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The Emergent, Self-explaining Universe of Paul Davies – a Summary and Christian Response

Physicist Paul Davies has emerged as one of the most popular scientists of the twenty-first century, despite his critique of the scientific establishment and its perceived failure to account for the origins and rational nature of the universe. Davies argues that the scientific consensus on cosmology rests on faith, both in its failure to provide an ultimate explanation for the origin of the universe and in its blind acceptance of its rational laws. As an alternative, Davies postulates an ‘emergent’ universe which contains the cause of its own existence and which renders unnecessary any sort of a personal deity. Yet Davies’s alternative falls short of providing a satisfactory cosmic explanation. Davies himself cannot adequately account for the principle of backward causation which creates his universe, and thus his paradigm still relies on a transcendent principle that remains unexplained. Furthermore, Davies’s objections against a personal god can be answered on philosophical grounds. Thus Davies’s hypothesis does not provide a superior alternative to the Christian view of God.

Key words: Paul Davies, physics, universe, emergent, self-causation, quantum mechanics, cosmology, time, teleology, cosmological argument, fine-tuning

Introduction

Douglas Adams’ classic *Hitchhiker’s Guide to the Galaxy* tells the story of an advanced civilisation that builds a magnificent supercomputer for the sole purpose of providing the ultimate answer to the meaning of ‘life, the universe, and everything’. After millions of years of calculation, the answer, much to the confusion and frustration of the advanced civilisation, turns out to be ‘42’.¹

Physicist Paul C. W. Davies has devoted himself to this very same question of ‘life, the universe, and everything’ (occasionally alluding to Adams’ classic work along the way). In addition to a plethora of research articles, Davies has authored a number of best-selling books that challenge the popular consensus on physics and cosmology. As a result, Davies has become one of the best-known physicists of the twenty-first century.

¹ Adams, D. *The Ultimate Hitchhiker’s Guide to the Galaxy*, New York: Ballentine (2002), pp. 111-122.

In the process of grappling with the concepts of ‘God’, creation, and the nature of the laws of the universe, Davies has strongly objected to the presuppositions, or elements of ‘faith’, that he believes prevail in science. Yet on the other hand, he has also rejected the concept of a personal deity, preferring to argue for an emergent, self-explaining universe. Indeed, Davies has gravitated towards a view where ‘a deep principle of nature links the laws of the cosmos to the emergence of life and consciousness, perhaps through some form of backward causation’.² For Davies, this simultaneously eliminates the need for a creator external to the universe while assigning a special role to human consciousness in explaining the existence of the universe. Furthermore, according to Davies, if any such concept as ‘god’ exists, it will be discovered via science, not by special revelation: ‘It may seem bizarre, but in my opinion science offers a surer path to God than religion.’³

While Davies’s attempts to answer the mysteries of existence are commendable, ultimately his metaphysical paradigm of a self-causing, emergent universe does not provide a satisfactory answer. This paper will summarise Davies’s cosmological views, point out how they have changed over the past two decades and then provide a Christian response.

An emergent and self-explaining cosmology

Davies’s self-explaining, emergent cosmology develops from his recognition of the seemingly tailor-made nature of the universe (i.e. that it appears designed specifically to support life) and his dissatisfaction with other cosmological models. On the one hand, Davies acknowledges that ‘it is hard to resist the impression that the present structure of the universe apparently so sensitive to minor alterations in the numbers has been carefully thought out’.⁴ Yet on the other hand, Davies rejects both multiverse theory and M-theory. The former (which argues for a vast, potentially infinite number of universes, of which statistically some must support life)⁵ may account for the initial state of our particular universe but still does not explain the existence of the physical laws.⁶ The latter (which attempts to provide an ‘ultimate explanation’ for everything in the universe in such a way that it is ‘the unique explanatory framework capable of describing the universe without running up against any internal inconsistencies or

2 Davies, P. ‘42? No, There’s More to it...’, *The Oxford Times* (September 2006), cited 23 November 2009. Online: http://www.oxfordtimes.co.uk/education/943801.42_No_there_s_more_to_it/

3 Davies, P. *God and the New Physics*, New York: Simon & Schuster (1983), p. ix.

4 Davies *op. cit.*, (3), p. 189.

5 For a technical discussion of the variations on multiverse theory, see Davies, ‘Multiverse cosmological models’, *Modern Physics Letters A* (2004) 19, 727-743.

