 men (10.5% of the male sample) and twelve women (5.1% of the female sample). This is a small set between the two very large sets wherein the great majority of athletes sampled still fit into normal testosterone levels for males and females, that do not overlap in any statistically significant manner.

Thinking like a statistician, when the study authors says "testosterone levels show a complete overlap between men and women" all this means is that (barring one woman at zero detected testosterone, a number of gradient gaps up to 14 nmol/l and 14 measurement gradient gaps over 14 nmol/l on the women's chart, and five men at over 32 nmol/l) there were detectable levels of testosterone for both men and women at ranges between 1 nmol/l and 32 nmol/l.

This does not at all mean that there is a "considerable" sex-indeterminate fuzzy zone where male and female athletes cannot really be statistically distinguished on the basis of their testosterone levels. Apart from hormonal substance abuse, elite athletes are abnormal anyway, and certain types of sport impact testosterone levels in sex-specific ways. The relatively high level of male elite athletes with below normal male testosterone levels, for example, is often observed in male elite extreme endurance athletes.⁶⁵

65 A. C. Hackney and Eser Aggon, "Chronic Low Testosterone Levels in Endurance

The point I am making is that Bulter—in a classically sophistic manner—is using “knowledge” as a means of advancing her interest claim when it comes to trans-athletes and her advocacy for the validity of believing in a “complicated” and fluid sex-spectrum. Perhaps she wasn’t deliberately misinterpreting the study, but the *fact* is she has at least implied a misinterpretation that aligns with her prior stance about sex-indeterminacy. The *New York Times* article Butler quotes—something of an apologetic piece for controversial trans-athlete Lia Thomas—also implies this misinterpretation. This happens a lot in this domain.

Trying to find good data sets on people who have had opposite sex hormones, puberty blockers, and sex-presentation altering surgery and have then detransitioned is very hard. As the Cass Report showed, getting accurate data on whether the known physical harms caused by puberty blockers for children (for example) is in other regards beneficial in treating gender dysphoria, is very hard, because if there are no clear benefits (which, according to the Cass Review, the currently available studies show),⁶⁶ this is considered adverse to the rainbow reform agenda, and hence fuel for bigoted fascists, so it is in the public interest not to provide such data.

Bulter’s co-constructivist approach where cultural meanings, normative frameworks, and governance structures are what inescapably constructs the natural facts, conveniently enables her to polemically

Trained Men: The Exercise- Hypogonadal Male Condition,” *Journal of Biochemistry and Physiology* 1:1 (2018): 103, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5988228/>.

- 66 Hilary Cass, “The Cass Review: Independent review of gender identity services for children and young people,” April 2024, <https://cass.independent-review.uk/home/publications/final-report/>. On page 20, the report notes that “the Review stepped into an arena where there were strong and widely divergent opinions unsupported by adequate evidence ... When the review started, the evidence base, particularly in relation to the use of puberty blockers and masculinising/feminising hormones, had already been shown to be weak ... To scrutinise the existing evidence the Review commissioned a robust and independent evidence review and research programme from the University of York ... The University of York’s programme of work has shown that there continues to be a lack of high-quality evidence in this area.”

message scientific data in advancing her cause. This all makes perfect sense if sophistry really is valid, and if “knowledge” is simply a political tool of interested persuasion.

Penultimate Thoughts

Citing Rev Daniel P. Horan (OFM), Butler states:

The Catholic Church needs to give up the “13th century pseudo-science” that informs its views about gender and reexamine what the Congregation for Catholic Education calls its Christian Anthropology, that is, its commitment to regarding the human as composed of an essential and complementary duality, man and woman.⁶⁷

Butler is keen to attack the Christian doctrine that God created the natural kinds of male and female humans by claiming that this doctrine is based on thirteenth-century pseudo-science. Natural philosophy has always been, and always will be ancillary to Christian doctrine. But to deny that there is a Creator, and to deny that we are creatures, is to deny Christian faith—which any atheist is entitled to do—but it is beyond the remit of both secular philosophy and modern science to either conclusively confirm or deny that there is a Creator. Yet, though Christian anthropology grounded in the Bible and sacred doctrine does entail the essential and complementary duality of man and woman, Butler really does expect traditional Christians to “give up” all faith commit-

67 Butler, *Who's Afraid*, 81–82. Butler here cites a LGBTQTI+ friendly Franciscan friar who is critical of the United States Conference of Catholic Bishops, which strongly supports the Vatican stance upholding the human natural sex binary. What Butler and Horan are not explaining here is that debates about thirteenth century (i.e., Aquinas') natural philosophy are very much live debates in the Catholic Church today, with the old rivals of Franciscan Scotus/Ockham supporters—such as University of Notre Dame's Rev Dr Horan—on one side, and strong Dominican backing supporters of the *Ressourcement* and the Pryzwaran revival of Aquinas, and other John Milbank-inspired advocates of metaphysical theology—such University of Notre Dame's Professor John Betz—on the other side. This is an ironically fourteenth-century justified polemic comment by Rev Dr Horan.

ments she deems to illustrate genderphobia. And Butler is not alone here. Over the past two decades concerted and well-funded rainbow inclusion movements have been advancing Butler's stance in faith-based organisations with considerable success.⁶⁸

In my estimation, Butler is a brilliant sophist, and a powerful political propagandist for the queer reform movement. In a secular and progressive country like Australia, this movement has now captured most university campuses, all education departments, and a great deal of sex discrimination and related legislation and policy stances tied to Butler's concept of gender. Thanks to ACON and other powerful lobby groups and government-sponsored reform bodies, Butler's notion that sex is a non-essential category which must have legal meanings that negate any natural kind understanding of the male/female sex binary⁶⁹ has been very successful in Australia. The 2013 removal of biological definitions of man and woman from the Australian Sex Discrimination Act (1984) has made all female-only spaces conventional only. The legal and institutional success of Butler's gender theory has negated the legal propriety of any unwanted public expression of the assumption of biologically essential differences between males and females, and forbids any normative behaviour premised on that assumption if a complaint is made. Women and girls are no longer entitled to female-

68 For example, the Arcus Foundation is a well-endowed foundation promoting LGBTQI+ causes. The Arcus Foundation donates considerable funds to organisations that “work for LGBTQ Equality with Faith-Based Community and Youth Groups.” Theological conservative faith communities are a distinct focus, as Arcus funds are directed towards promoting LGBTQI+ equality in the Catholic Church (such as via Dignity USA), in American Evangelicals (such as via Reconciling Ministries), and in Islam (such as via The Inner Circle), <https://tinyurl.com/22b2ar8t>. Of course, private foundations are entitled to fund whatever they like, but the point to notice here is that money coming from outside the church, and outside of Christian theology, is being directed into the church with the express aim of changing traditional Christian sexuality theology.

69 People who are born with physiological abnormalities such that they will grow up to be reproductively non-fertile, and/or express some combination of male and some female sex characteristics, are important and precious people—as is every person—but they do not negate the normal reproductive sex binary.

only spaces of any sort.⁷⁰ Given the known serious problem of women (females) suffering sexual and other violence from men (males), withdrawing female-only safe spaces is morally inexcusable. The queer reform movement has also legitimated the concerted public denigration of traditional Christian understandings of the sacred and created meaning of human sexuality. Traditional Christian sexual ethics is now deemed to be an expression of phobic and immoral bigotry. Even science has been subsumed into this sophistic manipulative power contest.

Conclusion

After closely reading Judith Butlers book, *Who's Afraid of Gender?*, I have come to the following four conclusions.

Firstly, Butler's book is driven by the uncompromising binary assertion that one either embraces sex-fluid and pro-queer gender-identity theory, to the exclusion of the scientific facts of the human biological sex binary, or one is a phobic, fascist-supporting, hateful, and unacceptably ignorant person in league with both Donald Trump and the Vatican. This assertion is false if it is intended as a serious intellectual and facts-based argument, but I do not think it is intended in that manner. In keeping with her performative understanding of norma-

70 As I write, Sally Grover has today (23 August 2024) been successfully sued in the Federal Court of Australia by XY chromosomed transwoman Roxanne Tickle for unlawful indirect gender-identity discrimination. Grover excluded Tickle from the Giggle for Girls social media platform on the claim that Tickle's sex is male and the app is a female-only app. Dr Anna Cody, The Sex Discrimination Commissioner, under the umbrella of the Australian Human Rights Commission, advocated against Grover as *amicus curiae*, and advised the courts to find in favour of Tickle, as Australian law now recognises no sex-based definition of man or woman, hence there is no place where a male claiming to be a woman can be excluded without that being illegal sexual discrimination. Justice Bromwich did find in favour of Tickle, and determined that an officially altered birth certificate stating that Tickle is female legally demonstrates that sex does indeed change. For Justice Bromwich's summary of his judgement see here: <https://tinyurl.com/42s4b8rv>. See also Law.com for a summary of the case, here: <https://tinyurl.com/5xwsx69y>. See also the LGB Alliance page on the Tickle vs Giggle case, with links to the Sex Discrimination Commissioner's advice to the court, here: <https://tinyurl.com/337sr2tn>.

tive speech acts, I take Butler's book to be an expression of political activism rather than a serious intellectual argument. As a form of political activism that denies that there even could be any genuine facts about what a male and a female human being actually are, I take this to be a dangerous form of political activism that will seriously erode long-established female-only spaces and social norms, to the considerable danger of vulnerable girls and women.

Secondly, Butler's book maintains a clear and uncompromising opposition to traditional Christian sexual heteronormativity. Butler maintains this opposition because she rightly discerns that the categories of sacred sexual meaning embedded in Christian theological anthropology, which are still deeply engrained in Western social norms, are where popular resistance to the rainbow reform agenda is most likely to arise from. But again, Butler offers no serious argument as to why religious stances on the meaning of human sexuality must be wrong, she only offers political rhetoric against religious opposition to her gender theory. There is no truth-seeking reason to take her barrage of insults and attacks on traditional religiously framed understandings of the meaning of human sexuality seriously.

Thirdly, Butler's non-essentialist metaphysics of both sex and gender fails because its dismissal of truth leaves only sophistical persuasion and relativistic virtue signalling as the flimsy grounds on which to accept gender theory. I find no persuasive reasoning in philosophy or science to accept her gender theory.

Fourthly, Butler's slippery use of argument does not simply display itself in the domain of meanings and norms, but in facts and statistics as well. Butler's rhetorical and distorting use of statistics displays her genuine lack of interest in factual truth. Facts are constructed tools of power to Butler, not truths that can be reasonably verified and respected.

In light of these findings, it seems clear that a reasonable case for heteronormativity needs to be reasserted in the public domain by science-respecting Christians. But, as we can now see, thanks to the courageous example of gender critical feminists and women seeking

to assert female-only safety rights, law and the institutional culture of universities and the mass media are now firmly set in favour of the rainbow reformation. To stand up for Christian heteronormativity now will entail a serious and unpleasant struggle. But perhaps that struggle cannot be avoided any longer.

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John C. Polkinghorne and Chen Ning Yang on the Dialogue between Science and Religion

John Z. Shi

Abstract: John C. Polkinghorne (1930–2021) (FRS 1974) was an English theoretical particle physicist, theologian, and Anglican priest. Professor Chen Ning Yang (ForMemRS 1992) is a theoretical physicist. Polkinghorne visited the Hong Kong Baptist University in November 2006. The present article gives an account of his visit, in particular his public lecture, a dialogue with Yang, and their responses to questions from the audience. Polkinghorne's trip to Hong Kong introduced the interdisciplinary field of science and religion to the people of Hong Kong and mainland China, and opened an East-West dialogue on this topic. Polkinghorne's view that "Science and religion are basically friends and not foes because they are both concerned with the search for the truth" is an inspiration for many. The same goes for Yang's point that "Science and religion belong to one family from the beginning."

Keywords: Chen Ning Yang; dialogue; John C. Polkinghorne; religion; science

John Z. Shi is Professor at School of Ocean and Civil Engineering, State Key Laboratory of Ocean Engineering, Shanghai Jiao Tong University, China.

“There was a man sent from God, whose name was John” (John 1:6)

Polkinghorne was one of the greatest scholars of the interdisciplinary field of science and religion. The above quote from the Gospel of John captures well the spirit of his contributions, serving as a metaphorical introduction to the dialogue between Polkinghorne and Yang.

The primary objective of this paper is to present perspectives on science and religion, with special reference to Polkinghorne’s public lecture, his dialogue with Yang on East-West perspectives on science and religion, and their responses to questions from the audience at a forum at Hong Kong Baptist University in November 2006. In so doing, this paper supplies further information about Polkinghorne’s groundbreaking visit to Hong Kong.¹ The novelty of the conversation he initiated is confirmed by the comments of the audience, addressed below, which indicates a public unaccustomed to this topic.

Sino-British Cultural Relations: A Selective Overview

As a background for Polkinghorne’s visit to Hong Kong, it is useful to consider aspects pertaining to the general context of Sino-British cultural relations.

The Notion of God in the Ancient Chinese Classics

In Xi Ci I of I Ching, one of the ancient Chinese classics, likely composed in the eighth century BC, includes the following line: “Seeing their spirit-like intimations and understanding them depended on their

1 R. Bêteille (ed.), *Science and Religion: Edwin Ernest Salpeter, Owen Gingerich, John Polkinghorne*, ed. Radha Bêteille et al., Creative Lives and Works (London: Routledge, 2021); J. Z. Shi, “Revd Dr John C. Polkinghorne’s Activities in Science and Religion: A Personal Perspective,” *European Journal of Science and Theology* 20:3 (2024): 1–33; J. C. Taylor and D. A. Wilkinson, “John Charlton Polkinghorne KBE: 16 October 1930 – 9 March 2021,” *Biographical Memoirs of the Fellows of the Royal Society* 72 (2022): 293–309, <https://doi.org/10.1098/rsbm.2021.0044>.

being virtuous people” (*Xi Ci I*).² The phrase “spirit-like” means God. Jao Tsung-I, also known as Rao Zongyi, a Hong Kong sinologist and historian, thought that it was extraordinary that ancient Chinese were talking about God.³

Legge argued that the “Lord on High” (*Shangdi*) mentioned in the earliest parts of two Ruist canonical works, the *Book of Historical Documents* (*Shujing*; fourth century BC) and the *Book of Poetry* (*Shijing*; dating from the beginning of the Western Zhou period, 1046–771 BC, to the mid-Spring and Autumn period, ca 771–476 BC), is equivalent to the concept of “God” in monotheistic traditions.⁴ As such, the monotheistic idea in China preceded the arrival of Christianity, it being generally thought that Christianity was first introduced to Changan, China, by a Persian monk, Aluoben, in the year 635, during the Tang Dynasty.⁵ Figure 1 shows what is possibly the earliest documented encounter between Christianity (*Jingjiao*) and ancient China.⁶

To speak of a traditional Chinese monotheism is no simple matter. Confucianism has been influencing the Chinese mind for over 2,000 years. While the ancient classics spoke of *Shang-ti* (*Shangdi* or Lord on High), the Supreme Ruler, to whom was attributed everything that belongs to God alone, Confucius replaced this term by “heaven.” However, he gave no clear account of what it meant—nor did he define people’s duties towards it.⁷

2 Available at <https://ctext.org/book-of-changes/xi-ci-shang/ens> (accessed 12 March 2024).

3 Y. T. Sze, *Literature and God: Interview and Dialogue with Prof. Jao Tsung-I: Elevation from Poetry to Philosophy* (SDX Joint Publishing Company, 2011; in Chinese).

4 J. Legge, *The Notions of the Chinese Concerning God and Spirits* (Hong Kong Register, 1852). See L. F. Pfister, “The Legacy of James Legge,” *International Bulletin of Missionary Research* 22:2 (1998): 77–82.

5 K. Barat, “Aluoben, a Nestorian Missionary in 7th-Century China,” *Journal of Asian History* 36:2 (2002): 184–198.

6 J. C. Feng, “Christianity’s Earliest Encounter with the Ancient Techno-Scientific China: Critical Lessons from *Jingjiao*’s Approach,” *Christian Perspectives on Science and Technology* 2 (2023): 80–103.

7 A. H. Smith, *The Uplift of China* (London: Young People’s Missionary Movement, 1908).

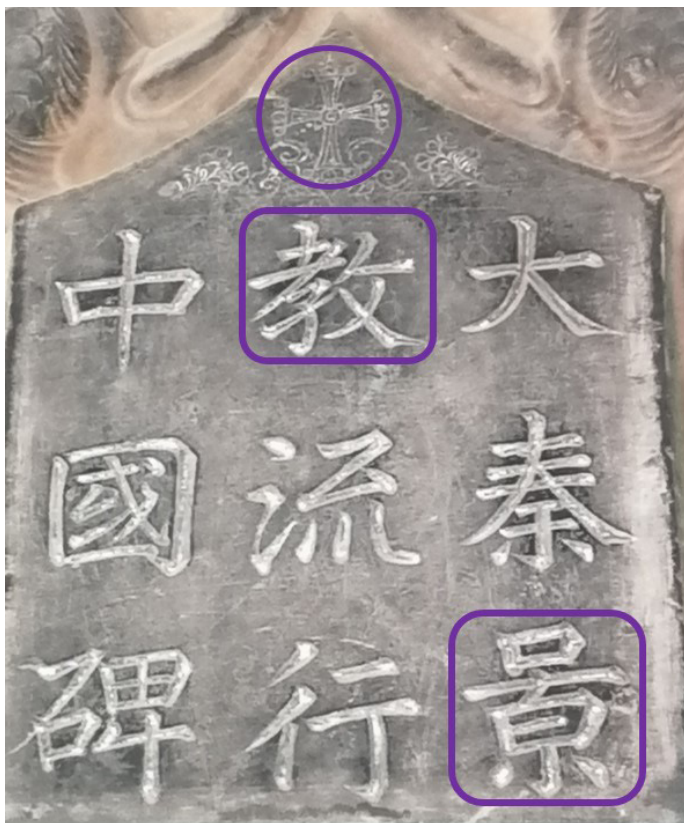


Figure 1. The famous Nestorian stone monument of Xi'an. A Christian cross, highlighted in the purple circle, is at the top of the monument; *jing* (bottom, right) and *jiao* (top of the middle column), highlighted in purple, refer to Christianity. Photo by John Z. Shi.

Confucianism, as a humanistic philosophy, downplays the importance of divine revelation and the supernatural; therefore, it does not provide a suitable framework for understanding the concept of God in Chinese culture. This realisation led scholars, such as Jao Tsung-I and Legge, to doubt the presence of monotheism among the Chinese people, but things are perhaps not quite so clearcut. Their understanding does not reflect accurately the original intent or meaning of the

ancient, pre-Confucian texts. Closer to the spirit of those texts is Feng's recent analysis, referenced above, which brings to light both ancient monotheistic ideas and the contributions of medieval Christians in emphasising divine authority and revelation.

What I am proposing, here, is that the audience's questions during Polkinghorne's visit to Hong Kong stemmed from an awareness of the ancient Chinese classics, including the contributions of the *Jing-jiao*. It is this awareness that explains why the audience was able to grasp the Christian concepts of God and divine revelation. In this light, Polkinghorne's visit to the Hong Kong Baptist University occasioned a return to the ancient sources of Chinese theology. That said, Polkinghorne was not the first modern Christian to visit China.

British Missionaries to China

To place Polkinghorne's connection with China within the general context of Sino-British cultural relations, a brief overview of British missionaries to China is given here. Those missionaries include Robert Morrison (1782–1834), James Legge (1815–1897), and James Hudson Taylor (1832–1905), among others.

Legge (top left in Figure 2), as the first example, translated all Chinese classics into English with the assistance of his three Chinese students. He was able to write Chinese in calligraphy (top right in Figure 2).

In turn, Taylor spent much of his life in China. The Society of the China Inland Mission, which he founded, helped to establish 125 schools in China. The positives of British missionary work, such as the numerous schools established on mainland China, should not be ignored. They are an important part of Sino-British cultural relations.

Equally important was the activity of the Cambridge Seven (bottom in Figure 2), who, according to Pollock, were “seven Cambridge students [who] volunteered to leave behind cosy lives of wealth and privilege to serve God in whatever way they were led.



Figure 2. Top left: James Legge. Photo Credit: the Legge Family Collection. Top right: Legge's hand-written Chinese in calligraphy and English translations dated 22 March 1879. Bottom: The Cambridge Seven. Source: <https://tinyurl.com/4bpp98tm> (accessed 12 March 2024).

These seven inspired thousands of others to think seriously of missionary service.”⁸ As shown in Figure 2, the Cambridge Seven wore Chinese-style clothes, namely, Mandarin garb, thus showing their cross-cultural adaptability. The Cambridge Seven were: M. Beauchamp, W. W. Cassels, D. E. Hoste, A. T. Polhill-Turner, C. H. Polhill-Turner, S. P. Smith, and C. T. Studd. Their efforts paid off. According to Chinese academics, China is currently home to at least 45 million Christians, the majority of whom are Protestant. However, Western researchers consider the number closer to 90 million.⁹

Before I turn to Polkinghorne’s visit, a point is in order, regarding the possible objection to the positive appraisal of missionaries’ impact. Were missionaries, coming as they were from privileged backgrounds, and bearing imperialist ideas, able to understand or empathise truly with the experiences of the communities they sought to convert? The freedoms granted to missionaries might have been a byproduct of imperialist agendas, rather than originating in a genuine respect for religious freedom. In this vein, I should point out that the British schools were not solely motivated by altruism, instead being used as a means of cultural indoctrination. This background history should be borne in mind when considering the attitude of Chinese people to religion, especially the Christian faith.

Polkinghorne’s Visit to the Hong Kong Baptist University in 2006

I begin by pointing out that the first time I had come across the name of John C. Polkinghorne KBE FRS was through Chen Ning Yang’s *Collected Essays*,¹⁰ where one essay referred to Yang’s dialogue with Polkinghorne at Hong Kong Baptist University in November 2006. There, Yang

8 J. Pollock, *The Cambridge Seven: The True Story of Ordinary Men Used in No Ordinary Way* (Christian Focus, 2006).

9 S. Schafer, “Onward, Christian Soldiers,” *Newsweek* (May 10, 2004): 24–28.

10 Chen Ning Yang’s *Collected Essays* (*Shuguang Ji*; in Chinese), ed. Weng Fan (SDX Joint Publishing Company, 2008).

(ForMemRS 1992; Nobel Prize Laureate in physics in 1957) pointed out that his famous physicist friend, Polkinghorne, believed in God and was a priest. Polkinghorne met Yang at the Institute for Advanced Study, Princeton University, USA, in the 1960s. As a Chinese who grew up in mainland China and trained in the United Kingdom, I am still surprised by Polkinghorne's two different careers.

Polkinghorne's visit was occasioned as part of the celebration of the Hong Kong Baptist University's fiftieth anniversary, a significant event called "Brilliance of Civilisation: In Celebration of the Hong Kong Baptist University Honorary Doctorate Recipients 2006." Held on 13 November 2006, the forum was organised by the Center for Sino-Christian Studies and was cosponsored by the Department of Religion and Philosophy. The Master of the Ceremony was Professor Lo Ping-cheung, Research Coordinator of the Centre for Sino-Christian Studies and a faculty member of the Department of Religion and Philosophy.

Prior to this event and to Polkinghorne's visit, it is noteworthy that, in March 2003, Dr Kang Phee Seng (alias Jiang Pisheng), Head of the Department of Philosophy and Religion, Hong Kong Baptist University, nominated Polkinghorne for an Honorary Doctorate of the said university. The university approved the nomination with the conferring of an Honorary Doctorate on Polkinghorne on 14 November 2006. On that visit, at the invitation of Yang, Polkinghorne presented a public lecture entitled "The Dialogue between Science and Religion and Its Significance for Academia." and was followed by an "East-West Dialogue on Science and Religion" with Chen Ning Yang. In what follows, I present the addresses given during the event—in English for the first time.

Opening Remarks by Council Chairman of Hong Kong Baptist University

Before Polkinghorne's public lecture and his dialogue with Yang, Mr Moses Mo-Chi Cheng LL.B., LL.D., GBM, GBS, OBE, JP, Council Chairman, Hong Kong Baptist University, delivered a short welcoming address. Here are his remarks (slightly edited):

We are very honoured to have both bishops of Hong Kong here, Archbishop Kong ... and Bishop Zen. Welcome to Hong Kong Baptist University! ...

This is indeed a very happy and special occasion for all of us here at Hong Kong Baptist University. As most of you know, we are celebrating our fiftieth anniversary. This forum is indeed a very important part of our year-long celebrations. This afternoon, Hong Kong Baptist University is very privileged to have two outstanding scholars as speakers. They are none other than the Revd Dr John Polkinghorne, who will speak on “The Dialogue between Science and Religion and Its Significance for Academia,” and Professor Yang Cheng Ning, Nobel Laureate in Physics, who will engage in East-West dialogue with Revd Dr Polkinghorne on science and religion ... Professor Yang is our honoured alumnus. An Honorary Doctorate of Science was conferred on him in 1999. Revd Dr Polkinghorne will become an Honorary Doctor of Humanities of this University tomorrow ...

The dialogue between science and religion, I am given to understand, has been one of the fastest growing interdisciplinary fields in the West, involving many top scientists and religious study scholars. However, this important interdisciplinary study is relatively new to academia in Hong Kong and mainland China. This is therefore a very special occasion during which we can benefit from two of the most creative thinkers of our time. The Hong Kong Baptist University is indeed honoured to host this lecture and the dialogue.

Ladies and gentlemen, Albert Einstein once said, I quote, “Religion without science is blind, science without religion is lame.”¹¹ This afternoon, we are here together to be illuminated on the relationship between science and religion and its significance for academia. I am sure our speakers will shed new light on these issues. At the end of this forum, we all will be able to see better and run faster in the race of life and in academia in particular.

11 See the context in A. Calaprice, *The Expanded Quotable Einstein* (Princeton University Press, 2000).

Opening Remarks by the Director of the Center for Sino-Christian Studies

The next speaker was Professor Kang Phee Seng, a founding member of the International Society for Science and Religion. Kang introduced the two speakers. Here are his remarks:

Hong Kong is the place where East meets West. Today, on this special occasion, we are witnessing its new role as the place where science meets religion ...

I cannot think of better scholars to initiate this conversation between science and religion at the highest academic level in Hong Kong, than the Revd Dr John Polkinghorne and Professor Yang Cheng Ning. This public lecture and dialogue involving internationally acclaimed scientists from East and West is the first of its kind in China and in East Asia. The University is honoured to host this historic event today.

The Revd Dr John Polkinghorne will first deliver his lecture on the dialogue between science and religion and its significance for academia. As an eminent scientist, he was elected Fellow of the Royal Society, joining the ranks of Isaac Newton, Charles Darwin, James Clerk Maxwell, and Stephen Hawking. Then, as an outstanding scientist and theologian, he was awarded the Templeton Prize, considered the Nobel Prize in religion. Within a short span of twenty years, he has produced more than twenty books on science and religion, many of which have been published by prestigious university presses. He has helped in no small measure to establish the new and reputable interdisciplinary field of science and religion. No wonder Harvard University has recently announced the creation of an Endowed Watson Professorship in science and religion, thus joining Princeton, Cambridge, Oxford, Berkeley, and others in affirming the discipline as a legitimate academic field. I am sure the audience cannot wait to hear Dr Polkinghorne tell us why the science-religion dialogue is significant for leading academic institutions.



Figure 3. Moses Cheng Mo-chi (left) presenting a souvenir to Polkinghorne (right). Credit: Centre for Sino-Christian Studies, Hong Kong Baptist University.

After the lecture, Professor Yang Cheng Ning will engage in a dialogue on this theme with Dr Polkinghorne. Professor Yang is a Nobel Laureate in Physics, a US National Medal for Science Laureate, and a member of the Chinese Academy of Sciences. He needs no further introduction. If I may, I would mention only that Professor Yang's doctoral supervisor, the famous Enrico Fermi, once advised him, "as a young man, work on practical problems. Do not worry about things of fundamental importance." For all his admiration of Fermi, Professor Yang did not seem to take this piece of advice too seriously. In fact, it is precisely his doing away with a fundamental parity conservation law which physicists before him took to be too important to deserve scrutiny that won him the Nobel Prize in Physics in 1957. Perhaps, in recent years, the still young at heart Professor Yang has been ignoring the same advice again. He has expressed his keen interest in something of even more fundamental importance, namely, religion. In very recent lectures, at Penang and Hong Kong University, for instance, Professor Yang has spoken about his interest in the relation between science and religion. It has been said that, as a

young theoretical physicist, Professor Yang experienced difficulties with applied physics. His fellow students used to say “where there’s a bang, there’s Yang.” In that vein, now they would have to say “where there is a discussion of God and the Big Bang, there is Yang.”

John Polkinghorne and Professor Yang are old friends. Their friendship began more than forty years ago during their Princeton days. This afternoon, we have a direct East and West dialogue on science and religion or rather a warm conversation between two old friends on things of fundamental importance.



Figure 4. From left to right: Moses Cheng Mo-chi, Ng Ching-fai, Polkinghorne, Yang, and Kang. Credit: Centre for Sino-Christian Studies, Hong Kong Baptist University.



Figure 5. Group photo (Polkinghorne at the centre of the front row). Credit: Centre for Sino-Christian Studies, Hong Kong Baptist University.



Figure 6. Polkinghorne giving the public lecture (13 November 2006).
Credit: Hong Kong Baptist University.

Polkinghorne's Public Lecture at Hong Kong Baptist University

After the above introductions, Polkinghorne gave a public lecture on “The Dialogue between Science and Religion and Its Significance for Academia,” on 13 November 2006 at Hong Kong Baptist University. The session was chaired by Professor Lo. Here is the transcript of the lecture (slightly edited):¹²

I hope you will excuse me if I sit down to speak, I am having back problems. Although I lose in authority for not standing, I gain in comfort.

It is a very great pleasure for me to be in Hong Kong and a great privilege to have a chance of speaking this afternoon. It is a special pleasure and a special privilege to do so in the presence of Profes-

12 The major part of Polkinghorne's public lecture and the dialogue with Yang was translated into Chinese and published in *Dialogues between Science and Religion in China*, ed P. S. Kang et al., *Dialogues between Science and Religion in China* (China Social Science Press, 2008).

sor Yang, who is such an outstanding insightful leader of the community of particle physicists in which I worked as a humble toiler for twenty-five years. It is very good to see him again.

In my own country, and throughout the world, the twentieth century saw a vast expansion of access to university education. Governments were willing, largely for what they saw as practical reasons, to provide financial resources needed for that expansion. Politicians understood that graduates are needed to enable the development of a prosperous nation. Now, while that is true and is certainly to be welcomed, I think it would be a bad mistake to think that the principal role of academia is to facilitate an increase in the gross national product. A different purpose, in my view, the most important purpose, of academia is the discovery and the propagation of knowledge. Many other good outcomes will follow and will fulfil its main objective. Their continuation depends in the long run on not losing sight of this central aim and justification for a life of academia.

So, I want to state from the outset of this lecture my strong belief in the value of knowledge for knowledge's own sake. I want also to state my strong belief that ultimately knowledge is one. Academic life today is subject to many severe pressures in the direction of intense specialisation. Now I am quite happy to recognise that engaging in depth with a specific topic teaches one something valuable about knowledge, something that cannot be learnt in any other way. But the insight that is gained then has to be set in a wider context. There is a real danger that the modern academy will be made up of people who simply know more and more about less and less. A true university is much more than a loose assembly of specialised research institutes, occasionally on the same campus merely for reasons of administrative and logistical convenience. There has to be a genuine intellectual exchange between all parts of academia—a form of interdisciplinary discourse by means of which all will be enriched. For this reason, I believe that the dialogue between science and religion has an important part to play or, speaking more precisely, the dialogue between science and theology is important, since the latter's intellectual reflec-

tion on the religious experience parallels science's reflection on the physical world. If the true university is to be an institutional expression of the unity of knowledge, it must include theology or religious studies among its faculties. So much for the general premise on which this lecture is based.

Let me start my more detailed discussion with that part of academia that I know the best, namely the faculty of science. Scientific research is hard work. Like any other worthwhile activity, there is a good deal of wearisome routine to be endured. Occasionally there is frustration. What seemed to be a good idea in the morning evaporates under close scrutiny in the colder light of the afternoon. So, why do we do it? The answer is because scientists want to understand the world. The rewards for their labour are those moments of discovery in which some new insight into the wonderful structure of the Universe and its remarkable and fruitful history is gained. At least, that is how the scientists understand what is happening. They believe that they are engaged in the search for true knowledge concerning the nature of the physical world, in which we are alone.

However, different parts of academia provide different perspectives. Sometimes, things may not appear to be the same, at least at first glance or when viewed from a different angle. In the twentieth century, a number of philosophers felt that they needed to disabuse the scientists of what they considered to be a naïve belief. These philosophers offered a variety of alternative suggestions about what was actually happening in scientific research. The positivists suggested that science is simply about correlating the results of experimental measurements. It was not at all clear why this rather banal task was to be considered worth much effort. It is one thing to work hard. If there really are quarks and gluons, one can learn about their properties. But it is quite another thing if the actual characters in the scientific story are simply marks on photographic plates or scale readings on instruments. Why should one bother about them? It seems to me that the positivists totally fail to give an account of science that is at all adequate to explain why many people devote their lives to its pursuit. A somewhat

more exciting account is offered by instrumentalists. They too do not believe science could tell what this world is actually like. But they do at least recognise it enables you to get things done. According to them, there might not really be electrons, but at least there are electron microscopes. In their view, science is about pragmatic success rather than about gaining a true understanding of nature. Yet, instrumentalism fails to explain how it is that those microscopes work so well. Surely, the obvious reason is that there actually are electrons with the properties that are being assumed in the design of the device. Once again, an explanation was offered that fell short of what the scientists actually experience in the pursuit of their subject. The fact is, of course, that scientists are not simply concerned with getting things done. This is technology. They want to understand the nature of things and how things work.

The way that science achieves the prize of understanding is subtle. People sometimes think that the scientific method for finding truth depends simply on checking whether the inescapable predictions of theory fit exactly with the clear results of experiments. But in actual fact the matter is more complex than that. Theory and experiment intertwine in delicate ways. There are no scientific facts that are not already interpreted facts. Appeal has to be made to theory in order to understand what it is the instruments are actually measuring and, in turn, theories have to be adjusted and corrected in the light of experimental findings. This interrelationship between theory and experiment involves an irreducible degree of circularity into the scientific procedure. Nevertheless, scientists have a good reason to believe that this circularity is benign rather than vicious.

Two particular kinds of experience strongly reinforce the belief that science is not just about making up a story about the world but about truly discovering what the world is like.

One is the continuing element of surprise that pertains to scientific investigations. Prior expectations of what might be found often need to be subject to a radical revision as a consequence

of the way things are actually found to be. Nature often runs contrary to our expectations. An outstanding example of this was when Professor Yang together with Professor Lee showed us that there is an intrinsic handedness in nature, a preference of the left hand over the right—something people have previously supposed to be impossible. This scientific experience of surprising novelty also implies corollaries of wider significance than for science itself. First of all, science shows us that there is no universal epistemology, no universal way of knowing everything. Things can only be known in accordance with their actual nature and so different identities must be known in different ways. The everyday world can be known in the clear and determinate ways that Newtonian thinking had presumed. But the cloudy and fitful quantum world can only be known in its Heisenbergian uncertainty. Secondly, there is no simple characterisation of rational expectation. No one expected handedness to be present in nature. Consequently, the natural question for scientists to ask, not only about science but about things in general, is not “is it reasonable?” as if we had prior knowledge of the necessary shape of reason. Rather, the instinctive scientific question is “what makes you think that might be the case?” You see, the latter question is, on the one hand, open to new possibilities but it is also ... requiring evidence for what is being asserted. These two insights—of no universal epistemology and an openness to the unexpected in rational thinking—are important in the science and religion discussion. They offer theology both an opportunity and a challenge to which, I believe, it should be happy to respond. I will say more about that in a minute.

