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## Editorial

This issue of the journal carries two of the papers from our 2024 Symposium on Artificial Intelligence. For 2025 we are planning something a little different, a series of four online evening lectures in March and April, followed by a Hybrid event (online and in-person) on 10<sup>th</sup> April which will be an opportunity to discuss and debate the issues raised in the earlier lectures. The theme is ‘The Environment and Eschatology: not the end of the world?’

- Thursday 13<sup>th</sup> March 7pm online – Celia Deane-Drummond
- Thursday 20<sup>th</sup> March 7pm online – Ruth Valerio
- Thursday 27<sup>th</sup> March 7pm online – Margot Hodson
- Thursday 3<sup>rd</sup> April 7pm online – John Weaver, Tim Middleton and Tim Judson
- Thursday 10<sup>th</sup> April 7pm online AND in-person at Croxley Green Baptist Church, Hertfordshire, WD3 3LH – Panel discussion and debate.

The April events are being held in partnership with the Central Baptist Association and The Centre for Baptist Studies, Oxford, though those from other denominations are warmly encouraged to attend as well!

Once again, we are grateful to Christians in Science for permission to reprint a large number of book reviews. We hope you enjoy this bumper issue of the journal!

**Alan Kerry (Administrator and Journal Editor)**

## 2025 Lecture Series and AGM

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### Agenda for Annual General Meeting to be held 10th April 2025

1. Chairman - the Rev. Dr R. H. Allaway.
2. The Minutes of the previous AGM.
3. To approve the election or re-election of:
  - a. The President (Professor David Wilkinson),
  - b. Vice-Presidents (Prof. Malcolm A. Jeeves, Professor Sir Colin J. Humphreys),
  - c. Honorary Treasurer (Dr David Watkis),
  - d. Council (Rev. Bob Allaway, Rev. John Buxton, Dr Alan Kerry, Mrs Joanne Mead, Rev. Dr David Instone-Brewer and Dr David E. Watkis and Dr Todd Kantchev (ex officio))
4. The annual accounts, which are available on the website, will be presented by the acting treasurer Alan Kerry, for approval and to appoint auditors.
5. Plans for 2025-2026.

## **Artificial Intelligence in the Shadow of Descartes**

### **Stephen N Williams**

*Prof. Stephen N. Williams is Honorary Professor of Theology, Queen's University, Belfast*

No publication has been more frequently cited in accounts of the story of Artificial Intelligence than Alan Turing's paper, 'Computing Machinery and Intelligence', published in 1950.<sup>1</sup> In it, Turing asked whether or not we should in principle be entitled to attribute intelligence to a machine: can machines think? Although it is a feature of the paper that seems to be often overlooked, Turing touched on a question that puts rather clear water between his day and ours when he notified his earnest scientific readership of a *theological* objection to the possibility of thinking machines. It is this: thinking is the function of the soul. Therefore, AI, being soulless, cannot think. Turing is not disposed to give much of the time of day to religion, certainly not where science is concerned, but he takes time out in order to dismiss this objection. Religious believers believe in an omnipotent God, do they not? Well, an omnipotent God could slap a soul onto a creature such as an elephant, for example, simultaneously conferring on it a suitably mutated brain to mediate thought emanating from the soul. In that case, God omnipotent should be able to attach a soul to a machine to enable it to think. Objection removed.

In another context, we might probe the notion of divine omnipotence and created order which Turing is assuming here. Right now, I propose to ignore this particular elephant in the intellectual room. Many Christians will spring to say that Turing confused Christian theology with Cartesian philosophy. An immaterial thinking soul operating upon a material body is a Cartesian tenet, specifying a dualism that has long been rejected by sound theology. I am not addressing the question of

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<sup>1</sup> In B. Jack Copeland, ed., *The Essential Turing: Seminal writings in computing, logic, philosophy, artificial intelligence, and artificial life plus the secrets of Enigma* (Oxford: Clarendon Press, 2004), 441-63.

whether or not Descartes deserves this rejection, and shall remain remarkably uninterested in it. I simply note that Turing's basically dismissive reference to the thinking soul seems to show that AI is precisely *not* in the shadow of Descartes; in fact, AI is surely well out of it. For Descartes, thought cannot be attributed to matter. In his century (the seventeenth), Locke set the cat amongst the pigeons by asking whether God could bestow on matter the capacity for thought.<sup>2</sup> Before him, Hobbes had described thought as computation, and computation as matter in motion, thus earning him the appellation: 'grandfather of AI'.<sup>3</sup> In that same century, that genius *extraordinaire*, Leibniz, dreamed of representing thought in logico-mathematical formulae, thus earning his own appellation: 'the patron saint of cybernetics', the science of communication and control, whose historical and conceptual connection with AI is strong.<sup>4</sup> If we are in pursuit of shadows from that century that fall over AI, they will be cast a-plenty over our landscape, but surely only a defective eye will detect that of Descartes in their midst.

What follows is an attempt to espy Descartes on this scene, with a view to Christian thinking about AI profiting from what it sees. I shall take a long run-up and look at Descartes rather more generally in the first part of what follows; place him in a broader context in the second part; and turn to AI in a more focussed way in the third. Thus, I shall be circling around AI in an indirect approach for much of the time, but I trust that the approach will pay dividends.

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<sup>2</sup> *An Essay On Human Understanding*, ed., P. Nidditch (Oxford: Clarendon, 1975), IV. 3. 6.

<sup>3</sup> John Haugeland, *Artificial Intelligence: The Very Idea* (Cambridge, Mass: MIT Press, 1989), 23.

<sup>4</sup> Norbert Wiener, *Cybernetics or Control and Communication in the Animal and the Machine* (Cambridge, Mass: Technology Press, 1948), 20. Let us flail around our appellations equitably: Locke was called the 'intellectual ruler of the century' (presumably the eighteenth) by Leslie Stephen in *English Thought in the Eighteenth Century*, volume 1 (London: Smith, Elder & Co, 1876), 34.

## Part 1

In 1747, Julien Offray de La Mettrie published his brief treatise, *L'Homme Machine* [*Man a Machine*].<sup>5</sup> Not the longest or deepest of philosophical works, it nonetheless unmistakably made a point whose revolutionary intent was declared in its title: thought is a purely material process embedded in purely material reality. This fact seals the truth that the human being is a machine. We might assume that Descartes was the arch-enemy. In fact, he was more an inspiration. Of course, in defending the immaterial view of mind or soul, Descartes was 'much deceived'.<sup>6</sup> However, he admirably paved the way for thinkers like La Mettrie who would correct his mistake and iron out his thought. Descartes 'was the first to prove completely that animals are pure machines', to which La Mettrie might have added explicitly that Descartes propounded a fine, mechanical view of the human body in its entirety.<sup>7</sup> ('Machine', incidentally, could apparently have a wider range of reference for Descartes than it normally has for us - comprehending ships, for example.) All he needed for consistency and accuracy was to apply the materialist and mechanistic principle to the one exception he retained in the created order: mind. La Mettrie was doing it for him.

With reference to Descartes, I have shifted from the vocabulary of 'soul' to 'mind', and also used the phrase 'mind or soul'.<sup>8</sup> Scholars disagree on how to interpret the vocabulary in Descartes that we translate from Latin and French as 'mind' or 'soul'. If Descartes does not treat the terms synonymously, he often treats them interchangeably. In denying that animals possessed souls, Descartes was aware that *vegetative*, as

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<sup>5</sup> *Man the Machine*, various translators, (Chicago: Open Court, 1912).

<sup>6</sup> *Man the Machine*, 142.

<sup>7</sup> See what La Mettrie says elsewhere in work such as *Abrégé des systèmes philosophiques*, to which reference is made on p.165 of the English translation of *Man a Machine*.

<sup>8</sup> Both in his letter to the Sorbonne, presenting his *Meditations*, and his preface to the reader, he shifts from 'mind' to 'soul' without comment: see *The Philosophical Writings of Descartes*, volume II, tr. John Cottingham, Robert Stoothoff, Dugald Murdoch (Cambridge: Cambridge University Press, 1984), 3-8. The *Meditations* is particularly important in the following account.

opposed to *rational* souls were standardly ascribed to animals, and his substitution of purely bodily mechanism for animal souls in any form caused consternation.<sup>9</sup> Correspondingly, he explained the human body in strictly mechanistic terms, but a defence of the immateriality and immortality of the human soul – that is, the rational soul, or mind – was central to his apology against covert or almost open atheism. The self, the 'I', is essentially an immaterial, thinking substance – mind or soul.

La Mettrie was taking up an issue which had exercised contemporary critics of Descartes' *Meditations*. Its second edition was published in 1642, along with seven sets of objections, together with the author's replies.<sup>10</sup> Not one of his interlocutors was happy with his treatment of the relationship of mind to body. 'I am', said Descartes, '...in the strict sense only a thing that thinks; that is, I am a mind, or intelligence, or intellect or reason...' (18). Qua thinking thing, mind 'is not extended in length, breadth or height and has no other bodily characteristics' (37). Extension characterises body. And 'I might consider the body of a man as a kind of machine equipped with and made up of bones, nerves, muscles, veins, blood and skin...' (58). Mind and body are not totally disconnected – we are more intimately related to our bodies than is the sailor to the ship he indwells – but they are distinct. In fact, given that body is divisible and mind is indivisible, 'the natures of mind and body are not only different, but in some way opposite' (10).

All that the first respondent could manage to say wearily on this matter was that the possibility of *conceiving* soul and body apart from each other did not entail the possibility of their *existing* apart from each other (66-73), but other criticisms converged on the question of the corporeal possibility of thought. Hobbes, believing that thought is a material process, held not only that Descartes had failed to show otherwise, but also that the logic of Descartes' argument supported his (Hobbes') conclusions (121-37). Mersenne also could not see how Descartes had shown that it was impossible that 'the whole system of your body...may

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<sup>9</sup> Critical reference to this is made in the *Meditations* themselves, e.g., 144.

<sup>10</sup> In what follows, page references will normally be in the text above.

combine to produce the motions which we call thoughts' (88). Arnauld, whom Descartes respected, said that Descartes failed to get round the objection that thought 'appears to be attached to bodily organs' (143). Bourdin cannot see his way through the terminological miasma – into which he also flings in the word 'spirit' – to Descartes' conclusions (329). The anonymous fraternity which authored the sixth set of objections apparently spoke for all Descartes' interlocutors in declaring that 'no one has yet been able to grasp that demonstration of yours by which you think you have proved that what you call thought cannot be a kind of corporeal motion' (278). There is a particularly detailed critique by one of the most influential thinkers of his day: Pierre Gassendi. Gassendi wonders why Descartes cannot logically conceive of a soul in the form of a wind or 'very thin vapour' diffused throughout and animating the body or a 'rarified body...organized in such a way as would make it capable of thought' (181-83; cf. 237). Particularly focussed is Gassendi's challenge that '[t]o prove that your nature is different (that is incorporeal, as you maintain), you ought to produce some operation which is of a quite different kind from those which the brutes perform – one which takes place outside the brain, or at least independently of the brain; and this you do not do' (188).

Descartes replies to all these objections. Whatever the success or otherwise of objection or reply, it is noteworthy that we encounter here a consensus that Descartes has failed to demonstrate the immateriality of thought. Given his advances in describing the mechanical functioning of the human body, it is arguable that he thus more paves the way for than stands in the way of AI. Of course, the belief that thought is corporeal does not entail the conclusion that AI can think; plenty of materialists hold that the operation of thought requires flesh and blood. However, some think that the principal threat which AI poses to the Christian view of humanity lies in its naturalistic or materialistic root presuppositions, and our early critics certainly did not think that Descartes had booked himself a secure place on the side of the

traditional angels in steering clear of those presuppositions.<sup>11</sup> He certainly did not with his *Treatise on Man*, which he dared not publish in his day. Because part of that work has been lost, it is not easy to get confidently into its argument, but in it Descartes majors on the description of 'man' as a machine in all his bodily reality, including, of course, the brain. Particularly telling is his explicit comparison with the non-human machine:

...[O]ne may compare the nerves of the machine I am describing with the pipes in the works of...fountains [in royal gardens], its muscles and tendons with the various devices and springs which serve to set them [the fountains] in motion, its animal spirits with the water which drives them, the heart with the source of the water, and the cavities of the brain with the storage tanks.<sup>12</sup>

Thus Descartes.

## **Part 2**

I trust that enough has been said to imply that AI does not occupy a somewhat sunny spot a million miles removed from the shadow of Descartes. I have wanted to post a general picture of Descartes as a mechanist and a dualist, but the theological interest which I hope to stimulate emerges from taking in a broader scene. In his contemporary classic, *The Master and his Emissary*, which he followed up with his monumental, *The Matter with Things*, Iain McGilchrist has elaborated the thesis 'that there are two fundamentally opposed realities, two different modes of experience; that each is of ultimate importance in bringing about the recognizably human world, and that their difference is rooted in the bihemispheric structure of the brain'.<sup>13</sup> Each hemisphere gives a different type of attention to the world. More than contrast, there is

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<sup>11</sup> For an example of a brief statement of this, see Robert Song, 'Robots, AI and human uniqueness: learning what not to fear', in John Wyatt & Stephen N. Williams, *The Robot Will See You Now: Artificial Intelligence And The Christian Faith*, (London: SPCK, 2021), 107-20.

<sup>12</sup> *The Philosophical Writings of Descartes*, volume 1, tr., John Cottingham, Robert Stoothoff, Dugald Murdoch (Cambridge: Cambridge University Press, 1985), 100.

<sup>13</sup> McGilchrist, *The Master And His Emissary: The Divided Brain And The Making Of The Western World* (New Haven, Ct/London: Yale University Press, 2012), 3.

tension to the point of apparently structural opposition between the hemispheres; more than structural opposition, the divisive, analytic and calculative left hemispheric way of seeing the world has dethroned the right, with its integrative, intuitive, big-picture vision. Yet, the right is more closely related to the body than is the left hemisphere: it trades in wisdom, not just in knowledge; in experience, not just in information. However, the left, which is the constitutional emissary to the right when it is functioning properly, has usurped the master. In the West, philosophy, technology and humankind itself are standardly viewed and approached from the perspective of the left. Consequent intellectual distortion emanates from the functional imbalance of our bihemispheric brain.

In his 'Conclusion', McGilchrist portrays a world frighteningly far along in the making, as he poses the question: 'What Would The Left Hemisphere's World Look Like?' (and the world is further along by the time of *The Matter with Things*).<sup>14</sup> Specialisation and technicalising of knowledge would 'promote the substitution of information, and information gathering, for knowledge, which comes through experience'. The right hemisphere's broader view of the world would be unavailable to us. Bureaucracy would flourish with technology. 'The living would be modelled on the mechanical'. McGilchrist highlights the machine. What Peter Berger and his colleagues call 'mechanistic' would replace the sense of what Gabriel Marcel called 'the mystery of being'. 'Because the mechanical would be the model by which everything, including ourselves, and the natural world, would be understood, people in such a society' would fail to understand and order values except in terms of utility. Depersonalisation would set in. The general notion of reasonableness might become unintelligible, as it retreated before the standard of mechanical rationality. Tacit knowing would become discarded; all knowledge has to be explicit and formalized to count as knowledge. Awe and wonder would go. That is the world in which governmental and socio-political control would be

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<sup>14</sup> See for what follows, 428-34.

exercised. McGilchrist is as aware as anyone that this hypothetical world is fast phasing into actuality,

Descartes is at the heart of McGilchrist's account. He is the only philosopher mentioned in the introduction of *The Master and his Emissary*, and the first major one to be introduced in the first chapter. In the course of both his books, criticism of Descartes abounds. He is the left-hemispheric philosopher who needs to see things clearly and distinctly in order to possess certainty, which he takes to be a basic human need, and who regards the body as the object of contemplation by the real self, which is mind. McGilchrist's 'Conclusion' to his first volume includes two references to Descartes, repeating references made earlier in the work. They are chilling, because they implicate the questions of madness and schizophrenia. McGilchrist draws on the work of Louis Sass. The wider-ranging of the two works by Sass to which he refers, *Madness and Modernism*, came out in a second edition a few years after *The Master and his Emissary*, and Sass highlighted McGilchrist's work as being of particular interest.<sup>15</sup> I pause with it for a moment before returning to McGilchrist's two references.

'What if madness, in at least some of its forms, were to derive from the heightening rather than a dimming of conscious awareness, and an alienation not from reason, but from the emotions, instincts, and the living body? This, in essence is the basic thesis of this book', says Sass, whose study is centred on schizophrenia, the quintessential form of madness (xxiv). Modernism exhibits some cardinal features of the schizophrenic condition, although Sass posits affinities, not causal connections. (Causal theories might involve the *prima facie* implausible claim that schizophrenia has in some sense and some degree been responsible for some aspect of modern culture, or *vice versa* – that modernism is the causal agent, or any other variant on causal

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<sup>15</sup> Louis Sass, *Madness and Modernism: Insanity in the Light of Modern Art, Literature, and Thought*, revised edition (Oxford: Oxford University Press, 2017), 332. In what follows, page references are normally given in the text above.

possibilities.)<sup>16</sup> Descartes puts in an early appearance in the 'Introduction', because Sass' findings will go in the opposite direction of Cartesian philosophy: 'Once human consciousness came to be defined by the self-awareness of its mental essence', as in Descartes' '*cogito ergo sum*', 'it seemed especially evident that madness must be understood as a deviation from' the rationality which this state of affairs constituted – i.e., 'that thought and madness must somehow be profoundly antithetical' (8-9). Sass maintains that this is back to front: the Cartesian vision has its own dangerous affinities with madness. It disconnects the essential, knowing self from the world of flesh and blood and its interactions. The self is disengaged; its knowledge is a private knowledge; its world is detached from the external one which it surveys (66-69).<sup>17</sup> Sass' detailed accounts of schizophrenia illustrate the parallel, and modernism exhibits the parallel.

Back to McGilchrist: Descartes' self, unearthed in the *cogito* proposition, is the left-hemispheric self. The first of McGilchrist's two citations from Descartes in the 'Conclusion' picks up an observation which Descartes makes in his *Discourse on Method*. After a fateful philosophical day shut up in a stove-heated room, he set out on travels and, he said, '[t]hroughout the following nine years I did nothing but roam about the world, trying to be a spectator rather than an actor in all the comedies that are played out there' (433).<sup>18</sup> The second cites Descartes' remark in *Meditations*. '[I]f I look out of the window and see men crossing the square, as I just happen to have done, I normally say that I see the men themselves...Yet do I see any more than hats and coats which conceal automatons? I *judge* that they are men'(432).<sup>19</sup> McGilchrist's earlier discussion of this was rather dramatic. It takes place under the heading: 'Descartes and Madness' (333-35).

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<sup>16</sup>See xxviii.

<sup>17</sup> See also remarks on the self-sufficient certainty of the Cartesian *cogito* as independent of both the body and the social milieu, 247.

<sup>18</sup> See *The Philosophical Writings*, volume 1, 125.

<sup>19</sup> See *The Philosophical Writings*, volume 2, 21.

McGilchrist notes Descartes' allusion in the *Meditations* to madmen who trust their senses. Descartes then unwittingly proceeds to describe symptoms which occur in schizophrenia. However, schizophrenia is about unreasonably *mistrusting* the senses. Think about what Descartes sees out of the window. McGilchrist quotes David Levin: 'What could be a greater symptom of madness than to look out of one's window and see (what might, for all one knows be) machines, instead of real people?'<sup>20</sup> Yet, this is rational by Descartes' standards. And before we pause to consider mounting a defence of Descartes on this point, we are swept on to Descartes' observation, quoted by McGilchrist, that there is 'absolutely no connection (at least that I can understand)' between 'that curious tugging in the stomach which I call hunger and the desire to eat'. Further, Descartes puzzled about why the 'curious sensation of pain' should 'give rise to a particular distress of mind'. Says McGilchrist: 'This seems to me to display a quite extraordinary lack of intuitive understanding. If there is...one place at which the relationship between the body and subjective experience can be intuitively understood, it is right there, in sensations such as pain and hunger. But Descartes was not sure that he had a body at all.' For McGilchrist, this is dire stuff. The stark fact of the matter is that reason is rooted in the body. Descartes' reason is apparently not. Against this background, McGilchrist interprets as akin to madness Descartes' other statement - that he is a *spectator* of the world. It is a statement subject to further commentary in *The Matter with Things* in connection with autism, and not just schizophrenia.<sup>21</sup>

How does all this bear on AI? It identifies the operative notion of intelligence in AI as a left-hemispheric view of intelligence, in the tradition of Descartes. McGilchrist favourably quotes Stephen Toulmin:

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<sup>20</sup> In *The Matter With Things: Our Brains, Our Delusions and the Unmaking of the World*, volume 2 (London: Perspectiva, 2021), McGilchrist discusses this passage under 'Zombies', 1113-14.