6 Davies, P. *The Mind of God: The Scientific Basis for a Rational World*, New York: Simon & Schuster (1992), pp. 219-220.

logical absurdities')⁷ would seem to contradict Kurt Gödel's incompleteness theorem while raising the question of why that particular M-theory would prove to be true.⁸ In other words, since Gödel's theorem basically asserts that 'there will always exist certain true statements that cannot be proved to be true'⁹ (or, phrased a different way, 'no rational system can be proved both consistent and complete,')¹⁰ and since a 'theory of everything' basically attempts to provide 'closure', as far as the physical universe is concerned (i.e. the elimination of all mystery), then Gödel's theory and M-theory are, according to Davies, irreconcilably at odds.¹¹ Furthermore, Davies argues that the very existence of model universes (with their own, alternative M-theories) raises problems for the existence of any unique and necessary set of laws for our particular universe. In other words, model universes force one to ask who chose that particular M-theory for this universe.¹² As a result of these objections, Davies looks elsewhere for answers to the universe's existence.

The emergent universe

For Davies, one of the greatest problems with physics is its reliance on a Platonic view of the laws of physics and the inability of physicists to offer up an explanation of those laws.¹³ In order to explain the universe, physicists and philosophers are forced to 'appeal to something outside the universe: an unexplained god, physical laws that exist reasonlessly, or a vast ensemble of other universes'.¹⁴ Davies argues, 'We will never achieve a satisfactory and complete scientific account for why the universe is as it is so long as we cling to Platonism – to externally-imposed, immutable mathematical laws.'¹⁵ The solution, according to Davies, is to stop treating

7 Greene, B. *The Elegant Universe: Superstrings, hidden Dimensions, and the Quest for the Ultimate Theory*, New York: Vintage (2003), p. 283.

8 Davies, P. *The Goldilocks Enigma: Why is the Universe Just Right for Life?*, Boston: Houghton Mifflin (2008), pp. 207-209. The reader should note that this book was originally published in the United States with the title *Cosmic Jackpot*, Boston: Houghton Mifflin (2007). The first edition was published in Great Britain with the title, *The Goldilocks Enigma: Why is the Universe Just Right for Life?* London: Penguin (2006). All citations in this article are from the 2008 US edition entitled *The Goldilocks Enigma*.

9 Davies *op. cit.*, (6), p. 103.

10 *ibid.*, p. 167.

11 *ibid.*

12 Davies *op. cit.*, (8), pp. 208-209.

13 Davies, P. 'The flexi-laws of physics', *New Scientist* (June 30th, 2007) 2610, cited 21 November 2009, online: <http://www.newscientist.com/article/mg19426101.300-the-flexilaws-of-physics.html>; Davies, P. 'The implications of a cosmological information bound for complexity, quantum information and the nature of physical law', *Fluctuation and Noise Letters* (December 2007) 7: C38.

14 Davies, P 'Life, the universe and everything', *Cosmos* 14 (April 2007): cited 21 November 2009. Online: <http://www.cosmosmagazine.com/node/1479>.

15 *ibid.*

the laws of science as eternal, immutable entities. Rather, 'one must try to explain the observed behavior entirely in terms of processes occurring within the universe'.¹⁶

In order to do so, Davies draws from the ideas of Gregory Chaitin to argue that the universe should be viewed (by analogy) as hardware, or a computer, and the physical laws as software.¹⁷ The universe by its very nature is finite (according to the temporal and spatial limitations put on it by the big bang).¹⁸ If, then, the universe is viewed as 'hardware', and if the universe is finite, then one can set a limit on the 'storage capacity' of the universe since the big bang. That limit, according to Davies (drawing on the work of Seth Lloyd at MIT), is 10¹²⁰ units ('bits') of information.¹⁹ Since 'no law can apply to a level of precision finer than all the information in the universe can express', Davies concludes that the physical laws of the universe cannot be precise, asserting that 'if a law is a truly mathematic relationship, it requires infinite information to specify it'.²⁰