The second experience that confirms the realist interpretation of science ... [refers to its capacity for fertile, long-term explanations of] other phenomena, of a quite different kind. My great scientific hero is Paul Dirac, one of the founding figures of quantum theory. He discovered his famous equation of the electron by considering how to combine quantum theory and relativity theory in a consistent fashion. He then immediately found it to be a new theory explaining the known—but until then inexplicable—anomaly in the magnetic property of electrons. Later on, he recognised the equation also implied the existence of antimatter, a previously

unknown possibility. This long-term fertile explanatory power is very persuasive in regard to [establishing] the truthfulness of [science]. Because of the subtle circularity of the interweaving of theory and experiment, science cannot assert that it possesses absolute proof beyond the logical necessity of its conclusions. Yet it can and should lay claim to the attainment of well-motivated convictions, even if those convictions will never amount to a total grasp of all truth about the physical world. There is always a possibility of some new phenomenon awaiting discovery around the next experimental corner, which will then cause physicists to revise and to deepen their understanding. The true achievement that science can claim is verisimilitude, the making of reliable maps of physical reality fully adequate on a specified scale but not exact on every scale. As a partial account of physical reality, science often has to speak in terms of unseen realities, entities whose existence is inferred in the explanatory power they convey in relation to more directly visible and accessible phenomena. For example, the current candidates for the role of basic constituents of matter are the celebrated quarks and gluons of elementary particle physics.

Not only have these not been observed individually, but it is believed they never will be since the forces bonding them together to make protons and electrons and so on are thought to be too strong to allow the necessary decomposition, a property that we call quark confinement. Nevertheless, particle physicists are totally convinced that quarks really exist. The basis for this belief is that it explains in an elegantly concise way the properties of the nuclear particles that are directly accessible through experimental investigation. In other words, belief in the unseen reality of quarks and gluons derives from a deep intelligibility this assumption affords. Here again, I think, we see the possibility of a close relationship between science and religion.

Theology seeks to speak of the unseen reality of God. It too can base its case on the claim that theistic belief makes sense of great swathes of human experience. This will include not only the widely-testified experience of encounter with the sacred but

also, interestingly enough, they include the experience of doing science when that experience is set in a deeper context of intelligibility. In fact, I think, those who are imbued with thirst for understanding—the thirst that so powerfully motivates scientists—will find it cannot be quenched by science alone. The truth of the matter is that the sciences have achieved their very great success essentially by the modesty of their ambitions. They only consider a certain impersonal kind of encounter with the world around us, namely, the encounter which treats reality objectively and, one might say, as available to be manipulated, to put to the test as we may choose. This restriction gives science a secret weapon—the method of experimental investigation from which so much of its success derives.

As we all know, there are other equally valid ways of engaging with reality, in which the encounter is personal, a meeting with a *thou* rather than an *it*, one might say. In that personal world of human experience, testing has to give way to trusting.

Another way of characterising the self-limitation of science is to recognise that it confines itself to asking a particular kind of question, essentially the “how” question, by what process things happen. Of course, this is a valuable kind of inquiry to pursue but it is not the only issue relevant to gaining understanding. There is also the “why” question, of whether there is meaning and purpose present in what is happening. Science brackets out this kind of inquiry, as we know perfectly well. But one may ask how and why about the same event. Indeed, we need to do so if we are to understand it fully. The kettle boils both because burning gas heats the water and because I want to make a cup of tea. A degree of consonance must be assessed before the answer is given to these two questions. The person who asserts the intention of making a cup of tea by putting the kettle into the refrigerator is suspect.

The search for consonance between insights offered by science and by religion is extremely significant, and an important part of the dialogue between them. Academia offers many resources for assessing questions of consonance. So, my argument so far is

that the impersonal insights of science need to be complemented by the personal insights of other kinds of human search for truth and understanding, which are proper concerns of other parts of academia.

I would like to explore what a faculty of theology or religious studies can offer in this respect. The first insight it can offer, I think, is to explain why science is possible at all ... Of course, we can all see that the evolutionary necessity for survival can explain why human beings are able to make rough and ready sense of everyday phenomena. Yet it is difficult to believe that our ability to understand the subatomic world of quantum physics and the cosmic realm of curved spacetime is at hand for all; understanding of them requires highly counterintuitive modes of thinking. It is difficult to believe that understanding quantum theory and relativity theory is simply a happy spinoff from our ancestors having had to dodge sabre-tooth tigers.

Not only is the world deeply and rationally transparent to scientific enquiry, it is also rationally beautiful, time and again affording scientists the reward of wonder as a recompense for the labour of their research. Fundamental physics is a proven technique of discovery to seek theories whose expression is in terms of equations possessing the unmistakable character of mathematical beauty. It has been found time and again that only such theories will turn out to have the long-term fruitfulness that persuades us of their verisimilitude.

I have already spoken of Paul Dirac. I think he is the greatest physicist whom I have known personally. He once said, "it is more important to have beauty in your equations than to have them fit your experiment." Now, of course, Dirac did not mean empirical adequacy could be dispensed with. No physicist could possibly think that. What he did mean was this: if at first sight your equations do not seem to fit your experimental facts, that is, of course, disappointing, but it is not absolutely and necessarily fatal. Perhaps you did not make the right approximations in trying to solve the equation ... Perhaps the experiment went

wrong. We have known that to happen more than once in physics. At least, there is some sort of residual hope. But, you see, if your equations are ugly, there is no hope. They could not possibly be right. The whole history of modern physics is against you.

Dirac made his great discoveries by a lifelong, highly successful quest for mathematical beauty. He once said, ironically, ... “it was a very profitable religion to hold.” Now, why deep science is possible and why its success ultimately involves the apparently abstract discipline of mathematics as a prime means to unlocking the secret of the universe, are significant questions about the nature of the world in which we live. Dirac’s brother-in-law, Eugene Wigner, who also won the Nobel Prize for physics, once asked, “why is mathematics so unreasonably effective?” Why did this abstract subject prove the key for unlocking the secrets of the physical world? Science itself is unable to offer an explanation of this profound character of the laws of nature. It has to treat them simply as givens on an unexplained basis that it has to assume for its explanation of the details of processes. Theoretical physicists rejoice that mathematics is unreasonably effective, but theoretical physics does not explain in a fundamental sense why that is so.

It seems intellectually very unsatisfactory, lazy in fact, to leave the matter there, as if the possibilities of science were simply a happy accident. I believe that a religious understanding renders the intelligibility of the Universe itself intelligible, which says that the world as explored by science is shot through with rational beauty precisely because the mind of its Creator lies behind its wonderful order.

I am both a scientist and a Christian believer, a physicist and a priest. When they are told this, people sometimes look at me with a kind of surprise ... and suspicion, as if I said I was a vegetarian butcher. Behind that attitude there lies the belief that there is some sort of incompatibility between science and religion, as if they are supposed to be at war with each other, as if we ought to decide clearly which side of the battle line we are going to take. I think this conflict picture of the relationship between science

and religion is a very bad mistake. I believe they are friends basically, not foes. I think the fundamental reason for their friendship is that both of them are engaged in the search for truth. Both believe there is a truth to be found, though their concerns are with very different aspects of the truth. Science's impersonal truths, as I have already suggested, are written with truths about persons and about the transpersonal reality of God. I also believe science and religion are both seeking the truth through the quest for motivated belief. In the case of science, that might not seem a very contentious claim to make. But what about religion? Is it not based on faith? Is not faith a question of shutting your mind and believing what you're told, in submission to some unquestionable religious authority?

I answer "yes" to the first of these questions. I think religion is based on faith. But I think that the nature of faith is a commitment to what we have good reason to believe is true. So, I emphatically answer "no" to the second question. I do not at all think that you have to commit intellectual suicide to be a religious believer. In fact, I could not be a religious believer if I thought that was required of me. If a religious belief turns out to be nothing but irrational fetishism, then of course theology or indeed religious studies would have no proper place in the truth-seeking community of academia. But I say that faith too is based on motivated belief.

In my speaking, my writing, and my thinking I explore with utmost scrupulosity motivations for my Christian belief. It is only in that way faith can truly be part of the search for the truth. In fact, I particularly reject the claim sometimes made that science is concerned with facts while religion is simply concerned with opinions—public facts versus private opinions. We have already seen that scientific facts are already interpreted facts; they intertwine experiment and theory, facts and informed opinion.

Religious beliefs are not merely theistic assertions; they are motivated experience. The foundational events of a religious tradition—in the case of Christianity, the life, death, and resurrection

of Jesus Christ—and a continuing engagement with sacred reality conveyed by a life of prayer, worship, and obedience. Understood in this way, religious revelation is not a matter of infallible propositional truth conveyed in some holy and mysterious manner, but it is a record of those events and persons to which the sacred reality of God has been most clearly and accessibly conveyed. Scripture is not a divine textbook in which are written all the answers and which examines questions of life that have to be memorised. Scripture is a laboratory notebook, one might say, giving the details of those critical experiments in which God has been encountered and known.

Now, if science and religion are friends and partners in the search for truth and understanding in the way I have suggested, then they will have things to say to each other in a fruitful dialogue. I want to describe some of these exchanges. For its part, science can tell religion what the natural world is like, what its past history has been. Religious people need to listen carefully and respectfully to what science has to say in this respect, and to welcome the insight it offers. If they are truly seeking to serve the God of truth, they should welcome truth from whatever source it comes.

Some truths, not of course all truth, but some truths certainly come from science. One of its most important discoveries, I think, has been that the Universe has a history, a discovery of deep time, as people sometimes say. The world looked very different in the past from the way it looks today. The Universe as we know it originated in the fiery singularity of the Big Bang, some 13.7 billion years ago. Notice that 13.7! Cosmologists are getting really very accurate or believe they are, and I think they are probably right. It all started very simply. The early Universe was just an almost uniform expanding ball of energy. But today that same Universe is richly structured and complex. The human brain is in fact the most complicated system encountered so far in the scientific explanation of the world. The fact that that initial ball of energy was eventually able to give rise to beings who are aware of their cosmic home and able to discover many of its secrets is an astonishing story of unfolding fertility—certainly compatible with the

theistic belief that a divine purpose lies behind the history of the world. I think the most extraordinary events in cosmic history of which we have knowledge anyway have been the appearance of persons here on planet Earth—people aware of themselves, aware of the world, and able to understand it. It is in human beings that the Universe becomes aware of itself and, of course, science becomes a possibility. You may recall that Pascal, the great French thinker, said, “Human beings are tiny beings on the enormous scales of the world. They are just reeds, frail reeds. But they are thinking reeds.”

Because of that, we are more than all the stars. We know them and ourselves, and the stars know nothing. I think that’s right. It turned out that this is only possible because the laws of nature, or rather the laws of nuclear physics, were just right to produce an enhancement effect, a resonance as we say in the trade, in having just the right energy to produce carbon. If nuclear physics had been a little different, there would have been no carbon; no you and me. There are many such fine-tuning exacting requirements of the laws of nature we recognise as having been indispensable for the development of the Universe in the fruitful way that it actually happened. The most exacting requirement for what has been called anthropic potentiality relates to the recently discovered dark energy associated with space itself, which drives the Universe’s expansion. The magnitude of this dark energy is at least fifty-four orders of magnitude, as a factor (10 to 54) smaller than what would have been expected on general grounds. This is a vital fine-tuning, since anything larger would have blown the universe apart so rapidly as to destroy the possibility of its forming any complex structures ... Such a remarkable set of facts surely calls for some explanation. Science by itself, in my view, can’t offer it since it has to take the laws of nature as it finds them. Theistic belief, however, offers such an explanation, for its concept of the divine purpose lying behind the history of the world enables it to interpret the built-in fruitfulness of the Universe. It allows for the development of carbon dioxide as being the endowment of fertility bestowed on the cosmos by its Creator.

The second thing science tells us about the cosmic story is that the process which has been at work throughout its history is the lawful regularity of nature, and the particular and exploratory character of individual happenings. Evolution is sometimes described as resulting from a combined operation of chance and necessity. Here chance does not stand for capriciousness. It stands simply for the contingency of much of what has actually happened. So vast is the range of possibilities that in 13.7 billion years of cosmic history only a small fraction of what might have happened has in fact happened. Necessity stands for the reliable regularity present in nature, which provides the context of these contingent events. It is this evolutionary dialectic between necessity and chance which has been the source from which novelty emerged in cosmic history, whether it was in the formation of the first stars and galaxies, in the beginnings of terrestrial life, the development of terrestrial life, or the coming into being of self-conscious humanity.

It is a deep insight of contemporary science that the realms in which true novelty can emerge are always held in regimes which may be described as being at the edge of chaos—a mixture of order and disorder—regimes in which chance and necessity inextricably intertwine. A regime which is all necessity would be too rigid for anything really new to happen. If there were no genetic mutations, there will be no new forms of life. A regime that was all chance will be too haphazard for anything new to persist. If genetic mutations were prolific and happened all the time, no species will be established on which natural selection could operate.

People sometimes think that evolution is the issue on which science and religion can never find agreement. There is a caricature account which sees the publication in 1859 of Darwin's great book *The Origin of Species* as being the final parting of the ways between science and religion. This picture is ignorant and far from the truth. From the start, some religious people were wise enough to see that the theory of evolution does not conflict with creation but rather tells us something about the way the Creator has chosen to work. A clergyman friend of Darwin's, Charles Kingsley, said that God could no doubt have produced a ready-made world but, it turns out, the Creator has done something cleverer

than that in making a world that makes possible the evolutionary exploration of potentiality with which creatures have been endowed. Creatures could make themselves. That is a phrase that encapsulates the theological understanding of the evolutionary process, the process by which creatures are allowed to make themselves.

It turns out that not only has science given religion new and deep insight in the ways of creation, but it also offers religion some assistance with the latter's greatest problem. What's that great problem? Surely, it is the problem of the evil or suffering of persons in the world. If God is good and all powerful, as religious people claim, how does it come about that disease and disaster are so widespread in a world asserted to be a divine creation? This problem, I believe, holds many people back from religious belief and troubles those who are religious believers. It does not have a simple one-line solution.

Some help arises from recognising that a world in which creatures are given freedom to be themselves and to make themselves, that kind of world is a great good. It also has the shadowy side of a necessary cost. Evolutionary processes produce remarkable fruitfulness for the emergence of new kinds of life but inescapably there will also be ragged edges and blind alleys. We tend to think it would surely have been easy for God to separate the good and the bad processes of the world—to keep the former and throw away the latter—but science helps us see how delicately intertwined and subtly interconnected are the natural processes. So, the simple division between this kind of good and bad is not coherently possible. Take a simple example, the engine that has driven the remarkable three or four billion years history of life on earth has of course been genetic mutation, which has continually produced new kinds of life to be sifted and preserved through natural selection in a reliable environment. If germ cells are to be able to mutate and produce new biological possibilities, then it must also be the case that some somatic cells, body cells, can mutate. Sometimes this will result in malignancy. You cannot have one and not the other. The ancient fact of cancer in the world

is not gratuitous. It is a shadowy side of fertility, a necessary cost of a world in which creatures are able to make themselves.

Science does not remove all religion's perplexities about the ills of the world. It does offer it some assistance in wrestling with them. So, there are real gifts which scientific understanding gives to religious people for a religious understanding. In the dialogue between science and religion, what gift could religion offer to science by way of return? Certainly not to seek to answer science's questions for it. We have every reason to believe that scientifically posable questions will receive scientifically testable answers even if these answers may at times be very hard to find. However, as we have already seen, there is very good reason to believe that there are many meaningful and necessary questions to ask, which are not scientific in character—which lie beyond science's self-limited power to address and respond. Hence the need for those seeking understanding to look to additional sources of insight, beyond those science can provide.

Of particular interest this afternoon are what one might call meta-questions, queries that relate to issues out of the experience of doing science, which take us beyond (that's the meaning of *meta*) the legitimate domain of scientific explanation. The gift which theology offers to science in their mutual dialogue within academia is a deeper and wider intelligibility that I believe a theistic metaphysics can offer.

Science has revealed a world whose rational order, rational transparency, and rational beauty is shot through with science in mind. I have already suggested that this fact should be understood as representing an invitation to encounter the mind of the Creator. The pursuit of science requires of the scientist the faith commitment that the Universe is endowed with a deep structure to which the human mind has access. Without that assumption, whether implicit or explicit, fundamental science seems a hopeless enterprise. In turn, a religious belief that the world is indeed a cosmos because it is also a creation underwrites this basic and necessary scientific conviction. Let's put the matter another way, through

the word that is frequently used by scientists in their informal conversations but never, of course, in their formal papers submitted to learned journals; that word is “wonder.” The experience of wonder at the rational beauty of the Universe affords scientists a recompense for all the labour and frustration inevitably involved in doing research. I believe that whether the scientists involved know it or not, the religious person will rightly interpret this basic scientific experience of wonder as being an impressive act of worship of the Creator.

The exchange of gifts between science and religion has been briefly sketched. One sees how these two quests for truth and understanding are not competitive rivals between which we have to choose. They complement each other as partners in the great human quest for understanding. If we are truly to understand the world, I believe we shall need to look at the Universe with both the eye of science and with the eye of religion. This binocular vision will enable us to see and comprehend much more than we can ever manage with either eye on its own. The fundamental reason why the dialogue between science and religion must rightly find a place in academia is that the richness of reality is such that it demands that all its diverse dimensions—scientific, aesthetic, cultural, ethical, and religious—find their proper place and recognition by being represented in that truth-seeking community. Certainly, science by itself could never be enough. It trawls experience with a coarse grain net. Many things of the utmost significance and importance slip through its wide meshes. Ask a scientist—as a scientist—to tell you all that he or she can about music. They all say it is your neural response to the impact of sound waves on the ear drum. Of course, that is true and it is in its own way worth knowing. But ask the same scientist—as a person—to tell you all they can about music and they will surely have much more to say about the deep mystery of how a temporal succession of bursts of vibrating air can convey to us a profound and true experience of timeless beauty. The university exists to bring together the insight of all truth-seeking investigations. Within that broad and deep embrace, there is an indispensable place for the dialogue between science and religion. Thank you very much.

An East-West Dialogue between Polkinghorne and Yang

It seems to be one of the fundamental features of nature that fundamental physical laws are described in terms of a mathematical theory of great beauty and power, needing quite a high standard of mathematics for one to understand it. You may wonder: Why is nature constructed along these lines? One can only answer that our present knowledge seems to show that nature is so constructed. We simply have to accept it. One could perhaps describe the situation by saying that God is a mathematician of a very high order, and He used very advanced mathematics in constructing the Universe. Our feeble attempts at mathematics enable us to understand a bit of the Universe and, as we proceed to develop higher and higher mathematics, we can hope to understand the Universe better.¹³

Polkinghorne's public lecture was followed by an East-West dialogue between Polkinghorne and Yang (Figures 7 and 8), chaired by Dr Leo Kam-Ching Cheung.¹⁴ As we shall soon see, throughout their dialogue the views of Polkinghorne and Yang complemented each other. Both reached the conclusion that science and religion are not foes but friends, and that a dialogue between science and religion is required.

Polkinghorne: I thought Professor Yang was going to make a sort of introduction, a few remarks to set out our position? Or do you want to go straight into conversation? The latter, is it? OK. Well, can I ask you? I am suggesting that the laws of nature—in their very wonderful order and in their amazing fruitful consequences—have a character about them that means that it cannot be satisfactory to treat them as given brute facts. They seem to point beyond themselves and beyond science. Of course, you wouldn't know about the laws of nature without science, which points beyond

13 P. A. M. Dirac, "The Evolution of Physicist's Picture of Nature," *Scientific American* 208:5 (1963): 45–53.

14 From this point of the event on, the audio recording includes indistinct parts where the words could not be made out. Hence the more numerous ellipsis signs.

them, to some further explanation. What I mean is a theistic explanation. But would you agree that there is more to be told than science on its own could say?



Figure 7. Polkinghorne and Yang engaged in an East-West dialogue on science and religion. Credit: Centre for Sino-Christian Studies, Hong Kong Baptist University.

Yang: I am not sure I know how to answer your question. My personal relationship with religion is undergoing a transformation as I grow older. I think, perhaps, I could share with you some matters ... Throughout my career, I was a teacher and a research physicist. You started your career also as a research physicist. When one understands as a researcher some secret of nature, that is a very humbling experience. The Revd Polkinghorne has mentioned Paul Dirac, one of the greatest physicists of the twentieth century. He was particularly famous for the second equation on this screen [Figure 8], which is now called the Dirac equation: $[\alpha \cdot pc + \beta mc^2]\psi = E\psi$

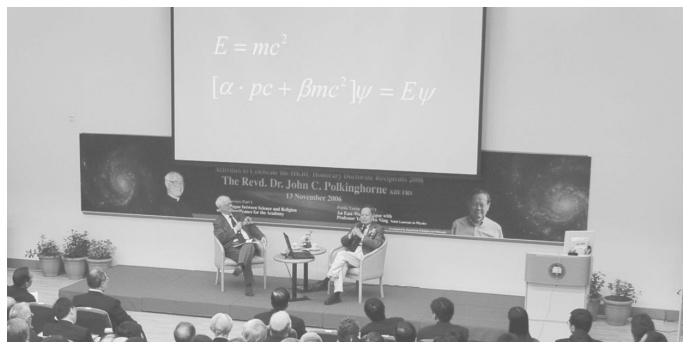


Figure 8. Polkinghorne and Yang engaged in an East-West dialogue on science and religion. Einstein's and Dirac's equations appear on the projected screen. Credit: Centre for Sino-Christian Studies, Hong Kong Baptist University.

The first equation on the screen is $E = mc^2$. It is familiar to everyone in the audience. It had a tremendous impact on the future of mankind. When that equation was written down in 1905 by Einstein, Dirac was three years old. Twenty-three years later, he wrote down the second equation, which incorporates the elements of Einstein's equation, E and mc^2 . Dirac added α and β , which are very simple mathematical structures, and it resulted in a miracle. It is a miracle because, given this ingenious idea, Dirac could predict that the fundamental particle electron—each of us have billions and billions of them in our bodies—are tops, spinning tops. And more than that. He could calculate from that simple equation how fast each of these electrons is spinning and how much magnetic field is created by that movement. Through subsequent development, that calculation resulted in a precise number for the magnetic strength of each electron, a result supported by subsequent experiments in laboratories all over the world. That calculation was confirmed to the accuracy of at least eleven decimal points. To appreciate the meaning of this, to appreciate how accurate it is, let us imagine that this hall is filled with marbles and you are required to count these marbles one by one. And there will be something like several hundred billion marbles. You are required to count them one by one, and tell us the precise

number down to the last marble—a twelve-digit number, and you have to be correct for every digit. That is the degree of accuracy which that simple-looking Dirac equation was able to create. The beauty, the elegance, the grandeur of this deep penetration of the secrets of nature! For any scientist that deals with it it is an absolutely awe-inspiring experience. Science students, in learning about the Dirac equation, have this experience. But in my old age I understand more. I understand that feeling of awe-inspiring experience in seeing something that perhaps is a secret which should not be seen by a mortal man. I understand it as a deeply religious experience.

A second aspect of my transformation came about because of the following thoughts. As I reflected on human history, I found that agriculture in early human civilisation is about 10,000 years old. That is one hundred centuries. Over the first ninety-nine of these centuries, progress in every sphere of human activity had been gradual and slow. Then, in the last of these one hundred centuries, the twentieth century, progress has exploded: While in the year 1900, the fastest way of traveling was on horseback, at perhaps 8 kms/hr, today we fly at 800 kms/hr. While in the year 1900 the telephone was a new toy, today several hundred million cell phones are in use all over the world. While in the year 1900 the best computational aid was the abacus, today we have supercomputers performing trillions of operations per second. While in the year 1900 diabetes, the dreaded disease, was incurable, today we have insulin, antibiotics, magnetic resonance imaging, organ transplants, etc., etc., more than doubling the human lifespan. While in the year 1900 humans were earthbound, today we walk on the moon. While in the year 1900 TNT bombs weighed 500 pounds, today the explosive power of a hydrogen bomb is equivalent to 20 billion pounds of TNT.

All of these miracles, good or bad, are consequences of the unprecedented development of science and technology in one century, the twentieth. So, I often reflect, it is as if humankind is on a fast train, propelled onwards by science and technology, rushing on, exploring and accelerating. Could the train crash? Of course, nobody can answer that question. But the question generates

uncertainty and anxiety, especially for me in my old age. Reflecting on it, I suggest that anxiety must be one of the fundamental reasons for the deep faith of a religiously devout person. I therefore agree with Dr Polkinghorne, that there is an urgent need for increased dialogue between science and religion. Thank you.

Polkinghorne: Well, thank you very much. I would like to just tell you something that you perhaps do not know. If you go into Westminster Abbey when you are next in London, look for the memorial slab for Paul Dirac [Figure 9]. You will find the Dirac equation inscribed upon that slab. I don't know what most tourists make of the inscription. You and I will be pleased, except it is written not in Dirac's notation you rightly used up there, α and β , but with a γ notation ($i\gamma \cdot \partial\psi = m\psi$). There was a big debate about that. I told the Dean of Westminster to write in Dirac's form but he did not accept the advice.

I think you made a very important point about the extraordinary acceleration of science and technology. Science gives knowledge. Technology comes along and turns that knowledge into power. I think that knowledge is always a good gift. It is better to know than to be ignorant. But power is an ambiguous gift. Not everything that can be done should be done. I think you put your finger, if I may say so, on a very important aspect of the dialogue and indeed the interaction between science and religion. Religious people are not the only people to have insights into ethics and what should be done, but they have a long tradition of thinking about those questions. They should be able to contribute to the dialogue. You pointed out to us very remarkable and striking ways in which the world has changed in the twentieth century. But, of course, human nature does not seem to have changed very much. And in fact, the twentieth century has shown us terrible ways in which human nature can be corrupted and distorted, and the dreadful deeds that flow from that. We do need, absolutely, to address those problems that, I think, focus on human nature. One of the difficulties many scientists have is that they are very used to thinking about things in general. That is the power of science.



Figure 9. Dirac's equation is engraved on his memorial slab in the Westminster Abbey. Source: <https://tinyurl.com/23t9v4cy> (accessed 12 March 2024).

Dirac's equation describes all the trillions, trillions of electrons in the Universe—an enormously powerful generality. But, of course, the character of a person is always unique. We are unique people. We have unique experiences and religious traditions, faith traditions that focus on unique founding figures and events ... I wonder how you, a scientist, respond to a religious appeal to unique events and unique people, I mean, are you happy with that?

Yang: You know I do not know how to answer that question. As I said, science has made amazing progress, especially in the last couple of centuries. And as science has made progress, it has become more powerful. Humankind can today manipulate things in nature in ways which were unimaginable even, let us

say, a hundred years ago. But, at the same time, while its power increases, the same goes for the humble feeling when understanding new deep matters. As you mentioned before, there is the question: Is there a grand design? Is there a purpose? And what is going to happen? As I said, when required to fill in a form with the item "Religious Affiliation," I had always filled it saying I am an atheist. That said, when you understand something really subtle, really deep, the question necessarily comes up, how come? If you ask me whether an increased dialogue between science and religion could answer such a question, I would have to say that I am not sure. However, that does not mean that such conversations would be useless and should not take place. In fact, I like very much a sentence in a speech made by our friend Freeman Dyson. When he accepted the Templeton Prize, he said: "God is when the mind has reached its limit."

Polkinghorne: Yes, and I think we can only find out the degree of fruitfulness of the dialogue between science and religion by pursuing it. In science, you investigate a regime. You do not know what is going to turn up but you won't find anything if you do not go to look for it. I very much doubt there is a sort of natural cosmic religiosity, one might say, that goes with the science. This is a feeling of awe and so on that you expressed so well, which Einstein frequently talked about. I remember one of his papers, where he says that "when he made great discoveries he felt like a child in the presence of the elders." This wonderful order of the world is something that transcends finite human thinking. That is a gift the practice of science gives to scientists. But there is another experience of science which is more ambiguous and relates to the ethical question you raised and that is very exciting ... In the twenty-first century, I think, the most important developments in terms of scientific understanding and technological possibility are going to be in the biological sciences rather than the physical sciences. The amazing advances taking place in genetics offer great opportunities for healing, also for manipulation of human life in ways that are ethically dangerous. It is very easy to be carried away with the excitement of research, to respond to a sort of technological imperative ... We have done this. We have done that. Come on, let us do the next thing. But the next

thing might not be the thing which should be done. I wonder what you think about whether we need a dialogue between the expert scientist and the general public—a religious public, or a nonreligious one, but an ethically concerned public, so that researchers are not carried away with excitement ... I am sure you read lots of the memoirs of people who worked at Los Alamos during the war, great scientists were there, perhaps the greatest concentration of scientists ever assembled to carry out a single purpose. Most of them, it seems, did not really ask themselves what they were doing till they saw the first test explosion. Then they felt differently about it. Oppenheimer said, didn't he, "the scientist is very sweet, easy to be carried away." It would be interesting to know what you think about that.

Yang: You mentioned that there is a common perception of many people that science and religion are contradictory. This is certainly not true. Science and religion have the same origin. The origin is the human desire to understand. Science and religion take different methods, different approaches, but the ultimate aim is really the same. If you look at what Newton wrote, you realise that of the thousands and thousands of pages of manuscripts that people have collected of his works, only a small fraction of them are about science. Most of them are about religion. I remember that once I was visiting Wutaishan in Shanxi. I went to one of the temples, and the monk there asked me to write something in their visitors' book. So, I thought about it. What I wrote in Chinese was as follows: "Science and religion belong to one family from the beginning."¹⁵ The monk was very pleased.

Polkinghorne: I am sure I would be pleased if I understood what you had written. You were thinking along the same lines though, this quest for understanding, this quest for truth being a fundamental human activity. It is interesting, is it not? The big sort of founding figures of modern science in the seventeenth century and the early eighteenth century were nearly all people whose religion was also important. They may have had their difficulties with orthodox religious belief, as Newton certainly did. They may

15 Translated by me.

have had difficulty with the religious authorities, as Galileo notoriously did. Others were lucky in that respect, Robert Boyle, Kepler, and so on. They were all people who clearly said we should read two books, the book of nature and the book of Scripture. I think we should remember that. I mean, one of the reasons why science and religion should be friends is that religious belief helped as a sort of midwife to bring modern science to birth. But I would like to ask you another question, which you may think is a tangent. I am very interested in what you say to it. I will explain why afterwards. What do you think about mathematics? What is the nature of mathematics? Is it a discovery or is it an invention? Did mathematicians invent mathematics or did they find it? Did Mandelbrot invent the Mandelbrot set or did he discover it? What do you think about that? Sorry, a tangent question, but very interesting.

Yang: You always raise questions with me and you know I cannot answer them. But it is important to raise such questions.

Polkinghorne: Thank you.

Yang: The dialectic of science and religion entails the questions of what religion can learn from science and what science can learn from religion. I thought about this last night. I would say that Galileo's was a very good example of what religion could learn from science.

Polkinghorne: Absolutely.

Yang: If there were more dialogues between religion and science, there would not have been that affair about Galileo several centuries ago. Religion has acknowledged that. But what can religion teach science? What immediately comes to mind is that religion could teach scientists to be less arrogant. As science produces more and more powerful results, there is a tendency for scientists to become arrogant, which, I am sure, everybody would agree is not appropriate. Furthermore, the power that is created by scientific progress, as I tried to show earlier, can lead to disastrous

consequences. That is where more thoughtfulness should come in. That is where religion can play an important role.

Polkinghorne: Thank you. The reason I asked you a question about mathematics is because I believe mathematics is a discovery. Most mathematicians believe that mathematics is a discovery, whether they are religious people or not, and I think that is right. It is a very interesting thing. There is a dimension of reality, a world of mathematical entities to which we have access given the unreasonable effectiveness of mathematics, a world which is clearly different from the material world though related to it. This belief, I think, enhances our understanding of the richness of the reality in which we live. We are, of course, material beings. But we are also, as Pascal said, thinking reeds. We have access to this world, this amazing world, a world of mathematics and human thought. Do you think we should find out what they (the audience) think out there?

Questions and Answers

The audience were people from various backgrounds. Their comments below brought to light the significance of the broader context of science and faith, in particular questions pertaining to the nature of science, theology and Chinese culture, tradition and thought. That said, at their core, the comments and questions were theological and philosophical issues of science and religion, in response to Polkinghorne's lecture. The concerns these questions illustrate point, however, beyond the confines of the Chinese world, to matters of general relevance for humankind in our age.

Chair (Dr Leo K. C. Cheung): It is now the time to invite questions and comments from the floor. To allow more questions, will you please keep your question short, within one minute? And when you are asking your questions, would you please introduce yourself by giving your name and affiliation?

Question 1 (from a young student): I am from mainland China, having a master's degree in communications. I have two questions. Do you think science and religion have the same origin, in a Marxist sense? There are many persons and outstanding scientists in mainland China who do not believe in religion. The government's policy discourages it anyway ... Do you think they need to believe in a religion?

Polkinghorne: Can I make a quick response to that? I make an empirical response. Of course, obviously, I do not share Marxism's understanding of the nature of religion. I think there is some empirical evidence that suggests Marxism is not a total explanation of history or of human nature. This is one thing I want to say. The other thing is, of course, you do not need to be a religious person to do science. I know great scientists who are convinced atheists, sometimes very militant atheists ... You do not need to be religious to do science. But this does not mean there may not be a hidden undergirding of the order of the world which originates in the mind of God.

Yang: I am not a student of Marxism. Of course, I know some things as a layman. Marxism was considered a deeply economic theory, I understand. Some people believe Marx should have won a Nobel Prize in Economics. As to Marxism as a philosophy, I am not qualified to make any statements. You mentioned the question of religion and the policy of the Chinese government. That is a very sensitive and a very important subject. It is my belief that that is a question the Chinese government is very anxious to find solutions to. I am sure that is also a question that the Vatican is paying a lot of attention to.

Question 2 (anonymous member of the audience): Dr Polkinghorne, you mentioned the unseen reality. Perhaps I can see some kind of unseen reality. I would like to introduce myself. I am from Hong Kong and I am not very educated. What I can see is that the birth of any newborn baby brings with it parents, gender, date and place of birth, mother tongue, ethnic race, colour of skin. All of these are given to anyone, everyone. No one can choose, change,

reject these [and the person is not asked to consent to any of this]
... Is this legal or illegal without the consent of the person?

Polkinghorne: Well, I share the Kantian view. Each human being is an end and not a means, and is entitled to a deep ethical respect ... I have a certain amount of amateur engagement with medical ethics issues in the United Kingdom, having been on various government committees and things. That has been a common denominator among the people wrestling with these problems, whether they came from religious backgrounds or not ... Certainly people are entitled to individual liberty. That does not mean there are not restrictions societies can rightly place on people's activity ...