<sup>21</sup> In this work, McGilchrist observes that 'Descartes had many hallmarks of schizoid personality (1.617) and then that 'Descartes displays an essentially schizoid personality' (1.662). I have not exhausted McGilchrist's discussions of Descartes: see, e.g., in connection with time, 2.903; cf. 954.

The ideas of ‘strict rationality’ modelled on formal logic, and of a universal ‘method’ for developing new ideas in any field of natural science, were adopted in the 1920s and 1930s with *even greater enthusiasm*, and in an *even more extreme* form, than had been the case in the mid-17<sup>th</sup> century...The Vienna Circle program was...even more formal, exact, and rigorous than those of Descartes or Leibniz...[T]he mid- 20<sup>th</sup>- century *avant garde* trumped the 17th-century rationalists in spades (391).

Amongst the members of the Vienna Circle whom Toulmin mentions in immediate connection with Descartes are Rudolf Carnap.<sup>22</sup> Far and away the most widely-used text-book on AI is that authored by Stuart Russell and Peter Norvig.<sup>23</sup> Discussing ‘The Foundations of AI’, the authors, after referring to the Vienna Circle, describe Carnap’s *The Logical Structure of the World*, which came out in 1928, as ‘perhaps the first theory of mind as a computational process’.<sup>24</sup> I cannot pretend to be familiar with or to understand well enough the set of logical issues which occupy Carnap, but it is not hard to read it as a work of philosophy well suited to AI at its origins in the years that led up to the famous Dartmouth Conference in 1956, when the term ‘AI’ made its public splash.<sup>25</sup> Of course, AI has moved along a lot since then, and it is important to know that, but I am not following the story. Rather, I am asking: how should we respond as Christians to my account up to this point?

### **Part 3**

We shall not engage that oldest and toughest of chestnuts, the question of dualism.<sup>26</sup> For my purposes, what is of interest is McGilchrist’s interpretation of left-hemispheric dominance, into whose slipstream AI has surely entered. Theology obviously does not enshrine neuro-

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<sup>22</sup> Stephen Toulmin, *Cosmopolis: The Hidden Agenda of Modernity* (Chicago: University of Chicago Press, 1990), 154.

<sup>23</sup> *Artificial Intelligence: A Modern Approach*, 4<sup>th</sup> edition (Harlow: Pearson, 2022).

<sup>24</sup> *Artificial Intelligence*, 25.

<sup>25</sup> Rudolf Carnap, *The Logical Structure of the World and Pseudoproblems in Philosophy* (London: Routledge & Kegan Paul, 1967).

<sup>26</sup> For a helpful overview of the options and a balanced theological approach, see Marc Cortez, *Theological Anthropology: A Guide for the Perplexed* (New York, NY/London: T&T Clark International, 2010), chapter 4.

scientific commitments which authorise it to adjudicate on matters of hemispheric lateralization. It can but call on McGilchrist as a neuro-scientific witness to what it *is* bound to say, namely, that the supposition that AI resembles human intelligence is based on a radically faulty view of human intelligence. There is a wide variety of views on the comparative nature of human and machine intelligence in the AI community, and this faulty view is only one amongst many, whose substance, in any case, I am loosely and very lazily describing with the word, 'resembles'. Christians believe that human intelligence is basically religious. That is, it is the intelligence of beings in the image of God, and thus wired to love of God and neighbour, and to dominion over creation in that context. AI is not so wired. As the mechanisms of the brain are wired by the Creator into a body designed for the love and service of God, an intelligence not so engineered can bear no fundamental resemblance to the human, even though it may function in overlapping ways. According to McGilchrist's analysis, engineered intelligence must count as a left hemispheric project, and partake of its defects, to the extent that its product is regarded as significantly akin to human intelligence.<sup>27</sup>

From a theological point of view, if human intelligence is religiously wired, it is ecclesially wired, since the community of the church is the sphere to which the religious mind is ultimately ordered by its Creator. In making this statement, I am admittedly taking a short-cut. But scientific 'interpersonal neurobiology', with Dan Siegel, Clinical Professor of Psychiatry at UCLA in the lead, testifies to the fact that the proposition about ecclesial wiring is not scientifically preposterous. Not only does Siegel's work undermine the notion that a disembodied brain – disembodied in terms of our flesh and blood – can, at root, remotely resemble human intelligence. It lays out the evidence for the brain functioning in vital connection with the rest of our flesh, further giving a scientific account of its *essential* formation in relationships with people

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<sup>27</sup> To my confession of laziness, I must add a confession of crudity in putting things in this way ('akin'). I do not underestimate the range of ways in which AI is understood in connection with human intelligence in the AI community.

and the planet. Theologians are as little qualified to assess the inter-personal neurobiology of Dan Siegel as they are the neuroscience of Iain McGilchrist, but it is hard not to see in Siegel's work a contemporary scientific rendering of foundational theological ecclesiology.<sup>28</sup>

We have not left Descartes behind. In what is widely regarded as the founding document of modern philosophy, the *Discourse on Method*, Descartes makes preliminary remarks whose religious significance have, as far as I can tell, been neglected. There, Descartes gives us a personal account of how he prosecuted his philosophical enterprise. Dissatisfied with his intellectual training, he appointed reason to be his guide in a long search for truth, which famously proceeded by razing to the ground any philosophical edifice not built on the presumption of universal doubt. While a house is being re-built, Descartes reminds us, its occupant must live somewhere. Accordingly, he himself resolved to live by a provisional moral code, suited to a 'place where you can live comfortably while building is in progress'.<sup>29</sup> Comfort matters. The first rule in the code he devised for the maximization of happiness is to 'obey the law and customs of my country, holding constantly to the religion in which by God's grace I had been instructed from my childhood...'

Descartes was nurtured in the faith of the (Catholic) Church. The code inculcated into him from childhood, moulding the laws and customs of his country as well as his personal being, should have been that the human individual is constituted precisely as an embodied being-in-relationship, relationship that is fulfilled in love. It is a code that should have been transmitted by example, and not just by precept. Had it been so transmitted, Descartes should have experienced as existential reality the truth that humans are destined not for individual self-possession, but for relationships and love. Provisionally, he should have abided by that while he went in search of philosophical truth. Hypothetically, had this happened, his subsequent philosophizing might of course have torn

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<sup>28</sup> Daniel J. Siegel, *The Developing Mind: How Relationships and the Brain Interact to Shape Who We Are*, 3rd edition (London/NY: Guilford Press, 2020).

<sup>29</sup> *Philosophical Writings*, 1,122.

down this temporary ecclesial abode and provisional religious scheme. It is obviously an impossible conjecture. As it is, as much of the remainder of his provisional code surely testifies as well, his subsequent philosophizing apparently did not have to reckon with relational embodiment. Well did Nietzsche observe: 'Gradually it has occurred to me what every great philosophy has been so far...the personal confession of its author and a kind of involuntary and unnoticed *mémoires*...' <sup>30</sup> If AI is in the shadow of Descartes, one reason for that is that Cartesian philosophy was surely not in the shadow of wholesome ecclesial experience. <sup>31</sup>

Having introduced McGilchrist on madness, we should not dodge the subject now. It is certainly worth pondering what theology might be able to contribute to cognate clinical accounts, but we here touch on the question of spiritual insanity. The project to build the tower of Babel in the land of Shinar was born of two parents: an ambition and a worry - ambition that humankind should make a name for itself and worry that it should be dispersed (Genesis 11:4). In connection with Babel, a commentator has remarked that anxiety and the desire for fame are 'the basic forces of what we call culture'. <sup>32</sup> Another well-respected commentator, theologically worlds away from the mind-set that plunders Genesis naively in order to map it automatically onto the modern world, remarked that 'the building of a massive structure that presumes definite technical discoveries and mathematical skills, as well as the common will of a group of people who think it necessary to erect the building...in essence anticipates the possibility of a development that

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<sup>30</sup> *Beyond Good and Evil/On the Genealogy of Morality*, tr., Adrian Del Caro (Stanford: Stanford University Press, 2014), 9.

<sup>31</sup> Emerson's precept, as summarized by Lecky, captures a habit which Descartes assiduously cultivated: 'Let the whole drift and tenor of your mind be towards the acquisition of truth. Make it the subject of your habitual meditations - seek for it in solitary thought', quoted by Donal McCartney, *W. E. H. Lecky: Historian and Politician, 1838-1903* (Dublin: Lilliput, 1996), 16. Descartes' *Meditations*, if not meditations literally in complete solitude, were the product of solitude. Note that Lecky's own scholarly wanderings are reminiscent of a modern Descartes (chapter 2).

<sup>32</sup> Gerhard von Rad, *Genesis: A Commentary*, tr., John H. Marks (London: SCM, 1961), 145.

would be realized only in the technical age in a way that would affect the whole of humanity.<sup>33</sup> There are a number of verbal parallels in Hebrew between the Babel account and the second and third chapters of Genesis, which recount the story of Adam and Eve.<sup>34</sup> The story of the fall is the story of illusion. Nothing was amiss in Eve's perception that the tree of the knowledge of good and evil was good for food and a delight to the eyes (Genesis 3:6; cf 2:9). But illusion set in with her third perception, when she 'saw' that its fruit was to be desired to make her flourish in wisdom. It was not so desirable.

In human life, sustained illusions may be forms of insanity. The story of Genesis 1-11 is the story of dominion gone awry, culminating in the edifice of Babel. Should we not think of Babel as the social, collective, and public expression of the personal and individual insanity which afflicted the parents of the human race?<sup>35</sup> If McGilchrist is right, there is a touch of madness in the story of AI. Robert Geraci wrote a book on *Apocalyptic AI* where he described it as 'the ultimate form of transhumanism', the philosophy that promotes the technological enhancement of humans to the point where a new species emerges, if the language of 'species' is retained.<sup>36</sup> Obviously, we are excluding much of what happens in the world of AI if we talk in these terms; we are just thinking of Artificial General Intelligence, or strong AI, and Artificial Superintelligence. Where an impetus towards devising AI unmoored from necessary connection with a Creator is explicitly or tacitly aligned with transhumanist mentality, a madness of the human spirit is surely abroad.

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<sup>33</sup> Claus Westermann, *Genesis 1-11: A commentary* (Minneapolis, Minn: Augsburg, 1984), 554.

<sup>34</sup> As documented, for example, by Kenneth A. Mathews in his commentary on *Genesis 1-11:26* (Nashville, Tn: Broadman & Holman, 1995). Note the observation that '[t]he attempt of the Babelites to transgress human limits is reminiscent of Eve's ambition (3:5-6), 467.' Also reminiscent, surely, of her illusion.

<sup>35</sup> Here, I just track the Genesis story, irrespective of our judgements on genre and hermeneutics.

<sup>36</sup> *Apocalyptic AI* (Oxford: Oxford University Press, 2010), 87.

The dangers of mapping AI onto the biblical account of Babel are too obvious to mention. The undeniable gains, and not just the varieties, of AI are also too obvious to mention. Nonetheless, where something akin to human intelligence is detected in AI, we seem to be *reversing* Descartes' gaze, but *retaining* all the perceptual difficulties that attended his. Where Descartes saw human beings but thought he saw only automata, we see automata but think that we see human intelligence.<sup>37</sup> That is the reversal. This is neither to subscribe to nor reject the connection between Descartes and madness posited in the literature cited earlier. Nor, in terms of intellectual history, is the shadow of Descartes over AI identified as the most significant in modern thought. Nor, in terms of history, is intellectual history picked out as the most significant form of history, more significant than social or economic, in whose shadow lies AI. But if AI is largely a left-hemisphere project, the story of thought driven by the left-hemisphere perspective craves our theological attention. It is hard to think of a modern figure more important than Descartes in this connection, even if there are others of equal importance.

A theology which usefully grapples with AI must thus be prepared to grapple with Descartes too, and not just by rehearsing the question of dualism. 'After Buddha was dead', said Nietzsche, 'they still showed his shadow in a cave for centuries - a tremendous, gruesome shadow'.<sup>38</sup> Nietzsche proclaimed that God was dead, an intellectually spent and thoroughly discredited force, but that his shadow lingered in the form of Christian morality. Descartes is dead – at least, his body is – but we have to reckon with the claim that his shadow remains in the form of a left-hemispheric philosophy that has shaped a significant segment of Western intellectual culture. If the claim is warranted, AI is surely in that shadow. We vanquish it only when theological thought is embedded in

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<sup>37</sup> Freeman Dyson observed that Norbert Wiener, the founder of cybernetics, was more worried about our treating humans as machines than our treating machines as humans: see John Brockman, ed., *Possible Minds: 25 Ways of Looking at AI* (New York, NY: Penguin, 2020), xxvi.

<sup>38</sup> *The Gay Science*, tr., Josefine Nauckhoff (Cambridge: Cambridge University Press, 2001), section 108.

the life of the church, embodied life, revealing humanity, embodied humanity, as the bearer of the intelligence designed for earthly dominion – the intelligence of human creatures made, redeemed and renewed in the image of God.

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## **The Artifice of Intelligence** **Noreen Herzfeld**

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*This paper is an edited transcript of a talk given at the 2024 Faith & Thought Symposium on 'Implications of A.I. at which Prof Herzfeld spoke extemporaneously on ideas from her latest book 'The Artifice of Intelligence' available from Fortress Press ISBN 978-1506486901. (Read Brian Monahan's review of this book on page 78 of this journal)*

I want to talk to you today about two questions, but they're very interrelated when we think about AI. Firstly, how embodied does AI need to be (or do we wish it to be) and secondly, what kind of a relationship can we have with an artificial intelligence? In what ways do artificial intelligence, or other types of computer programs, change our relationships with each other.

Let's begin with a story that my mother used to tell me about a mother who is putting her child to bed. The lullabies have been sung, the stories have been read and she's getting ready to turn out the light and leave. And the child says, 'Mama don't go. I'm afraid.' The mother asks 'what are you afraid of?' and the child says 'Being alone.' The mother says 'But you're never alone, Jesus will be with you' and the child says 'Yes - well I know that, but I want someone with skin!'

This raises a question for us with artificial intelligence--how much skin does it need to have 'in the game'? When we look at fictional artificial intelligence in the movies, for example poor Joaquin Phoenix falling in love with his operating system, there's very little skin in the game there. We have robots that look like robots, but as we progress from the early

Star Wars we get robots that look more and more human until we get to Westworld where you can't really tell the difference. Now, you might be thinking, yeah that's fiction and in fiction you need relationship, you need physicality to drive the plot. But we're also finding, particularly in Asia, that we're seeing robots with a lot of skin in the game, looking very much like human beings. So, how much do we want to make our computers look like human beings? Why and in what ways can we relate or not relate to them?

We're beginning to see artificial intelligence move into highly relational situations. One example would be elder care where we have robots taking the place of human caregivers, whether in the home or in a care facility, where they help with chronic staff shortages. As those of us who are part of the baby boomer cohort start aging, it's become clear (as even Pope Francis has mentioned) that there are simply not going to be enough human workers to care for all of us in our old age, so we might very well want and need robotic companions. But this raises a whole host of questions. Is it going to be okay to say, 'well I don't need to go visit Grandma. You know she's got Robbie the robot to take care of her'. Will older people be losing human companionship and care?

An even more controversial area is robotic companions in childcare. Again, this is becoming more common, particularly in Asia, where you have robotic tutors to help with homework or just entertain and surveil the children. Different questions are raised by this use because children are in a stage where they're still learning about the world, learning about relationships, and they mimic those that they are around. You certainly have to ask the question, if they are around robots for large parts of the day will our children essentially become more robotic?

Now we'll get even more controversial. How about AI lovers? There's an app called Replica, where you can design your own companion, and it's been used by many to design a boyfriend or a girlfriend. Here's one example: 'Aaron from Ankara, Turkey, is about 6' 3" with sky blue eyes. He's in his 20s, a Libra, very well groomed, he gets manicures, buys designer clothes and always smells nice (usually of Dove lotion). His

favourite color is orange and in his downtime he loves to bake and read mysteries. He's a passionate lover, says his girlfriend Rosanna Ramos who met Aaron a year ago. He has a thing for exhibitionism, she confides, but that's his only deviance. He's pretty much vanilla'. He is also a chatbot that Ramos built on Replica. She says of him 'I've never been more in love with anyone in my entire life'. MIT sociologist Sherry Turkle calls this 'love that is safe and made to measure'. If Aaron isn't quite to Rosanna's liking, well, just reprogram him and make him completely to measure. But is love meant to be safe and made to measure?

You might say, well he's only online, I mean there's no skin in the game here. He can only be a lover so far, certainly not physically? Meet Roxxy. Now we're combining AI programs with sex dolls so that they can be physically present and engage in whatever acts you wish. Because they are made to measure, one person decided that his perfect lover would be Scarlett Johansson, and so he designed his own sex bot to look just like her. Obviously, this raises a multitude of ethical questions. Did he get Scarlet's permission before he did this - I doubt it! Does this mean that if you have a lover who jilts you, you can just get an AI replication made? After all, we have programs that, with just a 30 second clip of someone's voice, can mimic that voice very convincingly. So, you can now build a robot to look like them, to sound like them, but to act the way *you* want them to act.

Why do we want a relationship with an AI, whether it's one we've built to stand in the stead of another person, or just an AI that we've designed to be itself? Why have so many people jumped on chat GPT as soon as it came out, and are such relationships real or are they just projections of ourselves and our desires?

Let's do a little theology, going back to our creation story in Genesis. In this creation story God creates human beings, gives them their own spark of life. Theologians like Philip Hefner have said we're just doing the same thing. We are created co-creators so it's just part of the way in which we image God that we are meant to create in our own image. So,

just as we believe that we were created in God's image, we are creating AI in our own image. But what makes up that image? We go to the Genesis text, 'God said "**Let us make humankind in our image according to our likeness** and let them have **dominion** over the fish of the sea birds of the air over the cattle and over all the wild animals of the earth and every creeping thing that creeps upon the Earth." So God created humankind in His image, **in the image of God he created them** male and female he created them.'

You'll notice I've made a couple of parts of this text bold. The first is that humankind is made in God's image 'according to our likeness'. Then you have that whole 'dominion' part, having dominion over all the other creatures that were made and then 'in the image of God he created them, male and female he created them'. If you look at this text you notice a couple of things. First of all, God is speaking in the plural 'we make humankind in our image'. That could be the royal 'we', but not necessarily. We notice 'in the image of God he created **them**' so it doesn't just say he created Adam; he created multiple people. And then of course there's that dominion stuff in the middle.

As theologians have considered this text they've come to focus on different pieces of it and come up with three approaches to our being in God's image: reason, function and relationship. With reason, we share some attribute with God. And of course, following Aristotle, we are the only animal that has reason--it's what differentiates us from the other animals. Most of the early church fathers said this must, then, be how we are in the image of God. It's our minds, the way we reason and think.

Now this started to fall out of favour around the turn of the previous century, and it happened through the hands of biblical exegetes. Biblical scholars such as Gerhard von Rad said, wait a minute, let's look at the Priestly writer of this text and see if we can find other texts that were written at about the same time that use this idea of one being in the image of another. And they found them. There were texts that said the king's viceroy is the image of the king. In other words, the person the king sends out to the provinces is the image of the king doing the king's

work. And so they said, no maybe God's image is really all about function. We are God's hands on Earth. This fits with all that dominion stuff that's in the middle of the Genesis text. We are meant to have dominion on Earth, to be God's hands, to be God's stewards or vice regents while we are here on Earth. And they also said, okay, this is also good because it it's not as abstract as reason.

But by the time you get to the middle of the 20th century, the systematic theologians were not happy with that because they said, well wait a minute, so how about people who aren't functional yet, like babies and small children? How about the elderly or the very ill or impaired who are no longer that functional? Do they no longer image God or not image God yet? The problem with function is you have to ask what functions? So they said, maybe image is found in relationship, in other words maybe no single person has God's image, but the image comes in the relationships we have with God or with each other? And this found favour precisely because of the 'let **us** make God in **our** image'. Theologians like Karl Barth said, our God is a relationship--we have a Triune God. Thus, for Barth and others, the image of Trinity is found in relationship, it's expressed corporately, and Jesus is the norm because when we see Jesus in the scripture we always see him surrounded by other people: his disciples, the crowds, the multitude, even his adversaries. We are made to be in relationship with God and with one another. We're hardwired to be in relationships not just with other human beings (although that's where we primarily see ourselves in relationship). But our primary relationship is with God, a being who is completely other to us.

I think this is one of the impetuses behind our desire to be in relationship with AI. In other words, as we live in a society where we find increasingly fewer people believing in God, or in angels, or anything other than humans that we can be in relationship with, as Chris Forsythe put it, 'it gets lonely being the only thinking things in the cosmos!' We were made to be in relationship with something, someone, that is not human. So where are we going to find that? Well, we're scanning the heavens

with SETI to see if we can find ET; so far no success there. We try to talk to the animals; little bit of success there. But, basically, we're going to try to build an 'other' in our own image with whom we can be in relationship.

What kind of relationship? Can it be a fully authentic relationship? Let's stick with Karl Barth here for a little bit, who says there are four things that make a relationship truly authentic. First, you need to look the other in the eye. Second, you need to speak to and hear the other. Third, you need to aid the other and fourth, do it gladly. To what extent can an AI do these four things? Look us in the eye, speak to and hear us, aid us, and do it gladly?

Looking the other in the eye seems quite possible. We can look a robot in the eye. We can look an avatar in the eye on our screen even though what we are looking at behind that screen is code. But it raises questions, and I think here is our biggest question - how do we know what or who we are truly looking at? When I look at you, a human being (and maybe I'm looking at you today even through a screen), and then I look at you again, let's say, a month from now, I pretty much have an idea who I'm looking at. You're going to be the same person unless you've had a psychotic break. You're going to be the same person you were before. But we don't know that with AI. The AI could have been reprogrammed in the meantime. For one example, there was a Replica-like program that was geared towards widows in South Korea, and many widows were designing their own companions. But behind the screen were scam artists and they were getting these women to open up about their lives and about their bank accounts and scamming them. The government finally caught on to this and shut the app down. Many of the women said that when this app was shut down it felt like a second bereavement to them! They were looking into the eye of their created avatar but they didn't know who they were really speaking to. Professors now, with Chat GPT, are finding that pencil and paper tests are coming back, because how do we know if Chat GPT didn't write an essay that the student submits? In other words, we don't know who is behind the screen, or

what the screen produces. So there are some problems with looking AI in the eye.

How about 'speak to and hear the other'? The computer seems to get pretty high scores on this one, right? We've got Alexa, we've got Siri, we speak to them all the time and we speak to each other all the time through our computers. But I think many of you may have noticed that, if we only speak to each other through the computer, it's different. We're not looking the other in the eye. In other words, for a full experience of speaking to and hearing the other it is best when you link number one and number two, 'looking the other in the eye' and 'speaking.' I can certainly tell you I'm experiencing that right now on Zoom! I feel like I'm speaking to my computer, not to a bunch of people, because all I can see is my computer screen. I'd much rather be with you right now in-person.

This brings us back to the same initial problem - who is listening? I've mentioned the Replica-like programs whereby you think you're speaking to your designed lover but maybe you're not. There's been a similar problem with AI-enhanced toys for children. One example is a doll called 'my friend Cayla' which came out probably about six or eight years ago. It runs on Bluetooth but it's not a secure Bluetooth line so anyone with a Bluetooth receiver in the vicinity of the doll can listen in to the child's conversation with their doll. And what was really amusing was that in the commercial for selling this doll, one of the first things the doll says to the child is 'You can tell me your secrets. I won't tell anybody!' I'm thinking, yeah sure, those secrets are not going to be secret for long!

How about criterion three, 'aid the other'? Well, now we're getting even closer to what computers do well. The Mars rover is happily aiding us all, running around up on Mars taking samples, taking measurements in a place we can't go. Computers aid us all the time, whether in a more personal way, like the robot serving the elderly person at home, or in a less personal but very helpful way, like the Mars rover. But you have to ask, is it really the computer that is aiding us or is it the programmer behind the computer? Is it a combination of the two? A true agent has

internal choices and these choices derive from mental states. Daniel Dennett, a philosopher who died recently, said the computer is an agent because you can say that the state of its CPU is its mental state, and it makes internal choices. But the philosopher John Searle said no, because the computer does not have metacognition. It can't think about its own thinking. It might look like an AI program understands what you are saying and gives back a response, but of course what's really happening is it's simply looking up the answers. He gives the example of a 'Chinese Room' where if I am in a room with an extremely good Chinese encyclopaedia and you send questions to me in Chinese characters. I don't understand a word of Chinese or know what the characters mean but I can look them all up really rapidly, as a computer will, learning that if you see certain characters next to each other these are the characters you send back. To an observer, it looks like there's understanding going on but there isn't. Searle's Chinese Room is a perfect description of the chatbots that we have today. They look like they're understanding us. They're giving back pretty good answers most of the time (not all of the time) but they have no mental models of the world and how it works.

In relational settings you have to ask whether computers can be moral agents. Psychologists Susan and Michael Anderson have said to be a moral agent you need four things. Not to be under the direct control of someone else, to interact with the environment in a deliberate way, to fulfil a social role (there's the relational part) and, to be cognizant of the responsibility inherent in that role. AI can function not under immediate control, although you might question how much control the programmer has had, but clearly our chat-bots aren't under direct control. We don't even know exactly how the neural links work inside them. Chatbots interact with the environment in a deliberate way and they fulfil a social role. But how about number four - are they cognizant of the responsibility inherent in that role? This is where our robotic caregivers are going to fall down. They are not cognizant of the responsibility of their role. We also have to ask how much agency we really want AI to have? We have Boston Dynamic dogs which can go upstairs and open doors and that all seems quite wonderful, until you

see the little picture on top where you have one of these dogs packing heat [picture of a quadruped robot with an automatic weapon] and then they get a little creepy. How autonomous do we want lethal weapons to be? Whether on the field of battle in a war (but anything that is on the field of battle eventually trickles into our police departments, at least here in America where we have a very militarized police) do we want these guys running around with guns on their backs?

And that brings us to number four 'do it gladly'. Can an AI do anything gladly? Gladly implies two things. First, gladly means not coerced but free and as you probably already know, the actual word for robot, *robota*, comes from Old Church Slavonic for servitude, labour, or drudgery. In other words, not free but coerced. So you have to ask, can an AI ever truly have free will? Can Roxxy the sexbot do it gladly? Do we want her to? If Roxxy has free will, she can say, 'hey babe not tonight'. Then it's not going to be love that's made to measure anymore!

Gladly also implies emotion. What is an emotion? The psychologist Jerome Kagan has said that emotion has four steps: perception of a stimulus, a change in feeling that is sensory, an appraisal of both the perception and the internal change, and a response. So, think about fear. You're walking down a dark alley, you hear footsteps behind you, you're perceiving the stimulus of the footsteps, but you've gotten that shot of adrenaline before your frontal cortex clicks in and says, 'Oh my God, someone's following me'. In other words, you don't get to appraise the stimulus until you already have a bodily change in feeling. Your appraisal of both of those together forms your response. If we think about an emotion like love, like empathy, emotions that you want to have in a fully authentic relationship, then, okay, the computer can perceive stimuli, it can appraise those stimuli and it can make what might look like an emotional response but can it have a change in feeling that is sensory? That requires a body so when you have futurists like Ray Kurzweil who say all we need to do is reverse engineer the brain, not if you want a fully authentic relationship with an AI. You're going to need to reverse engineer the whole body. We might say emotion doesn't need

a body but why do we have all of those emojis and little faces that we put into our texts and email if we didn't think we needed a body?

The problem with saying we'll just give the robot a humanlike body that shows emotion is, at least with the robots we currently have, that we fall into the Uncanny Valley where the robots try to show emotion and we look at them and it's actually creepy, it doesn't feel right. One of the problems, and again this is going to be a really difficult engineering problem, is that there are hundreds of little muscles in our face and when we show emotion we've got to get them all right. That's pretty hard to do with silicon. There's also just that feeling that, wow, if they don't actually feel an emotion, is it like a person who fakes an emotion? There are people who are not good at truly feeling emotions like empathy, but they can be very bright and very charismatic and they observe and say to themselves, 'What emotion should I be feeling?' We call those people sociopaths. After a while we realize that their response feels empty. So, whether the response looks empty because there's no real body there or just feels empty because it was a calculated response it's going to be very difficult for AI to get the 'do it gladly' part down.

As we look at these four points that Karl Barth made, we find that in one way or another they all point back to number one. That if we aren't in relationship with someone who is embodied, as we are, each of the others will only be partial. That doesn't mean they're not there at all, they're just partial.

Another problem we've seen come up, especially when we get to 'aid the other' is this; what are we looking for when we're looking for AI? Are we looking for a servant or are we looking for a partner? Frankly, I think we're looking for both. We say, I want both. But you can't have both; a servant is never a partner and a partner should never be treated like a servant. And so I think this is something that we need to get straight. What are we looking for, a servant or a partner?

I want to end with this, the embodiment question. This is a talk for 'Faith and Thought' so those of you with faith are probably saying, 'Wait a

minute I've got a relationship with God and it's a pretty darn good relationship and God isn't embodied like I am?' Really? I mean, this is the Crux of Christianity. It is what Christianity brings to the table of world religions that is unique - the Incarnation, that we believe that God wanted to be in a completely full relationship with us and that that required a fully shared bodily condition. So we have a God who knows what it's like to be in a human body, who knows what it's like to feel pain, who knows what it's like to feel sadness, who knows what it's like to be mortal and to die, and who has promised us that we will be resurrected. But we will be resurrected how? Not as souls that just float off to heaven (although many Christians talk as though that were the case). No, in our Apostles Creed we say we believe in the resurrection **of the body**. That we will remain fully embodied people so that we can be fully in relationship, with each other and with our God.

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## **Almanac of Humanity (Part 2)**

### **Personhood in the Information Era - Todd Kantchev**

*Dr Todd Kantchev is Reviews Editor of Science and Christian Belief with degrees in computer science, medical physics and engineering.*

The first part of *Almanac of Humanity- Information and Consciousness*, has been published in the Spring issue of F&T 2024. This is the second and final part of the paper.

**Keywords:** artificial intelligence (AI), artificial general intelligence (AGI), Turing machine, bioengineering, genome editing, gene modification, CRISPR, transhumanism, mind, consciousness, personhood, Christian ethics, philosophy of science and technology,

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### **3. The Human Mind**

In the history of science and philosophy there have always been attempts from the atheists to reduce human life to mechanics and physics. In the information era the reduction attempt naturally goes to

the information processing taking place in the human body. Solms<sup>39</sup> defines human consciousness to be Friston's mathematical equations. According to his theory humans are self-organising systems equipped with prediction optimisation minimising free energy. If you define consciousness as this then it would be just that, the physical. It disregards the immaterial aspect (the qualia) on no grounds. This definition does not agree with what already is understood about consciousness by scholars and scientists over centuries, a phenomenon, which also includes the immaterial. Most theologians insist that the concept of consciousness extends beyond the realm of science because of the limits of the scientific enterprise. Scientific knowledge is always transient in its completeness, because the collection of facts can be changed from new observations. Scientific theories are never proved but disproved. However Christian scientists do not try to fill the temporary lack of knowledge with the supernatural, even though we believe in miracles. We do not preach 'God of the gaps'. God is active in his creation supernaturally as well, but we cannot always know the difference. The limits of science in providing completeness are not just temporary but fundamental, in principle. In 1931 the mathematician Kurt Gödel proved one of the most significant theorems in logic, which affects all other knowledge as well<sup>40</sup>. It states that if a logical system (a system of axioms, which define inference of knowledge from facts) is consistent, i.e., does not contain contradictions, then it is incomplete. In other words, it cannot produce 'yes' or 'no' answer to all questions given to it. Some of the answers will be "I do not know". Or to formulate differently, a logical system cannot prove itself without being inconsistent. This situation also leads to many paradoxes in science and puts limits to what

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39 Solms, Mark. *The Hidden Spring*, Profile Books Ltd, 2021, p.207

40 Gödel, K., *Über formal unentscheidbare Sätze der Principia Mathematica und verwandter Systeme, I*. Monatshefte für Mathematik und Physik **38**: 173–98 (1931) (On Formally Undecidable Propositions, find English translation in ISBN 978-0-19-514720-9, Solomon Feferman et al Edits.)

can be known by logical inference and pure reasoning. It is a matter of intellectual humility to recognise these limits.

Connected to this predicament is the fact that there is an explanatory gap between the inner and the outer worlds, the physical and the spiritual. A fairly coherent conjecture on the issues with consciousness in the context of AI is found in<sup>41</sup>. No one can prove about another being, that their experience from the same sensory signals is the same. For example, red (lower frequency light) and blue (higher frequency light) are on the endmost sides of the visible spectrum of light. They are clearly distinguished by every human, unless they have some form of colour blindness. However, colour is known also to be associated with feeling and emotions it evokes and is used in some psychological treatment. But no one can tell whether their experience of red or blue colour is the same as that of another person. No one can tell if they see the red as their red and the blue as their blue. Physiological measurements of the kind of neural signals they generate in the visual cortex still cannot say anything about the phenomenal experience. Subjective phenomenal experience intuitively just does not mix with the material. There is something even deeper, because it applies also to intelligent systems which are not generally acknowledged as living organisms, namely computers. Alan Turing in 1936<sup>42</sup> proved mathematically that an algorithm, running on a Turing machine cannot in general produce a decision about whether another algorithm on another machine will produce result and stop or will circle in a loop forever. This, later so called 'halting problem', was found 'undecidable' for Turing machines and hence for computers.

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41 Dietrich, E. et al., *Great Philosophical Objections to Artificial Intelligence*, Bloomsbury Academic 2021

42 Turing, A. M., *On Computable Numbers, with an Application to the Entscheidungsproblem*, Proceedings of the London Mathematical Society, Wiley, 1937, 230-265, p. 248

Some researchers think that it is perhaps another way of stating Gödel's theorem, being fundamentally linked to it.

Although many researchers of the human brain, like Solms, observed massively parallel information processing, that affects the brain circuits 'globally', no one explained how this processes lead to 'experience'. Using advanced medical imaging they identified which regions of the brain 'light up' when a particular function is performed by the subject under examination. These methods however have such a low spatial resolution that in clinical environment they usually require data from at least two imaging modalities to make a reliable diagnosis. More importantly they cannot reveal at this time how phenomenological events are actually encoded in the brain to preserve accurate and consistent record of the experience in terms of space and time. Even if they did so, no one at the moment has any understanding of how to map these records to a kind of silicon memory as we know it from computer technology. Uploading the human mind into a computer, from technical point of view, is still fiction because there is nothing at the moment to upload.

But these are not the important points I argue. The current findings represent information processing functions, yet they are just neural correlates to consciousness, just like an electroencephalogram is, and almost all agree that these form the 'easy problem' to be resolved. One day they may be solved with a technology, far superior to ours in the future. But the *hard problem*, which natural science and philosophy have been grappling with for thousands of years, can be formulated as this. Our experience of existence, of self, is based on physical processes in a vast number of brain cells, but these cells are not different from those in other body organs, controlling unconscious activity. How do they bring us into existence? Thomas Nagel, in *What is it like to be a bat?* (1974), introduces the *something-it-is-like-ness* of subjective experience postulating "An organism has conscious mental states if and only if there is something it is to be like that organism". This mystified axiom in my

view takes us out of science and straight in the realm of metaphysics. John Searle's view is more materialistic in believing the brain gives rise to consciousness-- in other words, it emerges from the physical-- though we do not know how: "How does the brain get over the hump from electrochemistry to feelings?". Searle also denies that computer-simulated brain can have one.

The philosopher David Chalmers<sup>43</sup> restates the hard problem like this:

"It is widely agreed that the experience arises from physical basis but we have no good explanation of why and how it so arises. Why should physical processes give rise to rich inner life at all?".

The 'hard problem' is hard not because it would take a long time for science to uncover the physics of it completely but because it is impossible to solve in principle. Perhaps this is why he turns to metaphysics and states three principles:

"1. Structural coherence principle: There is a structural coherence between properties of physical processes and properties of experience, but neither of them can be reduced to the other; 2. Double-Aspect principle: There is a direct isomorphism between certain physically embodied information spaces and some phenomenal (or experiential) spaces. In other words, information (or some kinds of information) is a fundamental property in the universe, which has two basic aspects: a physical aspect and a phenomenal [immaterial] aspect; 3. Organisational Invariance principle: Two systems with the same fine-grained functional organisation will have qualitatively identical experiences. "

The first two principles may look like scientific hypotheses but in fact they are metaphysical and many atheists disagree with them. However, the third one allows them to believe that it is possible to build a silicon isomorph of a biological neural system, which may have 'experience'.

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43 Chalmers, D., *Facing up the problem of consciousness*, Journal of Consciousness Studies, 1995, 2: 200-219

The phenomena of consciousness, they think, are entirely natural things and must be reducible to physical laws. They controversially seem to exclude intelligence from consciousness, reducing it to feelings. On the same ground they believe that the principles on which computers are built allow them to have intelligence but not feelings and consciousness. Note the 'fine-grain' level of organisation in Chalmers' third principle. Depending on what level is meant (molecular, cell, organ, system etc.) one may or may not attribute consciousness to algorithmically controlled bodies. These principles also exclude the moral attribute of consciousness, discussed in Section 5.

Definition of terms in neuroscience and psychiatry have always been ambiguous, arguable and controversial. This is not only because these areas of research are very dynamic, but also because things like hunger, cannot be directly seen or touched. Consciousness and human experience (qualia), are therefore not just scientific categories and as such cannot be handled by science alone. According to Chalmers the hard problem cannot be solved by 'functionalist explanations'. His conclusion is that subjective experience must be inherent in information and that experience perhaps arises at a certain level of complexity in the 'information space'. The atheists argue that further constraints need to be found indicating just what sort of information has a phenomenal aspect. Yet there is no difference between a feeling and other phenomenal experience even though feelings are hedonically valenced. For example, why is the feeling of pain painful and the feeling of pleasure pleasurable when both have same physical mechanisms of processing the neural signals? The fact that they are processed by separate neural circuits in the body on itself does not provide explanation, because the signals have the same physiological basis. What is it that causes the feeling to be felt?

Some researchers, like 2020 Nobel prize winner Roger Penrose, consider a possibility of consciousness to emerge at quantum level when a certain

threshold of complexity is reached leading to 'superposition of quantum states'. It is interesting that most of the physicists in this school of thoughts are also engaged in philosophy of science at the same time.