Question 3 (Professor Lauren Pfister): I have a question to follow from Dr Polkinghorne's quotation of Blaise Pascal. Your quotation says that humans think and the Universe does not; that humans will die and know they will die, but the Universe does not know anything about it. So, Pascal goes on to say, "the question is not only to think, but to think well." I want to ask both of you. How do we face death in the light of science and religion? How do we think well about it? Because, I believe, Professor Yang is talking about anxiety and uncertainty [and] is thinking about death, and knows we will die. And that we need to know how to think well.

Polkinghorne: Can I kick off? Thank you very much for extending Pascal's quotation. I did not know that. I have forgotten it. I do think the question itself is a very serious question. And one that I think everybody thinks about. Some people think about it every day. Other people are able to dismiss it. But I think it is a question facing all of us. Every story that science tells, every *horizontal* story, you might say, of the scientific understanding of the world, ends in death of one form or another. The Universe is going to die but on a very much longer timescale than you and I. So, in the end, if the scientific story is the only story to tell, the Universe ends in futility. That is why another common friend of ours, the distinguished Nobel Prize-winning physicist, Steven Weinberg, stated that the more he understood the Universe, the more it

seemed pointless; in the end it's just going to end in futility. But I believe, of course, there is another story to be told. The *vertical* story of religion and theology tells us the story of God's faithfulness. I think the only ground for hope in a destiny beyond death lies in the faithfulness of God. That is exactly the point that Jesus had during an argument about this, he said "God is the God of Abraham, the God of Isaac, and the God of Jacob; not of the dead but of the living." In other words, the patriarchs matter to God ... People are not going to be thrown away. They will have some sort of destiny. I believe we have. Our destiny links with the resurrection of Jesus Christ ... If we do not have some transcendent story to tell beyond the horizontal story of science, then it is the end.

Question 4 (a business lady): My name is Huang. I come from the business community. I think it has been clearly demonstrated even today that you can see the glory of God in all the equations that describe the physical world. Personally, it is Schrödinger's equation that I admire. But this only says to us that there is a magnificent Creator. The equation and its underlying mathematics tell the magnificence of the Creator. My question then is, how do you get from this large-scale picture to something as specific as the resurrection?

Polkinghorne: You cannot learn everything from [mathematics]. In particular, the picture of God that it will give you will not be more than a picture of God the great mathematician or a cosmic architect or something like that. This is not to be despised but I think there's more about knowing God than that ... If there is some truth ... about God as in some sense personal, I mean, as far as we can use human language, ... [it is more appropriate] to call God a person than to call God a force. Then we will have to take the risk of entering into a personal experience and of evaluating that experience with the ambiguities and also the enhanced eventualities that it brings. The reasons for my Christian faith lie ... in the way I encounter the figure of Jesus Christ in the Scriptures, in the church, and in the sacraments. That is why for me individual experience is an indispensable component of possibly everybody's worldview but certainly of the Christian worldview.

Question 5 (an orchestra conductor): I am a conductor. I really appreciated your comments about music ... You evoked the idea of verisimilitude, really wonderfully ... Do you feel that verisimilitude can become perhaps [a way of furthering the dialogue of science and religion]? Given the contention between the two sides regarding the methods they use and the types of dialogue they choose to engage in, ... is there a fundamental disagreement between the two as to what constitutes realism?

Yang: I am not sure that realism is something which either Dr Polkinghorne or I had in mind when we were talking about the necessity to have more dialogue between science and religion. Reality is a question which has been debated in academic physics in the twentieth century. In particular, it was one of the unending disputes between Einstein, Heisenberg, and Bohr. But that is another subject which may or may not have anything to do with the subject matter that we are focusing on this afternoon.

Polkinghorne: I do not quite agree with that. To me the issue of realism is very important in science and religion. I think in some sense it is a common issue between the two. I am a critical realist in both my understanding of the nature of science and of the nature of theology. Verisimilitude, or something like it, is an indispensable concept for theology. I mean, we realise that the infinite reality of God will never be adequately caught in final human speech. Every image of God, in some sense, is an idol, it has to be broken. There is a strong tradition, I am sure you know, called apophatic theology, which says we can know what God is not, not what God is. This tradition is very strong in the eastern church but also in the western church. St Thomas Aquinas took that point of view. It does not mean we can't know anything. To paraphrase another theologian hero of mine, Augustine, talking about the Trinity: Three what? He said, "Three persons." We have to say something rather than to be silent. We know we are not getting the whole story. I think there is a concept, a very important concept, of verisimilitude in theology just as in science. Final remark about music, one of my favourite quotations is from George Steiner (he was a celebrated literary critic), who wrote a very interesting book *Real Presences*, about creativity, and somewhere in that book

he says something like “the matter of music is central to the issues of metaphysics.” Said otherwise, if your worldview does not give adequate account of the human experience of music, you have missed the point.

Question from President Ng Ching-fai: I would like to put a question to Revd Polkinghorne. You mentioned the phenomenon of circularity in science. That is, whenever a new discovery obtains from experimental results, the theory needs to be modified if it cannot explain the facts. Is there also circularity in theology? As you mentioned evolution, you are using a new interpretation of evolution, in which case circularity is also a phenomenon in theology. Is it not true?

Polkinghorne: Yes, I certainly would not wish to give you the impression that science is circulatory and theology is absolutely straight. To the point, I think all human knowledge actually is, to a degree, precarious. I think we do not have certain knowledge in the absolute sense. Gödel shows even mathematics is not logically complete. So, if that is true of mathematics, it will surely be true of science and even more so of religion. The philosopher of science I am influenced by the most is Michael Polanyi, who was a distinguished scientist and philosopher. When he wrote his great book *Personal Knowledge about Science*, he said in the preface, “I am writing this book to explain how I may commit myself to what I believe to be true while knowing that it might be false.” That is, I think, the human condition. That is certainly the condition of a religious person. This is why we walk by faith, and not by sight. Faith is not a rational belief but commitment to a rationally motivated form of belief. It is not an absolute certainty beyond peradventure. That is the human condition, in my view.

Discussion

Analysis of Polkinghorne's Public Lecture

Polkinghorne's public lecture could be of interest to many readers, as it proved groundbreaking for the present author's own experience. While a thorough analysis of the lecture in its entirety would be useful, in what follows I present my own perspective on selected points. This selection illustrates my learnings, as a scientist, from his lecture.

What is Polkinghorne's perspective on the primary role of academia? Polkinghorne, who spent most of his scientific life at the University of Cambridge, thinks that the most important purpose of academia is its focus on discovery and the propagation of knowledge. This view of academia works for top universities, but may not be easily accepted by, e.g., engineering or technology-oriented universities.

What is Polkinghorne's perspective on the motivations that drive the scientist to undertake research? I believe that perceiving the beauty and mystery of Nature is the best motivation driving the scientist to undertake research. Scientific research is not as easy as one might expect. Hence Polkinghorne's point that the key motivation of doing scientific research is the will to understand the world. Sometimes, scientists are rewarded by moments of elation, when they discover a part of the wonderful structure of the Universe, which pays off for their hard work.

What is Polkinghorne's view of Nature? Very often, Nature does not always oblige us with answers to our questions and expectations. This view is really interesting, and provides a good reminder for young scientists, especially when they experience disappointment, frustration, and failure in their scientific research.

What is Polkinghorne's perspective on Scripture? In Polkinghorne's view, "Scripture is not a divine textbook in which are written all the answers and which examines questions of life that have to be memorised. Scripture is a laboratory notebook, one might say, giving the details of those critical experiments in which God has been encountered and known." I believe that David Martyn Lloyd-Jones (1899-1981),

a Welsh Protestant minister, would not fully agree with Polkinghorne. Lloyd-Jones believed that the Gospel is concerned with everything that pertains to human experience, to the whole history, and to the world as a whole, insights which are very profound. The Bible is not just another ancient book. In one of his sermons, titled “The Message of the Bible,” Lloyd-Jones shares views about the unique nature of Scripture as the very word and revelation of God. Their views differ. But perhaps Polkinghorne’s metaphor of Scripture as “a laboratory notebook” is not diametrically opposite to Lloyd-Jones’ more traditional view of Scripture.

What is Polkinghorne’s idea of the relationship between science and religion? For him, the true achievement of science is verisimilitude, the making of reliable maps of physical reality, which are fully adequate on a specified scale but not exact on every scale. In turn, theology speaks of the unseen reality of God. Based on his own career as a physicist and a theologian, Polkinghorne reiterates that science and religion are friends; they both are engaged in the search for truth through motivated belief. This common denominator is indispensable for the dialogue of science and religion.

What is Polkinghorne’s idea of how to examine the Universe? He is convinced that, if we are truly to understand the world, we need to look at the Universe with both eyes, those of science and those of religion.

Analysis of Yang’s Short Presentation

Yang is an outstanding leader of the community of particle physicists. Although he is not a religious person, given his scientific reputation the transformation of his ideas about religion should be of interest to many. First, he has recognised that the awe-inspiring moments scientists experience on discovering a secret of Nature may actually be deeply religious ones. Second, he recognises that the unprecedented development of science and technology in a single century can cause

anxiety, which might be one of the fundamental reasons for embracing deep faith.

From my viewpoint, that first recognition of his is of utmost relevance here. Are the moments of awe religious experiences? Although Yang may not have stated it explicitly, it seems to me that he intimated that the laws of Nature were established by the Creator, whether or not this overlaps with the religious concept of God. Why is this perspective significant? Again, although Yang did not make this connection explicit, it is possible that his view of the awe-inspiring experiences of top scientists is not unrelated to the scriptural wisdom that proclaims, “The fear of the Lord is the beginning of knowledge” (Proverbs 1:7). He might have hinted at this connection when he pointed out that scientists should be humble in their research, regardless of its outcomes.

Yang’s second point implies that people should always seek to acknowledge the Creator, or God, no matter how much science and technology might advance. Accordingly, a dialogue of science and theology is unavoidable. His perspective finds its best illustration in the statement that “Science and religion belong to one family from the beginning.” It is hoped that Yang’s views will continue to inspire more and more Chinese, including scientists, to explore the relation between science and religion, including the Christian religion.

My Own Experience

On a personal note, with Polkinghorne’s encouragement, I made a final decision regarding my baptism and confirmation in the Ely Cathedral, Cambridgeshire, UK, on Saturday night, 26 November 2012. Figure 10 pictures me and my sponsors in a Chinese restaurant. I continue to serve the One Who is worthy of all my efforts and trust. Before writing this article, I, both as a scientist and a Christian, had been trying to reconcile science and religion in the footsteps of Newton, Kepler, Kelvin, Stokes, etc. Now, Polkinghorne’s speech and his dialogue with Yang provide inspiration for me, in many ways.



Figure 10. Celebrating the author's conversion to Christ. From left to right: Revd Peter Hayler, Thirza Hope, John Z. Shi, and Christopher McDougall (1936-2017). Chinese restaurant, Cambridgeshire, England, 26 November 2012.

Conclusions

This paper underscores the ongoing importance of fostering a dialogue between science and religion. The insights provided by Polkinghorne and Yang offer valuable frameworks for further exploration and understanding, encouraging a holistic approach to the quest for truth.

In the light of Polkinghorne's convictions that the search for truth requires the binocular vision of both science and religion, and that science and religion complement each other, it is neither odd nor disingenuous for him to be a physicist as well as a priest. His insights into the primary role of academia as promoter of discovery and disseminator of knowledge, which relates to profound motivations for doing scientific research, are precious to many, institutionally and personally. He speaks of Nature and Scripture in almost identical terms. Thus, he draws attention to the fact that Nature often runs counter to the expectations of scientists, which invites researchers to humility. The same

goes for his point that “Scripture is not a divine textbook in which are written all the answers”; instead, as “a laboratory notebook” of sorts, Scripture invites believers and theologians to humility, to the realisation that God and the mysteries of existence remain irreducible to arrogant and superficial claims about the truth.

In turn, the considerations of Yang, as a Chinese and a top physicist, brought to the fore his profound knowledge of the East-West dialogue in regard to science and religion. He made an important point about the unprecedented development of science and technology provoking anxiety, which, according to him, prompted many people to embrace deep religious convictions. The admission regarding the transformation of his later views on religion, which led him to state that “science and religion belong to one family from the beginning” will surely continue to inspire more and more Chinese, including scientists, to explore the relation between science and religion.

It can be cautiously inferred from their dialogue that for Polkinghorne and Yang there is no conflict between science and religion, which are two complementary ways of seeking the truth. It was encouraging that the Chinese audience at the event acknowledged the mutual relationship of science and faith, despite their Chinese traditional cultural background. It is this openness to the idea that led me to address, in the preliminary sections of this article, the complex backdrop of that tradition, which cannot be reduced to either Confucian humanistic ethics or modern atheism. In its most ancient sources, Chinese tradition treasured a sense of God’s mystery at work in the world which, to an extent, reverberates in at least some of the comments that were put forward. It would not be unwarranted to conclude by suggesting that Polkinghorne’s visit to Hong Kong in 2006 represented as significant a milestone in terms of science and religion as Batchelor’s visit to China, in the 1980s, was in regard to bridging the gap between Western physics and Chinese fluid dynamics.¹⁶ In this sense, indeed, the scriptural

16 J. Z. Shi, “George Keith Batchelor’s Interaction with Chinese Fluid Dynamicists and Inspirational Influence: A Historical Perspective,” *Notes and Records of the Royal Society* 75 (2021): 461–502.

words that serve as a motto to this paper—“There was a man sent from God, whose name was John” (John 1:6)—can be aptly taken to mean Polkinghorne’s own impact.

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Respect for the Natural: A Resource When Values Are in Conflict

Margaret Somerville

Abstract: Some time ago, I came to the conclusion that we were wasting our time trying to convince many young people that certain so-called “progressive values” were unethical or even just a bad idea for individuals and society, and that some “traditional values” merited reconsideration. Those who rejected these latter values saw them as having nothing good to offer, indeed, even harmful, entirely passé, outmoded, and superseded by the unprecedented discoveries of our new science. I proposed that we needed to take a new positive approach in communicating traditional values that saw what the new science revealed about the natural and Nature, including ourselves, as amazing, wondrous, and awesome. In short, I argued that, viewed correctly, new science and many old values were complementary, not in opposition. This approach requires people of all values persuasions to start our conversations about values from where we agree, in order to have an experience of belonging to the same moral universe. That experience gives a different tone to our disagreements, which arise when we

Margaret Somerville is Samuel Gale Professor of Law Emerita, Professor Emerita in the Faculty of Medicine, and Founding Director Emerita of the Centre for Medicine, Ethics, and Law at McGill University, Montreal. Currently, she is Professor of Bioethics at the University of Notre Dame Australia, School of Medicine (Sydney campus). She has an extensive national and international publishing and speaking record and frequently comments in all forms of media. Her books include *The Ethical Canary: Science, Society and the Human Spirit* (2000); *The Ethical Imagination: Journeys of the Human Spirit* (2006; CBC 2006 Massey Lectures), and *Bird on an Ethics Wire: Battles about values in the culture wars* (2015). Among her many honours and awards are the Order of Australia, Dame of the Order of Saint Gregory the Great, Fellowship in the Royal Society of Canada, and the Royal Society of New South Wales, eight honorary doctorates, and the UNESCO Avicenna Prize for Ethics in Science.

explore where we disagree and why. This approach also requires identifying a large number of factors relevant to making decisions about ethics and detailed consideration of them. They include all our “human ways of knowing,” such as experiences of “amazement, wonder, and awe,” “examined emotions,” moral intuition, and so on. Note, these factors do not displace foundational ethical analysis, but are “add-ons” to it. This article focuses on one such factor. It examines and compares the role that a value of “respect for the natural” plays for people with traditional values and those with progressive values in their decision-making about ethics and, in each case, how it plays that role.

Keywords: common good; individual autonomy; liberalism; values conflicts; wonder

Here are some of the questions which led me to writing this article: Might promoting respect for the natural help to reduce current, hostile societal values conflicts? Does the natural have any intrinsic value that requires respect? What role does and should respect for the natural play in bioethics decision-making? Could deconstructing current societal values conflicts help us to deal with them more ethically? Are hostile values conflicts a threat to democracy and why is that question relevant to bioethics and medicine?

As a bioethicist, part of my job is dealing with values conflicts in individual cases. Bioethics, however, does not exist in a vacuum, it is applied or practical ethics, especially in medicine and healthcare; therefore, what happens in the real world is important to bioethics and *vice versa*. In other words, thinking about bioethics is not just a theoretical philosophical exercise; the conclusions reached affect real people and real societies.

Currently, hostile, conflictual polarisation in relation to certain values is so prominent in some Western democratic countries, that people are questioning whether the functioning and viability of democracy, itself, is threatened. While we still have many shared values, there are some where we strongly disagree and these are a main focus of our

contemporary disputes in the political public square. Some of these latter values reflect major socioeconomic, political, and religious divides. In particular, the legal status of abortion and euthanasia have been in issue. This is not surprising. The values governing the two great events in every human life, its beginning and its end, have always been among the most important loci for the articulation and application of the values that govern both individual humans and their societies.

The persons in conflict can be identified as groups with respect to a given value or issue, but dividing them into collectives whose members are *ad idem* on the values that should govern all ethical issues is not possible, because of the wide variety of values espoused by these participants to a wide variety of ethical issues. They agree on some values and ethics issues, but not on others on which they can be in conflict. In other words, although people may share some values on some issues, their total “values packages” are not the same.¹ This variation leads to an unstable and unpredictable political public square. Stable democracies, however, require that there are some foundational values on which most people agree. In this article I ask, might one of these be respect for the natural, including Nature? What constitutes that respect is a further question, one discussed in this article.

Although it might not be possible to divide people consistently into progressives and conservatives, one rough division of some of the values in contention into two groups, “progressive values” and “traditional or conservative values,” is possible. The conflict between the adherents of each of these two groups in relation to certain ethical issues is threatening important societal institutions, such as respect for the law; social order, for instance, law enforcement by police; and precipitating the use of violence as a political weapon. Some fear that it might even be challenging the viability of democracy itself. To deal with this conflict in the least destructive ways requires that we

1 Margaret A. Somerville, “Could ‘The Wonder Equation’ Help Us to Be More Ethical? A Personal Reflection,” *Ethics & Behavior* 32:3 (2021): 226–240, DOI: 10.1080/10508422.2020.1867861.

understand its origins, features and, to the extent possible, its likely future evolution.

With seeking that understanding in mind, I have been musing on whether “progressive values” have a common thread and, likewise, whether “conservative or traditional values” do, and whether these threads are different or the same, and what they might tell us. I start by identifying, comparing, and contrasting features of each group of values. I am interested, in particular, in what role respect for the natural might play in informing decisions taken about ethics by adherents of one or the other group of values.

Before proceeding, I want to emphasise, again, that in speaking of people with progressive values or conservative values, I mean in relation to the ethical issue being considered and not that any given person necessarily has a “values package” in which all of their values are of the one or other persuasion.²

I also want to point out that I am not judging whether progressive or conservative values are preferable and I am not trying to convert those with either kind of values to the other side. Rather, as I have explained at length in a previous paper,³ which I discuss later in this article, I am looking for “add on” approaches to the ways that we use, currently, to decide our values, which will help us to make more insightful decisions about ethics. In the “Wonder Equation” article, I argued that experiences of “amazement, wonder, and awe” could be such an “add on.” I hope such “add ons” might help us to understand better and more comprehensively our own values and those of others, whose values differ from ours, and to adjust our decisions about ethics accordingly, which could decrease conflict and hostility. This is relevant to the future of democracy, because, to be able to function, democracy requires mutual respect when we disagree. Moral humility and moral courage, which are also discussed later, are essential precursors to mutual respect.

2 Somerville, “Could ‘The Wonder Equation’ Help,” 230–231.

3 Somerville, “Could ‘The Wonder Equation’ Help.”

In this article, I consider whether respect for the natural and Nature (neither of which I define, but leave for exploration and definition in a future article) could be such an “add on” and, thereby, have a role to play in furthering better ethical decision-making. In order to understand whether that might be a possibility, we need first to identify the current features of each group of values.

Features of Each Group of Values

Focuses

In making decisions about ethics, the focus of people with progressive values in relation to the issue differ from the focus of those with conservative values. Progressives tend to focus primarily on the individual, upholding their rights to autonomy, and on consequences, especially for the individual, in the present. That said, a major exception in both these regards is progressives’ deep concern about damage to the environment.

Conservatives, while also considering the individual and consequences in the present, give much more weight to protecting the “common good”—the impacts on others, especially vulnerable people and society. This concern for more than themselves—self-transcendence—can lead them to experience a feeling of belonging to something much larger than themselves, give them a sense of purpose, and help them to find meaning in life. They are open to exploring what they can learn from the past from collective human memory and imagine as future consequences through collective human imagination.⁴ They too, however, can be intensely focused on individuals’ rights regarding certain issues, such as parents’ rights to educate their children without state interference or to refuse vaccination for them.

Many people’s position on various contentious ethical issues, for instance, abortion or euthanasia, is, however, more complex than

4 See John Ralston Saul, *The Unconscious Civilization* (Toronto: House of Anansi Press, 1998), 76–116.

being informed by straightforward “pure progressive” or “pure traditional” values. Rather, they can manifest a combination of elements of both progressive and traditional values. We can imagine a spectrum with progressive values at one end and traditional values at the other end. Some people, who tend to be the people featured in media reports, adopt absolute values at one or other pole. Many people, however, fall somewhere along the spectrum between the poles. We need to understand these poles and this spectrum. We also need to take into account what we learn, if we are to avoid destructive conflict and hostility that could cause serious damage to the values base of our democratic societies and their institutions. The values that need to be upheld, at both the level of individual persons and society, include protection of vulnerable people, justice, respect for life, honesty, and integrity. I would argue that respect for the natural and Nature should be included among them, too.

Wise political decision-making in a democratic society requires a nuanced approach, much as the parties engaged in values conflicts might wish otherwise. That said, such an approach can result in outcomes that will not be accepted by those who believe that what it would permit is inherently unethical and must never be imposed on them or, perhaps, only with the strongest justification. An example of the latter could include compulsory vaccination of children in an outbreak of a life-threatening disease. We need ethical guidelines and laws that most people can live with, even though they are not what they consider would be ideal. It merits keeping in mind, here, that just because a majority votes for something or supports it in a survey does not mean it is ethical. Likewise, research and surveys indicating what the general practice or attitude is do not necessarily indicate what it should be ethically.

We need a critical minimum number of shared values to create the glue that binds us together as a society and we need to affirm these values through exchanging stories with each other and buying into them, identifying principles that should guide us, participating in community events, volunteering, fostering the arts, for some people

belonging to a religious community, and so on. Doing this creates our metaphysical ecosystem. We are all aware that our physical ecosystem is under great stress and could be irreversibly damaged or even destroyed. The same is true of our metaphysical ecosystem; it is not indestructible. The fear that possibility generates might be what people fearful of the failure of democracy could be expressing.⁵

Basic Presumptions and Freedom

All decisions are founded on a basic presumption, whether or not we recognise or articulate what it is. Our choice of basic presumption can affect our decisions about ethics. A primary difference between progressives and conservatives might be their choice of a basic presumption to govern their decisions about values and ethics.

There are four basic presumptions: “Yes” with no exception; “No” with no exception; “Yes, but not if ...”; and “No, unless ...” Difficult ethical decisions, which involve values conflict, usually involve choosing between a “Yes, but ...” and a “No, unless ...” presumption.

Progressive values adherents are likely to adopt either a “Yes” or “Yes, but not if ...” basic presumption.⁶ More specifically, it is either “Yes,” when the individual person should be free to make their own decisions (for example, about euthanasia or abortion), or “Yes, but not if ...,” when exceptions are formulated and articulated. Traditional values adherents are more likely to adopt either a “No” or a “No, unless ...” basic presumption. “No, you are not free to make certain decisions, because the action, for example, euthanasia or abortion, is inherently wrong.” Or, where the action is not inherently wrong, “No, you are not free to make certain decisions, unless you can show that you qualify for an exception, for instance, that what you will do is not seriously harmful to the ‘common good’ and benefits outweigh harms.”

5 Margaret Somerville, *Bird on an Ethics Wire: Battles about Values in the Culture Wars* (Montreal: McGill-Queen's University Press, 2015), 52–53, 55–56, 63–64.

6 Margaret Somerville, *The Ethical Imagination: Journeys of the Human Spirit* (Toronto: House of Anansi Press, 2006), 44–45.

In choosing between these presumptions, we should keep in mind the axiom “freedom in fetters.” To protect liberty we need to maintain the conditions that make liberty possible, which can require restrictions on freedom.

Depending on which presumption is chosen, the burden of proof of an exception differs between the person wanting to act and the person opposing that action. A “Yes, but not if ...” presumption requires the opponent of the action to prove the “not if” exception is fulfilled. In contrast, a “No, unless ...” presumption requires the person wanting to act to prove the “unless” exception is fulfilled. In situations of equal doubt as to whether the exception is fulfilled, the basic presumption governs. That is, in exactly the same factual circumstances, the outcome with respect to freedom to act is the opposite, depending on which basic presumption has been used. In other words, the starting points of progressives’ and conservatives’ reasoning and decision-making about a given ethics issue can differ and, even where there is no disagreement on the facts, this can lead to opposite decision outcomes regarding whether a proposed action is deemed ethical.

We also need to keep in mind that there can be conflict regarding the requirements for an exception to the basic presumption and whether these have been fulfilled.

Another difference between progressives and conservatives is that in deciding on their values, although each group takes into account both the needs and rights of individuals and impact on the “common good,” when, as in the legalisation of euthanasia debate, the relevant values of respect for individual autonomy and protection of the “common good” are in conflict and both cannot be implemented, their choices are opposite. Conservatives are likely to give priority to the “common good” at the cost of individual autonomy; progressives, in contrast, are likely to give priority to individual autonomy at the cost of protecting the “common good.” In short, conservatives give priority to the collective, to society; progressives, to the individual. This difference is sometimes also characterised as progressives giving priority to

change and innovation and conservatives to the *status quo* and safety or risk aversion.⁷

Progressives may choose, for example, to legalise euthanasia or abortion on demand, until ethically unacceptable risk and harm is manifested. Conservatives will oppose such changes because they believe euthanasia and abortion on demand are inherently wrong, but also, that they are unethical because of the risks and harms they entail on a broad range of considerations, and that progressives have not shown they are reasonably safe as a part of health or social policy.

Sometimes, the allocation to either progressives or conservatives of the burden of proof of reasonable safety of the values we adopt as a society can be introduced and used in subtle ways. For instance, America adopted a “precautionary approach” not a “precautionary principle” in relation to governing risks to the environment. They explained that a principle was mandatory, but an approach was not. A precautionary *principle* requires that before acting in a way that could harm the environment, the actor must show that it is reasonably safe to do so. A precautionary *approach* does not demand this. It is much more lax in its application.

Normally, in an “open legal society,” a person is free to act until it is shown that they are failing to take reasonable care resulting in damage. In a “closed legal society” a person must not act in a way that could cause risks or harm, until they have permission to do so. Western democracies are “open legal societies” with some specific examples of using a “closed legal society” approach in order to protect people. A common example of the latter is the legal regulation of “therapeutic goods.” New drugs or medical devices must not be marketed until they are shown to be “safe and effective.”

Both progressives and conservatives want freedom, but not necessarily of the same kind or in relation to the same elements of their lives.

7 Somerville, *Bird on an Ethics Wire*, 152–153, 195.

Conservatives tend to want *freedom from* government intervention in their private lives; they call such interventions “Big Government.” They might oppose, for example, mandatory vaccination, fluoridation of the water supply, compulsory school curricula that conflict with their religious or social values or even compulsory out-of-home schooling, and so on.

Progressives are more likely to want *freedom to* implement their values, in particular, respect for individual autonomy to allow them to do what they believe is best for them, especially as individuals. They want control over what happens to them, which requires their having choice among a range of options, and change, for example, in laws that inhibit or prevent their choices. The progressives’ goals in the debates about values can be summarised as their seeking Control, Choice, and Change. The legalisation of euthanasia is a prime example of this strategy being successfully used.

Is “Respect for the Natural” Relevant to Understanding Values Conflicts?

Is Respect for the Natural an Important Values Difference Between Progressives and Conservatives?

Might the deepest divide between those in conflict over which values our society should adopt be between those who believe that we need to have respect for the natural and those who do not believe this? Or, perhaps, and even more radically and divisively, those who deny the existence of the natural and those, such as myself, who believe it exists? Among philosophers, this debate seems to focus mainly on whether there is such an entity as “human nature.”

Respect for the natural does not mean that we must not change it or intervene on it. Rather, it means that we must be able to justify doing that. Most of the time when we intervene to change the natural, it is so obviously justified, for example, providing life-saving interventions in medicine, that we do not need to articulate our justification. The basic

presumption is “Yes,” with no exception, in favour of the intervention, although it bears keeping in mind that we can all be morally fallible, even when we all agree. This same caution also applies when we all agree that an intervention is unethical, that is, we adopt a “No” basic presumption, with no exceptions. It merits noting, as well, that advocating respect for the natural does not entail that everything natural is good or ethical or that what is not natural is wrong and unethical. Rather, implementing respect for the natural should enhance respect for life, all life, but in particular human life and flourishing for all people.

Attitudes to the worth or importance of the natural can differ and, like many other concepts, that of the natural can be wrongly defined, expanded, manipulated, or misused. For example, people currently concerned about irreversible damage to the environment will not agree with Benjamin Franklin, who is quoted as saying: “There cannot be a stronger natural right than that of a man’s making the best profit he can of the natural produce of his lands.”

At what is probably the most fundamental level in the debate over the ethics that should govern the natural, we need to keep in mind that there may be no consensus on what constitutes the natural, which needs to be respected.

Then there is debate as to whether the natural has any intrinsic value. Those who espouse what they call the “Naturalistic Fallacy” argue that it does not. One “response to the naturalistic fallacy is that it is based on a static view of ‘essence’ or ‘nature,’ rather than on how these develop over time to their full realisation ... their dispositional qualities ... is/ought takes on a different perspective with that latter consideration in mind”⁸—an argument developed by Anthony Lisska.⁹ In short, “the is/ought contains an uncertainty and this is relevant to one’s view of Natural Law.”¹⁰

8 Thomas Ryan, personal email communication (18 August 2024).

9 See J. Anthony Lisska, *Aquinas’s Theory of Natural Law: An Analytic Reconstruction* (New York: Oxford University Press, 1996), 188–222.

10 Thomas Ryan, personal email communication (18 August 2024).

The most powerful and contentious belief about the natural is that there is an existential reality not created by humans, but one they can explore and declare what they find, namely, Natural Law. This is defined, by some, as “a body of unchanging moral principles regarded as a basis for all human conduct,”¹¹ which can guide us morally and ethically. However, moral theologian, Rev Dr Thomas Ryan, questions the global characterisation of Natural Law as “unchanging” and refers to American ethicist and theologian Professor Lisa Sowle Cahill who argues as follows: “certain goods for humans can be universally known, most obviously those based on the physical conditions of human survival and our natural sociality and need for cooperative relationships.” This also can extend to “ecological goods” as both “public” and “global common goods.” Nevertheless, Cahill is also of the view that “knowledge of the natural law is always perspectival and partial, even when it is also true and accurate.”¹² In other words, as with all moral knowledge, it is an evolving part of human experience.

In the past, the precepts of Natural Law were usually found in religion and regarded as established by the Creator God. But one need not be religious or believe in God to accept Natural Law. It can be regarded as emanating from the essence of being human and having a purpose of protecting and realising that essence and its potentials. One expression of this view is that humans have a moral compass, which should guide them in making decisions regarding what is and is not ethical.

I note here that this human essence does not consist in our existing as solitary individuals who, above all, prioritise individual autonomy, but, rather, envisions us as social animals.¹³ To flourish as a human being and to find meaning and purpose in life, we need others. The problem with over-prioritising individual autonomy is that

11 See “Natural Law” in *Oxford English Dictionary*.

12 Lisa Sowle Cahill, *Global Justice, Christology and Christian Ethics* (Cambridge and New York: Cambridge University Press, 2013), 265.

13 O. Carter Snead, *What It Means to Be Human: The Case for the Body in Public Bioethics* (Cambridge, MA: Harvard University Press, 2020).

it does not take this into account sufficiently. In other words, even from a purely selfish point of view for our own survival we need to protect others, that is, to give sufficient weight to the “common good.”

Often, those who see no worth in the natural deserving of respect, simply on the grounds that it is natural, also argue that the wisdom of history and tradition are irrelevant to decision-making about ethics in our contemporary world and, likewise, that religion should have no voice.

The relation between science and respect for the natural is important. Many progressive values adherents, such as Richard Dawkins, see science as the only valid way of knowing and see no mystery in what it reveals. Others, especially those who are religious or spiritual, see science as revealing knowledge that engenders awareness of even greater mysteries and a sense of contact with the mystical. I belong in the latter group. James Watson, Nobel Prize Winner for his work on DNA, was supporting the views of Dawkins with whom I was arguing at a meeting we were at in Oxford. Watson quietly told me that I was “full of mystical nonsense.”¹⁴ I hope that he is correct.

In 2021, I published an article titled “Could the ‘Wonder Equation’ help us to be more ethical?”¹⁵ Here’s the Wonder Equation, as it now stands, with Earned Trust as an addition, and its explanation:

$$AWA + (S - (C + N)) \rightarrow ET + G + H \rightarrow E$$

Amazement, wonder, and awe (AWA) plus (*healthy*) *scepticism (S)*, that is “think and question” *scepticism minus cynicism (C)* and *minus nihilism (N)*, can create *earned trust (ET)* and elicit *deep gratitude (G)*, including for life, and *hope (H)*, the oxygen of the human spirit, which, in turn, can lead to *ethics (E)*, a concern to act ethically. Earned Trust (trust me because I will earn your trust) as compared with Blind Trust (trust

14 Somerville, *The Ethical Imagination*, 10.

15 Somerville, “Could ‘The Wonder Equation’ Help,” 237.

me because I have status, authority, and power)¹⁶ requires many ethical practices, including transparency, integrity, honesty, compassion, empathy, to name just a few, which are features of both conservative and progressive values.

Linking Threads

Might an important linking thread between various conservative values be a *prima facie* requirement of respect for the natural? And might an important linking thread between various progressive values be a carefully understood absence of a *prima facie* requirement of respect for the natural? And might the presence or absence of this *prima facie* requirement help to explain some of the most fundamental differences in values between the two groups? Let's look at some examples.

Pro euthanasia/physician-assisted suicide proponents advocate for the legalisation of doctor-inflicted death at the time of a mentally competent, consenting, seriously suffering adult's choosing. This is inflicted death and, even if thought ethical, is premature death. Those who oppose such interventions promote high quality palliative care to relieve suffering and allow the person to die a natural death, that is, they implement respect for the natural. Similarly, regarding abortion. Respect for the natural requires respect for the life of the foetus. That respect is not breached in natural miscarriage, but is in intentionally ending the life of the foetus.

It merits repeating, as explained above, that advocates of progressive values tend to focus on individual persons and their rights to autonomy and self-determination, which is sometimes called "radical," "intense," or "expressive" individualism. They also tend to focus mainly, or even only, on the consequences occurring in the present, that is, immediate consequences. While not ignoring an action's consequences in the present or its impact on individuals, conservatives look also to the past for wisdom from collective human memory

16 See Jay Katz, *The Silent World of Doctor and Patient* (New York and London: Free Press, 1986).

and through collective human imagination to future risks and consequences. Importantly they also take into account risks and harms to the “common good”—especially risks and harms to vulnerable people as a group—not just to individuals.