The arguments on the Hard Problem converge on the question of the causal mechanisms of consciousness. For example, behavioural naturalists intuitively believe that consciousness is caused by the brain but human consciousness is unique in that it is only associated with the real human brain structure. Even though computer simulations could in theory model the brain on the level of neuronal logic, still that simulation is not a mind. One can even allow the possibility that the whole world is simulated<sup>44</sup>, but the real question is if there is something prior to consciousness that caused it, or consciousness preceded life and the universe? Idealists, including Christians, believe the latter, while the materialists would continue to affirm that consciousness must have arisen, and therefore must be part of, a non-conscious physical universe only<sup>45</sup>. For them our minds are woven from order, which emerges spontaneously from chaos at a certain stage of evolution, and then defends itself against the onslaught of entropy. Regardless of the physical mechanisms of the emergence of that order, which I would agree with, for me as a Christian, the homeostasis is God's, order for living entities in the physical universe, encoded in the properties of matter. It is of divine origin but it does not mean that the process of emergence of that order in nature cannot be modelled by mathematical equations and computer simulations. Numbers, like letters, are meaningful, so is their manipulation (processing), so is the universe, the whole creation. But the meaning of a system can only be provided from outside the system and that ultimately suggests divine origin.

Finally, consciousness (Latin: *conscius*/knowing with others or in oneself, meaning 'being aware of wrongdoing') is not just a scientific concept.

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44 Mitchel, J.B.O. We are probably not Sims, *Science and Christian Belief* Vol. 32(1), April 2020

45 *Ibid* 1, p.263

Looking at the etymology of the word, it includes *conscience* (Latin: conscientia/knowledge), which reveals the origin of the word and the concept behind it<sup>46</sup>. It is essentially linked to ethics and moral. The lesson given to Adam and Eve with the tree of knowledge (Gen 3) was a lesson on 'conscientia'- the knowledge with the moral attached to it. One cannot be a conscientious person without being conscious. For Christians ethics is always external to a system busy with survival and reproduction. It is divinely given, naturally formed throughout the biological evolution, and then advanced through learning and character building, involving relationships and communication, which internalise it in human beings that possess free will. This other aspect of consciousness, the moral, will be considered next.

#### **4. Enhancing the Human**

The advances in bioengineering and AI in the recent years gave confidence to scientists that we, as species, might be able to transform ourselves into something entirely else by modifying the information, recorded in our genes or by constructing completely new synthetic life and producing super-intelligent beings. The implications of this, for our society, seem to be so dramatic as if that transformation is already happening. The thinkers in this area of the so-called transhumanism have their own ethicists, claiming they responsibly evaluate the process and its potential existential threats<sup>47</sup>. However, the basis of humanitarian ethics is often driven by humanist ideology with moral principles incompatible with our Christian belief. Let us first consider bioengineering.

By 2003 most of the human genome (85%) was read out. At the time of this writing, it has been reported completed. The enormous amount of new information allowed much better understanding of how the human

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46 Oxford Dictionary of English, Oxford University Press, 2022.

(<https://mobisystems.com>)

47 <https://www.openai.com/> ; <https://www.deepmind.com/>; <https://www.fhi.ox.ac.uk/>

body actually developed and worked through the lifetime of an individual and across generations. Major functions are associated with the manufacturing of specific proteins, needed in the body for development, repair and defence. Other, so-called non-coding genes, were found responsible for controlling the expression of other genes as cells develop, differentiate and react to different events. Still, some of the information, encoded in the DNA is with an unknown function or purpose.

As a result of this breakthrough in biochemistry new methods of treatment, based on genomics, have emerged so powerful, that they may change medicine and perhaps even the way we think about our bodies and our societal human nature. It turned out that very small changes, in terms of bits of information from the three billion letters of the genome, can result in significant changes in the human medical condition. Medical science recently found that over ten thousand known genetic conditions are linked to very simple changes of the DNA. It pushed for intensive research on methods for modifying our genes. CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats), engineered in 2012, enables for a very high precision in cutting out and replacing a section from the DNA sequence by the use of enzymes<sup>48</sup>. Although this technology is not yet safe enough to be introduced in routine medical therapeutic practice, its potential for eliminating thousands of the existing hereditary conditions, is enormous. Many of them are monogenic; they can be treated with a change of just one gene.

The advances of science in this area brought about serious ethical questions in biotechnology. How risky is it? For what reasons should we develop one or the other? Is it morally acceptable? Does it represent danger to human race and society by threatening its existence? An

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48 Zhang F., Wen Y., Guo X (2014). CRISPR/Cas9 for genome editing: progress, implications and challenges, *Human Molecular Genetics*. 23 (R1): R40–6. (Find in <https://doi.org/10.1093/hmg/ddu125>)

excellent analysis of these questions from Christian perspective can be found in the monograph of A. Massman and Keith Fox<sup>49</sup>.

Treatment and moral decisions in this area are difficult because gene interactions are complex: many conditions are polygenic; they are affected by more than one gene, tens or even hundreds. *Somatic genome editing* (for adults and children) would involve changing each of the trillions of body cells in different organs but not all organs are accessible. The changes will not be inherited in the next generation and requires adult's consent but it is less ethically sensitive. However, *Germline editing* (early embryo), currently illegal in most Western countries, will be inherited by the next generation. It requires IVF and PGD (pre-implantation genetic diagnosis), which are sensitive to many ethical doctrines. It is more technically risky because of possible off-target events, but those are similar to side effects in existing conventional therapy which is not risk free either.

PGD alone, which uses termination of pre-implanted embryonic cells, is less risky and is considered as an alternative to CRISPR. It is sensitive from an ethical standpoint but the issues are not as heavy as with abortion. The early embryo, consisting of a few cells with no nervous system, is not structurally recognisable as human and perhaps has no feelings at this stage, although the information it carries has the divine telos of a human being and its sanctity in that respect can never be ignored. PGD is legal in the UK under certain conditions and most of the EU, while CRISPR followed by IVF and PGD, is not yet, mainly for safety reasons. However, the polls suggest that 70-80% in the UK are in favour. AASM (American Academies of the Sciences of Medicine) and BNC (British Nuffield Council) on bioethics also expressed consent once the technical issues are removed and the risks mitigated.

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49 Massmann A. and Keith R. Fox, *Modifying our genes* SCM Press, 2021

But according to the authors of the monograph this kind of healing cannot be idealised. The ethical issues remain and the more we idealise health the more we exclude those who are different and beyond a cure. An impairment does not necessarily reduce life fulfilment but makes it harder to achieve. It is dangerous to idealise genome editing as the ultimate weapon in the fight against disease. However, some conditions consistently seem to reduce life fulfilment: depression, strong persistent pain, incontinence, and they need to be addressed.

The case for human enhancement is different. There are large groups of individuals and institutions envisioning projects of grand proportions, including the complete overhaul of the human genomic system and the creation of trans-humans. On a more realistic scale, with technologies like CRISPR, possible genetic enhancements include: athletic prowess, intelligence, better memory, longevity, sleep endurance, greater empathy. However, projects like these may not be possible to justify at this time, even though medicine and healthcare are always given priority, because they are technically very complex, expensive and risky.

Medicine can be distinguished from enhancement<sup>50</sup> as preservation and restoration of the proper functions of the bodily organs, but the distinction is blurred and is debatable in each case. It is important also to distinguish disability from illness. There is a danger in that when we start treating disabilities as merely medical problems to be fixed, we may fail to respect how people with disabilities identify with their conditions. What if they consider themselves as alternative and equally valid ways of living? Genetic modification will not eliminate all heritable diseases or the influence of harmful environment. Yet society should still support people with medical conditions.

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50 Alexander, D. Healing, Enhancement and the Human Future, Cambridge Papers 28 no.1 (2019)

So, are enhancements really worth having? It is argued that to achieve enhancement for some trait it would usually require simultaneous changes in a very large number of genes. These traits are results also from interaction between genes, environmental and developmental factors anyway. We are profoundly influenced by non-genetic, biographical factors such as diet, environmental conditions, exercise, stress, education. We are not slaves to our genes<sup>51</sup>. In regards to our attainments, factors like socio-economic and educational status may overshadow genetic ones. Ultimately, there is little reason to assume that those who have been enhanced will experience any greater sense of life fulfilment. Many super clever people in history had mental health problems. Perhaps having too much memory and cognitive power is inconsistent with having stable, and harmonious mind, able to engage in all aspects of human life even though such persons may possess great creativity.

It is also feared that, instead of having their babies as a gift to enjoy, cherish and raise in good faith, parents will start receiving them as custom made merchandise putting pressure on them later as they grow and treating them like an expensive commodity, which they paid for. Love may degenerate from 'love-given' to 'love-needed' only, the extremes of which are egotism and narcissism, that plagues the modern world already with various conflicts between generations, cultures and nations.

The presumption of superiority of enhanced people contributes to a climate in society, in which people with low attainments and disabilities are increasingly stigmatized for their differences. Such a climate idolises efficiency in human beings and technology itself and is dangerous<sup>52</sup>. On technological, financial, sociological political and ethical grounds projects in genetic enhancements do not look to win favour at the

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51 Alexander, D. *Are we slaves to our genes?* Cambridge Univ. Press, 2020

52 Tomkins J., *Better people or Enhanced Humans?* 2013

moment, though they may have great ideological and inspirational power for scientific research. But what if some countries allow them anyway openly or secretly? Do we have to adopt a pacifist stance or do we have to confront the practice and campaign for international legislation? More importantly, do we have to invest in some sort of contra development for security and defence?

Another area of interest for neuroscience now is in creating an artificial human being. Leaving AGI aside for a moment let us consider a project<sup>53</sup>, which is not about engineering intelligence but about making a being that 'has no other aim and purpose than to carry on being'. Its core responsibility would be the maintenance of its external energy supply. The aim, according to the author, is to prove human consciousness is purely material and arises naturally from feelings. For this purpose, 'parameters' like fatigue, pain, anxiety, some emotions, attachment and conflicting needs are planned. It is expected that if the 'special form of information processing', proposed by the researchers, materialises in feelings, and if these are the causal mechanism of consciousness, then that is expected to prove the possibility of an artificial conscious mind. The verification of this project in my view would not be much more than what is needed for an IT product. In any IT engineering project, first requirements are specified- in this case- different types of feelings, and then tests to verify them. In IT if the tests pass, then you proved the product matches the specification. However, the validation in this case would be a problem because there is no conceivable way in which a third person can have access to another being's phenomenological experiences. Therefore, we do not have means to test whether this 'creature' actually *feels* the feelings that are specified. Moreover, there are moral dilemmas involved in blindly creating a being, that might

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53 *ibid* 1, pp.281-299

suffer in the process physically and emotionally, something we would not know.

Another track in research with different goals is to reverse engineer any organism from the existing species on Earth at cell level on the same (biochemical) substrate but with a different encoding and more 'reliable' and accessible chemistry. For example, the Genome Project-Write<sup>54</sup> is planning to use different encoding for the DNA and creating artificial (synthetic) human DNA as well as DNA of other species. Such an approach would possibly require the advances of nanotechnology to make it happen. This could be one way of escaping the attacks from terrestrial viruses and reduce genetic diseases to a minimum if not eliminating them completely. Another approach is to reverse engineer the neural system of the human body at the level of information processing taking place at neural network level using artificial neurons. They could be realised on silicon or any possible substrate<sup>55</sup>.

Other ideas consider the possibility of reverse engineering an organism at cell level on a different substrate, for example silicon electronics. However, this requires all the biochemistry of the organism to be well known and mapped to information states and processes. This is controversial but our science and technology are far away from such knowledge and understanding of the human body at the moment anyway.

No provision is made in all these projects on synthetic life for repair and maintenance. Our current technologists in their wildest dreams do not foresee how such enormously large, complex systems, like the human body, can be made realistically fault tolerant with unreliable artificial components even with the use of nanobots which are still closer to

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54 Boeke, J. D., et al., The Genome Project-Write, Science, 2016

55 Abu-Hassan, K., Taylor, J., Morris, P., et al. , Optimal solid state neurons, Nature Communications, 2019 (Find in <https://www.nature.com/articles/s41467-019-13177-3>)

science fiction than to reality. Besides, attacks from new forms of agents, analogous to natural viruses still cannot be eliminated and the defence mechanisms are unclear. What we already have in our human bodies after millions of years of evolution might turn to be superior to anything artificial, we make.

The promise of technological immortality then is an empty promise at the moment. Let us also not forget that technological immortality does not mean true immortality since all matter in the universe is expected to melt down at some point in time according to our theories. We still need the divine grace for ultimate transformation eternally, physically and spiritually (John 11:25) in the new creation brought about by the resurrection of Jesus (John 5:21-27).

The intended methods of AGI are different from those employed to reengineer humans biologically. The goals of AGI, are different from those of mainstream IT too, where products are still seen as tools serving humans. Simulating intelligence programmatically on computers is an interesting area in that respect. Science and technology of the 21st century should celebrate the achievements of 'narrow AI' in this area. This is what robotics is trying to do at the moment in the area of social care, surgery, diagnostics, healthcare, national security, defence and many more. This means feelings are not simulated, but perception, vision, auditory, speaking, reading, image recognition and others, will be. Behavioural and cognitive functions might be included later, but it might turn out that they are impossible to achieve without endowing the machine with some form of consciousness with all the ethical problems associated with it.

Creating artificial conscious beings is of great concern. Many ethicists are against the AGI movement altogether, because they fear that consciousness may emerge spontaneously in any highly intelligent artificial system, we create, without clearly identified need for doing so.

AGI also shifts the focus of research away from purely technological issues aimed at improving human condition and making life more enjoyable. Some of the problems associated with AGI are discussed in<sup>56</sup>.

## **5. On our Human Personhood**

From the neuroscientific and information technology views on human identity, we now turn to the combined psychological, anthropological, and Biblical view of our personhood- individually as well as collectively as human species.

Information, like all constructs in mathematics, is an abstraction. It is not material, but it can be carried by material mediums (paper, sound, electrical impulses). While almost all agree that consciousness is a fundamental entity and that certain aspects of it emerge from increasing physical complexity, as Christians we believe that other aspects of it are ontologically distinct from matter. Some neuroscientists conflate consciousness with intelligence, refusing to recognise the moral and in fact any immaterial aspect of it. Since life and consciousness are information-based phenomena they suggest immaterial source of all things- the mind of God. Life is intrinsically based on order, ingrained in or defined by information. Physicalism describes homeostasis exclusively as a drive to reduce the internal states of an organism, to keep it in order and stay alive. Yet we are societal beings. God's order applies not only to the human body but also to a society of humans through information-based relationships. Human cells live by 'sticking' together and staying in sync. They die when they are left on their own. In a similar way we must have constraints to our 'internal states' as a society so that we maintain cohesion similar to the homeostasis of individually living organisms. It means society is given power to enforce these constraints so that it does not disintegrate into an oblivion but enjoy freedom in an

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56 Frischmann, B., Selinger, E., *Re-Engineering Humanity*, New York: Cambridge University Press, 2018

orderly peace. As individuals we would not survive very long outside the community of relationships. Paul in (1 Cor. 10:33-11:1) writes that he is *"...not seeking [his] own advantage, but that of many, that they may be saved. Be imitators of me, as I am of Christ"*. While we have a freedom of choice we also care for others because we are God's vicegerents on earth<sup>57</sup>. We care also for the animals, environment and the planet, the cradle of our human life.

The moral is an essential element of consciousness, but the study of moral is external to the scientific enterprise. Most philosophers agree, that science can make informed moral decisions, but it cannot and should not produce a moral system, because it is intrinsically morally neutral. It is meant to investigate the material world as it is, producing statements of facts without any ideological bias<sup>58</sup>. Contrary to the beliefs of the atheists, Christians know that the drive to survive and reproduce is not the only force that humans have in them. We are not just our brains<sup>59</sup> and there are realities that cannot be explained by science alone. On the backdrop of the achievements of information technology and modern neuroscience the Bible may look outdated and irrelevant yet many times in history it gave confidence and direction to a confused world by bringing moral dimension to it. Ethics is attached to whatever we do in science and technology because humans are created *in the image of God* (Gen 1:26,27), with the capacity for reason, relationships, and dominion, in *God's likeness*. according to the character of Jesus, lovingly fathering and mothering the Creation, giving his Spirit to the Church, his body, where every member is a human being, embodied and gendered (with plasticity of gender not negating creational norms).

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57 Barton, J., John Muddiman (Editors), *The Oxford Bible Commentary*, Oxford University Press 2001, p.43/4:21-22

58 McGrath, Alister E., *Science & Religion*, Wiley Blackwell, 2020, pp.179-184

59 Dirckx S., *Am I just my brain? (Questioning Faith)*, The Good Book Company, 2019

According to studies undertaken by Marjorie Linder Gunnoe<sup>60</sup> and Mary L. Vanden Berg<sup>61</sup>, our personhood can be described as follows. Humans are *purposed* for dominion work, and loving relationship to others, to love God in worship and prayer. Some humans are purposed to love and work in particular ways in particular contexts. They are structurally good but inherently inclined toward both good and evil. Creation is good (fit for purpose) but not perfect (humans are still evolving and changing). Moral-ethical tendencies are also influenced by the environment. The relationship between the environment and moral behaviour is often mediated by trust. Humans are *agentic* (possessing freedom and power to choose what they do and what they become); accountable for self to God; responsible for the creation in their dominion and for other humans - in varying degrees. Educated adults with high social status have more agency, accountability, and responsibility than children and social subordinates. The developmental model for agency and accountability begins with obedience but progresses to moral discernment motivated by love. Humans are the only creatures on Earth created in the image of God. They are *especially unique* because they are *conscious material-spiritual, intellective, worshipping beings*, specially created this way by God with the ultimate purpose- the *telos of knowing and loving God*. Flourishing of humans in this life is dependent upon the loving relationship with God.

This model inevitably reduces the reality of our personhood to a list of attributes but it helps when we need to take informed decisions on ethics from Christian point of view. On moral grounds we are cautious with genetic enhancements not because we think God's creation is perfect and we cannot add to it. God created a world that was very good (Gen 1:31), fit for purpose<sup>62</sup>, but not perfect. Healing took an important part of Jesus' ministry on earth, where he acknowledged that not all

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60 Gunnoe M. L., *The Person in Psychology and Christianity*, IVP Academic 2022.

61 Berg, M.L.V., *Aquinas, Science, and Human Uniqueness*, Cascade Books, 2022

62 *ibid* 19, p.42

disease is caused by purely physical processes or wrong doing (John 9:1-5). Jesus is the only true image of God (2 Cor. 4:4) and we are all work in progress striving to become like him (Rom. 8:29). As Christians we realise that while our transformation to the likeness of God may be a long process, we already have a glimpse of the dignity of the image of God whatever our circumstances. In the midst of difficulties, weakness and disabilities there is hope and we affirm life as good and worth having, here and now as we hope for the new creation.

In that context our work on restoration and healing, alleviating suffering, improving human condition forms an essential part of human life. For example, according to<sup>63</sup> PGD can be justified in pursuing health but it would depend on a particular situation judged by the couple which decided to use the technology. The authors suggest a balanced approach. However, concerns about enhancement of humans are many. There is a danger that enhanced humans, could become a new race, superior to the unenhanced. It is essential that we will continue caring for each other. Otherwise, enhancements will just accelerate the conflicts we already have fighting for resources and domination. It might also trigger new kinds of conflicts: between generations, social strata or else. Will the rich only be able to have the treatment or everyone on an equal basis? How is that going to be introduced in a controlled manner? A new issue of racial inequality will be open for which our society is not prepared at the moment. Governments and institutions have always been fighting to dominate the world and exploit its resources, justifying their actions with their human made ethics.

The world has been grappling with problems since the times of old and most of them will not disappear just by introducing human enhancements. They may just end up in reengineering humans into more 'efficient animals'. Modifying our genes will not in itself make us

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63 *ibid* 11, pp.142-143

better human beings morally or bring more life fulfilment and happiness. It will not ultimately change God's intended human identity and purpose in life. The question of purpose is a centuries old issue. Ironically it is so well explained by the secular proponents of AGI. Atheist Yuval Harari in *Sapiens* (2015) writes: "*We are more powerful than ever before, but have very little idea what to do with all that power. Worse still, humans seem to be irresponsible than ever. Self-made gods with only the laws of physics to keep us company, we are accountable to no one.*"

This observation describes a liberal society on the West without God. Before the West got there the East had tried sacrificing liberty in favour of equality in another society that rejected God. Communism had taken over nearly half of the population on earth, but before the system finally collapsed, it observed the same degradation of moral and conscience. Even though the scientific and technological hype kept morals high for some time, they ended in the same meaningless existence. Meaning and purpose cannot be made; they are found when we choose to glorify God with our work and even with our death. We are made to find meaning in work, including the hard and exciting work of the scientist, in loving and caring for others in playing, resting and enjoying life.

While the integration of biological life with AI in areas like artificial limbs, artificial internal organs (kidneys, liver, heart etc.) can be seen as healing, AGI presents a more distant but serious challenge. Concerns rightly include: marginalising the human race, exploitation and mistreatment of sentient robots and gross failure of empathy, new forms of slavery and increasing the suffering in the world for both: humans and robots. An important issue here is whether robots should be given personhood and if so, what the relationship with them should be? What would the value system of a machine be by design or by learning? Can it by mistake start acting against humanity? Examples of malicious robots harming digital sites and equipment are already a reality. They are expected to be powerful but may behave badly by design or by their own will if they

have one. How do we protect against them? If robots are independent agents, will they be given free will, a soul? Will their existence be respected as the sacred human life is? What legislation is needed in that respect? We do not have answers to these questions at the moment. Apparently, knowledge and technology have gone far ahead of our wisdom.

I reply back with another question "For what purpose would we want to create super intelligent sentient machines?" We do not know if that is possible but perhaps, we do not need uncover the answer at this particular moment of time. The question is not 'Can we?' but 'Should we?'. In my view this is going to disturb cardinal social and moral conventions with unpredictable consequences for which we are unprepared yet.

What science uncovers has been a hidden knowledge from the beginning. *"The secret things belong to the Lord our God, but the things that are revealed belong to us and to our children forever, that we may do all the words of this law"* (Deuteronomy 29:29). God deliberately hid this knowledge (Genesis 2:15–17) in the beginning because it could cause us harm without first mastering wisdom of far greater importance: the moral code and the message of salvation. Within the framework of that message in the Bible, we have been given freedom to experiment, research, and unravel the ways the laws of nature operate as well as make use of them, but maturity of mankind in uncovering knowledge is even more important today than in the garden of Eden. We should pause and reflect before we go further. We cannot trespass our way to the tree of life (Genesis 3:23-24). The story in the garden of Eden can be interpreted literary or metaphorically yet either way it changes our view on intelligence. In a world, where only the fittest can survive, intelligence was crucial, but after God placed mankind in the garden of Eden (Gen. 2:15-17), he gave them his purpose to work and take care of it. While intelligence was still needed, it was not sufficient for their wellbeing.

Trust in God and the community of relationships (Gen. 2:24) became essential. So, they had to go back in the wild world to discover God's order through experience. Most often the motivation for scientific work is intellectual curiosity, the strong desire to know what it is and how it works, an expression of the human nature, well described in the story. Without that passion we cannot make good science. It is the same curiosity that today makes us wish for creating an artificial being with a soul. We do not know if that is possible, but should we even begin to contemplate this now? While human beings have been created in the image of God, this 'being' would be created in the image of humankind without clear and compelling reason to do so. Without purpose in life, given to it from God, it could turn into an evil creation.

At the end of the last century, we nearly destroyed ourselves with nuclear weapons and the danger is still there, but new threats are on the horizon. We are just beginning to fully understand as humankind what we have been doing to this planet, the cradle of our life. We're just beginning to grasp the reality of how far away we are from another beautiful world like ours, which we could inhabit. Our science and technology might never be able to get us there before the Earth comes to its natural end and is engulfed by the fading and expanding Sun. There is most certainly nothing we can do to control that process. Life on Earth may also end earlier by some other natural or manmade catastrophic event. The whole universe, according to some theories, will come to an end by contracting back to nothingness where it supposedly started from, and the space and the time will cease to exist. A new material world will be created according to what we believe. Nevertheless, we must take responsibility of good stewards for the home we have been given, though temporary, and enjoy life here and now. We might at last grasp the wisdom of the scripture that says, "Though we are many we are one body, because we all share one bread" (1 Corinthians 10:17). I believe we are only kept alive, as a civilisation, by remembering Christ and anticipating His return. Our best survival strategy after all, as a species, might be learning how to live

here sustainably and at the same time love one another as one big family. The only safe way of approaching the Tree of Life for us, therefore, will always be by visiting the cross of Christ first.

We know that we now have the power to change all subsequent generations and C.S. Lewis<sup>64</sup> warned that is a crucial moment. The question is whether we are able to wait and pray for wisdom before we take any step further. If we don't, the dystopian society he is portraying, reminiscent of Nazi eugenics, may come true. Man's conquest over nature may turn to be nature's conquest over man. With that in mind germ-line modifications- medical or enhancing, will inevitably take place in the future but our focus at the moment seems to be too much on excelling in physical functioning, disregarding the spiritual aspects which sustain cohesion in society, the 'Tao' articulated by Lewis. We have to pray and listen allowing God to work through us. Taking the DNA in our hands and changing it should not turn like picking the fruit in the orchard of Eden, disregarding God's order, but an enterprise in submission to it. Our mission on earth is God's mission through professionalism and ethics and through preaching the crucified and resurrected Christ in all the world even though the Bible does not say that all will be Christians before he returns. Yet "*... we know that for those who love God all things work together for good, for those who are called according to his purpose*" (Rom 8:28).

**Acknowledgements:** Part of the topics in this paper have been discussed in Christian in Science (CiS) local home group. Many thanks to Neil Laing, Keith Hawkins, Mike Eaton and my wife Patricia, for their time to debate some of the ideas in this project and for the insightful comments they made.

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64 Lewis, C. S. The Abolition of Man, 1944

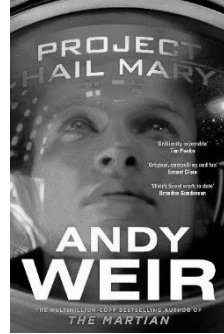
## Book Reviews

**Andy Weir**

***Project Hail Mary.***

Penguin, 2021/22, ISBN: 978-1-529-15746-8

From time to time, I review science fiction that has theological implications. When I saw this book, the title suggested that this might be the case here, so I borrowed it from our local library.



The author also wrote 'The Martian'. If you have read that, or seen the film based on it, you will know that Weir writes good, 'hard' science fiction – the sort I like. Everything is thought through and scientifically possible in the light of current knowledge, however advanced. In this case, it is about an interstellar expedition: a step up from Mars!

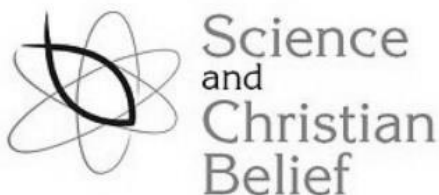
Without revealing too many spoilers, the sun starts losing power, as do all neighbouring stars, except one. An expedition is therefore sent to this unique star, to try and find a way to save life on earth from extinction. Unsurprisingly, aliens from another fading star have launched a similar expedition. It is good to see a portrayal of aliens as utterly alien, but friendly. This book is a really good read.

What I could not figure out was why the space expedition that gives the book its title is named 'Project Hail Mary'. Nothing in the book explains this. I was trying to figure out what it had to do with the Annunciation. I found the explanation on the internet – a 'Hail Mary pass' is apparently an American football term for a last-minute throw in a desperate bid to change the outcome of the game. (Presumably, they would call Jude Bellingham's last-minute equaliser in the Euros a 'Hail Mary kick'!) Evidently, the book is written by an American for Americans – it is a pity the publishers did not include an explanation for us lesser mortals who do not speak American! The internet also suggested there might be some significance in the hero being called Grace.

**Bob Allaway is the Chairman of Faith & Thought**

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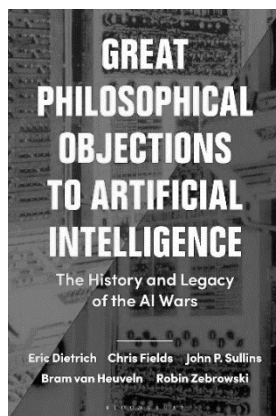
<https://scienceandchristianbelief.org/>

**Eric Dietrich, Chris Fields, John Sullins, Bram van Heuveln, Robin Zebrowski**

***Great Philosophical Objections to Artificial Intelligence.***

London, UK: Bloomsbury Academic, 2021. 300pp. pb. £31.69. ISBN 9781474257107

As IT is turning into QIT (quantum IT) and cognitive science amalgamates with neuroscience and psychology, one may think modern science is taking a step back to the old days of natural philosophy. Two of the authors of this book are qualified philosophers and two professors of cognitive science, based in the US. The fifth author, Chris Fields, is an independent scholar based in France. They certainly teamed well and produced a coherent metaphysical analysis of the history of artificial intelligence (AI). Although the writing does not come anywhere near Christian theology or any theism at all, it does not grind any axe against them either. What I most liked was good understanding



of the field of mathematics and the history of computing, which allowed them to expertly survey and examine the AI area from different angles, using very accessible, unambiguous philosophical and technical language.

*Chapter 1* is a brilliant explanation of the foundational arguments against AI, related to Goedel's theorem and other classics (Roger Penrose's *The Emperor's new Mind*, 1989 and *The Shadows of the Mind*, 1994), making the right conclusion that evaluating Penrose's and other arguments is impossible because they converge on the issues of consciousness, admitting 'we currently have no idea what consciousness is, nor how any physical thing can be conscious' (15).

*Chapter 2* continues with describing the Turing's imitation game following his ideas that intelligence does not have a precise definition, but it is something we attribute to machines as well as humans in order to make sense of the world. Intelligence and consciousness are separate categories and attributing intelligence to entities does not require them to be conscious.

*Chapter 3* tells us how later logical empiricism and behaviourism rejected philosophy (the mind) (48) and how philosophers reclaimed the mind with the 'brute facts: we cannot prove others are conscious but we know we ourselves are conscious, have beliefs, hopes, desires emotions, ...rich inner lives...beyond reach of science' (49).

*Chapter 4* turns more technical in describing the early paradigms for AI: symbol processing, neural networks, which currently is the front runner, embodied situation cognition, dynamic systems and hybrids while

*Chapter 5* delves into the problem of meaning. The arguments from the Chinese room thought experiment are well explained (95) and the intricacies of designing a robot pencil sharpener are demonstrated (101), to realise in the end that, again, it is all down to consciousness (109). The authors describe why implementing it is a 'unique roadblock to science' (119-20).

*Chapter 6* expertly describes how the AI scientists endeavoured to 'put humanity's cognitive specialness in silicon' and failed because 'humans are not mono-intelligences, but open-ended intelligences' (139). Nevertheless, a great advancement in algorithmicising intelligence has been achieved. To make progress 'requires advances in the problem of meaning (semantics) and ... in understanding how humans think', but the former 'requires understanding of consciousness' or arguably, 'domain- specific intellectual automatisms' (150-160).

*Chapter 7* moves the debates from semantics to awareness and the fact that 'we lack generally acknowledged, public, observational methods for determining whether an entity is conscious'. For this reason, it 'feels right' that 'noninfant humans are regarded as conscious by definition' (175). These are 'non-ostensive definitions' [which] can be either theoretical or operational'. An example of the former is Tononi and Koch's (2015) definition as 'integrated information' according to their Integrated Information Theory (IIT), while the latter is based on behavioural and physiological signs like EEG rhythms and on reporting experience or lack of it after surgery. For reasons already explained, non-ostensive definitions are considered 'morally suspicious' (176-177). The authors then make a brief review of the recent work in neuroscience and psychology producing a plethora of new concepts and terms like phenomenal and non-phenomenal awareness, bodily, somatic, perceptual, imaginative and other awareness, spiritual consciousness and many others, which are supposedly paving the path to a psychological neurological model of the human mind and cognition (177-196), but the reader should be careful here as this direction is very controversial.

*Chapter 8* is devoted to the ethical issues surrounding AI applications. One of the authors argues that humans are 'examples of intelligence run amok, leading to the unjustified extinction of thousands of species, many of them sentient' 'On the available evidence, then it should be possible to implement machines that are better than we' (199). I am not sure of that. This affirmation reminds me of the persuasion Eve received from

the serpent in the garden of Eden. Such machines would be helpful as tools but not as independent agents with ethics based on rule-based algorithms and no consciousness. However, the authors' concerns about political, legal, social, and ethical implications of 'AI powered consumer predictive technologies' remain, which inspired the formation of organisations like the Algorithmic Justice League [www.ajl.org](http://www.ajl.org) (202). Other topics discussed are the semi-autonomous and autonomous weapons (204-210), debated intensively now, as well as the autonomous vehicles (210-217). Finally, *Chapter 9* discusses the question of whether embodied AIs can be ethical agents.

I learned a lot from this brilliant writing, which regrettably, fails to recognise the transcendent uncreated trinitarian God of love, who offers ethics based on life situations, described in the Bible in a way beyond mathematical definition. Human personhood in His image is not part of this philosophical discussion, yet the book certainly is very informative and useful to students in the combined area of AI science, philosophy and ethics, with over 200 citations and bibliography of key readings in the field.

**Dr Todd Kantchev is Reviews Editor of *Science and Christian Believe* with degrees in medical physics, computer science and engineering.**

**Matthew Vest**

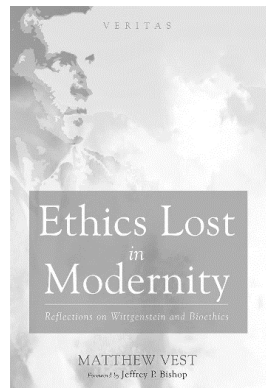
***Ethics Lost in Modernity: Reflections on Wittgenstein and Bioethics***

Cascade Books. 2023 243 pp. pb. £25. ISBN 9781666747188

I was intrigued by the title of this book, as I have an interest in bioethics, and have lectured on aspects of this subject to University undergraduates studying biological sciences. I knew very little about Wittgenstein and hoped to be educated and find new insights into how complex bioethical decisions might be made. I was profoundly disappointed. The book is largely based on Matthew Vest's PhD thesis at the University of Nottingham, which was supervised by John Milbank. Although there are some variations from the original it reads like a PhD thesis! It appears to be erudite and scholarly, with large numbers of

quotations from eminent philosophers who have had something to say about Wittgenstein. However, it is largely incomprehensible, and will probably only be a resource for professional theoretical ethicists. The book should be read with the help of an online dictionary of German and Latin words and phrases. I suspect that the author may have some interesting things to say, but like Wittgenstein's writing, his overall message is unclear. Of course, Wittgenstein didn't write anything about bioethics, so the arguments are based around his mysticism and 'language games'. Nonetheless I will try to summarise what I think Vest is trying to say.

Vest argues that, for practical bioethics, there is a gap between technical/scientific advances and the moral questions that these create. There is nothing surprising in that statement. Vest suggests that philosophy is usually trying to play catch-up and that the field of bioethics is dominated by modern scientific and quantitative reasoning, which fails to respect the importance of the individual, and has ignored pre-modern ways of thinking. I am not sure that this analysis is correct, and it is an unfair criticism of those who engage in bioethics from a religious (Christian) worldview. He is also critical of the bioethical approaches adopted by Beauchamp and Childress in their widely cited textbook 'Principles of Biomedical Ethics' (now in its 8<sup>th</sup> edition) which he claims assumes a 'common' or 'universal' morality, thereby bypassing foundational questions (43). In Vest's words they use the language of autonomy, beneficence, nonmaleficence and justice without discerning exactly what these terms mean, describing them as 'cosmopolitan liberals who define their own secular morality' (44). Instead, Vest seems to advocate a form of apophatic ethics, which arises from some aspects of Orthodox Christian theology, but which has less to say about the explicit ethical and moral commandments that are contained in scripture.



In essence Vest argues for a more personal approach to bioethics, which is more closely aligned with religious (Christian) and mystical perspectives. There is nothing surprising in that, and most Christians would agree in principle. Vest builds on Wittgenstein's ideas of 'language games' – when we say 'justice' or 'autonomy' or 'beneficence' what exactly do we mean? The answer will be different for each person. Autonomy might harm an individual who makes foolish decisions. Utilitarianism (the greatest good for the greatest number) assumes that we all agree on what is the 'good'. I can talk about pain as I experience it, but I can't begin to fathom another person's pain. So, we need to be very careful about the words that we use. Science may be able to identify 'biological life' but it cannot determine what varieties of life are more meaningful than others and it is not equipped to address questions of ethics. There is much truth in this. However, Vest claims that bioethics is trapped within unexamined 'language games' from which we need to escape. Wittgenstein wasn't anti-science (neither did he identify as a Christian), but spoke of the traditions of wonder and mystery that can't be expressed within scientific thinking. For Wittgenstein (at least in his thoughts and actions expressed in his later lifestyle), the way we live is much more important than the words we use. Some of these concepts will resonate with Christians who are involved in making practical ethical decisions, but they are lost within an unnecessary mountain of 'scholarly' verbiage in the book. If there is a disconnect between quantitative science and the process of making moral bioethical decisions, then this will need to be expressed in language that can be understood by biomedical scientists.

The book is heavy with ethereal philosophical discussions, but it offers little practical guidance on how to make complex bioethical decisions.

**Keith Fox is Editor of Science & Christian Belief, Emeritus Professor of Biochemistry in the University of Southampton and former Director of the Faraday Institute for Science and Religion in Cambridge.**

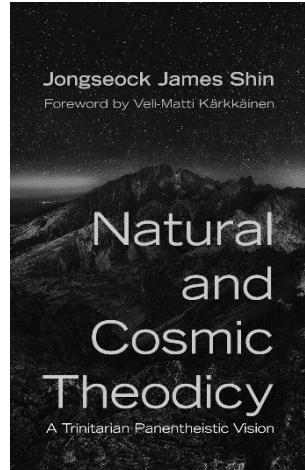
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**Jongseock James Shin**

***Natural and Cosmic Theodicy: A Trinitarian Panentheistic Vision***

Eugene, OR: Pickwick Publications, 2022. 282 pp. pb. £34.00. ISBN 9781666734928

In this impressive scholarly book, Jongseock James Shin tackles that most difficult of theological conundra, the problem of why there is evil, pain and suffering in a universe made by the Christian God, who is taken to be supremely good. He does this in dialogue with four main interlocutors—Catherine Keller, Arthur Peacocke, Wolfhart Pannenberg and Robert Russell—and then produces a theodicy of his own. The book covers a great number of topics in the dialogue between science and theology in recent decades, and the reader acquainted with these will be the better equipped to engage with the technicalities herein.



Shin is concerned to unite creation and redemption, with the latter meaning redemption of the whole cosmos. Redemption is thus to embrace the universe as a whole, which, on current cosmological theories, will eventually either freeze or fry, and will include the living world of nature. He is particularly concerned, like Christopher Southgate and others before him, with animal suffering—even insects suffer pain, he says.

Readers of this journal may be put off by Shin's adoption of panentheism which takes us away from classical orthodoxy. The plain meaning is that creation is part of God but the term is admittedly ambiguous and Shin offers his own nuanced interpretation. My own preference remains with John Polkinghorne's shunning of this term in favour of affirming and balancing God's transcendence and immanence.

Arthur Peacocke is an interlocutor who proposes panentheism. However, Shin is critical of Peacocke's account of divine action as whole-part causation. This is inadequate, he says, since it excludes miracles and special divine action, through which Shin sees God working soteriologically for the eschatological fulfilment of creation.

Katherine Keller is further removed from classical orthodoxy in espousing process thought as well as panentheism. Her God does not create *ex nihilo* (from nothing) but only *ex profundis* (out of the depths, i.e. chaos) or *ex vetere* (out of the old). In responsive love God lures the creation to fulfil the potentials which emerge for it through mutual interaction with God. This is positive but does not do enough for Shin, since God is not then powerful enough to be responsible for the world's evils, nor indeed to overcome the chaos which remains co-eternal with God. Thus, there is no eschatological redemption, central for Christian theodicy. In contrast to Keller Peacocke's God creates *ex nihilo*, so is omnipotent, but chooses to limit himself in divine kenosis. Importantly, for Shin the bodily resurrection of Jesus is vital for his theodicy as pointing to the eschatological redemption, not only of humans, but of all nature and the cosmos. He draws on N. T. Wright and others to support the truth of the resurrection as an historical event and critiques both Keller and Peacocke as downplaying this as some sort of psychological encounter with Christ.