These two approaches reflect very different visions of what it means to be human and what is required to live “the good life,” that is, for human flourishing. We are not isolated atoms—even if the atoms of which we are composed come from the stars—but social beings who need companionship and form strong attachments to others.¹⁷ This raises a host of other ethical issues, especially in relation to respect for the natural in the contexts of genetic manipulation and reproductive technologies. How important is genetic relationship? Does a child have a right to be born from untampered with natural human gametes from one, identified man and one, identified woman, a right not to be a clone, a right to their own unique ticket in the great genetic lottery of the passing on of human life?¹⁸ To be gestated in a woman’s body and not an artificial uterus? Should the body only be that of the child’s biological mother and not a surrogate? Should uterine transplants to biological men be banned? And so on.¹⁹

In a powerful recent essay, Australian Journalist and commentator Stan Grant, a First Nations man, wrote about the “democratic malaise” that he claims has been engendered by “liberalism.”²⁰ This is not a new concept and there are various definitions of “liberalism,” a prominent current one being “neoliberalism.” This is mainly

17 Sneed, *What It Means to Be Human*.

18 See Hans Jonas, *Philosophical Essays: From Ancient Creed to Technological Man* (Englewood Cliffs, NJ: Prentice-Hall, 1974), 148–163.

19 See Somerville, *Bird on an Ethics Wire*, 14, 275; Margaret Somerville, “Children’s Human Rights to Natural Biological Origins and Family Structure,” *International Journal of the Jurisprudence of the Family* 1 (2010): 35–54, <https://tinyurl.com/ymnnvb96>; Margaret Somerville, “Children’s Human Rights and Unlinking Child-Parent Biological Bonds with Adoption, Same-Sex Marriage and New Reproductive Technologies,” *Journal of Family Studies* 13 (2007): 179–201.

20 Stan Grant, “J. D. Vance and the Politics of Resistance,” *The Saturday Paper* 512 (10 August 2024), <https://tinyurl.com/2yeb4378>.

described as promoting fiscally conservative values but, I suggest adding to that definition, combined with progressive social values.

Grant's reflections are relevant to understanding the risks and harms of progressive values, such as radical individual autonomy and "wokism," which implement liberalism. The further question is whether reviving respect for the natural could help us to avoid at least some of these risks and harms. Here are some statements from his article:

Many thinkers, from the political right to the left, are resisting the politics of our time. To them, this is an age of convenience, hyper-rationality, scientism and technology that drains our souls... [However,] a resistance [is emerging to] the dispiriting, disenchanting, disengaged modernity. Liberalism, rather than the answer, is part of the problem.

Patrick Deneen, an American political scientist, claimed Liberalism ... had gone too far in dissociating culture from nature. The politics of the state, he argued, had suffocated the human. This is the triumph of the individual [becoming] "the basic unit of human existence, the only natural human entity that exists." The only liberation left, he argued, "is liberation from liberalism itself."

Grant proposes that the reason he and many Indigenous people are converting to Catholicism is that "Catholicism speaks to our culture and is a home of mysticism in a world that wants to tell us such things are superstitious or supernatural."²¹

This last statement raises the question of our attitudes to science and religion and the relation between them. Progressives often see them as being incompatible and in opposition, such that a choice must be made between them. This approach can be compared with seeing them as casting two different lenses on the same realities. Science opens up knowledge of Nature and the natural, knowledge of our

21 Grant, "J. D. Vance and the Politics of Resistance."

world, the universe, and all living beings, including ourselves. Religion, or spirituality, allows us to experience amazement, wonder, and awe regarding this knowledge and to recognise that the more we know, the more we know we don't know.²² That recognition should elicit a response of respect for the natural and Nature, as a prime expression of the natural. Might agreement that we need to foster respect for the natural and Nature be a link between progressive and conservative values, even though we might disagree about what that respect requires? Could respect for the natural and Nature help us to be more ethical?²³

Conclusion

In a world in which values conflicts are becoming more acrimonious, hostile, and dangerous, we all need to practice “moral humility.” This requires us to recognise, first, that we are all morally fallible; second, that we need to listen open-mindedly, carefully, and respectfully to the arguments of those who disagree with us; and, third, that we must look beyond considering only ourselves and consider others and the larger picture. In short, we need to take into account the needs and wellbeing of others—the “common good”—when making decisions about ethics.

And “moral humility” has an essential companion virtue, “moral courage.” This requires that when we conclude that something is unethical, we speak and act accordingly, despite cost to ourselves or, even more distressingly, to our loved ones, or to our colleagues and friends. It has been said that contemporary Western societies need old people and young people working together, as First Nations cultures recognise in respecting their Elders. Old people are needed to bring the wisdom from memory and young people to bring the courage needed to implement that wisdom. It can be argued that courage is the most important virtue, because it is not possible to practise any of the other virtues without it.

22 Somerville, “Could ‘The Wonder Equation’ Help Us,” 231–232.

23 Somerville, “Could ‘The Wonder Equation’ Help Us,” 232–234, 236–237.

I predict that as we act as though respect for the natural is of no importance, we will come to realise the opposite. We are part of Nature and, to maintain respect for ourselves, we must respect the natural and Nature. The daunting challenge now is to determine what respect for the natural and Nature requires that we not do.

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A Brief Critique of Arthur Eddington's Approach to Science and Religion in Light of Evidentialism

Samuel McKee and Jon Reynolds

Abstract: Since the emergence of New Atheism under figures such as Richard Dawkins, there has been a revolution in popular Christian interest in science and religion. However, many approaches to science and religion among Christian laypeople follow an evidentialist model. In sharp contrast, Sir Arthur Eddington's different voice, as a prominent scientist and devout Quaker, remains unfamiliar to the majority in these discussions. Heralded by some commentators as ahead of his time, his unusual yet bold ideas, which at times were misunderstood, deserve renewed consideration. His influence throughout the twentieth century ran deeper than he has been given credit for. It is time to reassess his value to science and religion as a discipline and to acknowledge that his contributions have a great deal of merit for the ongoing dialogue. In this article, we question whether evidentialist approaches are as valuable as Eddington's contributions. We examine his works and life to see what can be learned from his perspective on the science-religion question. In doing so, we are also asking whether his attitude to science and religion would be more fruitful than the alternatives.

Keywords: Christian apologetics; Eddington; epistemology; evidentialism; science and religion

Samuel McKee is Associate Tutor in History and Philosophy of Science, Manchester Metropolitan University. Dr Jon Reynolds is a member of the Society for the History of Astronomy.

The past twenty years have seen an explosion in modern popular apologetics due to the internet and social media. A brief examination of the landscape will see a proliferation of groups promoting their videos and blogs on science and religion. This explosion has seen classical, evidentialist, or cumulative-case apologetics approaches dominate, all of which promote the attitude that science provides evidence for God and points to a designer, following the nineteenth-century vision of natural theology (henceforth we shall include these under the umbrella term of evidentialism).

The sceptical climate of our post-Christian Western world may not be as conducive to these approaches anymore and, given the scientific boom of the past twenty years in multiple fields that particularly challenge the design approach (such as genetics and evolutionary biology) it is questionable why this approach has dominated. In this space, an approach more akin to Eddington's unified theory may prove far more fruitful.

Brief Biography of Eddington

Eddington was an astrophysicist who pioneered new avenues of astrophysics. He held Newton's chair in astronomy at Cambridge University and is most famous for confirming Einstein's theory of relativity in his eclipse voyage of 1919. For most of his career he held Sir Isaac Newton's chair as Plumian Professor of Astronomy at Cambridge University and was a fellow of Trinity College, Cambridge. He made great contributions to stellar physics and was the first to conclusively posit nuclear fusion as the source of the sun's energy. Einstein considered him the greatest expositor of relativity in the world, and he continued to make great strides in astronomy and astrophysics during the interwar period. He also wrote the first English language book on Big Bang cosmology.¹

Eddington was a Quaker and wrote often on science and religion and the philosophy of science during the interwar period. Given his

1 Sir Arthur Eddington, *The Expanding Universe* (Harmondsworth, Middlesex: Penguin Books Limited, 1940).

role in illuminating relativity, Big Bang cosmology, and quantum physics to the English-speaking world, he was one of the most significant scientists of the time. He was a very popular science writer and battled the atheists of his day, most notably Bertrand Russell. He is credited with saving the faith of many Christian scientists and academics caught between fundamentalism and humanism.²

Eddington was the first to grapple significantly with the epistemological challenges of the new physics. Though not well received at the time,³ recently value has been found in his work.⁴ Eddington's search for a Theory of Everything (henceforth TOE) was uniquely rooted in his Christian mysticism. He spent the final decade of his life trying to find a fundamental theory, but his work was published posthumously.⁵

His polemics against materialism brought an apologetics revolution in the interwar period.⁶ His motivation was a concern about the growing attitude that science had eliminated religion.⁷ Eddington repeatedly asserted that the nature of all reality is spiritual⁸ and sought out a philosophy of the ultimate reality that could harmonise science and faith.

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- 2 A. Vilbert Douglas, *The Life of Arthur Stanley Eddington* (London: Thomas Nelson and Sons, 1957), 133.
 - 3 John W. Yolton, *The Philosophy of Science of A. S. Eddington* (Hague: Martinus Nijhoff, 1960), 90.
 - 4 Ian T. Durham and Dean Rickles, *Information and Interaction: Eddington, Wheeler and the Limits of Knowledge* (London: Springer International Publishing, 2017; Kindle), location 124.
 - 5 Sir Arthur Eddington, *Fundamental Theory* (Cambridge: Cambridge University Press, 1945; Kindle).
 - 6 Matthew Stanley, *Practical Mystic: Religion, Science and A. S. Eddington* (Chicago, IL: University of Chicago Press, 2007), 229.
 - 7 Nicolaas A. Rupke, *Eminent Lives in Twentieth-Century Science & Religion: 2nd Edition* (Frankfurt: Peter Lang, 2009), 134.
 - 8 Sir Arthur Eddington, *New Pathways in Science* (Cambridge: Cambridge University Press, 1935), 408.

Evidentialism in Science and Christianity

Classical apologetics (for example, William Lane Craig) insists on the priority of establishing theism before one makes the case for Christianity. To that end, the traditional arguments for theism developed by Aquinas and the design arguments of the nineteenth century are used or updated. Evidentialist apologetics is more direct and leans heavily on historical evidence where science is used as such.⁹ In turn, cumulative-case apologetics is abductive, building a case supporting Christianity as the best explanation.¹⁰ In all three approaches, scientific evidence for God is used to defend theism or Christianity directly. During Eddington's early life, natural theology was in ascendancy through efforts such as the Bridgewater Treatises.¹¹

Given natural theology's desire to establish the case for theism in what can be known from observation of the world to all people, science is viewed principally as evidence for theism. This approach has become instinctive within modern popular apologetics (henceforth MPA) and the mind of the common church attendee who leans on Romans 1 or the Psalms for an account of how one might believe through observing the natural world.

Eddington's Approach to Science and Religion

Eddington's approach can be summarised in the following way: At the outset, he argues that relativity, cosmology, and quantum physics have radically overhauled the way we see the world, leaving mechanical or ultra-materialistic views of reality derelict. For him, mind is more fundamental than matter in how we understand and interpret the world, and a new overarching picture of reality is needed that can

9 As outlined by Gary Habermas in William Lane Craig et al., *Five Views on Apologetics* (Grand Rapids, MI: Zondervan, 2000), 92.

10 See Paul D. Feinberg's summation in Craig et al., *Five Views on Apologetics*, 151.

11 Denis R. Alexander and Ronald L. Numbers, *Biology and Ideology from Descartes to Dawkins* (Chicago, IL: University of Chicago Press, 2010).

accommodate the revolution in physics.¹² Neither materialistic atheism nor traditional and fundamentalist views of religion can supply this. His solution was idealistic (mind is preeminent), epistemological (experience is at the heart of our knowledge), and religious (the truth of God is found by the seeker, and personal knowledge of God lies outside the bounds of what science can show us). He rejected all attempts to infer God's existence from the data of science.¹³ Science fuelled polemics for undermining the attempts by others to remove God on the basis of scientific advance; it did not support Christian apologetics. He cautioned on evidence-proposing apologetics saying,

I would not venture to say that those who are eager to sanctify, as it were, the revelations of science by accepting them as new insight into the divine power are wrong. But this attitude is liable to grate a little on the scientific mind, forcing its free spirit of inquiry into one predetermined mode of expression; and I do not think that the harmonising of the scientific and the religious outlook on experience is assisted that way.¹⁴

Eddington didn't believe that science tells us much about God, or that science provides evidence to bolster the claims of Christianity, despite the revolutionary period during which he worked.¹⁵ God's existence was clear on the basis of experience¹⁶ and what it meant to be human as a spiritual being¹⁷—a conscious, free, truth-seeking person. Eddington's reasons to believe are not original. They are typically Victorian, Quaker, and influenced by the liberal theology of the early twentieth

12 Sir Arthur Stanley Eddington, *The Nature of the Physical World* (Shizu Bito, 2014; Kindle), location 4029.

13 Arthur Stanley Eddington, *Science and the Unseen World* (London: George Allen & Unwin Ltd, 1930), 45.

14 Eddington, *Science and the Unseen World*, 17.

15 Peter J. Bowler, *Reconciling Science and Religion: The Debate in Early Twentieth-Century Britain* (Chicago, IL: University of Chicago Press, 2001), 36.

16 Eddington, *Science and the Unseen World*, 25.

17 Eddington, *Science and the Unseen World*, 44.

century. However, he took the path of defending and upholding only a minimal, mystical form of religion, determined to leave the more nuanced details to qualified theologians. As a scientist, the data of physical science had nothing to say on his faith,¹⁸ but the spirit and manner in which he ventured as a scientist was inseparable from his religious life. Materialist claims against this were nonsensical and self-defeating.¹⁹ Both John Polkinghorne²⁰ and Alister McGrath²¹ have followed similar paths in seeking an overarching vision of reality that harmonises the scientific and religious under one grand narrative.

Eddington's epistemology is far more complex than can be addressed in brief, but he attempted to demonstrate how the new physics had undercut the materialist base of the emerging humanism. The spiritual individual as seeker and observer was now put more firmly in the centre, and now we are free to consider "mind-stuff" as fundamental to the ultimate reality. From here, his more mystical idealism takes over and he asserts that the ultimate reality is mind/spirit,²² not physical. From this perspective, materialist arguments against God's existence are nonsensical.

Examples for Comparison

The clash between the MPA approaches and Eddington is well illustrated in the following example. Eddington writes:

We have seen that the cyclic scheme of physics presupposes a background outside the scope of its investigations. In this background we must find, first, our own personality, and then, perhaps, a greater personality. The idea of a universal Mind or Logos would

18 Eddington, *The Nature of the Physical World*, location 4096.

19 Eddington, *The Nature of the Physical World*, location 1766.

20 John C. Polkinghorne, *One World: The Interaction of Science and Theology* (London: SPCK, 1986).

21 Alister McGrath, *Inventing the Universe* (London: Hodder & Stoughton, 2015).

22 Sir Arthur Eddington, *The Philosophy of Physical Science* (New York: The MacMillan Company, 1939), 69.

be, I think, a fairly plausible inference from the present state of scientific theory; at least in its harmony with it. But if so, all that our inquiry justifies ... is a purely colourless pantheism. Science cannot tell us whether the world-spirit is good or evil, and its halting argument for the existence of a God might equally well be turned into an argument for the existence of the Devil.²³

The more famous third sentence of this quote has been repeatedly used by Intelligent Design advocates, omitting the rest. Eddington's view is here seen to bolster a design-centred attitude to science and religion, whilst leaving out the context. Whether Eddington is being deliberately vague or not, he is content to raise the issue and note its problems to both the materialist and the natural theologian. This new science can give us significant and illuminating information, but it cannot tell us any more of what is behind it. Eddington acknowledges the plausibility of the thought but dismisses it on the problematic grounds that follow. There is data that may be used to promote an ultimate designer, but this data is ultimately problematic or irrelevant when pursued further as it cannot lead us to the relational God of Christianity, or the experiential God one communes with. It cannot be justified as good, evil, or personal. Furthermore, it says nothing about us as God-seeking or truth-seeking beings.

Eddington also candidly speaks of his experiences at the observatory in Greenwich and Cambridge, writing:

Probably most astronomers, if they were to speak frankly, would confess to some chafing when they are reminded of the psalm "The heavens declare the glory of God." It is so often rubbed into us, with implications far beyond the simple poetic thought awakened by the splendour of the star-clad sky. There is another passage from the Old Testament that comes nearer to my own sympathies—"And behold the Lord passed by, and a great and strong wind rent the mountains, and broke in pieces the rocks before the Lord, but the Lord was not in the wind; and after the

23 Eddington, *The Nature of the Physical World*, location 4845.

wind an earthquake, but the Lord was not in the earthquake; and after the earthquake a fire, but the Lord was not in the fire; and after the fire a still small voice ... And behold there came a voice unto him, and said, What doest thou here, Elijah?" Wind, earthquake, fire—meteorology, seismology, physics—pass in review, as we have been reviewing the natural forces of evolution; the Lord was not in them. Afterwards, a stirring, an awakening in the organ of the brain, a voice which asks "What doest thou here?"²⁴

It was not the sense of wonder revealed by the data of Eddington's astronomical work that gave evidence for God. Rather, the meaning and response of the heart that had led him there in the first place showed that part of being human was to seek, to pursue truth for its own sake, and to freely undertake the adventure of science.²⁵ These could not be accounted for by the humanism of his day, but they harmonised perfectly with his life as a Quaker, undertaking the religious life as an individual finding God in one's daily pursuits and mundane business.²⁶

For Eddington, both science and religious seeking were uncovering further truth about the world as one seeks.²⁷ One should not seek with agenda or conclusion in mind, but with courage to follow the path wherever it leads. Given that God is personal, we should not expect to discover God in the impersonal, for "If God means anything in our daily lives, I do not think we should feel any disloyalty to truth in speaking and thinking of him unscientifically, any more than in speaking and thinking unscientifically of our human companions,"²⁸ and "as laughter cannot be compelled by the scientific exposition of the structure of a joke, so a philosophical discussion of the attributes of God (or an impersonal substitute) is likely to miss the intimate response of the spirit which is the central point of the religious experience."²⁹

24 Eddington, *Science and the Unseen World*, 17–18.

25 Eddington, *The Nature of the Physical World*, location 4990.

26 Eddington, *New Pathways in Science*, 405–406.

27 Eddington, *The Nature of the Physical World*, location 338.

28 Eddington, *New Pathways in Science*, 406–407.

29 Eddington, *The Nature of the Physical World*, location 4634.

The natural theology of Eddington's time did not fit his concept of a God of intimate, personal communion, and MPA should consider this approach more cohesive with their view of God's nature.

How Eddington Moved the Conversation

The three approaches listed in MPA face a multitude of problems of a philosophical, theological, and scientific nature.³⁰ Eddington succeeded in moving the science-religion discussion away from natural theology and showed an alternative route.³¹ McGrath and Polkinghorne most notably have built on the ideas of Eddington whilst dismissing aspects which were unsuccessful (for example, his TOE) and criticising his idealism in favour of critical realism. Though they do not feature prominently in MPA, they have recognised the value in Eddington's approach to the relationship between science and faith being one of seeking and values. Eddington's approach leads to nature being more of a sacrament³² than a sign or signpost, as McGrath defines it.³³ There are similarities to Robert Boyle's comparison of the actions of the scientist as similar to communion or worship; both are forms of spiritual engagement with God in awe of God's handiwork.

Perhaps the Quaker account of Eddington satisfies more fully the idea that God holds all together, rather than the MPA approach where God is hidden behind scientific frontiers which are continually moving. Eddington makes a case that more of the mystical or experiential side of faith and science is to be retained.

Eddington was clear that whoever uses the present partially developed picture of nature for purposes outside science does so at

30 Eddington, *New Pathways in Science*, 397.

31 Stanley, *Practical Mystic*, 212.

32 Sir Edmund Whittaker, *Eddington's Principle in the Philosophy of Science* (Cambridge: Cambridge University Press, 1951), 34–35.

33 Alistair McGrath, *Re-Imagining Nature: The Promise of a Christian Natural Theology* (Chichester, West Sussex: Wiley Blackwell, 2017).

their own risk.³⁴ In an age where atheism claims science for its own, and popular opinion is based on the warfare model, rooting evidence for God in scientific discovery is unwise due to its changeability and unhelpful history. Eddington was not looking for evidence for God, but a coherent vision of reality that holds together faith, the new science, and what it means to be human. Matthew Stanley has noted that Eddington never thought of relativity as a proof of God,³⁵ nor did he see quantum physics as providing evidence either. This is despite his considerable energy given to marshalling both as evidence against materialism, even going so far as to declare, in 1929, that materialism was dead.³⁶

This ultimately led to the *Fundamental Theory* (published posthumously) which Eddington spent much of the final two decades of his life working on. Edmund Whittaker finished the final construction of his efforts, but it was found to fail immediately upon examination. Sir James Jeans noted that it could not account for the newly discovered subatomic particles,³⁷ and it was elsewhere mocked as a form of numerology. Though disregarded for having no scientific value today, we see Eddington's religious epistemology at play in trying to account for the mind, consciousness, and free will, as well as unifying the fundamental forces, constants, and quantities in nature.

Eddington's Quaker faith is largely responsible for both the rejection of natural theology and the idea that science could in any way prove God's existence, as well as his belief that what the religious believer needed was instead a grand, overarching vision of God's world which included everything made, including our own minds.

After he died, Cambridge University and the Royal Astronomical Society agreed upon an annual memorial lectureship in Eddington's

34 Eddington, *The Nature of the Physical World*, location 5044.

35 Stanley, *Practical Mystic*, 192.

36 Arthur Stanley Eddington, *Science and the Unseen World* (London: George Allen & Unwin Ltd, 1930), 31.

37 Sir James Jeans, *The Astronomical Horizon* (London: Oxford University Press, 1945), 20.

honour, which would focus on the interaction between science, philosophy, and religion. The vision he had, of seeing the three disciplines in continual interplay, was fruitful as the transcripts were published annually until the mid-1970s by Cambridge University Press (the lectureship ran until 2001, being restarted in 2009 with the sole focus on astronomy) and included philosophers of religion such as John Hick, Christian scientists such as Michael Polanyi, and multiple Nobel Prize winners who continued Eddington's emphasis on mind, such as Sir Roger Penrose.

Given this legacy, his extraordinary success as a popular communicator of science, philosophy, and religion, his engagement with the considerable antagonists of the time (particularly Bertrand Russell), and his ability to reframe the conversation away from natural theology, it is perhaps surprising that Eddington has not garnered more attention from religious thinkers in our present era. However, there are a few reasons that have been given.

Criticisms of Eddington

Eddington's approach as a Quaker may be too mystical and ambiguous for many conservatives yet finds a deeper appreciation from more liberal Christians. Eddington has drawn criticism from almost every side, both during his life and in the aftermath of his death. Whilst this deserves greater attention than can be given here, an aforementioned notable critic was his Cambridge University contemporary Bertrand Russell. Though admired by Eddington, Russell continually castigated him through the 1920s and 1930s, most evidently in his books *The Scientific Outlook*³⁸ and *Religion and Science*,³⁹ in which he furiously mocked both Eddington and Sir James Jeans for bringing the new findings of physics into conversation with Christianity, and scorned clergy for citing them as reliable sources for their evangelism. Stanley and others have observed that in Russell's criticism of natural theology is appar-

38 Bertrand Russell, *The Scientific Outlook* (London: Routledge Classics, 2009).

39 Bertrand Russell, *Religion and Science* (Oxford: Oxford University Press, 1997).

ent that Russell had neither read nor understood Eddington's more nuanced perspective on science and religion, which was far removed from that of Jeans in his most popular work, *The Mysterious Universe*.⁴⁰ We bring this to light as Russell was the most famous atheist of his era, whose *Why I Am Not a Christian*⁴¹ is still a popular tract of atheist writers today. The fact that Russell wrote an entire book attacking the religious affections of a well-read spiritual scientist during the same era in which he wrote his most popular atheist treatise, yet few Christian apologists seem to be aware of Eddington, is surprising. Eddington even wrote his own brief counter, *Why I Believe in God*,⁴² shortly afterwards.

There appears to be gold to be mined here, both in Eddington's writings and in his critics. Others followed Russell's suit in writing responses to Eddington, who has been credited with rescuing the faith of many scientists⁴³ who felt forced to make a difficult choice between their science and religion by the rising tide of fundamentalism in the interwar period. Fundamentalism was boosted by early twentieth-century religious revivals in the United States and incidents such as the Scopes Monkey Trial of 1925. Chapman Cohen and those at the National Secular Society sought interviews and published responses in magazines to compliment the books of Russell.⁴⁴ Eddington was an important voice in the BBC's first ever symposium on science and religion, in 1930.⁴⁵ Indeed, the more one explores his voice during this period, the stranger it seems that it is largely forgotten today.

40 Sir James Jeans, *The Mysterious Universe* (Cambridge: Cambridge University Press, 1930).

41 Bertrand Russell, *Why I Am Not a Christian* (London: Routledge Classics, 2004).

42 Sir Arthur Stanley Eddington, *Why I Believe in God: Science and Religion as a Scientist Sees It* (Girard, KS: Haldeman-Julius Publications, 1930).

43 A. Vilbert Douglas, *The Life of Arthur Stanley Eddington* (London: Thomas Nelson and Sons, 1957), 107.

44 See, for example, Chapman Cohen, *God and the Universe: Eddington, Jeans, Huxley and Einstein* (London: Pioneer Press, 1931).

45 *Science and Religion: A Symposium* (London: Gerald Howe Ltd, 1931).

Another important factor in the disappearance of the influence of both Eddington and Jeans in Christian apologetics around science and religion is the rise of C. S. Lewis. In postwar Britain, there was a desire for a new start in many fields, and Lewis became the leading popular Christian apologist. Whilst Eddington's work was forgotten by many, it certainly was not by Lewis, who refers to it in several of his writings. As Lewis' impact grew, it coincided with both the more silent later part of Eddington's life, where he published little, and the immediate aftermath of Eddington's death. Certainly, Lewis' writing is far more directly applicable and easier to comprehend than Eddington's in respect of religion.

Perhaps the greatest reason for sidelining Eddington is that natural theology has been thoroughly engrained in the Christian consciousness as the *de facto* approach to science and religion—or in defending faith against critics with scientific evidence.

Conclusion

In our present situation, Eddington's search for a better approach to the science and religion dialogue may be far more fruitful than the new revival of natural theology seen in philosophy of religion and popular movements such as Intelligent Design. Despite the nineteenth- and twentieth-century revolutions in physics and biology challenging so many traditional arguments for God, it is puzzling that so much of the field is reviving natural theology, when Eddington saw fruitful responses in his revolutionary context of interwar physics.

Perhaps the seeming lack of conviction in his writing is not as attractive as the reasoning of MPA. His emphasis on values and seeking over proofs and evidence is less attractive to contemporary Christian apologists than that of William Lane Craig's approach. But Eddington's approach does have clarity. He says,

I think it is something of the same kind of security we should seek in our relationship with God. The most flawless proof of the exis-

tence of God is no substitute for it; and if we have that relationship the most convincing disproof is turned harmlessly aside. If I may say it with reverence, the soul and God laugh together over so odd a conclusion.⁴⁶

Eddington's approach ends with a faith less disparate than one which is segmented over God's relationship with science and the natural world.

His Quakerism is seen as alien to the Evangelical faith that breeds MPA today. We argue that the faith Eddington presents is far more living and active than that presented by natural theology.

Eddington's God is present and engaged daily, rather than remote and rarely intervening. Despite this, many in the popular conversation over science and religion continue to celebrate the natural theology of William Paley and others, whose work outdates Eddington and whose approach carries the impression of repeated defeat in the past two centuries at the hands of advances in biology, among others. Eddington presents an entirely different and fruitful approach, in an era of immense historical significance. We suggest it warrants further consideration.

The authors report there are no competing interests to declare.

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46 Eddington, *Science and the Unseen World*, 43.

Book Reviews

Stavros Lazaris: *Le Physiologus grec, vol. 2: Donner à voir la nature*

Micrologus Library 77/2

Firenze: Sismel Edizioni del Galluzzo, 2021; 432 + xvi pages

ISBN 9788892901377, first edition, paperback

€85

On reviewing Lazaris' earlier volume on *Physiologus* ("natural philosopher"), in last year's *Christian Perspectives on Science and Technology*, I deplored the forgetfulness of contemporary Christians about this ancient book of science, the first of its kind. For this is, by all accounts, the oldest Christian scientific treatise, regardless of how peculiar it might appear to modern readers. Its first version, in Greek, dates to the second century, but successive editors added material to it even much later, in the Byzantine era. As to its peculiarity, this work, as Lazaris reminds us in this second study (pp. 14–15), tackles the items by moving from διήγησις (exposition, description) to ἐρμηνεία (interpretation), typical for the Christian intellectual tradition of Alexandria.

Specifically, the first step of the method, διήγησις, which draws on ancient treatises and anecdotal evidence, describes the characteristics of various animals, minerals, and plants, while the second step, ἐρμηνεία, brings to light their spiritual meaning through the lens of scriptural material (p. 15). Compared to modern scientific textbooks that do not include symbolic interpretations, *Physiologus* is clearly peculiar. It actually shows less interest in "describing the real behaviour of the various species," no matter the obsolete data on which it relies, instead focusing on the items "as moral or religious symbols" (p. 18). This is not the modern analytical science; this is a holistic approach to reality. I concluded my review of the first volume by highlighting useful lessons of *Physiologus*, of which one refers to the contemplation of nature. Granted, this lesson might not serve modern scientists in

their research. It could inspire them and their audience, however, to develop wonder at the natural world and to read this “other scripture”—to paraphrase Paul Blowers—for spiritual profit. This would work well for Christians committed to the contemporary scientific culture.

Scholars are not unaware of *Physiologus*, but study it within frameworks that most times present no interest for faith and science conversations. And even when historians of science discuss it (see Arnaud Zucker, “Zoology,” in *A Companion to Byzantine Science*, 2021, pp. 272–276), they ignore the accompanying illuminations, as Lazaris points out (pp. 25, 93–94). It is to the analysis of these illustrations, which make nature visible, as the subtitle says, that he turns in this second volume. He does so by examining thirteen Byzantine manuscripts of *Physiologus* (pp. 25–85), comparing the imagery found therein (pp. 89–308). This imposing book also includes a preface by Guglielmo Cavallo (pp. 3–12), a general introduction (pp. 13–22), a general conclusion (pp. 311–343), an exhaustive bibliography (pp. 345–410), 317 illustrations (amounting to 158 unnumbered pages, preceded by the list and the credits, pp. 411–419), and two indices compiled by Alexis Chrysostalis (pp. 423–432).

Lazaris examines the codices in detail. One of these illuminated manuscripts was discovered by him in Sofia, Bulgaria, in 1999 (pp. 38–41). The author systematises the findings by way of four tables of various length, of which the first two, quite short, list the available manuscripts chronologically (from the eleventh to the sixteenth century) and by the editorial stages they represent (the first recension, the second recension, and three mixed recensions). The last two tables, lengthy, compare the order of the sections in all thirteen codices and present the illustrated items alphabetically. This information is then distilled in the general conclusion, where the codices are treated from the viewpoint of their aesthetics and technical approach to the items (pp. 312–318).

Of particular interest is the thorough description and comparison of the illustrated items (pp. 103–289), which mostly depict terrestrial animals (excluding all domesticated ones but including several

imaginary ones, such as the gryphon, the siren, and the unicorn, taken for granted by the ancients and the medieval believers alike; pp. 101–102). These are accompanied by images of aquatic animals, insects, minerals, and plants. While the catalogue of *Physiologus* is poor, including only 63 items, both its text and the supporting illuminations bring to light the interest of the medieval editors and artists in the natural world.

Lazaris studies these images “in their historicity, plasticity, dynamism, and fertility” (p. 342) to understand the complex processes entailed by their production (p. 20). To illustrate the catalogue, Byzantine artists sought inspiration both in the *Physiologus* and in other textual and visual sources (pp. 293–295). Lazaris indicates the sources available to the artists (see, for example, pp. 93, 342), which differ from those on which the original text relies. He points out that, by drawing upon further sources, the artists produced a “visual exegesis” of the text (pp. 97, 290–291) and an interpreted reality (p. 302), a visualisation of nature. Sometimes, in the absence of models, the illustrators had to be imaginative (pp. 21, 300–301). Other times they attempted to depict the items within their environment (pp. 103, 109, 117, 133, 306, 311–313, etc.). Most times, they meant to generate “new layers of meaning” (pp. 97, 307), not to produce realistic depictions. The resulting illuminations tell a richer story than the text taken by itself. Nevertheless, the supporting images depend on the text to tell the fuller story (p. 291).

Lazaris’ second volume on *Physiologus* therefore is about making sense of illustrators’ awareness of the natural world (pp. 337–338) and of the interplay of text and image in depicting nature for Christian edification (pp. 98, 296–298). It establishes what scientific literacy amounted to among Byzantine Christians during the process of manuscript illustration and, dare I say, shows that these believers lived in a complex universe, including nature, not only transcendent realities. The analysis of text and image provides important insights into how reality and interpretation, as well as science, faith, and art, crossed paths within the intellectual world of Byzantine believers (pp. 89, 336–339, 342). As Lazaris shows in conclusion, both the text of *Physio-*

logus and the imagery of its many versions evolved through the centuries, in proportion to editors' and illustrators' awareness of the natural world. This is an inspirational story. It encourages Christians of any age, including our own, to continue the quest for understanding by engaging the available sciences from the viewpoint of their faith.

This erudite volume is meant for historians of culture and science, religious studies scholars, and historians of science and religion, to whom I wholeheartedly recommend it.

Doru Costache

ISCAST and the Sydney College of Divinity

January 2024

Christopher K. Knight: *Eastern Orthodoxy and the Science–Theology Dialogue*

Cambridge, UK: Cambridge Elements, Cambridge University Press, 2022; 74 pages

ISBN 9781009107761, first edition, paperback

AU\$33

Until recently, Orthodox Christianity has not shown much interest in the science–religion conversation, at least from the articulation of this field in Ian Barbour's 1966 classic, *Issues in Science and Religion*, and during the field's evolution thereafter (summarised by Knight at pp. 1–3 and referred throughout). As the reader gleans from the book under consideration, Orthodox impassivity about science and religion originates in different presuppositions from the Western Christian matrix of this field. In short, traditionally, Orthodox Christianity considers reasoning and research integral to the lifelong process of maturation of one's faith. Research and knowledge are as useful to the progress of faith as sound scriptural hermeneutic, asceticism, the practice of

compassion, and prayerfulness. But Knight, surprisingly, does not tackle this matter upfront, nor does he mention the fact that only very few Orthodox scholars embraced, alongside him, a career in science and religion. And this despite the worthy undertakings he lists, from the Russian philosophy of the nineteenth century to the funded research projects led by Basarab Nicolescu in Romania, in the 1990s, and by Efthymios Nicolaidis in Greece, from the 2010s to date, with the latter being the framework of Knight's own research towards the present book (pp. 4, 74; see pp. 3, 4, 38, 46–47, for other examples). To my knowledge, not many Orthodox participants in these projects define themselves as science and religion experts, although some of them are deft users of the tools of this trade. One wonders whether the traditional outlook of their tradition, as sketched above, is what prevents them from developing an interest in this field, and how productive this is against the backdrop of the conflict narrative. Anyway, Knight's little book tries a different tack.

Truth be told, Knight is the most significant Orthodox contributor to science and religion, others following at a distance. A convert to Orthodox Christianity and a priest, he is doubly trained, as astrophysicist and theologian. After a lengthy career in university chaplaincy and theological research at Sidney Sussex College, Cambridge, and as Executive Secretary of the International Society for Science and Religion, currently he is a Senior Research Associate of the Institute for Orthodox Christian Studies in Cambridge, UK. He has published numerous articles and book chapters, as well as three monographs, the most recent being *Science and the Christian Faith: A Guide for the Perplexed* (2020). I chose to mention the latter given that he refers to it as a counterpoint to the short book of interest here (pp. 5, 62). The two works discuss the same matters—namely, Orthodox Christian attitudes to science—but for different audiences, complementing each other. Specifically, while the 2020 monograph is aimed at the Orthodox grassroots—giving an elegant response to those who adopted the conflict paradigm, foreign to the Orthodox ethos—the scope of the present book is to translate the information for expert Western readership (p. 5).

It is this scope that explains why this book addresses only certain questions and not others, and why Knight's is "an Eastern Orthodox approach, not *the* Eastern Orthodox approach" (p. 2). In the absence of a consensus, he communicates the Orthodox attitude to science and religion from his viewpoint. And he does so skilfully, given his rich interdisciplinary experience. As a result, Orthodox readers whose awareness of science and religion is limited might puzzle over the author's approach (e.g., his discourse on divine action, a topic that does not pose difficulties to them), but not so the expert Western readers. The latter would readily understand matters such as critical realism (pp. 16–21), divine action (pp. 40–47), natural theology (pp. 5–16), naturalism and supernaturalism (pp. 47–51), theism (pp. 1, 26), etc. Other topics would seem closer to home for Orthodox readers, such as panentheism (pp. 34–40) and eschatology, the latter presented in trinitarian perspective (pp. 51–61). Nevertheless, appearances are misleading. Orthodox readers soon realise that Knight, in tackling familiar matters, brings into the conversation patristic classics, classics of science and religion, and a plethora of scientists. Western readers, likewise, find the grand masters of science and religion soldiering alongside patristics scholars, contemporary Orthodox theologians, and Orthodox philosophers and historians of philosophy.

One might wonder why Knight chose to invite everyone to the party. His rationale, again, relates to the scope of his book—one addressed to expert Western audiences but aiming to communicate what he considers significant about the Orthodox stance on faith and science. And so, at every step, known tropes become pretexts for conveying uncommon ideas. Because, as Knight points out, Orthodox Christianity sings a different song, as it were (pp. 2–3, 62–63). It conceives of philosophy, science, and theology as holding together, not in antagonistic terms (pp. 15–16); it believes in the suitability of concepts for conveying truths, but remains convinced that no language can exhaust reality, whether divine or cosmic (pp. 19, 21); it has a realistic view of fallen humanity, which cannot save itself by reasoning and researching when its spiritual aptitude fails, but which, in God's

grace and through ascetic reformation, can reawaken its *noetic* insight, namely, its capacity for transcending epistemological limitations and for experiencing reality directly (pp. 11–12, 14–15, 22–23); it holds the view that spirit and matter, natural and supernatural, intersect continuously within God’s bosom, within a God who is continuously active in and through the infrastructure of the world, so that it does not have to reconcile them (pp. 36–37); it proposes a Christological view of the creation (pp. 43–44, 46–47), with the Logos incarnate gesturing towards the shape of things to come, so that the nature of reality will be fully manifest only eschatologically (pp. 8, 32–34, 37, 46, 51, 58), regardless of our past, current, and future scientific discoveries and theorisations. No wonder, in this light, the staple of the conflict culture, creationism versus evolutionism, does not even feature in this book. It has no place within the Orthodox tradition.

This is heavy food for thought to chew, requiring a prolonged siesta to grasp it all. Knight explains everything and quotes the best sources, but does so unobtrusively, easing comprehension. There is no Orthodox triumphalism to his discourse. He proposes a different solution for the “blindspots” of science and religion (pp. 7, 62) from the viewpoint of his Orthodox background. But he presents this solution as an opportunity for relaunching the conversation as well as to invite other Christians to consider their own contexts, instead of going by the usual nondescript “religion” or abstract “theism” (pp. 1, 63). Implicitly, he extends the same invitation to his Orthodox confrères. But the most significant contribution of his book is having engaged relevant channels for translating Orthodox Christianity’s particulars for expert Western readers. This is a tour de force for which the author should be congratulated.

Doru Costache

ISCAST and the Sydney College of Divinity

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**Peter Harrison and Paul Tyson (eds.):
*New Directions in Theology and Science:
 Beyond Dialogue***

London and New York: Routledge, 2022; 220 pages
 ISBN 9781032146447, first edition, paperback
 AU\$82

So much has been written about the relationship between science and theology over the past two hundred or so years that it is hard to imagine that anything terribly new remains to be said on the matter. Yet as the title suggests, that is precisely the goal of this volume, and it is certainly thought-provoking, although I leave it to the reader to decide how much of its ideas are “new” (see below).

The volume springs from an international and interdisciplinary research project based at The University of Queensland, the home of its two editors. Apart from them, and Charles Taylor (McGill University, Montreal, Canada), all the authors are based in either the UK, Australia, or Norway. The absence of authors from the USA, where perhaps the environment has its own challenges, is interesting.

The central premise of the book is that contemporary science-theology *dialogue* is plagued with apparently insoluble problems that severely limit the possibility of genuine dialogue. Peter Harrison’s Gifford Lectures in 2011 (*The Territories of Science and Religion* (Chicago: University of Chicago Press, 2015)) attempted to reframe the interaction. This research project and volume might plausibly be seen as building upon that valuable work by further exploring the nature of these problems, their historical roots, and exploring ways to get around them.

What problems? A recurrent theme of the book is that the very categories of “religion” and “science” are themselves relatively recent inventions with often narrow definitions that have straight-jacketed how we think about their relationship. Another is that scholars today are too specialised and find it hard to bridge disciplines. When they do

talk to each other, science is often assumed to have an authority that theology lacks, and theology at best commentates from the sidelines rather than engaging on the playing field. Scientism often gets a free pass while theology is cast as fanaticism. All this assumes a conflict model of the relationship, rather than the three other models elaborated by Ian Barbour: independence, dialogue, or integration (*When Science Meets Religion: Enemies, Strangers or Partners?* (Harper San Francisco, 2000))

From a Christian perspective, such a state is less than optimal, but it is increasingly suboptimal from a scientific perspective as well. In the field of cognitive science (not discussed in this volume), for example, much fruitful research has arisen from engagement with non-western, non-secular, and non-modern traditions of thought. How might a more fruitful engagement between science and theology develop more generally in the future? A rich smorgasbord of innovative chapters provides a great deal of food for thought.

One class of solutions brings to bear relevant historical perspectives. Andrew Davidson reminds us that historically, this conflict is a relatively recent aberration, and Michael Northcott employs this history to offer an explanation for our desperate difficulty as modern people in dealing with the existential crisis of climate change. Theology can help temper the excesses of metaphysically reductive materialism that seem now to be hindering scientific progress. Nathan Lyons convincingly demolishes the central premise of Richard Dawkins' influential book, *The Selfish Gene*, which implausibly casts all human life and its apparent meaning and purpose as the insignificant accidental by-product of DNA replication. We can no longer pretend that scientific questions do not have moral or ethical dimensions—and theology is perfectly poised to address precisely these questions.

This cuts to the heart of one of the reasons for the conflict: scientists (not *science*, mind you, which is metaphysically neutral) make unjustified and unscientific assumptions. Theology (and philosophy, or theology using philosophy) has the resources to course-correct and lead to better science; that is, science that produces more accurate and

more useful results. Thus, Paul Tyson describes one way this might happen—a return to Aristotelian / Neoplatonist first philosophy as a much better way of interpreting scientific inquiry and thereby making more sense of the world. Knut Alfsvåg shows how Nicolas of Cusa (fifteenth century), Martin Luther (sixteenth century), and Johann Georg Hamann (eighteenth century) made cases against the reductionist materialism that arose with William of Ockham and co. in the Middle Ages. They provide a model not only for the Christian, but also for the scientist, to pursue knowledge and understanding more holistically, neglecting neither matter nor meaning.

Charles Taylor's Afterword presents a brief overview of the Axial Age (c. 500BC) as the framework for a discussion of modern western disenchantment (losing the sense of magic and hierarchy) and social unbundling (fractionating of life's belonging and activities). It ties many of the strands from other chapters together beautifully and left me (as ever with Taylor) with a far clearer and deeper sense of what has been going on all around me.

A second class of solutions is to look for avenues of engagement between *applied* science and theology. Simone Kotva points out that religions are still the largest transnational bodies in the world and therefore must be involved in serious scientific issues such as dealing with climate change. She goes on in the chapter to discuss an example of this—a climate change observatory in the Solomon Islands run by the Anglican Church together with the local community—faith-based citizen science saving the world. Keith R. Fox asks what it is that motivates scientific research, and researchers themselves. However pure the researcher's motives, the drive for profit constrains and dictates much funding research, replacing historically-earlier motivations such as wonder and piety. Dare we risk entrusting the power of science into the hands of a community with no overarching moral narrative? Scripture is capable of supplying just such a narrative, as illustrated by Tom McLeish and David Wilkinson's exegesis of the relationship between God and humanity found in Job and Colossians.

A third class of solutions addresses the perception of science and theology in the public sphere. David Wilkinson provides a balanced appraisal of the role that contemporary media can play in the relationship between science and theology. He points out the dangers, but also very persuasively highlights the positive potential. Sotiris Mitralexis provides a sobering assessment of scientism as a kind of “techno-religion” with its own eschatology whereby we seek to transcend *homo sapiens* and become our own divinities, Nietzsche’s *Übermensch*, or his heir, Harari’s *Homo Deus*, critiquing the latter in some detail.

As should by now be clear, the future envisaged here is *plural*: “new directions” ... “there is no one direction of travel, and no single path for the future of science–religion discussions” (p. 6). The appeal of many of the authors to healthier historical frameworks is a desperately needed remedy to the unhealthily constricted perspectives that abound today, but it does raise the question of what exactly it is that is “new” about the directions here sketched out. Perhaps it is their new solutions to new problems, such as Kotva’s Anglican citizen science? Or the sheer power to inform and persuade wielded by those who know how to use today’s media? Even Lyons’ elegant concept of the “inflation of nature”—“theologians sometimes expect too little of nature” (p. 79)—while a brilliant diagnosis of, and solution to, the problem, is ultimately a call to return to an *older* way of thinking about, and relating to, nature.

Then again, it is perhaps only one of those false modern assumptions that what is new must be better than what is old. It certainly was not considered thus in pre-modern times! The value of this volume is that it will make us modern readers think in ways that are new *for us*, and hopefully light a path forward that takes us sensibly back to the route we ought never have abandoned in the first place.

Antonios Kaldas

Coptic Orthodox Church; St. Cyril’s Coptic Orthodox Theological College

February 2024

**Denis Alexander and Alister McGrath (eds.):
*Coming to Faith Through Dawkins: 12 Essays on
 the Pathway from New Atheism to Christianity***

Grand Rapids, Michigan: Kregel Publications, 2023; 272 pages
 ISBN 9780825448225, first edition, paperback
 AU\$38

To describe this as a novel book is an understatement. Its title is enough to suggest that it will be provocative and stimulating. The idea that there are people who have come to faith through the writings of Richard Dawkins and those committed to debunking religion, is startling. But that is precisely what the writers of these essays are claiming. The New Atheists have caused them to move *towards* religious belief rather than away from it. If nothing else, these essays are deeply thought-provoking. They require some serious reading, but those willing to grapple with the ideas will find that a new world opens to them.

The stimulus for this book was the surprise of both editors when encountering people who told them that their pathway to Christian faith began with, or was influenced by, the New Atheists. This led the editors to discover that this was a far from unique phenomenon, and that people from diverse backgrounds were saying the same thing. This diversity emerges in these twelve essays as we encounter individuals from different countries, continents, and cultures, from backgrounds in science, the humanities, and the arts, in academia and business.

The titles of some of the essays give a feel for the topics and their diversity. These are: “From Dawkins to Christ via William Lane Craig,” “Hearing God through an enchantment with nature,” “An Afrikaner’s faith pilgrimage,” “*The God Delusion* and probability,” and “From lukewarm theism to committed faith.”

There is a commonality though, and this is that the writers’ conversion to Christianity is in all cases thoughtful and reasoned. I am inclined to say intellectual, but that may give the impression that

those conversions are cognitive and lacking in emotional and personal commitment. That would be unfair. The individual writers alike see clear reasons why the criticism of religion of people like Richard Dawkins can be rejected head-on and can be shown to be groundless and seriously misleading. In that sense they are illustrations of apologetics, even though this is not a description most of them are comfortable with.

All the essays have a personal element and paint a picture of how the writers moved from atheism to faith. This gives the essays a power they would have lacked had they been no more than descriptions of the respective arguments. These personal stories demonstrate the pull of atheism and the power of books such as Dawkins' *The God Delusion*, and the importance of Christian critiques capable of dissecting those books' arguments and throwing light on their weaknesses and inconsistencies.

However, it is not just the books that emerge as important. Dawkins' many appearances in the media and in debates were strikingly significant for some of the essayists, since it was in these that his strident and arrogant anti-religious assertions proved very annoying and exposed their flimsy base. Even more disturbing was his refusal to debate certain people especially the Christian apologist, William Lane Craig. Fascinatingly, this led some to start studying the writings of people like Craig, writings that they were to find far more satisfying than the writings of Dawkins and others such as Christopher Hitchens, Daniel Dennett, and Sam Harris.

The essays I found most helpful were those which articulated their examination of these writings and made clear what it was that they found helpful or distracting in the range of writings they were reading. There is a great deal of honesty in these essays, and this should help anyone seriously wrestling with the pull of atheism. Since they are so diverse the issues that emerge will prove relevant to a wide variety of readers.

Anyone reading the whole of the book from beginning to end will find that certain arguments and certain references are repeated. This is not a major criticism, although it is a point to note.

I have no hesitation in recommending this as a book for anyone prepared to grapple with serious issues at the border of atheism and Christianity. To see the transformation of some of these people's horizons as they find that a biblically based faith is so much more satisfying than the atheism propagated by Dawkins and his atheist friends is thrilling. It demonstrates that Christians have no grounds for being ashamed of their beliefs, since these beliefs can stand up to rigorous intellectual scrutiny. In these terms the book will benefit all Christians and not simply those troubled by atheism (and evolutionary humanism) in modern guise.

Despite its title with its reference to Richard Dawkins, it needs to be stated that the works of Dawkins do not feature equally prominently in all the essays. The strongest essays though are those that do engage with him and the writings of Hitchens and Harris.

Inevitably, all the essays will not appeal equally to any one reader. For me, a highlight was that of Australian historian Sarah Irving-Stonebraker: "Wrestling with life's biggest challenges." From a stable and loving home life, nurtured in academic pursuits and atheism, she grew up to accept that there was no need of a god. Fascinatingly, it was only when she was exposed to Christian thinking through her own academic work that she started to question her atheism. This was on the relationship between seventeenth century natural philosophy and the origins of the British Empire where she encountered the founders of modern science, including notable Christians, such as Robert Hooke and Robert Boyle. Here were some of the most important founders of modern science who saw no conflict between Christianity and science, and who took the Bible seriously. This was at odds with her atheism and with Dawkins' frequent assertions that the conflict signifies the death throes of religion. Another crucial figure to Irving-Stonebraker was Peter Singer with his stance that the innate preciousness and equal value of human beings is a Christian myth. This alarmed her since it

suggested that there are no objective moral values, and made her question why Dawkins is adamant about moral principles. From here, via C. S. Lewis and Scripture, she made her way to the God who loves her and to Jesus as the source of abundant and eternal life.

Having read this book, I looked back at a talk I gave in 2008 when the furore around *The God Delusion* was at its height. I was fascinated that I had pulled out most of the issues described by the writers of this book, but there was one I had missed. And this was the lack of any convincing foundations for Dawkins' values and the inconsistencies in his value system. These inconsistencies have become more prominent over subsequent years as his aggressive denunciations of anything religious have failed to cope with the ever increasingly murky debates at the interface of what we are as human beings and the extent to which this can be changed by social expectations and technology. The inadequacies of Dawkins' arid pontificating have come increasingly to the fore, as clearly demonstrated by a number of the contributors to this book.

D. Gareth Jones

University of Otago, New Zealand

February 2024

Nicholas Spencer: *Magisteria: The Entangled Histories of Science and Religion*

London: Oneworld Publications, 2023; 467 pages

ISBN 9780861544615, first edition, hardcover

AU\$52

Magisteria is a *tour de force*; an academic treatment of a vast array of issues at the interface of science and religion, written in a remarkably accessible manner. The reader, no matter what their background,

will get much out of it if they are prepared to commit themselves to a tome of around 400 pages. And yet it is the very detail that makes it what it is, as author Nicholas Spencer, a Senior Fellow at Theos (a Christian think-tank in the UK), untangles the many entangled currents at the intersection of science and religion. True, there are assumptions here, such as what constitutes science, let alone religion, his preference being the science with which we are familiar in the Western world and the Christian religion more than other religions (although Islamic science is seriously considered at various junctures).

Whatever anyone takes from this book, the one crucial message is summed up by the word “entangled.” As someone who writes repeatedly on bioethical matters, I have to remind people of the messiness of ethics at the intersections of scientific advances and Christian belief. It is no different in the broader reaches of the science–religion debates that Spencer deals with. Those seeking simple answers will be disappointed, but those looking for enlightenment will be largely satisfied.

There are four major sections: Part 1: Science and religion before science or religion; Part 2: Genesis; Part 3: Exodus; Part 4: The ongoing, entangled histories of science and religion. Some of the subtitles are fascinating, for example: “1543 and all that”; “How one goes to heaven and not how heaven goes”; “A barren Golgotha: the case of the brain”; “Breathtaking inanity: anti-evolutionism 2.0.” Part 1 encompasses the story from the classical world to 1600, when neither science nor religion had acquired their modern identities. Part 2 looks at the period in which modern science developed in the seventeenth and eighteenth centuries, during which European religion helped conceive and nurture the new philosophy. Part 3 deals with the nineteenth century, the time when science began to drift away from its religious roots and saw the emergence of the conflict myth. It was during this period that some believers balked at the increasing authority of science, while various scientists for their part overstepped their legitimate authority.

Part 4 brings us to the world of today with its ongoing debates centering on Freud, evolutionary biologists and genetic contributions to human nature, neuroscientists exploring brain-mind interactions,

and techno-utopians with their visions of possible future trajectories for human beings. Unfortunately, this last part is the least satisfactory since the detail that characterises the earlier parts is missing. The book is long enough without more detail, but it does mean that the contribution of religious thinking to current debates is largely missing. This is a shame since it would have demonstrated the way applied theological thinking is needed to restrain extremely powerful technologies with the potential to alter human function and undermine human relationships.

Underlying the relationship between science and religion is the question of authority, namely, who has the right to pronounce on nature, the cosmos, and reality? Is it self-proclaimed representatives of the church, or is it those with scientific expertise over aspects of the natural world? Illustrations emerge in one era after another: Baconian and Aristotelian scientists in the early modern period, creationist Protestants and eugenicist Darwinians in the Deep South, Galileo's view of the natural world over against the Vatican's theological assertions, professional scientists like Huxley and old-school natural philosophers like Wilberforce. And yet, as Spencer carefully points out in case after case, the well-known take-home messages are rarely as clear-cut as regularly portrayed. Frequently, there are subtleties and murky complexities that do not fit into neat science versus religion messaging.

The title *Magisteria* comes from the American palaeontologist, Stephen Jay Gould, who claimed that science and religion are "non-overlapping magisteria." For him, they are distinct fields that are to be accepted on their own merits. He was seeking to provide space for religion within a culture where religion in the form of anti-evolutionary fundamentalism was pitted against science expressed as evolutionary humanism. This was conflict at its most bitter, something that disturbed a scientific humanist like Gould. While appreciating Gould's intentions as a description of how science and religion should interact, Spencer concludes that when it comes to history, "the magisteria of science and religion are indistinct, sprawling, untidy and endlessly and fascinatingly entangled" (p. 11). This comes through repeatedly over

the years, as the following examples indicate. The riches of this book cannot be covered in a review like this. Hence, some highlights follow.

Spencer is at pains to argue that the Middle Ages (AD 500–1500) were not simply a time between the glories of antiquity and their resurrection at the Renaissance. To make his point he references Robert Grosseteste who combined scientific work with his ecclesiastical career. Interestingly, in recent years, the late Tom McLeish established the “Ordered Universe” project based on an interdisciplinary study of Grosseteste’s scientific papers. Back in the latter part of the thirteenth century Roger Bacon was one of Grosseteste’s disciples and made tentative steps towards experimental science in his work on optics.

The year 1543 stands out as a pivotal year for the emergence of science. Spencer does not agree that it signifies the birth of modern science, even though he does admit that it marked a paradigm shift in two areas. These were cosmology and anatomy, the domains of Nicolaus Copernicus and Andreas Vesalius, respectively. Neither, however, shook religious belief to its core. For some, heliocentrism was not of great concern, even if other theologians thought differently by attempting to side-step controversy with the suggestion that heliocentrism was simply a theory with no claim to reality. This was a way of avoiding a hostile literalism reaction, one that Spencer has no sympathy with. But these were dangerous times for heretics, and Giordano Bruno, who came after Copernicus, went much further with his speculations, entering dubious theological territory. His end was martyrdom, although he was probably a martyr for magic rather than for science.

As an anatomist I am fascinated by the lack of Christian interest in Vesalius, who revolutionised our understanding of human anatomical structure by dissecting dead human bodies rather than relying on concepts popularised by Galen of Pergamum (who had not dissected human bodies) in the second century. Somehow this does not seem to be regarded as an issue for science and faith, even as it raised the hackles of theologians and church authorities at the time. Spencer does not take up this issue. This surprises me because Vesalius and others in the sixteenth century demonstrated a true scientific approach with their

insistence on actual dissection and direct observation of the human body, over against concepts emanating from Aristotle and Galen.

As a neuroanatomist I have long been fascinated by phrenology, considered a means of detecting important elements of an individual's personality and cognitive capacities by examining the surface of their skull. This approach, now recognised as quackery, gained great popularity in the nineteenth century, when it was seen as a new scientific breakthrough. Spencer is helpful in following the influence of phrenology as a “scientifically” based approach to personal and social flourishing, which could help shed light on wider social and global issues. Phrenology, not religion, was thought to provide the true scientific picture of human character, intelligence, and morality. Religion was simply to affirm the moral lessons discerned from nature. Discussions of phrenology today rarely point to its materialistic associations or its grand vistas, nor to the religious antipathy to it in the nineteenth century. This was a science–faith conflict in which the science was seriously misleading, and the Christian concerns were entirely justified.

Spencer's analyses of globalisation are revealing because they paint a picture of early Protestant missionary activity and its relationship to science. For those missionaries, the more the mind is enlarged and strengthened by scientific pursuits, the better they were equipped to defend the truths of the Bible. The idea of a division, let alone a war, between science and missionary religion was anathema. For instance, William Carey the Baptist missionary to India, was a keen botanist and, when threatened with having funds withheld unless he focused solely on saving souls, responded indignantly that he had never heard anything “more illiberal.” In the same vein, the many medical missionaries displayed this close relationship between their religious and scientific vocations. One danger with this, as Spencer points out, is that science could be displayed as a badge of European intellectual and moral superiority. Science could also be used as a means of undermining indigenous religious beliefs. In other words, as in so many other instances throughout history, the relationship between science and religion must be treated with care and circumspection.

The conflict hypothesis of the latter part of the nineteenth century has assumed enormous prominence in the science–religion debates, owing much to Andrew Dickson White’s *A History of the Warfare of Science with Theology in Christendom*. However, as Spencer delves into a litany of other figures involved in these debates, it emerges that it was an Irish physicist, John Tyndall, who was instrumental in establishing the conflict metaphor by pillorying religion’s historic involvement in science. T. H. Huxley, long known as Darwin’s bulldog, was not actually known by this epithet during his lifetime and may not have been as rabidly anti-religious as frequently thought. What he did object to was unremitting theological dogma, dogmatic authoritarianism and papal authority, and their opposition to the notion of methodological naturalism. For Spencer, the last years of the nineteenth century have been reduced to a single narrative of uniform conflict rather than what they were: “the complex, colourful, ambiguous and hopelessly entangled histories of science and religion” (p. 313).

Spencer is a noted Christian communicator and yet he does not push his Christian stance in these pages. It is there if the reader knows what to look for. The notable feature of the book, however, is his even-handed way of covering the tensions as they come into sight throughout the centuries. He has not set out to fly any particular flag, but he has, in my estimation, attempted something more important, namely, a fair examination of the numerous forces at work around each of the science–faith debates. By approaching them in this manner he has been able to quash many of the simplistic messages touting an ingrained conflict between science and faith—an interpretation urgently needed in some of our churches. Science is a God-ordained means of understanding our world and it is the privilege and responsibility of Christians to use it for his glory and the betterment of his creation.

D. Gareth Jones

University of Otago, New Zealand

March 2024

Andrew J. Brown: *Recruiting the Ancients for the Creation Debate*

Grand Rapids, MI: William B. Eerdmans, 2023; 366 pages

ISBN 9780802874597, first edition, hardcover

AU\$49

This is both a scholarly and delightfully accessible text in historical reception. In this book, Brown throws a very helpful light on how the six days (hexaemeron) of creation have been interpreted at key points in the past two thousand years.

Brown is largely writing for a modern and Western audience, yet he gives carefully explained attention to some key Eastern theologians who are very important in the first flowering of hexaemeron theology in the Patristic era. Contemporary scientific thinking has distinctly Western and post-nineteenth-century signatures, and thus our understanding of past voices is situated within a predominantly Western and very recent scientific mindset. This makes it incredibly easy for us to misappropriate Patristic, Medieval, Reformed, and even early-modern theologians when it comes to science and creation. Brown's book is designed to make us aware of such misappropriation and to also enlighten us about the riches of our faith's long and vigorous heritage in theological reflection on Genesis 1.

Given our contemporary scientific mindset, one might think that readers are going to have very little interest in pre-scientific interpretations of Genesis 1, particularly when Brown's book focuses on the "figurative" versus "literal" axis of hexaemeron interpretation. But such disinterest would be a mistake. Brown's very accessible descriptions of great historical theologians on this highly important theology of creation passage of Scripture has much to teach anyone interested in science and creation today. In my experience, Christian lovers of science can be uninformed about sophisticated non-modern creation theology developments in the distant past, so Brown's book is a very helpful corrective of that lack. Readers who have come to

love history-of-science-and-religion scholars like Peter Harrison will recognise a very similar style of inquiry in this book. Indeed, Harrison blurbs the back cover in justly glowing terms and was one of Brown's doctoral supervisors.

The organising aim of this exercise in historical reception is to explore how high-profile pre- and early-modern theologians have recently been “recruited”—typically in a cavalier and anachronistic manner—by both literalist and figurative contemporary interpreters of Genesis 1. These recruitments are then used as putative authorised grips in the mud-wrestling pit of contemporary Christian science and creation disagreements. Brown thinks contemporary outlooks on the meaning of Genesis 1 can be greatly enriched by engagements with our pre-nineteenth century theological giants, but that they cannot be directly recruited for the particular set of “science and religion” problems that our current historical situation puts us in. In effect, pre-modern authorities allow us to see the peculiarities of how *we* interpret Genesis 1, by virtue of them *not* sharing our interpretive assumptions, and *not* sharing our natural philosophy and “religious” lifeworld.

The take-home message of Brown's book is that no contemporary treatment of scientific questions as interfaced with the hexaemeron, has any directly translatable relation to the interpretive outlook of hexaemeron theologies that predate Darwin. The ancients cannot be meaningfully “proof texted” as obvious allies in contemporary disputes.

For example, unpacking patristic thinkers, Brown points out that the nuanced “figurative” leanings of thinkers like Basil and Augustine are not grounded in a contest between age-long natural developmental processes and young-earth creationism. Rather, sophisticated ancients were drawn to an instantaneous theorising of creation entirely outside of time (as favoured by Origen, and as ambivalently attractive to Basil and Augustine) which then makes the six days in some sense figurative. It is also the case that the gnostic and Platonist outlooks of the early Christian world were richly mythopoetic, super figurative, creatively numerological, and spectacularly hermeneutically flexible in ways

that made a more literalist outlook almost necessary to preserve basic theological truths about the relation of God as Creator to the natural world. Modern natural history was not imaginable in these contexts, there were strongly competing natural philosophies (different sciences) among non-Christian intellectuals to start with (which Basil mocks), and modern notions of the autonomy of science from theology and philosophy were simply not imaginable. For these reasons, none of *our* “literal” and “figurative” concerns were remotely in view for patristic theologians. Brown goes on to show how the relation between scriptural theology and natural philosophy continually evolves in the Middle Ages through to pre-nineteenth-century modernity. But again, the concerns of theologians prior to our times have nothing to directly say to *our* difficulty in trying to reconcile *any* reading of Genesis 1 with modern (functionally materialist) secular naturalism and contemporary (methodologically atheist) accounts of natural history. And let us be disturbingly honest for a moment: perhaps there is no satisfactory deep reconciliation possible here.

There are reasons why both theistic evolutionists and young-earth creationists are likely to roll their eyes over a book on hexaemeron reception. Contemporary “figurativists” are certain that the literalists have an impossible understanding of Genesis 1 as literature, and a preposterous disregard for demonstrated scientific truth. Further, young-earth creationists are seen by theistic evolutionists as the chief Christian villains in the entirely unproductive and historically fabricated war of science against religion. On the other hand, contemporary literalists are certain that the figurativists have interpreted the straightforward revelation in the Scriptures to fit in with an interpretive outlook on nature defined by the Godless spirit of secular materialism and will do anything it takes to interpretively fit Scripture around contemporary scientific orthodoxy. It is likely that there is some degree of truth to both of these concerns. However, what we are still not doing is wondering—with the assistance of historical perspective—how the world *we* live in is shaping the way *both* “sides” understand the meaning of figurative and literal.

Brown's book is carefully descriptive. The manner in which the meaning of figurative and literal interpretations of Genesis 1 has experienced profound shifts in meaning and emphasis over the past two millennia is his only point of concern. Whilst he points out the contemporary misappropriation of past theological authorities on all sides, he himself takes no side. Personally—as a philosophical theologian—I always find historians a bit annoying in how they sit so primly on the fence as regards the major interpretive bunfights of our times. I am more than happy to actively leap into the *mêlée*. But it is a complex mess, and I can see things I am prepared to fight about on both contemporary figurative and contemporary literalist sides, but I can't sign up to either side in toto. This typically means no true team player for either side trusts me. But, if Brown is correct, both sides are almost certainly wrong about at least something, and interpretive frames are always shifting around and are usually (respecting the frailty of human knowledge) a matter of “make do” better or worse rather than a clean and decisive right or wrong. A bit more mutual regard for opponents, and a bit more nuance and recognition of genuinely hard problems, on all sides, would be beneficial.

When it comes to contemporary hexaemeron interpretation, I think this is much more complex than a choice between a scientifically sensible figurativism and a scripturally authoritative literalism. This complexity cannot be neatly side-stepped, as the significance of the hexaemeron to any serious Christian theology of creation is never going to go away. So, we still have some serious problems to identify (let alone solve) as we try and love God with all our minds when it comes to science and Christian theology, in our times. I think Brown's book is very helpful in understanding how hard our interpretive challenge is, and I recommend it highly.

Paul Tyson

The University of Queensland

April 2024

Stephen Ames: *A Strange Goodness? God and Natural Evil*

South Australia: ATF, 2024; 188 pages

ISBN 9781923006621, first edition, paperback

AU\$40

“As a theologically orthodox Christian, I live from the ‘good news’ of the vulnerable, yet invincible Triune God revealed through Christ” (p. x). So Stephen Ames states in the preface to this book. I have known him for some forty years—in theological education, as a parishioner, on the Cathedral Chapter, and as a fellow traveller in various causes.

Ames lives as he states, not least in the contested air of The University of Melbourne, where for two decades he shared with atheist scholars in teaching the unit “God and the Natural Sciences.” That is the fountain from which this book springs. So, what is it about?

“For many people, the problem of natural evil is a very significant obstacle to identifying with the God Christians worship,” Ames writes. Debate about how we cope with suffering—the *evidential* problem of *experienced* evil—has moved to the metaphysical level: the *logical* problem of *natural* evil. Could a loving, all-powerful deity create a universe such as evolution discloses, with the enormous waste and suffering involved?

The book has three Parts. The first clarifies the problem (Chapter I); the second offers a “solution” (Chapters II–IV); and the third, “Reality Checks,” responds to objections raised (Chapter V). A long Appendix “clarifies the idea of God in the problem of natural evil.”

A question often put is: “How could an all-good, all-powerful, all-knowing God create such a world as this?” Ames notes that, though this question begins from creation as we know it, a better approach is to start from the “omni-God” assumed in the question. A “theological moment” is needed on all sides: “The proper basis required is to argue *from* the idea of the omni-God *to* the kind of world we should expect that God to create. Without such an argument, there is no basis

for speaking about natural processes as ‘natural evils.’” This is the key point of Part 1 (p. 10).

This book’s distinctive contribution is spelled out in Part 2. This attempts “to offer an account of God as creator based on the idea of the omni-God, *without* using the scientific understanding of the universe and without concocting a theology to suit” it. What stands out is the exploration of how core aspects of mainstream Christian faith impinge upon the “natural evils.”

Drawing on Aquinas, Ames contends that what the *living* God creates is a *living* world, where “created things have the dignity of also being causes” to be fruitful and multiply. Since this world is finite, there will be conflict, waste, and suffering, as well as cooperation. Even so, “we should expect the life-producing processes should in some sense exceed the death-dealing processes.” In sum, God “creates a life-producing universe, which is better than only producing an inert universe, or a merely mechanically interactive universe or a chaotic universe.”

This undermines *logical* “natural evil.” But what of God’s *purpose* in creation? This “leads to at least three new developments: the creation of ‘persons,’ the revelation of God, and the ultimate ordering of the created universe.” Chapter III proceeds with a nuanced and careful exposition of this trio. First, God’s loving purpose includes coming into relationship with “persons” (on this planet, human beings). Secondly, divine self-revelation enables finite creatures to respond in love, and play our part in God’s ordering all things towards new creation (the third development). The discussion respects the important distinction between special and general revelation, as well as the (so often missed) equally important distinction between being finite and being sinful.

But the best is yet to come! Chapter IV “locates” this theology of creation in the complementary spaces of the natural sciences and of theology. Ames contests the claim that the former can explain everything by neatly asking how the existence of *inquirers* on planet earth can fit into such a materialist worldview. “Natural evil” is seen

as a way to understand, in evolutionary terms, the *penultimate* order of the universe. “A theologically grounded view of creation ... for *theological reasons* waits upon the natural sciences to tell us in detail what the *penultimate* order of the life-producing universe is.” Which also involves poets and artists ...

The insight of Christian theology (“special revelation”) is to see human persons as made in the image of God, revealed fully in Christ. In Christ God “opens” into creation and its suffering, raising Jesus as the first fruits of the *ultimate* order of creation. The cross shows that the “opening of the divine life to the whole creation is the costly, unbounded, love of the Triune God.”