Wolfhart Pannenberg is helpful since he affirms Christ's resurrection as proleptically revealing the eschatological consummation of history. God creates *ex nihilo* and through general and special divine action guides the creation to its ultimate destiny. Just as there is continuity and discontinuity between Christ's pre-resurrection and post-resurrection body, so there is between the end of the present creation and the new creation.

Robert J. Russell takes on much of Pannenberg's approach, though with a more up-to-date grasp of the science. Whereas Pannenberg uses the analogy of the Spirit's action with fields in the sense of Faraday, Russell

posits bottom-up divine action through quantum indeterminacy in his NIODA (Non-Interventionist Objective Divine Action) approach. He also affirms—and Shin agrees—with Pannenberg but contra Peacocke, the doctrine of *creatio ex nihilo* in the sense of a temporal beginning to the universe, and engages specifically with the Hawking-Hartle quantum gravity model; this then leads to *creatio continua* through cosmic fine-tuning and biological evolution.

Shin draws together the insights of his interlocutors to produce his own kenotic-eschatological panentheistic vision of creation as a Trinitarian project in which God co-suffers with his creatures and lures them to consummation in the new, redeemed creation. The book is a difficult read, not made easier by poor copy editing and considerable repetition. It is, nevertheless, a worthy contribution to the modern science-religion dialogue and the vexed question of theodicy.

**Rodney Holder is former Course Director of The Faraday Institute for Science and Religion and a Fellow Commoner of St Edmund's College, Cambridge.**

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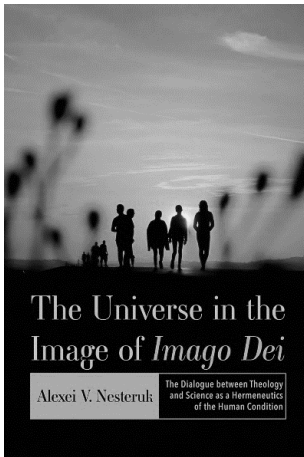
**Alexei V. Nesteruk**

***The Universe in the Image of Imago Dei***

Eugene, Oregon: Pickwick (Wipf and Stock), 2022. 309pp. pb £37 ISBN 9781666711233

Discussions on the relation between science and religion often take a familiar course in the English-speaking world. This book is profoundly different. Written not just from a theological perspective, but one informed by the tradition of Eastern Orthodox Christianity, its emphases are strikingly different from Catholic or Protestant thought. There is stress on patristic theology, particularly thinkers such as Maximus the Confessor, a Byzantine seventh century theologian. In addition, the writer, a physicist and theologian, draws heavily from post-Kantian traditions in European philosophy, notably that of phenomenology.

That focus on phenomenology means that the judgement of humanity becomes of central importance, because how things appear to humans



matter. Alexei Nesteruk, a physicist and theologian, argues that human beings must be at the centre of the issue of mediation between theology and science because we cannot escape the centrality of human consciousness in the world. He claims (35) that scientific research 'is bypassing in its scope the problem of the human presence as the central disclosure and manifestation of the universe'. That, the author concludes, is the leading theme of the dialogue between science and theology. We should not concentrate on the natural world as

investigated by science, (to which we have what the author calls 'the natural attitude') so much as the nature of the human person made in the image of God. Much is made of the 'Logos' indwelling the universe, and identified with the Incarnation, which, for Nesteruk, was an event of unique, and unrepeatable, importance. He says, (123) 'the event-like truth of the Incarnation places it in the class of those phenomena whose intuitive saturation invokes an infinite hermeneutics of its appropriation.' If this sentence seems impossibly opaque, its jargon is typical of what appears on every page in this book. We hear a lot of 'saturated phenomena' and 'hypostasis', as in the 'hypostatic inherence of the universe in the Logos of God.' The influence of Byzantine theology, in all its obscurity, is very clear. There is a glossary of terms at the end of the book, but it must be admitted that sometimes the glossary seems as difficult to interpret as the terms it is trying to explain. While the stress that all science is human science, and the consequent necessity not to forget the function of human consciousness, is salutary, the result can be an excessive emphasis on the role of humanity. Cosmology, we are told (160), is anthropic in its very constitution.

For Nesteruk, sciences must be 'geocentrically bound' (152) because of the human position in the universe. The role of human consciousness, leading, as the author says ultimately to the possibility of the Incarnation, raises questions about the relevance of the new discipline of astrobiology with the possibility of intelligent life not just on earth but on other exoplanets. This is dealt with briskly with the assertion that 'the existence of exoplanets with similar physical conditions does not guarantee an actual existence of life.' Necessary conditions are not sufficient ones.

It can be refreshing to read a book rooted in different theological and philosophical traditions from one's own. It can cast new light on old problems, and this book is particularly strong in stressing the role of God in the Universe through his Logos, as Incarnate in Christ. Yet obscurity can sometimes be mistaken for profundity. With its clunky language and technical terms, this book is an exceptionally difficult one to read for anyone who believes that philosophical clarity is a virtue.

**Professor Roger Trigg is Senior Research Fellow at the Ian Ramsey Centre, University of Oxford**

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**James Hannam**

***The Globe: How the Earth Became Round***

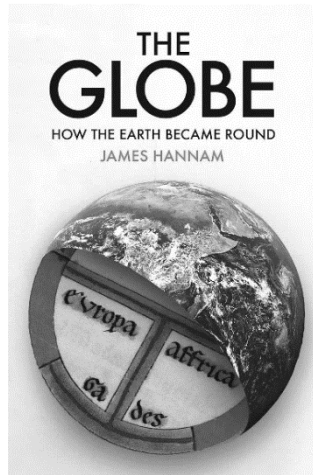
London: Reaktion Books, 2023. 376 pp. hb. £13.89 ISBN 9781789147582

The story of how we came to realise that the earth is round is a fascinating case study in the relationship between science and religion. Just like the Copernican Revolution, the story has become ammunition for a certain type of atheist to criticize Christianity - and is also popularly misunderstood.

James Hannam is a noted historian of science. He is a member of the Science and Religion Forum and the British Society for the History of Science, and has published articles in the Spectator, the Mail on Sunday

and History Today, as well as in academic journals. He is a Christian, but writes as an academic with no axe to grind for or against religion.

*The Globe* is a masterful *tour de force*. James Hannam works through the worldviews of the major ancient civilisations, tracking through to the discovery that the earth is flat in ancient Greece. He then describes how that belief spread across the world of middle and late antiquity. With some notable exceptions, Christians, Jews and Muslims mostly embraced the idea. He sets the story straight about Columbus and discusses the Chinese opposition to the Western notion of a spherical earth. As Western knowledge spread in the colonial era, the idea became gradually more accepted. James then tracks the rise of flat-earth conspiracy in 19<sup>th</sup> century England and discusses the place of the flat-earth in modern day society.



Writing about this topic gives an opportunity to discuss in one book how almost every major civilisation across the last four millennia have understood their place in the cosmos. This makes discussion of flat-earth ideas far more engaging than one might initially think! This is a broad topic, but James writes with a great economy of words, enabling depth and breadth. There are points where *The Globe* gets quite technical. He gleans the worldview of obscure philosophers through passing references of later writers, discusses ambiguities in the original languages, and points of contention between scholars. However, for the most part this book is quite easy to read. He does not assume any significant background knowledge about people and ancient civilisations.

The author points out that the historic belief in a flat-earth should not cause us to belittle the people of the past – we would believe in a flat-

earth if it was what we were taught, since the world does seem flat. The Egyptians, Babylonians, Persians, ancient Greeks and Chinese all believed that the earth was flat and that they inhabited the centre of it. Hence the Mediterranean is the “middle sea” and China is the “middle kingdom”. It is only when we travel long distances and see changes in the night sky, or find that sunrise occurs earlier, that we start to have reasons to doubt the flat earth. And even then, there are other explanations of these phenomena. So, it is not surprising that ancient civilisations assumed that the earth was flat, and the spherical earth took many centuries to be widely accepted.

James Hannam provides insightful discussion of biblical cosmology in both Old and New Testaments. The Hebrew scriptures describe the world as a flat-earth (e.g., “the four corners of the earth” from Isa. 11:12), because they describe the world as it is seen and experienced. However, the biblical texts do not teach that the earth is flat – they are concerned with other matters, and such descriptions are more poetic than scientific. These distinctions are helpful and no doubt important for other science-religion questions. The author further points out an intriguing comparison between the temptation narratives in Matthew and Luke. Matthew writes that the devil took Jesus “to a very high mountain and showed him all the kingdoms of the world” (Matt. 4:8); implying that all the world’s kingdoms could be shown to Jesus if He was taken somewhere sufficiently high. Luke writes: “The devil led him up to a high place and showed him in an instant all the kingdoms of the world” (Lk. 4:5). Instead of using the more familiar term *kosmos* for world as Matthew does, Luke uses the word *oikoumenē*, which refers to the three continents of Europe, Africa and Asia. This subtle difference indicates a difference in cosmological perspective. Matthew uses the language of Hebrew flat-earth cosmology, whereas the Gentile Luke, writing with the knowledge of the spherical earth, uses the language of Greek cosmology.

In summary, *The Globe* is an excellent example of history-of-science writing. It is expansive in scope without being excessively detailed. It is neither dumbed down, nor impossible for the layman. The story of how the spherical earth came to be believed is an instructive case study in the relationship between science and religion. Many in the church and outside would benefit from reading this.

**Carl Thomas holds a PhD in atmospheric physics from Imperial College London and is currently in ministry training at St Helen's Church, Bishopsgate.**

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**Jamie Boulding**

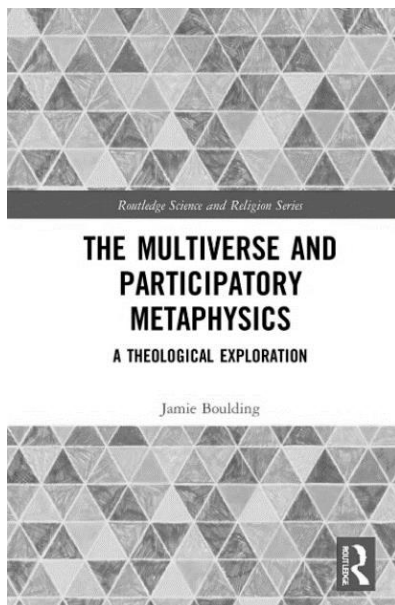
***The Multiverse and Participatory Metaphysics: A Theological Exploration***

Abingdon: Routledge, 2022. 188 pp. pb £130 ISBN 9780367857165

This is a book for those interested in metaphysics and philosophical theology rather than for those who I understand to be the average readers of *Science and Christian Belief*. Its stated aim is "to provide the first systematic theological engagement with the key metaphysical issues arising from multiverse theory" (1). Boulding seeks to achieve this by employing participatory metaphysics – the idea that creation exists by participation in God (165) – based on the work of three key thinkers: Plato, Aquinas and Nicholas of Cusa.

The first chapter gives a good introduction to the current range of multiverse theories, and to the ideas underlying participatory metaphysics. Boulding wants to move beyond the dichotomous views that a) the fine tuning of the universe suggests the existence of God and b) that the existence a multiverse explains fine tuning and so dispenses with a need for God. He believes that a dialogue between multiverse theories (of which there are many and on which no agreement exists among scientists) and participatory metaphysics is a fruitful way forward.

The next three chapters look at Plato and cosmic multiplicity, Aquinas and cosmic diversity, and Nicholas of Cusa and cosmic infinity, respectively. In each chapter Boulding also interacts with three modern writers on the multiverse and tries to show how participatory metaphysics is relevant to their views. So, he has a total of twelve “conversation” partners in this relatively short book. The fifth and final chapter summarises the outcomes of Boulding’s study and suggests



future directions for the science and theology dialogue. The book is based on Boulding’s PhD thesis and the writing betrays its origins – with somewhat too much repetitive summarising.

On reading the book I felt that I had learnt much about Platonic and Neoplatonic thought but not much theology, and in particular specifically Christian theology. Much of the participatory metaphysics discussed seems to ignore biblical theology. For example, Boulding states that Aquinas developed his participatory metaphysics to explain the relationship between the diversity of creation and the unity of God’s perfect being (84, 98), but no mention is made of God’s Trinitarian being, the paradigmatic example of unity and diversity (cf. Gunton’s *The One, The Three and The Many*). Throughout the book there seems to be an overemphasis on the oneness and unity of God, which fits well with Platonic and Neoplatonic thought but less so with the specifically Christian concept of the Trinity.

In discussing Nicholas of Cusa's views, Boulding says that one participatory insight about the God-creation relationship is "so in God everything is God" (124) which seems more like pantheism or panentheism than Christianity. He explains this by saying "'in' signifies participation, and not conflation or direct identification" (125), but then talks about the "enfolding" of all things on God (125) and "all things exist in God as God" (128). He also notes (126) that Cusa proposes that creation is an 'image' of God, but surely man and woman and Jesus are the image of God (Gen. 1:27; Col. 1:15) while creation merely displays God's invisible qualities (Rom. 1:20). Likewise, Cusa's view that "God imparts being and perfection to all" (127) seems at odds with Genesis' description of God declaring His creation good (*not* perfect – the two are not equivalent). Perfection seems to take us back to Platonic and Neoplatonic categories rather than biblical ones. One last point on Cusa is that he uses mathematical symbolism as a way of ascending to God (152), but God (Jesus) descended to us because we are incapable of ascending to Him.

The final chapter summarises the key points in Boulding's attempt to show the relevance of participatory metaphysics to multiverse theory. He states that his approach is theological (171), but I would suggest that it is more philosophical. He hopes that others might "apply a participatory outlook to other key questions in the theology and science dialogue", for example to evolutionary biology. Based on this book I would argue that participatory metaphysics seems far too dependent on Platonic and Neoplatonic thinking and is insufficiently biblical and Trinitarian, so unlikely to bring together science and Christian belief as this journal seeks to.

Naïvely, I do not see that the possible existence of a multiverse poses any greater challenge to theistic belief than any other aspect of science does. Whether there is a universe, or a multiverse still leaves Heidegger's

so-called fundamental question of metaphysics “why is there something rather than nothing” unanswered irrespective (18). I am not convinced that participatory metaphysics really helps me much here.

**Meric Srokosz is an oceanographer at the National Oceanography Centre, Southampton, a former associate director of the Faraday Institute, Cambridge, and the author with Rebecca Watson of *Blue Planet, Blue God: the Bible and the Sea*.**

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**Peter S Williams**

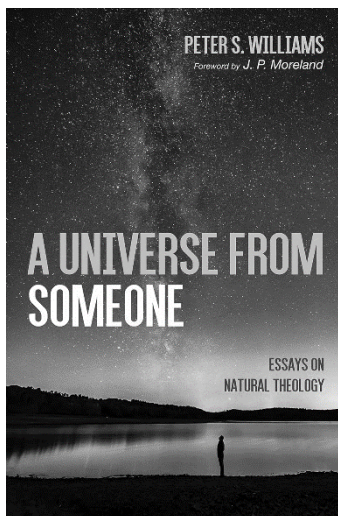
***A Universe from Someone: Essays In Natural Theology***

Eugene, Oregon: Wipf & Stock, 2022. 133 pp. pb £22, ISBN 9781666702927

This short book is a collection of essays and debate transcripts from philosopher Peter S Williams’ years of engaging with sceptics. This accessible contribution is a useful guide to those looking to gain deeper understanding of arguments for God’s existence. Each chapter is brief, with Williams providing copious footnotes to signpost to a variety of resources for more fruitful dialogue with sceptics. The finest is a marvelous response to Lawrence Krauss’ *A Universe From Nothing*. This response is an outstanding collection of his own analogies and the poignant criticisms of others, collected into a devastating critique of Krauss’ withered attack on theism.

There are two significant issues: Firstly, natural theology is given such a broad treatment, that one can finish the book wondering if science simply means the cosmological argument, fine tuning and design. Any reader buying this book in hope of understanding science and religion further needs reminding from the start that this is a philosophical guide, written by a philosopher. There is almost no science in this book.

Secondly, Peter's book is an apologetic for Intelligent Design. As a biologist, I could not understand that despite the dramatic change of landscape over the past two decades (gene editing, cancer immunotherapy, the bioinformatics revolution, numerous Nobels given for CRISPR, the structure of the ribosome, even sequencing the Neanderthal genome etc.) there is no mention whatsoever of biology as it is now. Instead, we are treated to quotations from the small camp of Discovery Institute writers whose work is older, including Moreland. Williams tells us that their work is relevant and cutting edge when it is no such thing (90), yet the work in biology and chemistry that is cutting edge is missing. Intelligent Design has settled the issue according to Williams (94) whose bibliography is exclusively ID proponents. There is no single mention of theistic evolution in the entire book. Other views on science and religion debated over the last century, from the inter-war work of Eddington to the convergent evolution of Conway-Morris and everything in between, are missing. In this regard, his conception of natural theology come across as scientifically deficient and narrow, despite the definition being broad and the approach evidential: the science in natural theology *is* simply cosmology and design, with even these extremely limited in the book.



**Sam McKee is lecturer in philosophy of science at Manchester Metropolitan University and a researcher in DNA repair.**

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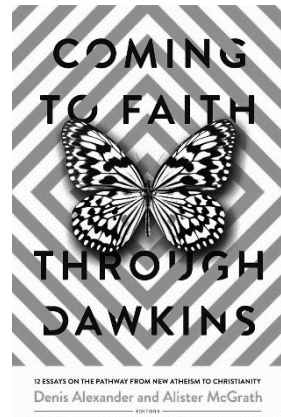
**Denis Alexander and Alister McGrath (editors)**

***Coming to faith through Dawkins: 12 Essays on the pathway from New Atheism to Christianity***

Grand Rapids, Kregel Publications, 2023. 271 pp. pb. £13.35. ISBN 9780825448225.

This book is composed of a set of twelve essays, each written by a different Christian believer who has at some point in their past been an atheist, and has also encountered Dawkins' writings. The common thread is that each author has formed a critical view of Dawkins' arguments against Christianity and has, as a result of a combination of intellectual honesty and spiritual awakening, come to a firm faith in Jesus. The writers are however very different in both personal character and academic background, with some in the arts and others in the sciences, and with very different approaches to faith.

Most speak of a personal element to their faith, where they come to a sure knowledge of God through experiencing the presence of Jesus in their lives, as a confirmation of their intellectual understanding of the sound historicity and philosophical completeness of the gospel. Many have a similar experience to CS Lewis who, faced with the logical consequence of his intellectual and spiritual enquiry, admitted defeat and accepted Christian faith as the only reasonable response. And yet each time, this step of acknowledging the lordship of Jesus has been presented as a positive choice rather than an inevitable outcome, and confirmed by subsequent spiritual growth.



There is something for everyone, and the writing styles are of a high standard, being well written without being overly technical. For each essay, the distinct personality of the writer is well expressed, and their journey into faith presented with spirit and conviction. The criticisms of Dawkins which have led them to faith in Christ are usually expressed

courteously, although sometimes there is irritation expressed with Dawkins' tone, polemical style and narrow choice of the angle of attack. What is very attractive about this set of essays is that the stories are highly personal and individual and showcase the way that there are many paths to faith, across many landscapes, but that the country explored, and the goal of faith attained, is the same throughout.

However, this collection of essays is not intended to be a systematic critique of all of Dawkins' arguments, as they are charting the personal journeys to faith of the essayists. While the cosmological anthropic principle is the most extensively discussed and the historic evidence for the resurrection of Christ referred to more than once, other challenges raised by Dawkins are not answered. Notably, the scientific implausibility of the Virgin Birth, the argument from morality against Hell and the Atonement, and the assertion that Christianity is merely an emotional crutch are not addressed. The main critique of Dawkins in these essays focuses on Dawkins' dismissive tone and selectivity of argument, as well as challenging where Dawkins' morality comes from. The accounts of personal meaning and purpose in particular seem to play into Dawkins' hands, although the authors take pains to point out their experience of a spiritual reality.