An acute analysis of the Nicean and Chalcedonian dogmas follows; the fathers involved would have been amazed at how their work would help open ways of understanding God’s purposes in our age! Several “Reality Checks” follow through on this in Part 3 (Chapter V): how are matters such as changing entropy, asteroid collisions, or apparent divine recklessness, taken into account? Wisely, Ames does not seek to cover every issue in detail but shows enough to deflect the problem and allow his “solution” to stand.

A long Appendix outlines the development of classical theism from Plotinus, through Augustine, Anselm, and Aquinas to modern debates, engaging with questions raised by Ames’ students and more. Modern theologians considered range from Farrer to Mascall to Williams among Anglicans, from Barth to Gunton, to Moltmann to Zizioulas on the Trinity, and many more on the philosophy of science. Illuminating anecdotes tell of Galileo’s “two books” concept, how Charles Kingsley’s *The Water Babies* explored evolution, John Walton’s insights into Genesis 1, and more.

But do aspects of classical orthodoxy resist his conclusions? For example, how does the traditional emphasis on the incarnation as the remedy for human sin (*O felix culpa*) fit in? Again, the concept of God taking suffering onboard in costly love was opened up in the wake of World War 1 by Studdert Kennedy in particular. It is central to Ames’ thesis, but some will see it as distorting orthodox belief. And how might

insights into gender—human and divine—shape the discussion, which does not touch on these?

And what of the title? Ames explains it thus: “This is the strange goodness of God who has created a world worth dying for. Is it too strange to be called good, or too good to be true? What if it is true?” (p. 154).

This is a most significant book, inviting sustained engagement. The demanding nature of the subject, and Ames’ fairness, mean that it is a close read. Whatever their stance on the issues, academics in theology and the natural sciences will benefit greatly from working through it, as will thoughtful Christians and others. You can take a short-cut by reading the three “Preliminary Conclusions” Ames provides to Chapters II, III, and IV, but you will miss the richness of the argument. More, you will miss a model of Christian engagement with questions both perennial and contemporary.

Charles Sherlock

*Ridley College, Trinity College, University of Divinity,
Anglican Dioceses of Bendigo and Melbourne, Australia
May 2024*

Samuel T. Wilkinson: *Purpose: What Evolution and Human Nature Imply About the Meaning of Our Existence*

New York: Pegasus Books, 2024; 340 pages
ISBN 9781639365173, first edition, hardcover
AU\$26

Wilkinson is a professor of psychiatry at Yale University who brings his knowledge to bear in *Purpose* on the question of evolution’s ability to explain our nature, with particular focus on our social and individ-

ual need for meaning and relationships. He is a celebrant of nature's capacity to form our behaviour through evolution's constrained yet comprehensive ability. This is the best work yet for a popular audience in expositing evolution's formative process for our dual nature of selfishness and altruism, lust and love, aggression and cooperation, individual and societal needs, and capacity for freedom.

Except for some personal examples, Wilkinson is pulling together the work of scientists who have contributed to their disciplines from the past century and a half into an accessible book of moderate length. Evolutionary biologists, geneticists, sociologists, psychologists, and philosophers of biology have their voices succinctly integrated without the work becoming too dense, yet this is quality academic work that is fair to its subdisciplines.

The crux of his case begins with convergent evolution, with particular emphasis on the work of Simon Conway-Morris, at Cambridge. Wilkinson outlines convergence in sufficient detail to show the problems with viewing evolution as a mindless, unguided process that empties life of meaning. He keenly shows with his expertise how family and monogamy in human relationships can point to an evolutionary undergirding as the best for individuals and society.

Where Wilkinson excels in persuasion is his ability to balance across chapters the dual nature of the forces at work in selection: lust and love in our relationship formation, aggression and altruism in our social success, monogamy and kin selection versus our desire to pass on our genes at higher frequency, and the importance of cooperation in our survival against pure selfishness.

There is a strong balancing act born on comprehensive research that did not appear to leave any gaps in accepting the strength of argument from opposing voices.

Kin selection in particular is given a thorough examination at the centre of the book, with Wilkinson acknowledging the importance of the work of E. O. Wilson, who many regard as the founder of sociobiology, with the criticisms that have undermined many of Wilson's claims in the decades since the birth of sociobiology.

Sceptics to Wilkinson's claims may be keen to point out that for much of the book there is little need to posit God behind evolution. He states that "I often refer to 'nature' or 'evolution' as a force that has shaped, moulded, and affected our psychological capacities. If you'd like, you can substitute the word 'God' into these passages. To me, it's much the same" (p. 17). Then why posit God at all? However, Wilkinson brackets his work by emphasising convergence as a constraining, and even guiding force behind nature. Drawing especially on the research of Conway-Morris, he derides the narrative of randomness and chance in guiding both development and behaviour.

Psychology is used to critique the sociobiology of E. O. Wilson to show that "the way evolution has shaped our nature reflects the purpose and meaning of our existence" (p. 18). Narratives of nihilism as a result of the randomness of life are unfounded to Wilkinson, who draws on extensive research to illustrate that evolution is "constrained and guided by natural laws and higher-order principles" (p. 34). Our arrival at a human dependence for meaning, family, and purpose have evolved carefully and for collective reason. Rather than a social byproduct, or epiphenomenal emergence, the benefits of marriage and tight family units is no accident.

As the book develops, he leads us to appreciate that it is highly unlikely that evolution can be anything but theistic in its pointing us to the good life, concluding that "If God really intends for us to multiply, to replenish the earth, and to have joy in our posterity, then it's no wonder that a process such as evolution was used in our creation" (p. 232).

Whilst evolutionary biology can explain the origins of much of what makes us human in our behaviour and formation of societies, it cannot determine what is "good" as one still cannot get an *ought* from an *is*. However, here is where Wilkinson's Christian underpinning can make up the difference.

Wilkinson's championing of evolution as God's provision of purpose and meaning is compelling and should be celebrated for both its popular accessibility and depth of argument. In conclusion,

I welcome Wilkinson's contribution to the question of purpose and meaning in evolution as an exceptional and accessible offering and recommend it to all who wish to know more about the subject matter even without much prior knowledge.

Samuel McKee

Manchester Metropolitan University, UK

June 2024

Christopher Watkin: *Biblical Critical Theory: How the Bible's Unfolding Story Makes Sense of Modern Life and Culture*

Grand Rapids, MI, USA: Zondervan, 2023; xxiv + 648 pages

ISBN 9780310128724, first edition, hardcover

AU\$48

How keen are you on shopping? Sport? What shapes your vote? What makes you angry, exhilarated, despairing? In short: how does your worldview shape how you live?

Such questions are what this book is about. It was deservedly the Australian Christian Book of the Year for 2023. It speaks to the “late modern” world that western Christians inhabit, covering many fields of thought. Yet the author does not lecture but explores and offers resources. He can excoriate false ideas and attitudes—but out of a deep love for what God is bringing to fulness. For a *critical* theory, there is no rancour.

Christopher Watkin is Senior Lecturer in French Studies at Monash University, Melbourne, Australia. As a scholar, he knows Descartes, Marx, Nietzsche, Popper, Sartre, Derrida, and the like. As a Christian scholar, he engages the cultural analyses of writers such as Herman Dooyeweerd, Terry Eagleton, Jacques Ellul, John Milbank,

Paul Ricoeur and Charles Taylor. As a theologian, he makes excellent use of varied perspectives, notably Reformed (Cornelius van Til, Herman Bavinck, and John Frame), Anglican (Oliver O'Donovan, Richard Bauckham, and Sarah Coakley), and the modern martyr Dietrich Bonhoeffer. As a “mere Christian,” he delights in C. S. Lewis and G. K. Chesterton.

Behind the book lies a fresh reading of Augustine's *City of God*—the foundation work behind western civilisation. The first half of *City of God* is an empathetic critique of the culture of ancient Rome; the second takes a “grand sweep from Genesis to Revelation” as Watkin puts it. These halves are blended here, cultural critique woven across an analysis of the biblical story. This is what “Biblical Critical Theory” entails.

Watkin loves diagrams (“figures”): the 114 sprinkled across the book even have their own Table of Contents! These are often used to illustrate pairs of dichotomies (e.g., traditional versus modern, pessimism versus utopianism, sovereignty versus responsibility), but then shows how a biblically grounded analysis, called “diagonalization,” can “rearrange false cultural dichotomies” in creative ways (p. 15). But words are not neglected, since they shape how we see and interpret the world.

* * *

Watkin observes about his university life and Christian experience, “We are taught the ‘what?’ and the ‘why?’ but not so much the ‘so what?’” its relevance to life. So, he has penned “a book about how the whole Bible sheds light on the whole of life” (p. 2).

The book's structure is significant. The opening chapter is “Trinity” (Karl Barth would applaud!). Then come thirteen chapters on each Testament, with unusual balances in their contents. On the First Testament, ten chapters cover Genesis 1–11 which Watkin sees as crucial. The others are “Prophecy and Power,” “Prophecy and Cultural Critique,” and “Wisdom Literature” (brilliant)—but the “historical” books are omitted. On the New Testament, after six (excellent) chapters on Jesus,

from incarnation to ascension, eight chapters cover “The Last Days” and “Eschatology,” skipping Acts.

It is unusual that over half the book focusses on the opening and closing parts of the Bible. Watkin is not interested in “creationist” side paths, or “pie in the sky” waffle. Common questions are handled skillfully, but the focus is on how we are to live here and now. The foundations laid in Genesis 1–11 remain for us, living in the “last days” between Christ’s ascension and return, and, by appreciating both the “now” and the “not yet,” and both cultural and heavenly understandings of reality, we are called beyond a simple two-dimensional perception of reality to a more three-dimensional “parallax living” (pp. 477–492). Alongside the big issues of market economy, environment, globalisation, and more, Watkin responds to personal ones, such as the “go your own way” ethos of today’s world (pp. 570–573).

* * *

Two themes recur across this book. First, Watkin delights in the “super-abundance” of God’s grace and love, in contrast to the cramped ways of the world. Two letters symbolise this: n and u. The shape of the letter n, up then down, reflects the idea that we make offerings to the “gods”—money, fame, family, ideology, etc.—so that they might supply our needs. Such self-serving “religion” leads nowhere. The contrasting shape of the letter u, down then up, reflects God’s boundless grace, taking the initiative to call and empower us to live responsively and responsibly with money, fame, family, ideology, etc. (pp. 408–410).

Secondly, the “way of the cross” is seen as *the* ethos for Christian living, including church life. God’s power is “always expressed in and through love” (p. 51), love seen most fully in Christ crucified. Christian living thus means being “witnesses” (“martyrs”) to what God in Christ did, does, and will do (pp. 527–539). Such witness calls us to engage positively with the world God loves, to live in the light of the “new creation” towards which the Spirit is moving all things.

* * *

As I worked through this excellent book, I found two aspects to critique: gender and narrative. When speaking of individual acts, Watkin typically uses feminine pronouns: “The Christian ... is free *for* service of God and other people, commissioned by her Lord to love God and her neighbor as herself” (p. 451; Watkin’s italics). But masculine pronouns for God are so frequent that I found myself wincing. For example: “God ... finds identity in nothing greater than himself and in nothing outside himself. He reveals himself when he wishes and as he wishes. He does not say ...” (p. 261). Reducing (or eliminating) pronouns for God would help many readers.

Secondly, while Watkin emphasizes the importance of the Bible being in “story” form overall, he resists “metanarrative” to describe the Bible since this is “an explanation of the world that sits not on the surface of events but beyond (meta) the history it attempts to frame” (p. 368). Rather, “I prefer to speak of the Christian *mesonarrative*—from *meso*, meaning ‘middle,’ ‘between,’ or ‘amidst’ ... Christ appears in the midst of this world, dirty fingernails and all, to dwell among us” (p. 368).

Narrative thus lies at the heart of Watkin’s argument. However, there is little discussion of the historical books, Joshua to 2 Kings, and nothing on 1 and 2 Chronicles, Esther, and Nehemiah. In the New Testament, the missing book is Acts beyond chapters 2 and 17. This absence of reflection on narrative texts leaves a hole. A chapter tracing the story of God’s work overall from Joshua to Paul would consolidate Watkin’s thesis—and another 30 pages would make little difference!

* * *

This book is long—some 650-plus pages of some 500 words each—and its subject matter is solid. Long sentences are rare, and Watkin’s stories from life, films, and more, as well as his “figures,” illuminate the argument helpfully. But readers with little or no background in politics, philosophy, or theology will find it a challenge. Even so, I would hope that anyone who wants to learn will, with patience, gain much.

Let me make a radical suggestion: some readers may find it helpful to read chapters out of order. Start with the Preface on how Watkin came to write the book. Unfamiliar with “late modernity,” a key period for Watkin’s thesis? See Chapter 24, “The Last Days and Modernity,” followed by Chapter 27, “Eschatology and Identity.” Chapter 14, “Wisdom Literature,” would be good to be read next; it explores how the Bible’s sharp contrasts are responsibly used. Chapters 1 and 2, “Trinity” and “Creation” will then make a lot more sense. Chapter 17, “The Ministry of Jesus, Love of God, and Love of Neighbor,” and Chapter 22, “The Last Days and Parallax Living,” are the core of what all this means for Christian living. In sum: Preface, 24, 27, 14, 1, 2, 17, 22. The remaining chapters read in order will now make a lot more sense.

Each chapter concludes with an exercise and study questions that explore the chapter’s sections. These would suit a group engaging with serious questions—the Parliamentary Christian Fellowship in Australia’s capital, Canberra, comes to mind. A full bibliography, and indices on subjects, scripture references, and names, round the book out.

* * *

I have no hesitation in commending this highly significant book. It is particularly relevant to those—Christian or not—whose vocation touches public service, service industries, the media, church structures, and community involvement.

Charles Sherlock

*Ridley College, Trinity College, University of Divinity,
Anglican Dioceses of Bendigo and Melbourne, Australia
July 2024*

Nicholas Spencer: *Magisteria: The Entangled Histories of Science and Religion*

London: Oneworld Publications, 2023; 467 pages

ISBN 9780861544615, first edition, hardcover

AU\$52

This review complements an earlier review by D. Gareth Jones (pp. 304–309), an Opinion & Response article by Frank W. Nicholas (pp. 357–369), as well as a 2023 review essay by James C. Ungureanu (Vol. 2, pp.165–198 / <https://journal.iscast.org/cposat-volume-2/disentangling-the-histories-of-science-and-religion>.)

Readers of books on science and religion written for a general audience will recognise the name, Nick Spencer, as the author of *Darwin and God* (SPCK 2009) and *The Evolution of the West* (SPCK 2016), both written while he was research director at Theos, a Christian think tank in London, UK. Now risen to Senior Fellow at Theos and a Fellow of the International Society for Science and Religion, he has graduated from Nick to Nicholas, and written what the *Sunday Times* has described as “surely his *magnum opus*.”

The historical span of Spencer’s latest book is immense, from the ancient world to the present day, rich in detail and written with characteristic verve. Other reviewers comment on the sheer readability of the prose and the author’s capacity to fascinate his readers with illuminating detail and the sweep of his perspective. This reviewer was similarly engaged; for a book of its length (over 400 pages) and subject matter, keeping the argument moving along briskly is quite an achievement.

Spencer’s theme is that the supposed antipathy between science and religion is wildly exaggerated in the popular imagination and largely founded on myths. The reality is both more complex and more convoluted. That said, the myths are not total fabrications but rather distortions or partial renderings of historical encounters that were more subtle and multi-faceted than their re-telling has allowed.

When placed in historical context, the famous encounters between Galileo and Pope Urban VIII, Thomas Huxley and Bishop Samuel Wilberforce, and William Jennings Bryan and Clarence Darrow at the Scopes trial reveal a more complex entanglement of faith and reason than a simple clash of religion and science would imply.

The book divides its narrative into four parts. The first examines the pre-history of science as we now know it and traces the emergence of *scientia* and *religio* as separate but related aspects of human experience when “everyone worshipped god(s).” The second part, titled “Genesis,” describes the beginnings of modern science and the role of religion as midwife (assisting at the birth of science) and nursemaid (nourishing science’s progress through its infancy). The third part, “Exodus,” describes the coming-of-age of science as a professional and specialised pursuit in its own right, no longer the province of amateurs, and the rise of overt antipathy between those who saw science as a growing threat to faith and those who saw religious objection as grounded in obscurantism and wilful ignorance. The fourth and final part brings the discussion into the twentieth and twenty-first centuries, when the blurring of faith and reason has become, if anything, more marked with the emergence of quantum physics and artificial intelligence.

Towards the end of his life, the American palaeontologist, Stephen Jay Gould, sought to silence protagonists in an increasingly feverish science versus religion debate, waged among others by so-called New Atheists, by declaring that science and religion occupied “non-overlapping magisteria.” The intention was metaphorically to send each of the bickering parties to their own rooms, thereby silencing fruitless arguments over matters that neither had ultimate authority to adjudicate. Spencer acknowledges Gould’s good intentions in trying to defuse antagonism but concludes that history fails to support his characterisation. To the contrary, “the ‘magisteria’ of science and religion are indistinct, sprawling, untidy, and endlessly and fascinatingly entangled” (p. 11).

The entanglement arises, as Spencer explains, because science and religion both seek to understand the nature of the human

condition (who, or what, are we?) and each asserts authority in putting forward its perspective. Entanglement is inevitable if naive reductionism (“nothing buttery”) is to be avoided. Scientists are surely right to debunk “young earth” creationists but theologians are equally right to affirm that Genesis was not written, and should not be read, as a scientific account of the beginning of life on Earth. Similarly, religious adherents are surely right to question the idea that morality is just relative, as suggested by sociobiological explanations of the human condition. They are also right to point out the contradictions in attempts to balance the idea that biology determines our behaviour with the belief that we have the freedom to act against our own “selfish” genes.

There is as much to learn from Spencer’s detailed account of the engagement of religion and science as there is about the faith lives of individual scientists and the scientific (or proto-scientific) interests of people of faith. The twin “books” of nature and of Scripture appear to have influenced people on all sides of the various debates, sometimes in ways they themselves have less than fully appreciated. This too is further evidence in support of Spencer’s entanglement thesis.

One final point is that the book deals at some length with the early history of Islam and science, including the debt Western science owes to Islamic scholarship prior to the thirteenth century. Indeed, the words “algebra” and “algorithm” derive from the names of ancient Islamic scholars. There is also a brief discussion of the tension within Islam between the science of evolution and the Quranic explanation of life’s origins. The science–religion debate is not unique to Christianity, although Islam has proven, in Spencer’s telling, ultimately less conducive to the development of modern science than Christianity, a point apparently lost on those determined to demonise the Church as the enemy of scientific progress.

Magisteria is in equal parts enlightening, entertaining, engaging, and informative. It is especially recommended as a gift to non-believing friends who might have imbibed, often without realising, the commonplace view that science long ago displaced religion as the

authoritative source of knowledge on the human condition and that no scientist worthy of the name could sensibly think otherwise.

Ian Harper

ISCAST and The University of Melbourne

July 2024

Darrel R Falk: *On the (Divine) Origin of Our Species*

Eugene, Oregon: Cascade Books, 2023; 252 pages

ISBN 9781666757019, first edition, paperback

AU\$56

I read this book with increasing delight. Author Darrel Falk, a fellow of ISCAST, is now an Emeritus Professor, having taught biology first at Syracuse University followed by prolonged periods at each of two Christian universities in the US. He made the transition with the specific purpose of addressing the Evangelical Christian opposition to the Theory of Evolution and was able to exercise gracious persuasion in support of his teaching curriculum. As he points out in the introduction and demonstrates in the remainder of the book, the scientific specifics of human evolution open the door to “largely unexplored spaces that enrich our understanding of what it means to have been lovingly and purposefully created by God” (p. 3).

The book is not polemical, rather the author takes the reader on a voyage of discovery. Along the way, Falk refers to and quotes a wide, rich range of scholars, scientific and theological, from Augustine of Hippo to Charles Darwin, to Dietrich Bonhoeffer, Simon Conway Morris, and Richard Dawkins, including many citations from the 2000s and some from the 2020s. It is a scholarly work, distilled from a lifetime of research and reflection, but it is written for the general reader with an interest in biology, evolution, and theology.

Falk begins by presenting some evidence for the historical validity of the Christian faith, particularly the resurrection of Jesus. This then becomes justification for citing biblical material and Christian belief in the remainder of the book.

He explains that two genetic mutations were critical to the development of *Homo sapiens*. The first mutation resulted in dramatically increased brain size and the second in increased neural connectivity and slower maturation during childhood, with increased capacity for learning and sociality. These Falk describes in terms for the person with no more than high school level biology to understand, but those unable to grasp the detail can nevertheless perceive that a seemingly insignificant event had far reaching implications.

He then describes evidence, from cave art and figurines dated 40,000–60,000 years ago, of the first indications of imagination and awareness of transcendence. The latter, he proposes, had a top-down origin, with God taking the initiative, rather than occurring by a bottom-up process, from human supposition. He acknowledges that such a top-down process is inaccessible to science. This development comes with a greater self-consciousness and an understanding of the thinking of others, and as evolutionary biologists Ajit Varki and Danny Brower (in *Denial: Self Deception, False Beliefs and the Origins of the Human Mind*; New York: Twelve, 2014) have indicated, also awareness that death will be the fate of each individual. Varki and Brower realise that this awareness could be maladaptive and suggest that death denial, with or without an imagination of transcendence, allowed persistence of this feature. Probably anticipating perception of weakness in this hypothesis, Falk indicates that it is supported by many prominent evolutionary biologists but offers no further explanation. Falk himself has an alternative suggestion, which is that divine engagement conferred a promise of eternity. From Scripture, in support, he cites “Since the creation of the world, God’s invisible qualities, his eternal power and divine nature, have been clearly seen” (Rom 1:20, NIV).

Domestication of hominins is addressed in two complementary ways. The first is by following adaptive pressures on the expression of

neural crest cells. These cells reside just above the developing spinal cord of the foetus and influence the formation of face, skull, teeth, exterior pigmentation and adrenal gland. Softening facial features, reduction of skull ridges and smaller teeth are associated with domestication. Examples from animals and from hominin skulls are given. The second influence leading to domestication proposed by Falk is the work of the Spirit of God. Those communities responding to God's Spirit were characterised by "growing wisdom, humility and grace" (p. 154). With greater cooperation, less disputation and violence, more development and creativity occurred and more progeny were born. In addition, selective pressure would have resulted in further genotypic and phenotypic changes associated with domestication. This process could be the reason other groups of hominins died out and only *Homo sapiens* persisted.

In a chapter on providence, Falk discusses the "countless ... low probability, contingent events" (p. 186) leading to the emergence of our species, as recognised by evolutionary biologists. One of these is the development of the first eukaryotic cell (with mitochondria and nucleus) from the merger of two prokaryotic (bacterial) cells. Further, the emergence of placental mammals apparently occurred only once despite tens of millions of years of evolution in the separated land masses of Australia and New Zealand, and apes developed only in Africa despite the presence of monkeys in the Americas and Asia and lemurs in Madagascar. For this material he draws on work by J. Maynard Smith and E. Szathmáry (in *The Origins of Life: From the Birth of Life to the Origin of Language*, Oxford: Oxford University Press, 1998).

Given the importance of cooperation between mitochondria and the cellular nucleus and between organs in each organism, as well as in ecological systems, Falk concludes: "goodness is built into creation" (p. 210). Thus, the way forward is through love and behaviour that enhances the welfare of all creation.

Falk is clear that those biologists (and other scientists) who claim that our knowledge of evolutionary development demonstrates that God does not exist have a faulty philosophical position. He does

not make the parallel point that Christians perceiving the theory of evolution to be a threat to Christian theism are also suffering from a philosophical misunderstanding. In *On the (Divine) Origin of Our Species*, Falk has elegantly woven scientific evidence (from the Book of Nature) with Christian belief (from the Book of Scripture), and he has done so without claiming more than is valid for his suggestions of divine engagement, while simultaneously drawing on scientific evidence, which gives reason to praise the Trinitarian God of love. I highly recommend this book.

Kathlyn Ronaldson

Monash University, Australia

August 2024

Graham Buxton, Chris Mulherin, and Mark Worthing: *God and Science: In Classroom and Pulpit*

Reservoir, Victoria, Australia: Morning Star Publishing, 2018; 160 pages
ISBN 9781925208412, revised edition, paperback
AU\$25

The subtitle catches what this short book is all about: giving teachers and pastors tools to be true to faith in both God and science. The three authors are Christian theologians with scientific and educational backgrounds, and a passion for good science and sound theology.

So—does the book deliver? Before answering, a little more on the contribution of each author. Chris Mulherin (Chapter One) and Graham Buxton (Chapter Three) lay foundations through complementary surveys of the issues between “science and faith” (pp. 10, 43, even “science–faith debate” at p. 46). This latter phrase, however, is unfortunate, since—as Mulherin later shows in different words, and Chapter

Seven explores—science (or better, the scientific method) itself rests on faith assumptions.

Mulherin helpfully sketches nine issues in the relationship between Christianity (not just “religion”) and science. A key point is that the former is a worldview involving *meaning*; the latter focusses on *mechanism*. This highlights the distinction between science seen (wrongly) as a worldview—*philosophical* naturalism—and (properly) as *methodological* naturalism.

Buxton begins by giving four reasons as to why “those who are involved in pastoral ministry need to address the science–faith relationship” (p. 43): the significance of technology, media, apologetics, and what is positive in creation. Good stuff! A short survey of significant scientists who are Christian leads to a helpful assessment of three “models of the science–religion relationship” (p. 52): conflict, contrast, and complementarity.

Chapter Four (Buxton), “Integrating Science and Faith for Pastors and Teachers Today,” makes two main points: the importance of *beauty* in scientific discovery, and that science has limits, which calls for humility in its practice. These points are made beautifully, with Denis Edward’s work cited helpfully. A brief section on “Science and the Bible” quotes Billy Graham to ease Christian minds worried about evolution, but I found myself wincing at ancient peoples holding “a primitive worldview” (p. 71). Six suggestions for teachers and preachers conclude the chapter: useful, but they overlap with Worthing’s more “Australian” oriented insights in Chapters Two and Five.

The bulk of the book consists of four chapters (Two, Five, Six and Seven) by Mark Worthing, who has wide experience working in Lutheran schools in Australia and the USA, and in theological education. Chapter Two opens by contrasting the vast difference between the life settings of people in typical Australian congregations of today and a century ago. Worthing argues cogently for preachers to speak from the Scriptures into the life experience of today’s Christians, in which science-related matters are prominent. He takes examples from recent

discoveries about the beginning and end of the universe to show how theology can be helpful—or not!

The classroom is the focus for Worthing's contribution in Chapter Five. Writing from his own experience in Australia and the USA, he focusses on secondary education, where conflict around science is sharpest. The first half takes a welcome step away from the “usual suspects” to explore the resurrection of Christ in relation to issues in modern physics. The second half speaks directly, practically, and widely to classroom teachers, notably on curriculum issues in Australian public schools. Worthing is consistently positive: “the sciences are brimming with opportunities to talk about realities that transcend the material world” (p. 89).

Chapter Six is an excellent “Brief History” of science and theology. It would be an ideal text for Year 11 or 12 students to discuss, or a group in a church context. Worthing sketches three main periods in Western history: religion and science seen as united (pre-Renaissance); as complementary (from Francis Bacon on—and still in some quarters, notably Karl Barth); and regarded as in conflict (especially since Darwin). Worthing makes a strong case for moving beyond each position to a two-way conversation between them.

The assumptions behind science are the focus of Chapter Seven. The unhelpful ones that lie behind “folk science” and “folk theology” are exposed, and a sharp analysis made of the influence of Wittgenstein, Popper, and Kuhn on how science is perceived. These insights will assist teachers and pastors. But the long opening on the “how to” focus of education is not relevant, and pages 113–115 repeat 101–103 (which is where they belong).

The final—and longest—chapter is from Graham Buxton. This recaps the historical material, showing that Newton's mechanistic worldview is poor theology. But the focus is on recent decades: Polkinghorne's reading of the universe both from below and above is used to support a creative conversation between science and Christian faith. Quantum mechanics and Mandelbrot sets open out concepts of the Spirit, providence, emergence, and rupture in the “dance” of

creation—exciting stuff, as is the use of Proverbs 6:9 and John 12:24! The final section is a stirring call to ground all Christian reflection in the doctrine of the Holy Trinity. This is a wise chapter.

If I have one reservation about this book, it is that potential readers may needlessly be put off by the repeated explanations of its origins. The Introduction needs rewriting to focus on the book's *distinctive* contribution rather than its origins, while Acknowledgments can be an appendix. There are a few editorial slip-ups, such as incorrect page numbers in the Contents, and is the Introduction to Chapter Three really needed (pp. 42–46), or the first paragraph of Chapter Five (p. 76)? I urge ISCAST to do a third edition, taking these comments into account. Further, questions on each chapter will encourage groups to use it.

This short book's distinctive contribution to reflecting on God and science is its focus on teachers and preachers, in Australian contexts, a task it does well but could do better. That said, it offers readers with a wider interest practical and care-full insights into seeing science positively through Christian eyes. It is most welcome.

Charles Sherlock

*Ridley College, Trinity College, University of Divinity,
Anglican Dioceses of Bendigo and Melbourne, Australia
July 2024*

Patricia Weerakoon, with Robert Smith and Kamal Weerakoon: *The Gender Revolution: A Biblical, Biological and Compassionate Response*

Sydney, Australia: Matthias Media, 2023; 199 pages
 ISBN 9781925424973, first edition, paperback
 AU\$20

It is becoming something of an unfortunate cliché to note how contested discussions of gender and sexuality have become, and how much the landscape has changed in the last decade in Western democracies. It is territory that most Christians would feel ill-equipped to address, especially those who hold to a traditional theology and ethic of sex, sexuality, and gender. In this book Dr Patricia Weerakoon, a retired Christian sexologist, addresses these complex and fraught issues with the aim of equipping ordinary Christians to understand and respond to these issues—and more importantly—those who are struggling with them.

With the help of her son, lecturer and Presbyterian minister Rev. Dr Kamal Weerakoon, and Rev. Dr Robert Smith, lecturer in theology at Sydney Missionary and Bible College, Dr Weerakoon orients her readers to the social and cultural context of the discussion and presents a response that engages biblically and theologically with the relevant issues of sex, embodiment, gender, and identity. She does so explicitly from a conservative “heteronormative” evangelical perspective that engages openly and critically with the relevant scientific and medical data. In this she is largely successful, although I suspect that those who adopt a different theological framework would find many of her arguments unpersuasive.

Let me briefly outline the argument of the book before I note what I appreciate about it, as well as what I found problematic.

The book opens with a brief preface justifying the need for the book. While the concern for vulnerable people is clearly evident, so is a focus on cultural critique: “There is a war going on in Western culture, and gender is one of the chief battlefronts” (p. 3). One of the authors’

chief aims is to combat what they call “transgender ideology” and its damaging effects on young people. The first chapter, “A world awirl with words,” seeks to chart the nature of this ideology and its development with reference to how word-use shapes our imaginations. Chapter 2, “Who am I? Seeking the source of our identity,” traces this to a shift in cultural views of the nature of the self and of our identity. In contrast to a Christian notion that grounds identity in who we are as redeemed creatures, expressive individualism sees our identity as self-determined and inward. We are who we see (or feel) ourselves to be, and any contesting of that is illegitimate. The authors counter that with a redemptive–historical view of Christian identity, before moving in Chapter 3, “Harmony and Disharmony,” to an examination of the biology of sexual development, sexual attraction, and their relationship to what they see as the biblical view of sex. This binary view of sex, and what they see as its necessary expression in binary (but not stereotypical) gender expression, is the focus of Chapter 4, “Embodied and binary: Is biology destiny?” They recognise the reality of inter-sex conditions but see their existence as consistent with a binary view of sexed embodiment determined at conception. They also contend that the “transgender ideological” claim that changing the body is an appropriate response to the distress of gender dysphoria is false and damaging.

Chapter 5, “Desire, orientation, romantic love and choice,” addresses specific questions relating to sexual attraction. Weerakoon’s experience as a sexologist is evident in this chapter as she helpfully discusses the physiology and psychology of desire and orientation, as well as the important influence of character development and the will. It is particularly useful (if quite countercultural) to recognise that sexual desire is not an unstoppable force that must be released for psychological health. Weerakoon also notes that there can be a biological predisposition towards same-sex attraction—but given the complexities of attraction and desire, this does not entail that one might be “born gay.”

As is evident from the title, Chapter 6, “Gendered behaviour and transgender ideology: Biblical, biological and cultural views,” locates questions of gender in relation to a “transgender ideology.” This chapter makes some helpful points, including the reality of gender distress in children and young people, and that “gender nonconformity is not synonymous with gender identity confusion” (p. 123). They also argue that, while gender is necessarily grounded in biological sex and ought to be lived out in conformity with it, the Bible does not establish a rigid pattern of gendered behaviours—and certainly does not affirm our gendered stereotypes. The authors’ framing of their discussion of culture around what they call the “transgender ideology” shapes both the content and tone of their discussion in this chapter in ways that some people may find off-putting.

This tone continues in Chapter 7, reflected again in the title “The minefield of management.” Once again, there is a mix of helpful discussion (especially noting the disputed and fraught nature of the data on causation and management which references the [then interim, now final] Cass review’s critical evaluation of the care of children and adolescents with gender dysphoria in Britain), and unhelpful rhetoric. Both this chapter and the next, “How should we live? Responding with compassion and truth,” reject all forms of transitioning as unfaithful to God and harmful to vulnerable persons. While in my view they over-emphasise the evidence against the efficacy of transitioning (especially in adults), they do rightly note the irreversible nature of any medical or surgical intervention in children, and the associated problems of consent. Given the fluid nature of personal development in childhood and adolescence (especially around matters of sex and gender), the tendency to push early “gender affirming treatment” is indeed a matter of serious concern. A postscript and glossary deal respectively with the matter of what names and pronouns we should use with trans people and important terms.

I must confess to a clear ambivalence about this book. On the one hand, Weerakoon and her colleagues orient us to important cultural

shifts in late modern capitalism and the dominance of expressive individualism and its associated notion of an incontestable privately determined sense of self. As they note, this does reinforce the notion that my gendered sense of self should take priority over and be *expressed* in my bodily form—including the sexed appearance of my body. The book is also broadly informative and provides an accessible entry into the complexities of the biology and sociology of sexual development. Moreover, the authors seek to be compassionate in their response to individuals who struggle with matters of sex and gender, and strongly encourage their readers to do the same. This is to be commended.

On the other hand, while I am in broad agreement with their heteronormative ethic, I disagree with them on a number of important theological and practical details, especially in relation to whether transitioning might be an appropriate response to intractable distress that some people with gender dysphoria experience.

My biggest concern, however, is with the tone of the book. On (too) many occasions they adopt an unhelpfully adversarial tone, in part because of their desire to combat a pervasive “gender ideology.” Here are a few examples: “Only now, in the last decade or so, have we discovered ‘the truth’ about the human condition: that our bodies are essentially nothing more than clothes, which we can change if we don’t like the way they fit us” (p. 19); “... today we face a major problem: we have begun to manipulate and distort scientific truth and empirical research to fit the transgender ideological agenda” (p. 40); “... transgender ideology reverses hundreds of years of hard-won gains in the arena of women’s rights ... A biological man can declare himself to *be* a woman anytime he wants to—even while he has a penis, testes, and full male characteristics and functions” (p. 65).

While I would agree with (at least some of) the substance of the claims, and understand why they adopt that tone, it does not, in my view, serve them well.

Nonetheless, it is good to see a significant Australian contribution to this discussion and, so long as you understand both the tone and the intended audience of the book, it is well-worth reading. It will

inform and stimulate your thinking (even at points of disagreement) and, please God, help shape a faithful and compassionate response to people in need.

Andrew Sloane

Morling College, NSW, Australia

September 2024

Darrel R. Falk: *On the (Divine) Origin of our Species*

Eugene, Oregon: Cascade Books, 2023; 252 pages

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AU\$56

Despite its academic nature and many quotations, the book maintains an engaging and accessible tone, ensuring readers of all levels can grasp its content. The book has seven chapters, five starting with “The Origin of Our Species and...”, and includes a foreword by geneticist Philip Batterham, and afterword by biblical scholar Robert W. Wall and evolutionary biologist Cara Wall-Scheffler. Both fore- and afterword are essential sources of information and not to be overlooked. The foreword prepares the reader for the journey of human evolution with Christ in mind, and the afterword summarises the author’s argument. Fun fact on this last section: father and daughter, respectively.

Falk’s central thesis is that our species (*Homo sapiens*) originated as evolutionary theory describes but with the guidance of the Spirit of God. He explains the genetic evidence that links us with the rest of the primates. A simple mutation in our evolutionary history “significantly impacts the number of nerve cells (neurons) in the brain” (p. 63). However, our origin was not by chance. God guided this process. Falk explains the current theory of mind, which is the development of consciousness that makes us human. We can do science, art, religion,

and language as unique human features. This consciousness is the mind, a gift of God, which allows us to ask questions about God's creation. *H. sapiens* needed genetic and physiological traits different than other species to become the image of God. Falk guides us to several archaeological discoveries of hominids, depicting burials and paintings. Those could indicate the human soul's presence because these individuals imagined and depicted the afterlife or beings in their minds. Individual accountability for the sake of the group was crucial for the emergence of morality, which means a sense of understanding the difference between good and bad behavior that will affect the community. Falk describes this behavioral change as something such as "a garden-of-Eden-like experience for some period of time where individuals, under the guidance of the Spirit of God, were effectively policing themselves, holding each other accountable in a manner that was good for the group as a whole" (p. 209).

As dogs evolved from wolves through domestication, we domesticated ourselves, reducing aggressiveness, which was caused by genetic changes. Falks explains this process with the Baldwin effect, a driving evolutionary force started by a behavioral change. It is possible that when our behavior became more "friendly," human language evolved, and humans became more social and empathetic. An exciting example of genetics influencing our personality is found in individuals with Williams syndrome, who are hypersocial. It is possible to trace these genetic changes in vertebrate embryos. Mice mutations on the same gene as those with Williams syndrome have the same effects. The same mutation also differentiates wolves from dogs.

According to Falk, the Spirit of God guided our evolution using the Baldwin effect. God loved primitive humans, who became *H. sapiens* through a long cooperation process (p. 90). The sense of responsibility towards others and the choice of good and evil could be infused by God, as well as the perception of the afterlife, depicted in the first human burials at the beginning of our species. "Many of our unique human features —the basis for our success —may well have emerged because belief in the transcendental reality made death-awareness

tolerable” (p. 130). In this way, God could have been in those primitive human communities that showed love to one another. He states that not all individuals of *H. sapiens* responded to God’s Spirit. Still, those who did acquired the genetic change crucial to becoming humans. Then, the search for meaning came, which is typical of our species.

On God’s providence in the origin of our species, Falk goes as far as the asteroid that killed the dinosaurs and affirms that this event made it possible for us to exist now. If the asteroid had crashed in another part besides the Yucatan peninsula, the dinosaurs would have been here, not us. The low probability of our existence would be God’s providence. God is free to use natural laws or miracles to fulfill his purposes.

In my experience as a science educator in a Christian university, most of the young are open to evolutionary theory except for human origins. They can’t fit Adam and Eve with *Australopithecus* and other hominids. Falk recognises this puzzle, and he does not disregard the challenge it implies. Famous atheists in academia, such as Jerry Coyne, stated that “Christianity must be grounded in real historical events” (p. 42). Besides Christ’s resurrection lies the question of whether Adam and Eve were historical. If we brought faith into the discussion, Stephen Pinker’s definition of faith is “belief in the unreasonable” (p. 44). Falk rejects these scholars’ arguments as having a “perfunctory knowledge of [Christianity]” (p. 46). As John Walton said, Adam could be an “archetypal representative of us all” (p. 73). He also acknowledges the metaphorical language in Genesis 1–11 and Adam as a symbolic representative of the origin of sin, explained by the apostle Paul. Falk recognises the topics outside the science domain: love and goodness. However, they were crucial for forming *H. sapiens*, and we Christians state that God is love. Christians shall not deny science but bridge scientific findings with our Christian practice.

Falk states six principles “that brought our species into existence” (p. 159). I summarize these principles in this way: Love made some pre-human communities thrive because God is love; these communities came in communion with the Spirit of God. After several generations

of living with love as a standard (which could have been expressed in cooperation and reducing aggressiveness), genetic variation changed this community, and the Spirit of God originated humankind.

In summary: this book is a crucial milestone in the science-faith debate, touching the spiny subject of the integration of human evolution and Christian belief. Falk provides an excellent resource for understanding the origin of our species and solid arguments on how divine intervention was possible over the course of evolution. These arguments have many references to scholarly publications, which Falks quotes as support. There is no mention of young earth creationists or intelligent design apologists. This book will appeal to anyone curious about human evolution and to Christians striving to reconcile their Christian faith with evolutionary science.

Oscar González

Anderson University, South Carolina, USA

August 2024

Sandra L. Richter: *Stewards of Eden: What Scripture Says about the Environment and Why It Matters*

Downers Grove: IVP Academic, 2020; 168 pages

ISBN 9780830849260, first edition, paperback

AU\$35

In this book Sandra Richter, the Robert H. Gundry Chair of Biblical Studies at Westmont College in Santa Barbara, California, brings her considerable expertise as a Hebrew Bible scholar into conversation with her passion for Christian environmental ethics. She handles both sides of the conversation with both knowledge and (com)passion. In a field in which stridency so often prevails, hers is a voice of winsome wisdom and deep conviction.

The book opens with “Introduction: Can a Christian be an Environmentalist?” While this is not a live question in the circles I move in (nor, perhaps, for many readers of *CPOSAT*), it is a real and pressing question for many Christians, especially amongst evangelicals in the USA (Richter’s context, and primary audience). So, it is important to recognise the particular political context of US evangelicals, where right to life equals Christian and republican, environment equals liberal and democrat. Richter not only acknowledges that context, she also seeks to counter those assumptions—and does so with great effect.

Chapter 1, “Creation as God’s Blueprint” presents a clear account of Genesis 1 and 2. She demonstrates the way these biblical chapters show God as ordering a good and beautiful creation and entrusting stewardship to humans as vassals. Both that order, and its subsequent disruption due to sin, call for environmental engagement to be integral to our mission.

In Chapter 2, “The people of the old covenant and their Landlord,” she presents a lovely discussion of Deuteronomy’s instructions on the tithe and offering of firstfruits and firstborn as both worship directed to God, and a system of taxation and redistribution implemented by the divine suzerain. Torah’s presentation of Israel as tenants not owners of the Land, and instructions on Sabbath rest generate sustainable agricultural practices that sacrifice short term yield for long term productivity and intergenerational sustainability. This is all in striking contrast to the industrialised agriculture of the “green revolution” and its effects on the environment, a contrast she documents with devastating effect in relation to both the Punjab and the Mississippi delta.

In Chapter 3 “The domestic creatures entrusted to ‘adam,’” Richter provides us with an excellent discussion of ordinary animal husbandry in Israel, including the costly practice of not muzzling an ox while treading the grain in Deuteronomy 25:4. This concern for animal welfare, she argues, reinforced by the institution of sabbath for animals as well, highlights the evils of the appalling conditions of most

US (and some Australian) meat production (such as sow stall piggeries and battery poultry farms).

Chapter 4, “The wild creatures entrusted to ‘adam,’” extends the discussion beyond the immediate environs of local communities. Richter notes that subsistence communities of ancient Israel were small, relatively stable in size, and their agricultural practices presented no real threat to the rich wild ecology of the region. In contrast to the unfettered power of Assyria, Deuteronomy 22:7 shows concern for sustainable hunting (not taking both mother and young ...). It is telling that our effects on the landscape through urban sprawl and resource mismanagement resemble more the Assyrians’ exercise of despotic power than the care shown by the community of the covenant. This comparison is even clearer in Chapter 5, “Environmental terrorism.” She outlines how Israel’s engagement in siege warfare demonstrated a concern for sustainability (see Deut 20:19 and the command not to destroy food bearing trees) and is radically different to Assyrian (and other ancient imperial) “scorched earth” practices. Again, to our shame, the US deforestation campaign in Vietnam and its horrific effects in loss of productivity and toxic residue echoes Assyria rather than Israel (let alone Eden).

In Chapter 6, “The widow and orphan,” Richter turns her attention to social structures of ancient Israel, in so doing highlighting the plight of widows and orphans. The costliness of the gleanings laws for marginal households (Lev 19:9; Deut 24:21) thus accentuates the importance of this provision for widows, orphans, sojourners, and other marginalised peoples. The links to the way that environmental destruction most threatens marginal groups are obvious, as she demonstrates with horrifying stories (including from poor US communities). Tragically, the churches’ responses are very little and very late.

Chapter 7, “The people of the new covenant and our Landlord,” moves beyond the Old Testament and into the New. The apocalyptic texts of the New Testament are often evoked to invalidate any environmental concern—for it is “all destined to burn.” Richter rightly notes the background of the language of cosmic destruction in the judgement

imagery of the day of YHWH and apocalyptic symbolism, and so ought not to be taken literally. Moreover, they are balanced by both Romans 8 and the new heavens and earth of Revelation 21. No grounds here for neglect of the earth. This leads naturally into the final chapter, “How then should we live,” which closes the book with a clear and obvious call to action: ecology is part of our mission as God’s (new) covenant people.

All in all, this is a fine book. It is well argued, eminently readable, and informative both about the Scriptures and the world in which we live.

That said, it is not perfect. There are a few places where I think she overplays her hand. For instance, Deuteronomy 25:4 relates at least as much to a concern that the burden of providing energy for threshing and grinding ought to fall on the *user* rather than the *owner* of the ox (making sense of Paul’s reference to it in 1 Cor 9:9 and elsewhere). And given the role of draft animals in pre-industrial agriculture, sabbath rest for animals renders the means of tillage and transport out of commission (agricultural labourers can hardly do their job if their tractor and ute are sitting idle now, can they?)—thus reinforcing sabbath rest for the community. Despite my love of the Hebrew Bible, I also think she could have dwelt a little longer in the *other* Testament given her desire to persuade conservative Christians of their environmental responsibilities.

Nonetheless, the depth of her knowledge of Old Testament, archaeology, and ancient everyday life is impressive, and the contrasts between the implications of Old Testament law and contemporary practices are devastating. This is a book that will both enrich your understanding of the Old Testament / Hebrew Bible, and kindle or *rekindle* your passion to care for the planet and creatures entrusted to us. If you’ve somehow missed this book in the four years since it was published (as I had!), now is the time to remedy it.

Andrew Sloane

Morling College, NSW, Australia

September 2024

Paul Tyson: *A Christian Theology of Science: Reimagining a Theological Vision of Natural Knowledge*

Grand Rapids MI: Baker Academic, 2022; xiv + 208 pages

ISBN 9781540965516, first edition, paperback

AU\$35

Paul Tyson is a Senior Research Fellow at the Institute for Advanced Studies in the Humanities at The University of Queensland. Such a context involves ongoing engagement with the academic world beyond Christian theology, and this shows on every page of *A Christian Theology of Science*. It is an engagement shaped by the Western philosophical heritage, from Plato and Aristotle through Augustine and Aquinas to Kant, Descartes, Marx, Ricouer, and more. Tyson is acutely aware of what matters for Christian theology and how it engages with modern Western life.

Karl Kruszelnicki is one of Australia's best known science popularisers, and an effective one. Yet, Tyson's book shows why his—and many others'—perspective on “science and religion” is so unhelpful (for example, see Kruszelnicki's “Father of the Year” piece in *Good Weekend* of August 31, 2024, p. 22, link is paywalled). Seeing science and religion as running alongside one another, as Kruszelnicki does, is a false trail, Tyson shows. This perspective sidelines religion into the private sphere; then everything in the public sphere, including the sciences, operates around power rather than principle. Yet it is a path taken by well-meaning Christians such as Isaac Newton, one that keeps God at a distance from creation. What is needed, Tyson argues, is a Christian theology of the sciences, for the sake of both. This calls for reflection on the basic questions of knowing, meaning, and purpose. In this respect, Tyson's book recalls the work of Elizabethan philosopher-theologian Richard Hooker, which developed a Christian theology of society.

I concluded my review of Paul Tyson's earlier “popular” work, *Seven Brief Lessons on Magic*, by writing “More please!” This, his new

book, fulfils that request more than adequately. A key term is “first truth discourse”: what do I assume is true? As a disciple of Christ, I espouse a Christian worldview. But how different are my foundational—my “common sense”—ideas from society around me? What “first truth discourse” guides how I shop, work, invest, travel—and approach science?

In responding to this question, Tyson lays a reader-accessible base in the introduction and chapters 1 to 3, beginning with “The Difference between *And* and *Of*” in the book’s title. Chapter 1 gives “Starting Definitions” of science and Christian theology (faith grounded in the Nicene Creed). Chapter 2 explores how Christian theology is viewed through the three elements of the “Truth Lens of Science”: empiricism, rationalism, and physical reductionism. Chapter 3 brings these chapters together, highlighting the importance of distinguishing essence from existence, and laying “Theocentric versus Egocentric Foundations.”

The demand on readers grows steadily as the book progresses. For those with little philosophical background, I suggest that the last chapter (9) could well be read next. This reprises the technical topics addressed in the intervening chapters. The concluding position reached—one not free of ambiguity—is described as “A Confident and Uncomfortable Stance.” As an excellent example of living by faith, not sight, it is taken further in the epilogue, “The Future?” (love the question mark!). A glossary offers practical help to readers needing to have ideas (“pure matter,” “supernatural”) or terms (“teleological,” “voluntarism”) explained; it could well be read before chapters 4 to 8 are considered. A helpful index and bibliography round out the book.

From his engagement with the academic world beyond theology, Tyson explores three major issues in chapters 4 to 8: the history of the emergence of the empirical sciences (4 to 6); how we truly know something (7); and the importance of mythic truths, notably “Adam and the fall” (8). In what follows, it is impossible to do more than offer a terse outline of what are nuanced, engaging, and persuasive reflections.

The historical emergence of science is analysed with attention to the philosophical shifts involved and where they lead. Chapter 4 explores the three elements of the “lens of science” through the “Truth Lens of Christian Theology.” Particular attention is paid to “physical reductionism,” the idea—prevalent in the West today—that material existence is all there is. In a striking analysis, Tyson shows that its roots go back much further than Thomas Huxley or Richard Dawkins, to nominalism (William of Ockham) and the concept of “pure matter.” Chapter 5 follows up by considering the “Remarkable Reversal” from the 1870s in the relationship between Christian theology and the sciences. Chapter 6 looks ahead: what might thinking “After” science or “After” theology look like?

Knowledge grounds the sciences of every sort, as it does for Christian theology. But, as Descartes and Kant asked, on what grounds do we truly know something, rather than our impression of it? This involves epistemology, the philosophical exploration of knowing (I lost count of the number of times “epistemological” occurs!). Chapter 7—the longest—engages with this question from Plato and Aristotle through Augustine to Aquinas to the Enlightenment and onward. Particular attention is paid to the complexities involved in seeing things through natural and divine light. Tyson argues that, while empirical science had its origins in the “first truth” of Christian theology, these roots have been set aside in “Post-Victorian Science.” Solid reading but illuminating.

“Myths” involve more than fairy tales: they are the often-unarticulated sense of what lies at the base of social life. Though usually stable for long periods, they can change: as Tyson shows, the myth of “secular progress” that undergirds much environmental damage has faltered in the public mind. He takes up Ricoeur’s term “Mythos” to describe four “mythic archetypes” that shape what human societies assume lie underneath their common life: violence, the fall, tragedy, and exile.

But why all this seeming aside from the focus on theology of (and) science? Because a major myth of modern science is that suffering, harm, wrong, and evil are built into existence. Such a myth

reduces all relationships to power, leaves the universe without hope and meaning, and is impossible for Christian theology. Christian theology insists that sin, evil, and the like are intruders rather than intrinsic to creation, which is on the way to being healed and renewed in Christ. So, the “fall” described in Genesis 3—let the reader find out how Tyson understands this—must be taken with full historical seriousness. As I would put this in class, rephrasing Arius, “There was a then when sin was not.”

* * *

This is a groundbreaking book. It takes with full seriousness the theological questions around the sciences (and much else in the modern West). Tyson articulates an attractive blend of the wisdom of centuries with contemporary insights. He shows the philosophical and practical emptiness of “physical reductionism” that is widely presumed in Western cultures, not only in the academy but in social and mass media. Tellingly, a number of times Tyson notes how inconceivable physical reductionism is in the “first truth discourse” of Indigenous Australians (for example, pp. 92–93, 120, 152–153)—a gift that modern Australia would do well to receive.

But Tyson also puts up a stop sign against “conservative” Christian approaches to “science and religion” that effectively take Christ out of theology. The most significant aspects of Tyson’s work, however, are the positive elements sketched of a Christian theology OF science, and the stimulation they give to developing them further. A call to take up!

As an academic, Tyson is scrupulous in developing and documenting his thesis, and precise in using technical terms. This book addresses the academy, and is being well-received there, given the wide variety of back cover blurbs. It could speak to a wider audience, however, notably undergraduates in the sciences and theology, if repetitions and technical vocabulary were reduced. But this last comment applies in hope to Paul Tyson’s next book.

I have no hesitation in commending *A Christian Theology of Science*, not only to those involved in the sciences and theological work, but to anyone wanting to explore what “first truths” are shaping modern Western societies.

Charles Sherlock

*Ridley College, Trinity College, University of Divinity,
Anglican Dioceses of Bendigo and Melbourne, Australia.*

October 2024

Nick Spencer and Hannah Waite: *Playing God: Science, Religion and the Future of Humanity*

London: SPCK: 2024; 196 pages

ISBN 9780281090037, first edition, hardcover

AU\$40

Nick Spencer has become a valuable voice in the dialogue on science and religion in the past decade where he has produced several strong works (see, for example, the ISCAST journal *CPOSAT* reviews of his other recent work *Magisteria: The Entangled Histories of Science and Religion*). Hannah Waite has a PhD in divinity at the University of Aberdeen and is now in a postdoc at the University of Leeds where she is continuing to explore intersections of theology and mental health psychology. Her voice in this book is notable across the big ethical questions raised over emerging technology.

The book reviewed here focuses the dialogue on a more practical level on the question of what it means to be human in an increasingly technological future. As science advances in AI, genetic engineering, spacefaring, and other world-changing ventures, what will it mean to be human in that future? And what role will be left for religion to play?

Playing God is the best treatment I have read on this matter, and at only 196 pages I highly recommend it to all, regardless of background.

Each chapter is a miniature assessment of a current issue facing humanity arising from the effects of technology, with impressive detail and strong external referencing. Despite its strong academic style, these are all highly accessible for the layperson without a background in the subject. The scope of the issues covered is also impressive, including ventures into the political that many would shy away from. Mental health is covered as well as physical health, with Spencer and Waite drawing from psychology, sociology, theology, and philosophy, intersecting them with each other as well as with the science at focus in each chapter. Waite's background in psychology and mental health is put to strong use throughout, and this book is another example of the outstanding research that *Theos Think Tank* routinely produce.

The first chapter deals with the transhumanist quest for immortality. Several high-quality works have addressed this recently (particularly by Sandra Godde) but this is a great summary of the landscape, coupled with a quality theological response in a brief chapter. It sets the tone for the rest of the book that handily grapples with the ultimate question of what it means to be human from each science perspective, only to remind us that "single answers to the ultimate question of what a human is are almost always inadequate" (p. 192).

The chapters proceed through the search for extraterrestrial life, vaccination (and the anti-vaxx movement), human and animal personhood, AI, mental health, abortion, and finally gene editing. Ironically, given the title, "the familiar warning against playing god has no place in these debates" (p. x). The authors instead are concerned with the religious dimension of the scientific and technological conversations. The book contains the appropriate level of restraint and caution, looking to signpost and ask the right questions, rather than bring a specific theological position. There is great strength and wisdom to the restraint shown, and the narrower scope of this shorter book makes it an excellent contribution. Spencer and Waite have a habit of saying more with less words. The referencing is exceptional for those

that wish to explore further, and each chapter feels connected by the few, strong threads that tie the theme of the book together. This is all the more remarkable given that there is a useful amount of political research and wrestling in the book. The chapters that are more loaded with ethical questions (especially on vaccination and abortion in the USA) are more concerned with political theology and what is missing, rather than taking a side. The data is heavy and well researched, allowing the reader to make informed assessment of the points made without fear of being undersold.

Throughout the book, I was gladdened by the extent of historical referencing, use of classical philosophy, artistic analogy, and anecdote. The authors are well-informed and draw from their own extensive backgrounds. The work is brief but not dry.

From my own background in genetics and CRISPR-Cas9, I was particularly interested in the chapter on genetic engineering. I was satisfied with how Spencer and Waite framed the chapter in saying “The question is not so much about whether or not we should ‘play God,’ but more what kind of god we should seek to imitate” (p. 171). Genetic engineering is here, and we now live in a CRISPR world. No one is going to put the genetic genie back in the bottle, and Christians must not be the voice shouting against medical and technological progress. What sort of research is ethical and necessary, and where should the lines be rightly drawn? The analysis I was hoping to find was well addressed, including the He Jiankui affair in China, the spacefaring prospects for colonising Mars, and the latest research in military and health benefits.

I found the book to be fair, to adequately summarise each discipline, and to ask the right questions. For a book of less than 200 pages, I see this as an essential contribution to the science–religion dialogue on what it means to be human both now and in the future.

Samuel McKee

Manchester Metropolitan University, United Kingdom

November 2024

Opinion & Response

Response by Paul Tyson to Antonios Kaldas' review of *New Directions in Theology and Science: Beyond Dialogue*, edited by Peter Harrison and Paul Tyson

Paul Tyson

As one of the editors I am most appreciative of the Very Rev. Dr Antonios Kaldas' thoughtful and constructive review of *New Directions in Theology and Science*. To have the book so carefully and constructively read by such an intelligent and informed interlocutor is a delight from this editor's point of view.

Even so, there are two small points I would like to make by way of a response.

Dr Kaldas' central point—that many of our contributors are actually trying to do something old, rather than something new—is something I agree with entirely. But, of course, trying to do something old in a new context is still a new direction if nobody else is trying it. Many of the volume's contributors are wondering out loud if metaphysical theology, appealing to some of the patristic and medieval masters of our Christian theological heritage, and appealing to Milbank's powerful analysis of modern secularism as itself a theological construct, can be critically interfaced with the contemporary sciences. This leads to the second point.

There are a range of views in the volume, some very affirming of a sympathy between modern science and biblical, patristic, and

Dr Paul Tyson is an Honorary Senior Research Fellow with the School of Historical and Philosophical Inquiry at the University of Queensland. He works across philosophy, theology, and sociology. He has been working in the “science and religion” domain for the past decade, and recently coordinated the “After Science and Religion” project with such contributing luminaries as John Milbank, William Desmond, Peter Harrison, and Charles Taylor. His most recent book in this domain is *A Christian Theology of Science* (Grand Rapids: Baker Academic, 2022).

medieval understandings of the meaning of creation and knowledge, and some more critical. But I would not describe those critical voices (such as myself) as representative of Barbour's conflict paradigm. As useful and domain enriching as Barbour's Science and Religion models of independence, dialogue, integration, and conflict were, *New Directions* is not prepared to assume that any of these models can genuinely progress the "science and religion" domain now. As Dr Kaldas indicates, once one can no longer believe that "science" and "religion" are natural kinds, then Barbour's models no longer adequately describe the sort of complex and ever moving relationship between the broad church of contemporary Western natural philosophies (the sciences) and the broad church of living Christian theologies. Which is to say that Peter Harrison's work in exploding the conflict myth historically, and his work in exploding any natural kinds understanding of what science and religion "are," requires an entirely new approach to the "science and religion" domain. Even if some of *New Directions'* theological approaches to natural philosophy are critical of the widespread methodological and metaphysical assumptions embedded in the theory and practices of contemporary science, this is not a "science and religion" conflict problem if we no longer hold that science and religion themselves can be usefully defined into separate models of interaction (friendly or not) or non-interaction. How can we do "science and religion" scholarship after dropping essentialist and delineated definitions of science and religion? This is not a conflict question as this is a question outside of Barbour's four models.

I think Harrison's work forces us to acknowledge that relationships between our understanding of high meaning and the natural world are always intimately and inextricably entwined. This being so, we have to start thinking outside of the contained boxes of trans-historical, neatly separated, and conveniently definable Science and Religion. This is quite frightening, as we have become accustomed to those boxes as dependable and ordering features of our lifeworld. And I must say that trying to think *after* Science and Religion was decidedly more challenging than I had anticipated. And even if we can

succeed, this does not mean that there is no use for these boxes, and it does not even mean that it would be possible for us to do without those boxes, in at least some regards. But Harrison's insight does mean that the post-Christianisation of the West that has followed the territorial separation of Science from Religion—and the evolution of their mutually exclusive definitions—from roughly 1870 to 1970, does not leave us at a stable destination. *New Directions* is trying to conceptually name and theologically address our present instability, and it is a very provisional and exploratory attempt to so do.

It is also the case that conflict is complicated. The “myth of conflict” is now deeply integral with the de-Christianising educational formation of our pragmatic and functionally materialist lifeworld. This myth has no basis in history, but it remains a motherhood truth of our modern (and postmodern) secularised intellectual culture. There remains a live need to combat the conflict myth (nota bene, this combat is itself a form of conflict) by organisations such as ISCAST. But, I would argue, it is also the case that Christians have become overly scared of any sort of first order conflict with the secularising worldview that uses science as an ersatz and assumed anti-Christian theology. The twentieth-century battle between fundamentalist materialist Darwinians and fundamentalist six-day creationists is pretty well spent (thank God!), but that was always something of a sideshow to the relentless scientistic de-Christianisation of the West in the twentieth century. Scientism really has been the means of culturally transforming the West away from publicly accepted Christian assumptions. Lovers of science who are Christians should stop pretending this hasn't happened. We need to be mature enough to not have to continuously display how much we accept the authority of modern science so that we can display ourselves as credible modern Christians.

As an explanatory addendum, the absence of US voices in the *New Directions* volume was not by design. We initially had 24 contributors to the “After Science and Religion Project”—including a number of Americans—so there were three edited collections that came out of the project, the other two being *After Science and Religion*, edited by

Peter Harrison and John Milbank (Cambridge University Press, 2022), and *Astonishment and Science*, edited by Paul Tyson (Cascade, 2023). There are five internationally reputed contributors from the USA in these other two volumes (David Hart, D.C. Schindler, etc.). Rev. Dr Robert Brennan kindly reviewed the Cambridge volume for *CPOSAT* last year, but if anyone wishes to review the *Astonishment and Science* volume as well, then *CPOSAT* readers will have a full view of the project outputs in the edited collections. The monograph of the project is *A Christian Theology of Science* by Paul Tyson, which is the subject of a special review feature by the journal *Modern Theology* later this year, with extensive review essays by John Betz, Peter Harrison, Michael Hanby, John Perry, and Simon Oliver.

Coming to Terms with Irreconcilable Magisteria: Reflections on Nicholas Spencer's *Magisteria: The Entangled Histories of Science and Religion*

Frank Nicholas

Readers of this journal will be aware that James Ungureanu has written a very detailed and informative commentary on Nicholas Spencer's book *Magisteria: The Entangled Histories of Science and Religion*;¹ that D. Gareth Jones has written a thoughtful review of the book, describing it as a “tour de force”² that provides “a fair examination of the numerous forces at work around each of the science–faith debates”;² and that Ian Harper has also written a thoughtful review, describing the book as being “in equal parts enlightening, entertaining, engaging, and informative.”³ Here I offer some reflections on some of the issues raised in *Magisteria*.

Despite the book's dustjacket declaring in bold uppercase, THE SO-CALLED WAR BETWEEN SCIENCE AND RELIGION IS A MYTH,⁴ Spencer actually takes a far more nuanced approach (as Jones and Harper mention in their reviews). Indeed, Spencer aims to show that

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- 1 James C. Ungureanu, “Disentangling the Histories of Science and Religion,” *CPOSAT* 2 (2023), <https://doi.org/10.58913/CCFT3672>.
 - 2 D. Gareth Jones, “Nicholas Spencer: *Magisteria: The Entangled Histories of Science and Religion*,” *CPOSAT* 3 (2024), <https://doi.org/10.58913/VVHI5786>.
 - 3 Ian Harper, “Nicholas Spencer: *Magisteria: The Entangled Histories of Science and Religion*,” *CPOSAT* 3 (2024), <https://doi.org/10.58913/CKUL7893>.
 - 4 Given the very clear implications of this dust-jacket quote, it is ironic that in *Magisteria*, Spencer actually perpetuates a myth (p. 242), namely that the rooms occupied by Darwin in Cambridge were previously occupied by William Paley. Darwinian scholars (present author included) would love this to be true, but there is no evidence for this claim (John van Wyhe, *Darwin in Cambridge* (Christ's College, 2009), 30, https://darwin-online.org.uk/converted/pdf/2009_van_Wyhe,_Darwin_in_Cambridge_A2973.pdf).
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Frank Nicholas is a retired geneticist in the Sydney School of Veterinary Science within The University of Sydney. He has an interest in the relationship between science and religion. In 2018 he wrote an opinion piece in *CPOSAT* on the book by Jonathan B. Losos, *Improbable Destinies: Fate, Chance, and the Future of Evolution*.

“The ‘magisteria’ of science and religion are indistinct, sprawling, untidy and endlessly and fascinatingly entangled.”

Consistent with his aim, Spencer’s major conclusion is that “There is no merit in demolishing one simplistic and unjustifiable narrative—of constant conflict—only to replace it with an equally simplistic and unjustifiable narrative of constant amity” (p. 6). In other words, Spencer concludes that it is “simplistic and unjustifiable” to argue that there is constant harmony between science and religion.

In the next paragraph, he gives examples of the lack of harmony, that is, the presence of conflict between science and religion. His examples include “The Catholic Church did threaten Galileo with torture,⁵ prohibit his books and ban teaching of heliocentrism for nearly two hundred years” and “Darwin was roundly attacked by many Christian correspondents, including many clergymen. ... And today, millions upon millions of Protestants reject Darwinism, as do an increasing number of Muslims.” Here Spencer clearly provides examples of conflict between religion and science, in the past and in the present.

This is a particularly important message from Spencer, especially for organisations that expound harmony between science and religion.⁶

5 Spencer does not actually cite the evidence for this claim in *Magisteria*, but there is convincing evidence, for example Maurice A. Finocchiaro, *Retrying Galileo, 1633-1992* (University of California Press, 2005), 11; and Henry Ansgar Kelly, “Galileo’s Non-Trial (1616), Pre-Trial (1632–1633), and Trial (May 10, 1633): A Review of Procedure, Featuring Routine Violations of the Forum of Conscience,” *Church History* 85 (2019), 724–761, <https://doi.org/10.1017/S0009640716001190>.

6 One of the aims of Christians in Science is “To support churches by helping congregations appreciate the harmony of science and faith,” <https://www.cis.org.uk/aims/>; “BioLogos invites the church and the world to see the harmony between science and biblical faith,” <https://biologos.org/about-us/what-we-believe> (This quote featured on the BioLogos website in the early months of 2024. At the time of publication of this document (early 2025) that quote is no longer on the BioLogos website. However, in late 2024 the website does state that Francis Collins’ book *The Language of God* shows “that science is not in conflict with the Bible”; <https://biologos.org/about-us#our-history>); Part of the mission of the Society of Catholic Scientists is “To witness to the harmony between the vocation of scientist and the life of faith.” <https://catholicscientists.org/about/>.

On page 7, Spencer makes the very important point that there are two major themes underlying situations where there is conflict between science and religion, namely 1) authority “to pronounce on nature, the cosmos and reality,” and 2) “the nature and status of the human.”

In the case of Galileo, religious authority won out (for the first few hundred years) because of the Church’s authority: it could threaten witnesses with torture; it could ban books because they contain what we now call scientific understandings that were judged by the Church to be inconsistent with religious understandings; and it could prohibit the teaching of certain topics. We must, of course, appreciate that there is context to every historical fact; that nothing in human history happens in a vacuum. In Galileo’s case, as has been well documented by Spencer in *Magisteria* and by others,⁷ the whole saga unfolded in the context of the Reformation, in which the Catholic Church was under substantial pressure from outside forces claiming the right to interpret the Bible in their own way; and Galileo was in many ways his own worst enemy, even to the extent of offending the Pope in print, and stretching the truth to breaking point if he felt it would aid his career.⁸

Nevertheless, as the seven Cardinals who signed the official 1633 indictment stated:

We say, pronounce, sentence, and declare, that thou, the said Galileo, by the things deduced during this trial, and by thee confessed as above, hast rendered thyself vehemently suspected of heresy by this Holy Office, that is, of having believed and held a doctrine which is false, and contrary to the Holy Scriptures, to wit: that the Sun is the centre of the universe, and that it does not move from east to west, and that the Earth moves and is not the centre of the universe: and that an opinion may be held and defended as

7 See, for example, Peter Harrison, “Interviewing Prof. Peter Harrison: Science and faith have a complex relationship.” Interview by Chris Mulherin, ISCAST, August 16, 2017, <https://iscast.org/interview/peter-harrison-interview/>.

8 Michele Camerota, Franco Giudice and Salvatore Ricciardo, “The reappearance of Galileo’s original Letter to Benedetto Castelli,” *Notes and Records (The Royal Society Journal of the History of Science)* 73 (2019), 11–28.

probable after having been declared and defined as contrary to Holy Scripture.⁹

As pointed out by Finocchiaro,¹⁰ it is important to notice that Galileo is here pronounced guilty of being vehemently suspected of two heresies: 1) of believing and holding a doctrine that is false and contrary to Holy Scripture, and 2) believing that it is reasonable to promote an opinion that is contrary to Holy Scripture. Although most attention has been focused on the first suspected heresy, the second one is actually more relevant to the present discussion, because here the Catholic Church was declaring that Holy Scripture can be the sole determiner of whether an opinion can be held or not held. In other words, the only acceptable understandings are those that are consistent with Holy Scripture. As if to drive home this key point, the 1633 indictment mentions “contrary to Holy Scripture” eight times.