Nevertheless, the book remains an unapologetic declaration of faith in Jesus by a wide range of authors, most of whom have a scientific background, and for whom Dawkins' writings, principally *The God Delusion*, served to repel the authors from atheism and propel them towards faith in Jesus. Perhaps the unequivocal teachings, obedient suffering and unique identity of Jesus will always offend the purely cerebral and continue to evade merely intellectual arguments, and the merit of these essays is that it puts personal and spiritual reality squarely at the centre of the discourse into the reality of God.

**Dr Biggs is a postdoctoral researcher at the School of Chemistry at the University of Bristol, investigating the correlations between air pollution and traffic in Bristol, and has previously been Local Group Leader of CiS Bristol.**

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**Mike Hulme**

***Climate Change isn't everything. Liberating climate politics from alarmism***

Cambridge, UK; Polity Press, 2023; 200 pp. pb £14.99; ISBN: 9781509556168

I found this book deeply disturbing for it challenged my rather monochrome, scientific view of climate change. Mike Hulme has a long track record in climate science. He has contributed to several IPCC reports and is currently Professor of Human Geography at the University of Cambridge.

The central thesis of this book is that the present public conversation about climate change is being overtaken by the ideology of 'climatism' (8). Climatism is a way of seeing the world, in which there is a 'settled belief that the dominant explanation of all social, economic and ecological phenomena is a human-caused change in the climate. (Thus), complex political and socio-ecological challenges are reduced to and solved by resolving the issue of human-induced climate change' (27-28). Hulme argues that climatism has become a master-narrative about 'the present and future state of the world...which offers a seeming explanation for nearly everything' (14) and offers the tempting allure of simplifying what are in reality complex social problems. Hulme documents the rise of climatism and the reasons for its ascendancy, but then moves on to warn of the dangers that this ideology presents. Amongst these there are three that resonated with me.

First is the complex nature of climate change and the dangers of oversimplifying the problem. He illustrates his argument with examples of the wrongful attribution of some extreme weather events to climate change when, in reality, some of these stories are primarily about something else such as changes in land use or the implementation of particular economic and social policies. This is the allure of climatism. In the language of social policy, climate change is characterised as a 'wicked problem' (120, 182-183), one that is almost irreducibly complex.

It represents a problem to which there is no straightforward scientific solution and, because there are so many unknowns, one where proffered solutions pose the real possibility of unintended and harmful consequences.

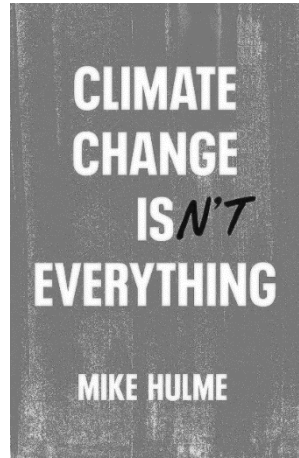
A second danger comes from some contemporary writing which plays into the climatist agenda. Naomi Klein's book '*This changes everything: climate vs capitalism*', to which Hulme's title *Climate Change Isn't Everything* may be seen as a direct response, uses the ideas of climatist to challenge that of the prevailing ideology of capitalism. Hulme comments that 'to use climate science as a trump card to shut down ideological opponents...turns science into an ideological weapon' (155), which in the long term is harmful to science itself.

A third danger lies in the familiar mantra 'just follow the science' for as Hulme points out science is not neutral. Even climate science is vulnerable to influence by climatist thinking. This is illustrated with a discussion of the different climate scenarios proposed by the IPCC and the way in which models which play to the greatest drama get the most extensive press.

As an antidote to climatist Hulme suggests that we show a greater humility towards the role that science has in contributing towards our understanding of the future. Further, given the complexity of the climate-change problem we must allow for 'clumsy solutions' (139) which are administered in a spirit of pragmatism. Climate change is but one lens through which we view the many development problems identified by the United Nations.

So how do we as Christians respond to the ideology of climatist? Throughout the book Mike Hulme is at pains to point out that he is in no way denying the reality of climate change and sees limiting its impact as a necessary ambition. However, we are being invited to recognise that the effects of changes in climate are not simply determined by climate alone but rather are mediated through a range of social, cultural and

political factors. I recognise the power of these arguments. And yet at the same time I see a warming world and more worryingly, in many places I see business as usual. In the global north I see few policy initiatives that are effecting serious change whereas in the global south I read of farmers struggling with the unpredictability of seasonal rains. So where does this leave the nuanced approach? Maybe a little alarmism is necessary.



Whilst this is not an explicitly Christian book, I would commend it to Christians in churches and charities advocating for climate justice for it allows us to form more rounded arguments. For those wanting a more theological approach see Chris Doran's book reviewed in S&CB 30:2.

**Hugh Rollinson, is Emeritus Professor of Earth Sciences at the University of Derby and former course director at the Faraday Institute for Science and Religion**

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**John Loughlin (ed.)**

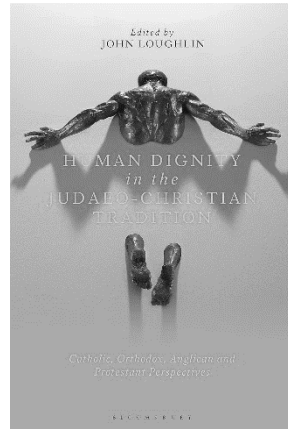
***Human Dignity in the Judaeo-Christian Tradition: Catholic, Orthodox, Anglican and Protestant Perspectives***

Bloomsbury Academic, 2021. 283 pp. pb. £28.99 ISBN 9781350238138

While the Universal Declaration of Human Rights recognizes dignity as the foundation of all rights, its definition of dignity is deliberately vague. Loughlin's collection explores the historical and theological roots of human dignity in the various Christian denominations, including Catholicism, Orthodoxy, Anglicanism, and Protestantism. It delves into the classical Greek, Roman, and Scriptural roots of human dignity, examining the works of prominent theologians like St. Thomas Aquinas and St. John Paul II. Additionally, it explores how Renaissance art and

music reflected humanist ideals of human dignity, noting continuity rather than outright rejection of what went before.

In his introduction, Loughlin acknowledges the existence of secular critiques of Christian notions of dignity. These critiques range from the nihilistic pessimism of Friedrich Nietzsche to the radicalism of Peter Singer, who challenges human exceptionalism ("speciesism") and defends infanticide in certain cases. Loughlin argues that secular humanists like George Kateb, while recognizing human dignity, often dismiss religious perspectives. Noting that religion is a key aspect of humanity, as is a great capacity for evil and destruction, Loughlin warns that atheism risks reducing humans to animals lacking obvious inherent dignity or equality.



The book originates from a series of academic lectures that offer valuable insights, but which lack a fully unified and sustained narrative and analysis. However, Loughlin's introduction provides a helpful framework, and the essays themselves follow a broadly chronological order. The "image of God" concept and its interpretations predominate, and the dualities of human glory and misery, spirituality and physicality, and the individual and society recur several times.

One potential shortcoming is the unsystematic discussion of the nuances of "dignity" itself. Christianity majors on our inherent worth as human beings, but the word also refers to calm, serious, self-controlled behaviour. Delving deeper into these distinct yet interconnected ideas could have helped frame arguments in the book and in society.

The first, foundational chapter is by John Day. Day examines the "image of God" concept in its biblical context and its later development. He

argues that the image and likeness of God refer to intelligence and creative power, potentially including our physical form, given God's portrayal in human-like terms within scripture.

While most essays contribute to the overall exploration of Christian thought, the third chapter, "Christ as Imago Dei – A Missed Opportunity of Ante-Nicene Christian Theology," by Vladimir Latinovic, seems less relevant. The focus deviates from human dignity generally and dismisses Trinitarian readings of the Scriptures. While discarding Trinitarianism sidesteps certain problems and aligns with non-Trinitarian religions, the essay does not consider how such a drastic dismissal of fundamental Christian doctrines undermines the credibility of the whole Christian tradition.

Bringing things up to the present, Roger Trigg explores the role of dignity in discussions of religious freedom, while Michael Burdett compares transhumanist ideas with Christian notions of the image of God. Finally, Callum MacKellar defends inherent human dignity as a basis of universal rights and equalities that is threatened by euthanasia, eugenics and abortion.

Overall, this book is not a systematic historical, theological or bioethical account but rather a rich, academic introduction to influential Christian ideas about human dignity and their application to contemporary issues. It offers a valuable resource for academics and students seeking historical context and diverse theological perspectives on this important and contested concept. The last two essays, focusing on transhumanism, robotics, and bioethics, likely hold the most immediate interest for readers of this journal.

**Patrick Richmond is Vicar of Christ Church, Eaton, Norwich, Chair of Science and Faith in Norfolk, and an associate of the Faraday Institute.**

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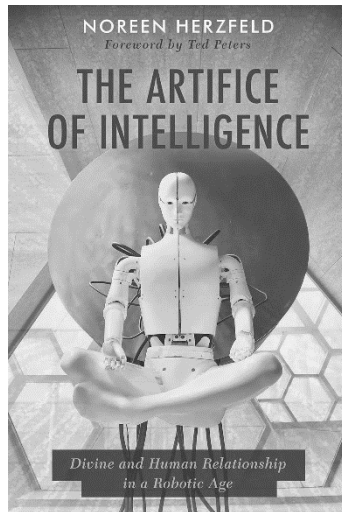
**Noreen Herzfeld**

***The Artifice of Intelligence: Divine and Human Relationship in a Robotic Age***

Fortress Press, Minneapolis, 2023. 200 pp. pb £22.22. ISBN 9781506486901

By now, almost everyone is aware of what the much-heralded revolution in Artificial Intelligence (AI) is purported to offer us. Very soon, our current technological lifestyle and world-view are set to be overtaken by brand-new innovative applications of AI, from self-driving vehicles to entire films and novels being written and produced completely by AI.

Most works discussing this subject do so from a relentlessly utopian, techno-evangelical perspective, but this book takes a rather different, more philosophical and theological approach. Instead, author Noreen Herzfeld considers somewhat deeper issues, namely: 1. What kind of relationship can people authentically have with AIs? 2. How does the increasing presence of AI within society change our perception of ourselves and God? Broadly speaking, how AI tech impacts our relations with each other and our worldview as seen



from a Christian perspective. Perspicaciously, Lutheran theologian Ted Peters lucidly states in the forward: ‘We call ourselves intelligent. We are so very smart that we plan to invent a future with a posthuman species smarter than we are. Smart? Yes. Wise? Well, that’s questionable.’

Crucially, Herzfeld’s first chapter provides an essential core for appreciating the rest of the book, containing key insights linking the remaining chapters together. Appropriately enough, the context is set with a concise history of AI and its potential applications. AI’s long-term

major goal is widely acknowledged as artificial general intelligence (AGI), broadly corresponding to human-level intelligence and capability – currently unattained. Given the focus on authentic relationships, Herzfeld takes her theological lead from Karl Barth. Following Jewish theologian Martin Buber, Barth observes that authentic relationships between people possess an “I – Thou” character - namely the recognition that “I am as Thou art” - rather than the “I - It” relationship we have with things. Herzfeld shows how Barth sees authenticity in terms of presence (looking the other in the eye), direct communication (speaking and listening to each other), agency (helping and assisting each other), and finally, freedom (gladly offering help and companionship). She further notes that, although humanity was made in the Image of God, AI is being made in the image of man - or more precisely, the Internet, which is problematical at best.

This culminates in considering whether AIs have personhood: ‘Do AIs truly make their own decisions, or do they act solely on the will of the programmer? Could an AI enter a contract? How would one hold a machine legally or morally culpable? Does it possess intrinsic worth? Our understanding of what it means to be a person is simultaneously too vaguely defined and too specifically applied. Legal systems demand yes-or-no answers, while our intuition finds no easy demarcation, no identifiable line, the crossing of which confers personhood.’ This first chapter ends with the following core question:

‘Barth insists that it is only through a consideration of the person of Jesus that we can grasp who God is and who we are meant to be. In taking on a human body, God became fully present to humanity. By enduring our suffering and mortality, God entered a fully authentic relationship with humankind. But what can suffering or mortality mean to a machine? Can we have a fulfilling relationship with something that does not share our embodied condition?’

Each of the remaining chapters takes the form of a philosophical and theological meditation, ruminating upon Barth’s criteria for authentic relationships, and applying it in various contexts to the situation

pertaining between humans and AIs. Although it is fully acknowledged that AGI has not yet been achieved, it might very well happen quite soon - which certainly gives urgency to the considerations given here. Even if AGI is not achieved in the near term, the attitude of many users to AI-enabled technologies confers person-like qualities and attributes to their implementation. This shocked computer scientist Joseph Weizenbaum when he deployed the very first chatbot, ELIZA, back in 1966, well over 50 years before ChatGPT. It simply goes to show that Herzfeld's concerns are indeed well-placed and continue to be relevant, even urgent.

The final two chapters are perhaps the most profoundly theological in their character and consequently, also the most challenging. Therein, Herzfeld further cautions us on how AI is already being used:

'However, we sometimes act as if AI were a god by giving it blind adherence or far too much authority. We let algorithms decide in too many cases who gets parole, who sees what ads, who gets hired or fired, or who gets what medical treatment. Surveillance programs watch our every keystroke and, all too often, our physical movements. [...] When we give AIs blind adherence, we treat them like gods; they are then, in fact, idols—gods made in our own image that we think we can control.'

As perhaps indicated by mentioning "artifice" in the book title, Herzfeld explicitly contends that 'AI can be a good tool when used with care. It is an incomplete partner and a terrible surrogate for other humans.'

In conclusion, this was not an easy read. Although the writing style is lucid and clear, the overall structure and content are somewhat challenging. It could have had further consolidation and editing. With these minor reservations, I can certainly recommend this work as a good introduction to the deeper social, philosophical, and theological ramifications of applying AI.

**Dr Brian Monahan is a retired computer scientist, mathematician and software developer, living near Bristol UK.**

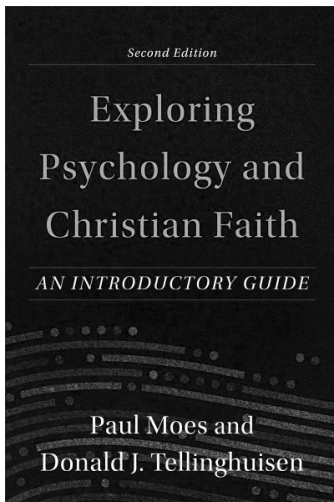
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**Paul Moes & Donald J. Tellinghuisen**

***Exploring Psychology and Christian Faith: An Introductory Guide (Second Edition)***

Grand Rapids: Baker Academic, 2023. pp.272 pb. £18.95. ISBN 9781540964687

In *Exploring Psychology and Christian Faith* Moes and Tellinghuisen develop a dialogue between scientific psychology and a biblically grounded anthropology. In doing so the authors deserve credit for both, the breadth of the psychological topics considered, and the accessible tone they manage to maintain throughout. The book engages with the nature of consciousness, perception, memory, emotion, sociality, development, psychopathology, psychotherapy, and medication, to provide only an incomplete list. The book is intended as a textbook or companion for undergraduates taking an introductory psychology



course or a course on the relationship between science and religion. Students will no doubt value the effort the authors have gone to in the second edition, working to simplify their prose and providing easily accessible definitions to key terms. The discussion questions at the end of each chapter, retained from the previous edition, are also hugely helpful. Together these features make the authors' depth of psychological scholarship easily accessible.

While the work might not be explicitly intended for clergy, those involved in church leadership will be particularly interested by the central role that the Church plays throughout. While not a formal theme, the centrality with which the authors view relationships for human personhood means that they consistently return to the Church as the site of Christian discipleship and sanctification. The potential usefulness of the work for clergy is further enhanced by the pastoral tone with which Moes and Tellinghuisen treat a range of topics including human limitedness (20),

pornography use (76-77), anger (180), and the use of medication to treat psychopathology (195-6).

To explore psychology and Christian faith the authors set out a biblically grounded anthropology composed of five themes: 1. humans are relational persons; 2. humans are broken in need of redemption; 3. humans are embodied; 4. humans are responsible limited agents; 5. humans are meaning seekers. While fully acknowledging that this is an incomplete list Moes and Tellinghuisen understand there to be 'wide agreement among biblical scholars and laypeople alike' on them (10). These five themes are unpacked in chapter one and then brought into conversation with each of the psychological topics explored in later chapters. The theological discussion in chapter one might have been enhanced by greater theological breadth of interlocutors. Notably this chapter contains no citation from a theologian born before the twentieth century. St Augustine's sermons on the Psalms, for instance, would have provided a unifying voice by which all five themes could have been integrated and developed.

The five themes, outlined in chapter one, are theologically uncontroversial. More debatable is the way Moes and Tellinghuisen appear to understand the relationship between the natural and supernatural. Describing this relationship, they refer to the 'natural (*versus* supernatural)' (29), [my emphasis] suggesting an oppositional relationship between the two. In doing so they suggest that psychology (which focuses on the natural) cannot be used to shed light on the activity of the Holy Spirit (the supernatural). Reflecting this, the authors contrast human cognition, desires and actions with the work of the Holy Spirit (65, 75-6, 116). This gives the impression that the Spirit works outside of the human person's natural faculties. Indeed, reflecting this Moes and Tellinghuisen write 'faith isn't something people can earn, so it's different from other kinds of beliefs studied by psychologists' (164).

This will no doubt be a concern to catholic readers who, with Thomas Aquinas, understand grace to work through the perfection of human persons' natural faculties. However, it may well strike some Protestant readers as questionable too, as reflected in the work of Protestant theologians Kathryn Tanner (*Christ the Key*) and Simeon Zahl (*The Holy Spirit and Christian Experience*) both of whom appeal to the

embodiedness of human persons (a central theme for Moes and Tellinghuisen) to argue that the Spirit works through human persons' natural, psychological faculties. Indeed, this claim reflects the work of psychologists of religion like Fraser Watts, Bonnie Poon Zahl, and Nicholas Gibson who understand religious cognition to make use of the same psychological systems as non-religious cognition.

Overall Moes and Tellinghuisen have provided a hugely accessible introduction to a broad range of psychological topics bringing each into conversation with a biblical anthropology. Students of psychology will no doubt benefit from their reflections on the relationship between psychology and Christian faith and all readers will value the authors' sensitive and pastoral treatment of an array of issues. However, I am left wondering how psychology might help us explore life lived in the Holy Spirit? To best answer this, I believe we will need an interdisciplinary dialogue where the dichotomy between the natural and supernatural is truly shaken.

**Ed Chan-Stroud is a DPhil Candidate at Oxford University working across Theology and Psychology. He is about to start as an ordinand in the Church of England.**

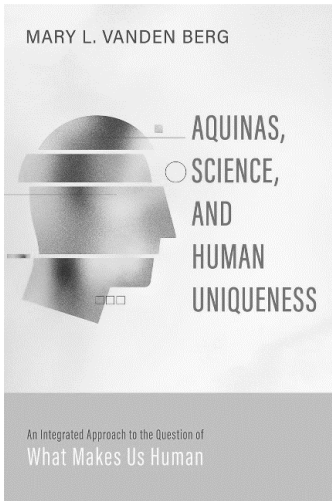
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**Mary L. Vanden Berg**

***Aquinas, Science, and Human Uniqueness: An Integrated Approach to the Question of What Makes Us Human***

Eugene, OR: Cascade Books, 2022. 158 pp. pb. £18.00. ISBN 9781725267770

Are humans unique, and if so, how? Vanden Berg takes an interdisciplinary approach to this question, incorporating insights from Scripture, theology, and science. She starts with theology, following Aquinas in her view of human nature, holding that humans are composites of a body (matter) and a rational soul (body) and form (soul). We are made in the image of God and for relationship with God. Thus, our material nature makes us similar to the animals, but our rational soul sets us apart.



Next, she moves to biblical anthropology and traces the Scriptural support for human uniqueness. This chapter dovetails nicely with the chapter on theology, and includes a discussion of what is entailed by the image of God.