This point about authority, so central to Spencer’s arguments, was addressed by the Catholic priest Father George Coyne S.J. (Director of the Vatican Observatory from 1978 to 2006, and a member of Pope John Paul II’s Galileo Commission¹¹), when he wrote “history continues to show that the differences between authority in the Church and authority in science are persistent.”¹² Having studied the Galileo case in great detail as a Catholic insider, Coyne goes on to say: “In the Galileo

9 <https://sourcebooks.fordham.edu/mod/1630galileo.asp>

10 Maurice A. Finocchiaro, *Retrying Galileo, 1633–1992* (University of California Press, 2005), 12.

11 More formally known as “la Commissione Pontificale d’E’ tude du cas Galilee”; see M. Sánchez de Toca, “A Never Ending Story: The Pontifical Commission on the Galileo Case: A Critical Review,” in *The Inspiration of Astronomical Phenomena VI Proceedings of a conference held October 18–23, 2009 in Venezia, Italy*, ed. Enrico Maria Corsini. ASP Conference Series, Vol. 441 (Astronomical Society of the Pacific, 2011), 99–108, <https://adsabs.harvard.edu/full/2011ASPC..441...99S>. In addition to Father Coyne, the seven-person Galileo Commission included two Cardinals and two Archbishops, one of whom became a Cardinal during the Commission’s tenure of nearly ten years.

12 George V. Coyne S.J., “The Church’s Most Recent Attempt to Dispel the Galileo Myth,” in *The Church and Galileo*, ed. E. McMullin (University of Notre Dame Press, 2005), Chapter 13, 340–359, https://www.vaticanobservatory.org/wp-content/uploads/2017/01/Galileo_ed._McMullin.pdf

case the historical facts are that further research into the Copernican system was forbidden by the Decree of 1616 and then condemned in 1633 by official organs of the Church with the approbation of the reigning Pontiffs.”¹²

Furthermore, as explained by a Professor of Philosophy and Theology at a Catholic seminary in the USA on the website of the Society of Catholic Scientists, it wasn’t until 1758 that the Catholic Church relaxed censorship of Copernican books, and it wasn’t until 1822 (almost two hundred years after Galileo’s trial) that the Catholic Church decided “no longer to deny the imprimatur to books that taught heliocentrism.”¹³

This is conflict between religion and (what would later be called) science writ large!

Another case discussed at length by Spencer is the Wilberforce–Huxley exchange in Oxford in 1860. Importantly, Spencer stresses that it was the nature and status of the human that was centre stage in this debate. As Spencer clearly explains on page 258, the historical aspects of this exchange are now well documented, thanks to an enterprising American, Richard England—a philosopher from Eastern Illinois University. In 2017, England reported finding an account of the 1860 Oxford meeting that is more extensive than any of the accounts known before 2017.¹⁴ This more extensive account appeared in a contemporary Oxford newspaper, namely the 21 July 1860 edition of the *Oxford Chronicle and Berks and Bucks Gazette*, on page 3.¹⁵ Why didn’t any of us think of looking in this most obvious place, long before 2017?

13 Cory Hayes, “Galileo’s Contribution to Theology,” 1 February 2024, <https://catholicscientists.org/articles/galileos-contribution-to-theology/> Interestingly, Coyne (footnote 12) states that “the works of Copernicus and Galileo remained on the Index until 1835.”

14 Richard England, “Censoring Huxley and Wilberforce: A new source for the meeting that the *Athenaeum* ‘wisely softened down,’” *Notes and Records (The Royal Society Journal of the History of Science)* 71 (2017), 371–384. <https://royalsocietypublishing.org/doi/10.1098/rsnr.2016.0058>

15 Anon., “Meeting of the British Association for the Advancement of Science,” *Oxford Chronicle and Berks and Bucks Gazette*, 21 July 1860, 3. For an edited transcript, see <https://darwin-online.org.uk/content/frameset?itemID=A1088&viewtype=text&pageseq=1>

To put this in context, until 2017 the most favoured account (regarded as semi-official¹⁴) was the one published on 14 July 1860 in the London-based magazine *Athanaeum*, which made no mention of any exchange between Wilberforce and Huxley. To the surprise of Richard England and just about everyone else, the *Oxford Chronicle* article includes everything (almost word-for-word) that is in the *Athanaeum* account, but also includes substantial additional text that, among other things, includes a blow-by-blow account of the Wilberforce–Huxley exchange, and a very clear account of Wilberforce’s religious opposition to Darwin. It seems, therefore, as Spencer explains, that the *Athanaeum* account was a censored account of the Oxford meeting, omitting the controversial bits!

On page 259, Spencer provides an annotated version of the *Oxford Chronicle* account of Wilberforce’s question to Huxley and of Huxley’s response. The two key sections of the *Oxford Chronicle* account are reproduced here:

Glancing at Professor Huxley’s remarks, on the previous day, in a discussion with Professor Owen, the Bishop facetiously asked if he had any particular predilection for a monkey ancestry, and, if so, on which side—whether he would prefer an ape for his grandfather, and a woman for his grandmother, or a man for his grandfather, and an ape for his grandmother. (Much laughter.)

...

Professor HUXLEY followed. In reply to the Bishop’s query he said that if the alternative were given him of being descended from a man conspicuous for his talents and eloquence, but who misused his gifts to ridicule the laborious investigators of science and obscure the light of scientific truth, or from the humble origin alluded to, he would far rather choose the latter than the former. (Oh, oh, and laughter and cheering.)¹⁵

So, we now have clear evidence that the Wilberforce–Huxley exchange in Oxford in 1860 is not a myth but is historical reality.

As mentioned earlier, Richard England's discovery also sheds additional light on the religious objection to Darwin.

Of course, we did not have to wait until 2017 to know that Bishop Wilberforce had expressed religious objection to Darwin. This has been known ever since Wilberforce's review¹⁶ of *On the Origin of Species by Means of Natural Selection* was published around the time of the Oxford debate. Even though Darwin had avoided directly addressing the implication for humans in *On the Origin of Species*, those implications were clear for everyone to see. Addressing them head on in his 1860 review, Bishop Wilberforce wrote:

Man's derived supremacy over the earth; man's power of articulate speech; man's gift of reason; man's free-will and responsibility; man's fall and man's redemption; the incarnation of the Eternal Son; the indwelling of the Eternal Spirit,—all are equally and utterly irreconcilable with the degrading notion of the brute origin of him who was created in the image of God, and redeemed by the Eternal Son assuming to himself his nature.¹⁷

This same theme was addressed by Sir B. Brodie,¹⁸ who, as shown in the *Athanaeum* account of the Oxford meeting, spoke just before Bishop Wilberforce. Being in the *Athanaeum* account, Brodie's understanding has also been in the public domain since 1860:

16 Anon. [Samuel Wilberforce], "[review of] *On the Origin of Species, by means of Natural Selection; or the Preservation of Favoured Races in the Struggle for Life*. By Charles Darwin, M. A., F. R. S. London, 1860," *Quarterly Review* 108 (1860), ART. VII, 225–264, <https://darwin-online.org.uk/content/frameset?pageseq=1&itemID=A19&viewtype=text>. As was common at the time, the review was anonymous, but its authorship was evident to those who were familiar with Wilberforce as author (Janet Browne, *Charles Darwin: The Power of Place* (Pimlico, 2003), 114).

17 Page 257 of the Wilberforce review.

18 Sir Benjamin Brodie, surgeon and teacher: President of the Royal College of Surgeons (1844), President of the Royal Society (1858–1861) at the time of the Oxford meeting.

Sir B. BRODIE stated, he could not subscribe to the hypothesis of Mr Darwin. His primordial germ had not been demonstrated to have existed. Man had a power of self-consciousness—a principle differing from anything found in the material world, and he did not see how this could originate in lower organisms. This power of man was identical with the Divine Intelligence; and to suppose that this could originate with matter, involved the absurdity of supposing the source of Divine power dependent on the arrangement of matter.¹⁴

So, conflict between religion and science in relation to the nature and status of the human (to use Spencer's words) was evident in the initial responses to *On the Origin of Species*. Given this, the discovery in 2017 of what Bishop Wilberforce said in this regard in the Oxford meeting does not introduce anything new. Yet it does reinforce Spencer's suggestion that a key issue of conflict between religion and science has been the nature and status of the human. As recounted by the *Oxford Chronicle*, and as included by Spencer in *Magisteria* (p. 258), Bishop Wilberforce stated, just a few sentences after questioning Huxley's ancestry, that:

he did consider it a most degrading assumption—(hear, hear)—that man, who, in many respects, partook of the highest attributes of God—(hear, hear)—was a mere development of the lowest forms of creation. (Applause.) He could scarcely trust himself to speak upon the subject, so indignant did he feel at the idea.¹⁵

These words highlight the essence of the initial religious objection to Darwin.

Interestingly, the essence of this particular case of conflict between religion and science, as expressed in 1860 by Brodie and Wilberforce, is still with us now, as shown by the following quotes, to take just some examples.

Pope John Paul II (1996):

The Church's Magisterium is directly concerned with the question of evolution, for it involves the conception of man: Revelation teaches us that he was created in the image and likeness of God. The Conciliar Constitution *Gaudium et Spes* magnificently explained this doctrine, which is pivotal to Christian thought. It recalled that man is 'the only creature on earth that God has wanted for its own sake.' In other terms, the human individual cannot be subordinated as a pure means or a pure instrument, either to the species or to society; he has value *per se*. He is a person. ... It is by virtue of his spiritual soul that the whole person possesses such a dignity even in his body. Pius XII stressed this essential point: if the human body takes its origin from pre-existent living matter, the spiritual soul is immediately created by God.

Consequently, theories of evolution which, in accordance with the philosophies inspiring them, consider the mind as emerging from the forces of living matter, or as a mere epiphenomenon of this matter, are incompatible with the truth about man.¹⁹

It is interesting to note that the message from this last sentence of Pope John Paul II, namely that the scientific understanding of evolution is "incompatible with the truth about man," is not unlike the message from the Inquisition back in 1633, namely that the only truth is the truth that is held by the Church.

Returning to modern quotes, Pope Benedict XVI (2005): "We are not some casual and meaningless product of evolution. Each of us is the result of a thought of God. Each of us is willed, each of us is loved, each of us is necessary."²⁰

19 John Paul II, "Address to the Plenary Session on 'The Origins and Early Evolution of Life.'" Message delivered to the Pontifical Academy of Sciences 22 October 1996, <https://www.pas.va/en/magisterium/saint-john-paul-ii/1996-22-october.html>.

20 The Holy See, "Mass, Imposition of the Pallium and Conferral of the Fisherman's Ring for the Beginning of the Petrine Ministry of the Bishop of Rome." Homily of His Holiness Benedict XVI, St. Peter's Square, Sunday, 24 April 2005, https://www.vatican.va/content/benedict-xvi/en/homilies/2005/documents/hf_ben-xvi_hom_20050424_inizio-pontificato.html. It is worth noting that this is still the Catholic Church's view, as clearly expressed in

Francis Collins, founder of Biologos (2006): “But humans are also unique in ways that defy evolutionary explanation and point to our spiritual nature.”²¹

Stephen Barr, founder and President of The Society of Catholic Scientists (2023): “The human spiritual powers of intellect and will are the only realities empirically accessible to us that transcend matter and thus point to the possibility of other realities that transcend the physical world, including God.”²²

Each of these writers accepts that evolution has occurred. Indeed, on page 396 Spencer quotes from the same document of Pope John Paul II as is quoted here, showing very clearly that Pope John Paul II accepted that evolution has occurred. However, as indicated in the quotes cited in this commentary, each of these writers, while accepting evolution, sees an irreconcilable difference between the scientific understanding and the religious understanding of the nature and status of the human.

We can conclude that the Galileo story and the story of the 1860 Oxford meeting are both real historical examples of the differences between scientific understanding and religious understanding. In the Galileo case, the basis of the difference of understanding still exists (neither the scientific understanding nor the biblical text has changed), but the authority (the Catholic Church) has softened its stance on the interpretation of scripture.²³ In the case of the 1860 Oxford meeting,

item 366 of the Catechism of the Catholic Church: “The Church teaches that every spiritual soul is created immediately by God—it is not ‘produced’ by the parents—and also that it is immortal: it does not perish when it separates from the body at death, and it will be reunited with the body at the final Resurrection.” https://www.vatican.va/archive/ENG0015/_P1B.HTM

21 Francis Collins, *The Language of God* (Free Press, 2006), 200. These same words are quoted in full in Chris Mulherin, *Science and Christianity: Understanding the Conflict Myth* (Garratt Publishing, 2019), 55.

22 Stephen M. Barr, “Faith and Science in Catholic Tradition: From the Early Church to Pope St. John Paul II,” (1 December, 2003), <https://catholicscientists.org/articles/faith-and-science-in-catholic-tradition-from-the-early-church-to-pope-st-john-paul-ii/>

23 John Paul II, “On the Galileo Affair.” Speech delivered at the concluding summary presented by the Papal Commission, 31 October 1992, Rome. <https://inters.org/John-Paul-II-conclusion-galileo-affair>

the difference in understanding of the nature and basis of the human is irreconcilable, and is still as strongly held today as it was in 1860.

Are these differences in understanding really conflicts between science and religion? Well, yes, they are. The *OED* defines “conflict” as “The clashing or variance of opposed principles, statements, arguments, etc.” And here we have opposed principles, statements, and arguments.

This is best illustrated by considering how a scientist who is a Christian and who accepts evolution would teach/lecture/write about the evolution of humans in a scientific class/lecture/paper/book, compared with in a religious studies class or in a lecture in a seminary or to a Christian meeting/conference or in a paper or a book on the religious understanding of humans.

In the former, the Christian would explain that every aspect of humans has arisen by the same evolutionary processes that have given rise to every other living organism, noting (as stressed by Darwin in 1859) that not every trait has arisen by natural selection; that is, that not every trait is adaptive. There would be no mention of God or God-like phenomena.

In the latter, the Christian would explain that the physical human body has arisen by the same evolutionary forces that have given rise to every other living organism, but that God has acted on every human so as to bestow special attributes that exist only in humans, reflected in the religious understanding that humans have an immortal soul and that humans are made in the image of God.

How can we come to terms with these differences in understanding? What do we tell young Christians who are concerned that studying science will threaten their Christian understanding?

One strategy is to claim that there is no conflict between scientific and religious understandings, despite the evidence to the contrary.

An alternative solution is to accept that 1) here we actually have a double truth,²⁴ that is, that each understanding is a valid truth in its

24 For a recent review of the concept of double truth, see Ann Giletti, “Double truth: medieval story reveals how you can believe two conflicting positions

own context; and 2) St Thomas Aquinas notwithstanding, it is possible for a person to hold to both truths. Indeed, after hearing a talk from ISCAST's Chris Mulherin on the relationship between science and religion, a school student declared that "I learned that science and Christianity can both be true."²⁵

How can a person hold to two irreconcilable truths? Well, most of us do it every day. On the one hand, we see with our senses, on a daily basis, the sun revolving around the earth. Indeed, it is not just our common sense that confirms this observation every day; daily weather forecasts speak of the sun rising and the sun setting, and forecasts usually include an exact prediction of the time when the sun will rise and when the sun will set each day. On the other hand, almost everyone knows that the scientific understanding is exactly the opposite, namely that the earth revolves around the sun. Most people hold these two irreconcilable truths—the common-sense truth and the scientific truth—without any effort or stress or cognitive dissonance. Surely we can do the same with irreconcilable religious and scientific truths. Both can be held to be true in their respective contexts.

There is long-standing support for this strategy. Doru Costache has argued that a "great realisation of the early Christian and medieval scholars" was that "reality can be perceived from diverse viewpoints."²⁶ Physicist and philosopher Basarab Nicolescu has devoted much thought to the concept of levels of reality, each with its own level of perception, this being the key to transdisciplinarity.²⁷ Also, in his

at once," *The Conversation*, 10 July 2018, <https://theconversation.com/double-truth-medieval-story-reveals-how-you-can-believe-two-conflicting-positions-at-once-96033>; Also, double truth is mentioned in passing by Ungureanu (2023; footnote 1).

25 Chris Mulherin, "An important message from ISCAST Executive Director, Chris Mulherin." Email to the ISCAST community, 24 June 2024.

26 Doru Costache, "One Description, Multiple Interpretations: Suggesting a Way Out of the Current Impasse," in *Eastern Orthodox Christianity and the Sciences: Theological, Philosophical, Scientific and Historical Aspects of the Dialogue. Science and Orthodox Christianity 2*, ed. Christopher Knight and Alexei Nesteruk (Brepols Publishers, 2021), 33–49.

27 Basarab Nicolescu, "Methodology of Transdisciplinarity—Levels of Reality, Logic of the Included Middle and Complexity," *Transdisciplinary Journal of Engineering & Science*, Vol 1 (2010), 1732; Basarab Nicolescu, (2014) *From Modernity to*

2015 encyclical *Laudato si'*, Pope Francis made the important point that science and religion have “distinctive approaches to understanding reality” which enable them to “enter into an intense dialogue fruitful for both.”²⁸ These sources point to what could be a more acceptable strategy: instead of thinking in terms of two different truths, we can think in terms of two different perceptions or understandings of reality.

As challenging as it may seem to some, surely it is an easier and more satisfying strategy to accept two perceptions or understandings about human nature than to claim that there is harmony between scientific and religious understandings about human nature, in direct contradiction of the evidence. I hope that this strategy may be helpful in coming to terms with the entanglement of religion and science so well documented by Nicholas Spencer in *Magisteria*.

Cosmodernity: Science, Culture, and Spirituality (State University of New York Press, 2014).

28 Pope Francis, *Laudato si': an Encyclical Letter on Ecology and Climate* (St Pauls Publications, 2015), paragraph 62, https://www.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

The Cultural Element in the Dialogue Between Science and Religion: A View from Aotearoa and a Plea to the Mainline Church

Nicola Hoggard Creegan

As we think about the future of the science–faith interface, I want to spend a little time taking stock.¹ I spend a great deal of effort looking at the ways in which we can think theologically about science and the places in which science does (and should) really inform theology. But in this short article, I want to step back with some level of discouragement and admit that all of this has had very little impact on the church in general.

In this interdisciplinary space, we spend much energy on mapping the territory and making arguments. We have all waded in, confident that just a few more arguments will make all the difference. But at some stage, one must step back and say, why is it still so hard? There are over fifty years of arguments about how science and faith *can* be held together, how scientists can be people of faith, and Christian believers should study and consider scientific evidence. The surveys include wide historical purviews as well as integration with the latest genomic and string theory models. We have examined epistemology, imagination, narrative, evolutionary Christology and eschatology,

1 This paper was first given at ANZATS in Sydney in 2022 when the theme was the Future.

Nicola Hoggard Creegan is a theologian of Anglican persuasion, based in Tāmaki Makaurau (Auckland), New Zealand. Nicola specialises in the intersection of evolutionary theory and systematic theology. She is also interested in the theology of healing, ecotheology, and Mātauranga Māori/theology interactions. She is the director of New Zealand Christians in Science (NZCIS) and the current Chair of A Rocha Aotearoa. Her doctoral work was done at Drew University in New Jersey. Her undergraduate work was in mathematics and biology. She is the author of *Animal Suffering and the Problem of Evil* (OUP, 2013) and many other papers and edited books in this area. Her participation in notable projects, such as the Human Nature Project at the CTI in Princeton and the Human Distinctiveness Project at Notre Dame, underscores her commitment to exploring the deep harmonies between nature and theology.

animal lives and sentience, and animal suffering. We will keep doing all that because reflecting on how we know and think is fascinating. But still, the arguments often fail to penetrate very deeply or fail to take at all.

Conflict and Contrast

John Haught, for example, was one of the early categorisers of different modes of relating science and faith. One of these is outright conflict and another is indifference, or contrast. We find the contrast model (which includes the idea that religion and science are different worlds that don't need integration, accompanied by indifference to any synthesis) operating a great deal in Anglican and mainline church circles where people have the off-the-cuff saying: "I have no problem with science." You know they haven't thought about science or delved deeply into it either, or at least, not far enough to be either troubled or moved by its findings. This phrase is more a thing you say that positions you in social terms rather than anything else, communicating: "We are liberal and open-minded Anglicans / Methodists / Presbyterians." When this phrase is used, it is meant to be agreeable, but I find myself dismayed. Science and religion *are* now different worlds, and if you don't feel the tension, something is wrong. And on the other side, scientists who are people of faith often feel that the church does not get them. It isn't a place that deeply engages with science at a metaphysical or an ethical level. All of this typifies what Haught describes as the Contrast Model.² But the classification and the observation that all of this is happening doesn't get us any further to integration.

If contrast is problematic, the ongoing perpetuation of the Conflict Model is ever more concerning and puzzling. Creationism continues to be the default position in many large interdenominational and Pentecostal churches. These are the churches attended most by

2 John Haught, *Science and Faith: A New Introduction* (New York: Paulist Press, 2013), Chapter 1.

young university students. At university, they are being taught critical thinking and analysis, and even science, but they keep their religious views under wraps, with authorities and culture in universities not overlapping with those in their churches. For a long time, I thought it was just that New Zealand seemed to be too far away from anything to be properly grounded. But I was surprised in a trip to the Netherlands in 2018 for a *Metaphysics in Evolution* conference, to see that creationism is also a huge problem in liberal Holland. This, of course, is Haught's conflict model.

Creationism is often a deep belief that isn't even openly discussed or articulated. A few years ago, I was surprised to find a group of Christian medical students who assured us they loved science. But in the same discussion, it became clear that they did not love evolution. Yet they had already learned cell biology, genomics, and other disciplines that rely on an evolutionary model. The students know enough to be silent in their dissenting. When I related this to one of their deans, he was flabbergasted. Why does this resistance to evolution persist even with all the evidence in its favour and when these students are being trained in a strictly evidence-based profession? Why were they uncurious and, in fact, disturbed by the vast body of material that allows them to think of these disciplines together?

I have often assumed that one of the reasons for this is that there is an implicitly materialist aspect to evolutionary teaching. At times this comes across as a form of triumphant atheism. This is the conflict model from the other side, which leads me to admit that all these arguments and books over fifty years also make little difference to *science*. The science side is revealed in the persistently anti-teleological framing of even neutrally presented evolution; in many science classrooms the evolutionary process and natural selection which drives it are presented as blind and automatic. Conflict is also seen in the persistence of reductionist materialism that hangs around science as it is often practiced.

This is despite the changing of evolutionary paradigms in the last few decades. I think of the work of Simon Conway Morris, Agustín

Fuentes, Denis Noble, and what is known as the “extended evolutionary synthesis.” Even the *Guardian* has recently asked if we need to reframe the Theory of Evolution.³ The tight calculus between evolutionary progress and blind competition to the death has been broken, though it is still upheld by some. But this makes little difference to biology’s overall sense that it is incompatible with faith, and its reluctance to investigate how the changes affect us metaphysically.

Culture and Our Ways of Knowing

I think there is another aspect to all of this. It is the cultures of the churches we belong to and the deep impact they have on our commitments. If we are honest, all knowing happens through cultures and cultural filters. There isn’t any neutral way of seeing, even if some sciences try to approximate that. Michael Polanyi and others have put the lie to the idea that science is just objective seeing.⁴ There is wide attention paid to the fact that we only know things within communities of knowledge. World views, knowledge systems, and cultures enable narratives, evidence gathering, and transmission of knowledge, whether in Indigenous societies or modern, highly industrial ones. Within these deeply cultural frameworks, one form of Christianity becomes almost alien to other forms. Clusters of belief and dogma are attached to different kinds of church culture, but I would postulate that they are much less referencing reality out there and more pragmatic social cues to one’s place in the world. The dogmatic attachments of culture are a way of referencing one’s identity, even if they do, in the end, produce continuing cognitive dissonance.

3 See Stephen Buranyi, “Do We Need a New Theory of Evolution?,” *The Guardian*, 28 June 2022, <https://www.theguardian.com/science/2022/jun/28/do-we-need-a-new-theory-of-evolution>; Denis Noble, *Dance to the Tune of Life: Biological Relativity* (Cambridge: Cambridge University, 2017); Simon Conway Morris, *Life’s Solution: Inevitable Humans in a Lonely Universe* (New York: Cambridge University Press, 2004).

4 Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (The University of Chicago Press, 1974).

The particular sub-disciplines within the sciences and the denominations within the church all act as particular communities of knowing and remembering. And yet, we often approach discussion about science and faith as though arguments will make all the difference. For instance, we say Genesis 1–3 wasn't meant to be read literally, and if you don't read it literally and you do read it seriously, you no longer have any problem with science and faith. Except that it often doesn't work that way. The person who takes the early biblical stories literally has authorities and a culture of support in a church that incidentally makes a literal reading of Genesis almost a litmus test of belonging. The only way to really take on the newer integrated worldview is to leave the old family or culture behind. The history of faith has a rich narrative of people going out and leaving their families behind to hear the Word of God, with Abraham being the most important and the most pivotal. But it is hard.

Never has it been truer what John Brookes long ago argued, that there is no one religion and one science, but many forms of both. Brooke refers to the complex ways in which sciences and religious faith have mutually affected one another, sometimes for good and at other times not throughout the modern era. His thesis is that complexity, rather than harmony or conflict, is the norm.⁵

Christians have probably never been more divided on the overarching narrative of faith. Do we survive death? Are we just bodies, or is there really a soul? Is the fall literal or symbolic? What does the future hold? What does salvation mean? Many Christian churches deny evolution without ever mentioning it. They resist it with tightly interweaving doctrines centred around a literal fall, which is logically incompatible with evolution. Nobody has to mention evolution. It just becomes a shadowy threat to the central kernel of faith.

On the other side, scientists and universities are their own authorities and tend to make religion a taboo. While there is now a rich

5 John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge: Cambridge University Press, Reprint, 2014), 5. <https://doi.org/10.1017/cbo9781107589018>

literature on the subject of how one can be a Christian and a scientist at the same time, one might not be able to be a *particular kind* of Christian in a *particular* science context. Adopting science might require leaving a home community or family, or it might be associated with feeling alienation among one's science colleagues as well. We should acknowledge that this is asking a great deal of people, especially the young, and that it is not surprising that many end up choosing faith over science or vice versa, despite all the reasons we provide for integration.

Finding God in the Waves

An example: Some of you will have read the book *Finding God in the Waves* by Mike McHargue, also known online as "Science Mike."⁶ Science Mike grew up in a Baptist church. He was a bit of a loner and didn't have many friends, but he had a great childhood talking to Jesus. He married his Baptist childhood sweetheart and had several lovely, God-loving children within a large Baptist church. He loved the culture of the church, but unlike many there, he was also interested in science, and ideas. He had read *Velvet Elvis* by Rob Bell and knew you didn't have to take the whole Bible literally. He was also active online. To cut a long story short, at one stage he was challenged to read Dawkins' *The God Delusion*. In exchange, the atheist behind the challenge was happy to read *Velvet Elvis*. Unfortunately, Science Mike was completely persuaded. He lost his faith almost overnight. But he couldn't tell anyone. This went on for two years, because he knew if he did say anything he risked his life, his marriage, his family, and his church community. He privately dissented, as I think often happens in less dramatic ways in church communities. In the end, he confessed, but only because his wife sensed something was up. They agreed not to tell the church. His mother, however, told him she was praying, and that God was coming. There is a very dramatic denouement in which

6 Michael McHargue, *Finding God in the Waves: How I Lost My Faith and Found it Again through Science* (Colorado Springs: Convergent Books, 2016). Michael McHargue is known online as "Science Mike."

he has a profound religious experience of deep symbolic significance in and after a Rob Bell seminar. He came back to faith, albeit a less certain and more chastened faith, but could not return to the church. He and his family struggled but ended up finding a small Methodist community. The huge wrench here was the cultural one, giving up a community, and authority, risking marriage and family. What brought him back to faith was not arguments, but rather an experience. As the subtitle of the book suggests however, this initial experience was in a context where he found a group of Christians who were taking science seriously. That was enough to then set him on a journey of re-interpreting his previous polarised thinking. In this case Science Mike did have access to the integrating literature, but only after a re-conversion experience.

Another example: I have an ex-student who ended up doing a course in science and theology with me at Otago as part of the requirements for her doctorate. I had known her and taught her for probably fifteen years, on and off. I was always talking about science in the context of theology. She had come from a family of deep faith but completely oblivious to science. She was never antagonistic, just blissfully un-alert to any talk of science. But doing this course, fifteen years later, she suddenly had an epiphany that science was important for theology. It was only a sustained period of looking at science and theology together that overcame her family/cultural indifference to science. Through all the previous years, although she was embracing theology, she was defecting in place when it came to science until it all got through one day. Again, this shows that the challenges to integration are surmountable, but they don't come easily.

These vignettes show that culture and belief are tightly bound, as they should be. Mary Douglas talks about how institutions allow us to think, but institutions also reflect different levels of hierarchy, role differentiation, and bonding, with non-egalitarian groups, especially, finding it hard to change.⁷ It is far easier to silently dissent than

7 Mary Douglas, *How Institutions Think* (Syracuse: Syracuse University Press, 1986), Chapter 1.

to struggle with the cultural displacement that changing your mind brings. There are always individuals who do end up thinking hard and finding their way. But it is easy to see how they then easily adopt the alternative secular public culture in which all religious claims are implausible, as they were for Science Mike, and this implausibility is something of which we have probably all felt the power. By far the most common way out of the creationist culture is to get taken up into a science research culture and abandon faith, as Science Mike did at first, skipping one culture to land in another.

Science Engaged Theology

In the two years since I first gave an earlier version of this paper at the Australian and New Zealand Association of Theological Schools conference (ANZATS) in COVID-run Sydney, there has been an interesting development in the science–theology dialogue. Science Engaged Theology (SET) has been made popular by Joanna Leidenhag and John Perry’s book *Science Engaged Theology*.⁸ SET changes the conversational emphasis because it is led from the theology side by theologians who are engaging a particular science. They are not necessarily trained in science and are not trying to give an overall picture of the field or fields. SET is humbler—a particular tradition within theology engages a particular science. It may end up helping the academic conversation because the dialogue between science and faith is now taking place not only in dedicated conferences but in general theology conferences, classes, and seminars as well. So, watch this space.

But I also promised to think about ways out of the conundrums I have listed above, none of which have yet been fundamentally resolved. I am advocating for modes and methods that might make our job of communication more effective. We are often people who move

8 John Perry and Joanna Leidenhag, *Science Engaged Theology* (Cambridge: Cambridge University Press, 2022). <https://doi.org/10.1017/9781009091350>

between worlds, and who inhabit multiple cultures. How then can we enhance the conversation between cultures?

Experience

Our work is often too rational. We need to embrace religious experience and the spirituality of people like Richard Rohr, who routinely expresses prayer, nature, theology, and science in one breath. He seems to do so effortlessly, deeply inspired by one of the first theologians of science, Teilhard de Chardin, but also, of course, by his Franciscan heritage.⁹ This kind of science and theology orients us to nature and to what Sarah Coakley would call “unmastery.” It leads inevitably not only to speculation about our place in nature, but also to a love of nature as a window to God, and to a desire for ecological healing and awareness.¹⁰

This then becomes an invitation to look deeper into the way in which the natural world works: its laws of evolutionary production, its deep interconnections, and its framework, all of which open grids of thinking that work so powerfully but also reveal hidden paradoxes and hints of transcendence. Whatever our theologising does, it has to avoid the flattening of reality that can so often be the result of a materialist outlook. The novelist and theologian Marilynne Robinson says this very aptly:

To some extent even theology has embraced impoverishment, often under the name of secularism, in order to blend more thoroughly into a disheartened cultural landscape. To the great degree that theology has accommodated the parascientific world view, it too has tended to forget the beauty and strangeness of the individual soul, that is, of the world as perceived in the course of a human life, of the mind as it exists in time ... the beauty and strangeness persist just the same. And theology persists, even

9 See, for instance, Richard Rohr, *The Universal Christ* (London: SPCK, 2019).
 10 Sarah Coakley, *God, Sexuality and the Self: An Essay in the Trinity* (Cambridge: Cambridge University Press, 2013), 43-51. <https://doi.org/10.1111/rirt.12404>

when it has absorbed as truth theories and interpretations that could reasonably be expected to kill it off. This suggests that its real life is elsewhere.¹¹

Mainline Churches

It is hard to become an authority in some of the more fundamentalist churches. But that makes the middle mainline churches all the more important as places where this thinking can occur, and as places of refuge from creationist culture. It is mostly the churches that are there for the long haul for people. It is mostly in churches that relationships endure over the length of time that can enable a change of mind. Churches are also needed as places where scientists can be free to dialogue in ways that are not possible in the secular university.

Elephants in the Theological Room

It is also important when we are doing the rational argument to tackle the elephants in the theological room. One such elephant is the nature of evolution, the importance of our prehistory in knowing who we are, and the theology of the fall and the problem of evil. So much Christian reaction to evolution is ignorant of recent radical changes in evolutionary theory and of how evolutionary theory has always been quite heterodox in its interpretation. Evolution has changed and we need to be telling people this quite unequivocally. It has changed in ways that make a difference theologically.

The reluctance to engage with evolution means that Christians do not openly engage with our prehistory. We have to think about how we crossed the species boundary, our dozens of hominin cousins, the traits our ancestors came with, and the conditions that seemed to help with peaceful coexistence. Lastly, we must consider what all of

11 Marilyn Robinson, *Absence of Mind: Dispelling of Inwardness from the Modern Myth of Self* (New Haven: Yale University Press, 2017), 13. <https://doi.org/10.12987/9780300166477>

this says about traditional understandings of the fall. This should take us deep into theologies from the early centuries, which emphasised different understandings of the fall and of salvation. But to do all that is to ask a lot from people.

The Immensity of the Cosmos

Long ago C. P. Snow decried the ignorance of those in the humanities when it comes to science.¹² This situation remains. Most Christians know very little about the universe and its unintuitive and unbelievably long history. What they do know makes them feel alienated and alone. Yet the physics story is one that is full of majestic details, a largely hidden territory (dark energy and dark matter), and paradox. It is fitting subject matter for people who believe in a creator God. In a recent book, Doru Costache interacts with this physics (an example of SET), showing also that our consciousness is made to be in relationship with all of this. Rather than feeling alienated, we should recognise how this enhances our sense of self and connection to God.¹³

Indigenous Worldviews

Finally, we should not just keep re-hashing old arguments but also sense where the Spirit is moving in the world. In New Zealand that is definitely into the world of Mātauranga Māori. Mātauranga Māori is the holistic understanding of knowledge in Maoritanga. Next year these conversations will be a part of the New Zealand National Certificate of Educational Achievement (NCEA) high school science curric-

12 C. P. Snow, *The Two Cultures and the Scientific Revolution* (Oxford: Oxford University Press, 1959).

13 Doru Costache and Geraint F. Lewis, *A New Copernican Turn: Contemporary Cosmology, the Self, and Orthodox Science-Engaged Theology*, Routledge Focus on Religion (London and New York: Routledge, 2025). <https://doi.org/10.4324/9781003527138>

ulum. Christians, I think, should welcome this. It breaks the secular materialist worldview of science to some extent. In New Zealand society the primary wedge against pure secularism is the growing Māori renaissance, and the acceptability of karakia (Māori for prayer) in the public domain. Faith and science, and Mātauranga Māori and Science conversations are parallels. But more importantly this emphasis helps us to critique the close and sometimes exclusive partnership between Western enlightenment thinking and faith.

To summarise, our arguments over the past fifty years have been ambitious and comprehensive, yet the church has remained largely unmoved, as has the scientific academy. The mainline church, which could be so helpful, remains largely disengaged. Larger congregations perpetuate the conflict model, as do many university science departments. We need to reimagine where we might find traction—perhaps in a more spiritual, ecologically-oriented narrative, or by persuading the mainline to re-engage with science. The future cannot simply mirror the past; it must be different in some way.



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