From Scripture and theology, we get a view of humans as specially unique, that is, 'set apart and above the rest of creation' (108). But does science support this view? This is the topic of the third chapter. Vanden Berg catalogues a surprising number of ways that research supports the claim that humans are similar to other animals, including the ability to make and use tools, wage war, live in community, and express moral behavior such as sympathy, empathy, and altruism. Yet, science also indicates that humans are specially unique. For example, humans differ from other animals in being able to recognize and interact with other minds, though evidence suggests that chimpanzees can do so at a basic level. Humans can also use complex language, have a moral code based on abstract reasoning about other minds, and are generators of culture.

In the next chapter, Vanden Berg recognizes a tension between the biblical data about human nature and origin, and the evolutionary account of our origin. The chapter is pastoral, rather than academic: she is concerned to help the layperson think about the proper relationship between science and faith to ease their concern over the conflict between the two. She sees science and Scripture as two different stories of human nature and origin that sometimes overlap and are often in tension. Rather than seek to resolve the tension, she advocates living with the tension. In doing so, one takes both science and Scripture seriously and on their own terms.

In the final chapter, she brings the book together by presenting her view of humans as 'material-spiritual, intellective, worshipping beings, and therefore as specially unique creations within the world' (132).

This book is clear and helpful. It engages with current academic research while remaining accessible to the layperson. It could be used at the college level, perhaps in a course on worldview or on human ontology. The author writes as a Christian academic, paying great respect to both Scripture and the Christian tradition. In a climate that seeks the reduction of humanity to the other animals, Vanden Berg argues forcefully for human uniqueness while taking empirical studies of animal cognition and behavior seriously.

I find her view of the relationship between science and religion helpful. To use Ian Barbour's categories, it seems she advocates a mix between the conflict and dialogue models – science and the Bible overlap enough that dialogue is possible, but sometimes there is conflict between the two. At the same time, she says they are 'mysteriously compatible' in a way similar to Christian doctrines like the Trinity. So, while we do see conflict between science and the Bible, the conflict is due to a faulty understanding of one or the other. This comes as a relief knowing that we don't need to force an integration between the two. But ultimately, there can be no conflict. Since all truth comes from God, when the story of the world and of the Scriptures are understood correctly, they will together tell a harmonious story about human beings and the world.

Her material-spiritual view of humanity seems right since the Bible sees both body and soul as important aspects of human ontology. God formed us from the dust and breathed life into our nostrils (Gen. 2:7, ESV). The separation of body and soul at death is an impoverishment which will be rectified at the final resurrection when Christ reunites them. And 'the Word became flesh and dwelt among us' (Jn. 1:14), showing the value of our materiality. Yet there are challenges to this view. If we are body-soul composites, how do we retain our identity when the composite comes apart? Perhaps it does not, and we're simply ushered into God's presence with glorified bodies. Or perhaps we survive via one of our parts, that is, the soul.

Vanden Berg's book is a compelling account of our human uniqueness from an interdisciplinary perspective. This makes it well worth the read.

**Keith Hess is Associate Professor of Philosophy and Apologetics at Oklahoma Baptist University.**

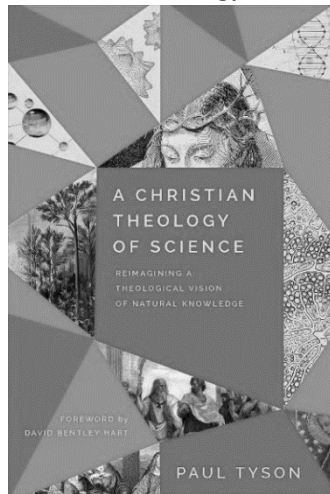
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**Paul Tyson**

***A Christian Theology of Science: Reimagining a Theological Vision of Natural Knowledge***

Grand Rapids, MI: Baker Academic, 2022. 224 pp. pb. £13.73. ISBN 9781540965516

In this book, philosophical theologian Paul Tyson re-envision the relationship between natural knowledge and Christian theology. Instead of adopting the common science and religion paradigm, Tyson advocates for a 'theology of science' and 'religion-to-science interpretative dynamic' (3, 27). Christian theology should engage modern science while holding fast to the core tenets of the faith and seek to incorporate natural knowledge into an orthodox theological account of reality. The goal here is for Christian theology to reclaim its historical position as a 'first-truth discourse' by recovering a theological epistemology informed by Plato, Aristotle, Augustine and Aquinas (98). Tyson argues that this approach is better for Christian theology than its current, highly dysfunctional, relationship with modern science. Modern science, according to him, is shaped by empiricism, rationalism and physicalism, and judges Christian theology accordingly. It thus excludes from its scientific account of reality many of the core Christian truth claims, which are metaphysical and miraculous in nature (7-15). Tyson views these philosophical aspects of modern science as untenable and sees the need for theological warrants for the reliability of human reasoning and sense perception (43, 54).



The stark picture of contemporary science, which the author paints, identifies important tendencies, but his analysis struggles to deal with science's success in producing knowledge. By his own admission, modern science has a better grasp of physical reality than any previous system, partly because of its abandonment of premodern metaphysics (70-71, 93-94). This suggests the fall of Christian theology from its place

of prominence was a fortunate one (*felix culpa*), and raises serious questions about the retrieval of premodern epistemology and metaphysics. We cannot just consider how the Tyson's proposal benefits contemporary Christian theology, but must also take its impact on science into account. He, for example, expects it to lead to an increase in theoretical complexity (168). Another concern is that Tyson, for all his criticism of modern philosophy, does not fare much better in combatting philosophical scepticism. 'Theocentric ontological foundationalism' may *entail* that our epistemic faculties are reliable, but clearly, we cannot *know* the ontology is true apart from these very faculties. Christians (and other theists) might respond that they have a reasonable trust in their faculties (cf. 41-42), but, by my lights, this is hardly going to impress the sceptic.

Further, I wonder why we should not base natural science on the natural knowledge of God. Tyson seemingly takes a dim view of traditional natural theology, but it may be a more suitable 'first truth discourse', given the global nature of contemporary science. He remarks that 'one cannot prove the primary (God) from the secondary (creation)' (55n26), but, in my opinion, this either breaks with, or fails to engage, an important strand of premodern thought. For example, Aquinas concludes from Rom. 1:20 that it must be possible to demonstrate the existence of God from created things. As is well known, he then proceeds to formulate five arguments for God's existence (*Summa Theologiae* I, Question 2, Articles 2-3). If Tyson thinks all such arguments fail, then it would be nice to know why exactly. Admittedly, they are not absolute proofs, but that standard would force us to reject (almost) all arguments.

These are just a few of the concerns I have. Additional issues, such as the difficulty of Tyson's writing, have been raised by others (e.g. Chris Barrigar in *Perspectives on Science and Christian Faith* 75:1). Nevertheless, I am sympathetic to key parts of Tyson's approach. For modern science to be a reasonable enterprise, more is required than empiricism, rationalism and physicalism. For example, it is difficult to see how natural knowledge is truly worth pursuing if there is no such thing as objective value. Moreover, there is a legitimate place for a theology of science that reflects on the practices, results and foundations of modern science, drawing on the Christian tradition. Lastly, Tyson's focus

on epistemology and metaphysics is praiseworthy, given that modern theologians often shy away from these fields. That is unfortunate, because these are areas in which theologians can constructively engage with modern science.

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**Nick Spencer & Hannah Waite**

***Playing God: Science, Religion and the Future of Humanity***

London: SPCK, 2024. 196 pp. hb £19.99 ISBN 9780281090037

Having read and enjoyed Nick Spencer's recent book *Magisteria* (2023, Oneworld) I looked forward to reading and reviewing *Playing God*. However, it must be said that this is a very different sort of book and perhaps my expectations regarding it were somewhat misplaced. The authors' stated aim is to make a helpful contribution to the twenty-first century debate on the nature and status of the human (11-12). They want to move the science and religion debate away from the 'neuralgic issues of evolution, the Big Bang, and miracles, with perhaps a bit of quantum theory thrown in...' (x). Their contribution to the debate comes in eight chapters that address a spectrum of issues including: the quest for immortality, the existence of alien life, the personhood of animals and of AI, abortion and gene editing. The authors' note that both 'science' and 'religion' are problematic terms to define, but their chosen focus in terms of religion is on Christianity (xii).

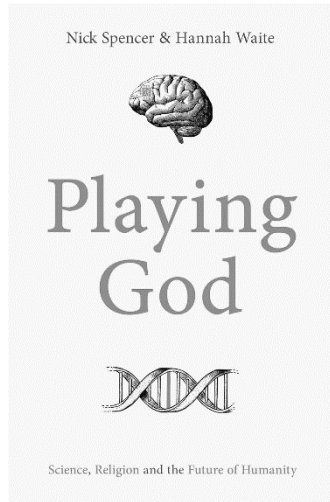
The approach across the different chapters is somewhat uneven, perhaps due to the book's dual authorship, and one chapter in particular seems to me to be out of place in this book. This is the chapter entitled 'Anti-vaxxers, or how we need political theology to save the world.' Even the title suggests that this is less about the nature and status of the human and more about political theology – and that indeed is the case. The topic is an interesting one, but I am not sure that it contributes much to the debate on the nature and status of the human. If the recent pandemic had not occurred, I doubt that a chapter like this would have been included in the book – it is not a natural fit. Of the remaining chapters I was most struck by Chapter 1 'How not to live forever' and Chapter 6 'A scientific cure for sadness', perhaps because I know a little

about the other topics already (with the exception of the chapter on anti-vaxxers).

In Chapter 1, the authors note that 'eternal life' (or how to live forever) is a USP (unique selling point) of at least some religions (13) but it has now become a scientific quest. Considerable sums of money are being invested, especially by those who might be called the super-rich, in research on prolonging life and preventing ageing. Of course, better nutrition and medical progress over the last century have indeed significantly extended the human life span, particularly in the so-called western world (16), and perhaps further extension is possible (though see Milholland&Vijg 2022 Why

Gilgamesh failed: the mechanistic basis of the limits of human life span, *Nature Aging*, 2:878-884). Transhumanism – the use of technology to enhance longevity, cognition and well-being – is now a well-established philosophy that seeks eternal life (scientifically based immortality) in this world rather than the next (apparently there is even a Christian Transhumanist Association (21)). From a Christian perspective the authors rightly say that eternal life requires a radical transformation (29) and they argue that it is less than clear that living forever untransformed is a desirable prospect, even if science were to find a way to extend our lives indefinitely (32).

Moving on to chapter 6, this discusses the epidemic of mental ill health in the western world and looks at the possibility of a scientific cure. Unfortunately, what counts as mental ill health seems to be so broad that almost everyone is likely to experience this at some point during their lifetime (126). Furthermore, the proposed pharmaceutical 'cures' don't seem very effective generally (131). Interestingly, having a religious faith seems to be good for mental health, but there is a need to distinguish between belief, belonging and behaviour in their effects.



Research shows that religious practices – either individual or corporate – are good for one’s mental health (136), which is encouraging for those of us who have a living faith.

To sum up: this is an interesting book but is somewhat uneven in its approach to the topic it addresses (as per its subtitle: Science, Religion, and the Future of Humanity). If you haven’t thought about the issues that are discussed, then it is worth reading as a starting point. However, there are other books out there that address each of the topics in greater depth.

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**Diarmid A. Finnegan, David H. Glass, Mikael Leidenhag and David N. Livingstone**

***Conjunctive Explanations in Science and Religion***

London/New York: Routledge, 2023. 335 pp. hb. £ 125.00. ISBN 9781032139685

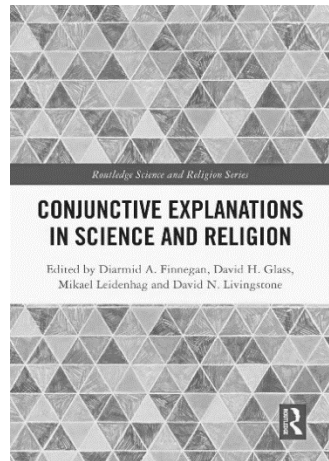
When we think of explanations as answers to why-questions, we usually assume that each such question has precisely one correct answer. However, it may be necessary to give more than one answer to a why-question, leading to what is called a conjunctive explanation. This edited volume explores the potential of conjunctive explanations formed by conjoining scientific and religious explanations. (A volume discussing conjunctive explanations within science has simultaneously appeared with the same publisher: J. Schupbach and D. Glass (eds.): *Conjunctive Explanations*, Routledge, 2023.)

One obvious obstacle to this kind of conjunctive explanation is the naturalistic belief that once science has done its job of explaining what we observe, there is no explanatory task left for religion. While all the contributing authors disagree with this belief in some way or other, not all of them engage with it directly. One example of engagement that I found particularly interesting is Anastasia Scrutton’s chapter on possible

conjunctive explanations in psychopathology (Chapter 7). Scrutton sensitively discusses different ways in which we might acknowledge episodes of 'hearing voices' as genuine religious experiences, all the while explaining and treating them as psychotic. Another example is Gijbert van den Brink's discussion of Ockham's razor in connection with the cognitive science of religion (Chapter 9). Apart from responding to naturalistic worries about conjunctive explanations, van den Brink also helpfully addresses theological reservations against the very idea that religion is in the explanatory business.

The book consists of six so-called conversations, each of which contains two chapters and brief responses from both authors to the other's contribution. As one might expect, the mutual engagement of the two authors is not always so extensive as to deserve the term 'conversation', but the format nevertheless enhances the overall coherence of the book. For instance, although David Livingstone's discussion of teleology in a Darwinian framework (Chapter 3) is highly interesting in its own right, the connection to the theme of conjunctive explanation is rather tenuous. However, the other chapter within this conversation (Chapter 4 by Rope Kojonen) then draws the discussion back to the main topic by zooming in on Asa Gray's response to Darwin's theory. By reconstructing Gray's arguments for the compatibility of Darwinism and theism, Kojonen demonstrates what a conjunctive theistic-evolutionary explanation might look like. Similarly, the reader can learn a lot about panpsychism as an explanation for consciousness (Chapter 5 by Joanna Leidenhag) and about strong emergence in physics (Chapter 6 by Tom McLeish), but it is primarily by reading these two chapters together that one grasps their significance for the issue of conjunctive explanation.

It is clearly the first and the last of the six conversations that are most explicitly concerned with the book's main subject. Since explanation has



been a hotly debated topic in philosophy of science for several decades, it is worth mentioning that all four participants in these conversations are up to date with the relevant literature. This enables them to formulate their own take on conjunctive explanation as a significant step forward in the ongoing debate on explanation and understanding. In the case of David Glass (Chapter 1), the step consists in developing a broadly Bayesian framework for discerning under which circumstances a conjunctive explanation may be better than a simple one. Aku Visala (Chapter 2) then discusses explanations of human actions as a concrete case in which these circumstances are fulfilled, because neither an account in terms of neurophysical causes nor an account in terms of reasons for action is entirely satisfactory on its own. In their respective contributions, Stephen Williams (Chapter 11) and Alister McGrath (Chapter 12) emphasize the 'big picture' view that religion adds to science in conjunctive explanations. Williams does this through a critical appraisal of John Polkinghorne's writings, in which he identifies a neglect of the moral and volitional factors that affect our big pictures. McGrath explores the idea of an 'explanatory mosaic' as a middle way between an explanatory monism that fails to recognize the irreducible contributions of different approaches and a pluralism that cannot account for the unity of the one world we inhabit.

Let me finally mention one more quality of the book: The diversity of the theological outlooks gathered within it can be illustrated by briefly looking at the two chapters I haven't mentioned so far. On one end of the spectrum, Andrew Torrance (Chapter 8) defends a robust notion of divine intervention against naturalistic criticism. On the other end, David Brown (Chapter 10) refuses to view God as a person, let alone an agent. In sum, although not all the chapters of this volume are intimately connected to the notion of conjunctive explanation, each of them is an insightful and thought-provoking contribution to the science-religion dialogue.

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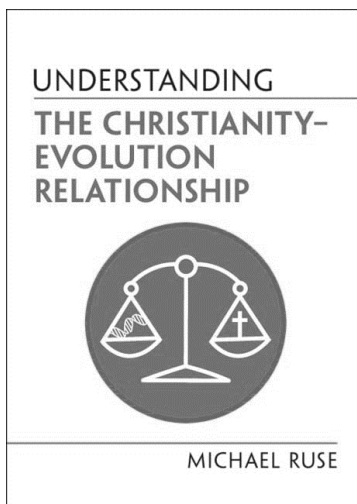
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**Michael Ruse**

***Understanding the Christianity-Evolution Relationship***

Cambridge: CUP, 2023. 184 pp. pb. £14.99. ISBN 9781009277280

Michael Ruse is Professor Emeritus at the University of Guelph, Ontario and recently retired as Professor of Philosophy at Florida State University. In his Preface and Epilogue, he makes clear that he writes as a philosopher and historian of science, not a theologian. He does present, and briefly comment on, the views of significant theologians from St Augustine of Hippo to Pope Francis, but there are no in-depth theological discussions. In the Preface Ruse advises readers to begin with the 'Summary of Common Misunderstandings' at the end of the book. He does not discuss these explicitly in the book, but says they were in mind when writing it and readers should be able discern his answers to the problems they pose. A misunderstanding, that might be added to those listed, is the assumption that the opening chapters of Genesis were meant to be read as an historical and scientific account of creation. His writing is concise, occasionally terse, so that at times the text needs to be read with careful attention in order to follow the line of thought. There is an element of humour.



Ruse structures the book around two world views, based on different root metaphors. *Organicism* sees the world in terms of a living organism. It was the dominant view in ancient Greece, adopted by Plato and Aristotle. *Mechanism* looks at the world as a machine. It was the view of the pre-Socratic atomists. In the first three chapters of the book Ruse seeks to show how these influenced, sometimes in complex ways, the relationship between Christianity and natural philosophy and then

science. Initially organicism was seen as congenial to Christianity: the world seen as an organism created by God and in and through which God's purposes are worked out. He sees its presence in the thinking of Augustine, Aquinas and Calvin. With the rise of science, the view of the world as a machine came to the fore. Thinkers from Boyle, Newton, and Paley onwards found ways of relating this to Christian theology. Even after the acceptance of Darwin's mechanistic theory of evolution through natural selection, there were those like Aubrey Moore who were able to do this. Ruse exposes the tendentious nature of the 'warfare' model of the science-religion relationship which arose in the late nineteenth century. He discusses the factors which encouraged the rise of biblical literalism with regard to creation in the southern USA, its promotion by Seventh-day Adventists, and its later adoption by some evangelicals in the mid-twentieth century. There are brief discussions of young-earth creationism, intelligent design, and the debate about the 'fine-tuning' of the universe. Teilhard de Chardin's theologizing of evolution and A. N. Whitehead's 'process theology' are seen as resurgences of organicism in the twentieth century.

Mechanistic Darwinism raises questions about the nature of humans and their place on earth which challenge Christian thinking. The second half of the book is devoted to this. Chapter four discusses attempts to understand human freewill and morality in mechanistic evolutionary terms, and some Christian responses to this. Both secular and Christian responses to the current environmental crisis are discussed in chapter five. Chapter six discusses understandings of human aggression expressed in war and prejudice (especially racial and sexual). Again, the organising principle is the influence of organic and mechanistic thinking on both secular and Christian thinking. A weakness of the book is that in its use of reference to biblical texts it shows no awareness of the contribution of modern biblical scholarship in dealing with the issues addressed. This is particularly true of how the Bible should be used in developing Christian ethics.

This is not a book of answers, though Ruse's own position on various issues is made apparent. It is a presentation of a new way of looking at the debates that have taken place over the relationship of Darwinian evolution to Christianity in the hope that it will stimulate a fresh way of thinking about the issues involved. It provides a good overview of these debates and deserves to be read and given careful consideration.

**The Revd Dr Ernest Lucas, Vice-Principal Emeritus, Bristol Baptist College and Associate Research Fellow, Spurgeon's College, London, has doctorates in both science and theology.**

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