Thus, according to Davies, the physical laws themselves must have emerged from the big bang.²¹ In the miniscule moments after that initial event, the laws were 'fuzzy' (Davies's own term) but could develop further and further as the universe expanded.²² Working hand in hand with the early development of these laws is a sort of 'emergent teleology'.²³ This 'implicit teleology' causes the development of complexity in a natural way that does not require any interventionist God.²⁴ Indeed, 'chance and law-like necessity conspire *at the basic physical level* felicitously to produce (incredibly!) emergent lawlike behavior at the higher levels of complexity'.²⁵ Ultimately, the simplicity implicit at the quantum level allows for

16 Davies *op. cit.*, (13 ('Flexi-laws of Physics')).

17 Davies *op. cit.*, (13 ('Implications')), C39. See also Davies *op. cit.*, (6), pp. 132-133, for a discussion of Gregory Chaitin and the concept of randomness in mathematics.

18 Davies *op. cit.*, (13 ('Implications')), C39-C40.

19 Davies *op. cit.*, (13 ('Flexi-Laws')).

20 Davies, P. 'Yes the universe looks like a fix. But that doesn't mean that a god fixed it,' *The Guardian* (June 26th, 2007), 33, cited 21 November, 2009. Online: <http://www.guardian.co.uk/commentisfree/2007/jun/26/spaceexploration.comment>.

21 See Davies, P. 'The Physics of Downward Causation,' in Clayton, P. & Davies, P. (eds.) *The Re-Emergence of Emergence: The Emergentist Hypothesis from Science to Religion*, Oxford: Oxford University Press (2006), pp. 46-47, for a technical discussion of John Wheeler's argument concerning the laws of physics coming into being from the big bang.

22 Davies *op. cit.*, (20), 33.

23 See Davies, P. 'Emergent biological principles and the computational properties of the universe', *Complexity* (2004) 10, 11. Here Davies defines 'emergence' as 'the appearance of new properties that arise when a system exceeds a certain level of size or complexity, properties that are absent from the constituents of the system'.

24 Davies, P. 'Teleology Without Teleology: Purpose Through Emergent Complexity', in Clayton, P. & Peacocke, A. (eds.) *In Whom We Live and Move and Have our Being: Panentheistic Reflections on God's Presence in a Scientific World*, Grand Rapids, MI: Eerdmans (2004), p. 96.

25 *ibid.*, p. 104.

complexity at a higher, 'holistic' level.²⁶

Thus creation itself continues to be creative, and this 'ongoing creativity' apparently 'manifests itself in the spontaneous emergence of novelty and complexity, and organization of physical systems'.²⁷ Hence, 'the order of the cosmos is more than mere regimented regularity, it also organized complexity'.²⁸

Furthermore, contra the Newtonian, deterministic paradigm, the 'holistic' state of a physical system can exhibit 'new and unforeseen modes of behavior. There arises the possibility of *self-organization*, in which systems suddenly and spontaneously leap into more elaborate forms. These forms are characterized by greater complexity, by cooperative behavior and global coherence, by the appearance of spatial patterns and temporal rhythms, and by the general unpredictability of their final forms'.²⁹

One of the instruments behind this self-complexifying scheme is the force of gravity. As Davies notes, gravity alone of the four known fundamental forces of nature can act unhindered across the universe. Thus, 'gravity powers the cosmos'. Gravity causes matter to develop and clump together, resulting in the various epic structures of the universe necessary for the development of solar systems and, ultimately, life. Furthermore, gravity cannot be screened out, affects every particle in all of reality and escalates its cumulative effect over time.³⁰

This, for Davies, offers a solution to the problem of life. Davies suggests that, in contrast to ordinary physics, the 'emergent laws of complexity' might actually create information.³¹ As a result, given the freedom to develop its own laws and create information, the universe in essence engineers its own 'biofriendliness'.³² This would hardly limit life and consciousness to one planet, for consciousness would be the natural outcome of such an emergent, teleological force; one may thus expect life to be found elsewhere in the universe.³³ Davies adds, 'the order of the cosmos is more than mere regimented regularity, it is also organized complexity, and it is from the latter that the universe derives its openness and permits the

26 *ibid.*, p. 104. See also Davies *op. cit.*, (23), pp. 13-14, esp. 14, for a technical discussion of how the finite computational properties of the universe may contribute to the development of complexity.

27 Davies, P. 'Templeton Prize Address,' cited 21 November 2009, online: <http://cosmos.asu.edu/prize.htm>.

28 Davies *op. cit.*, (6), 139.

29 Davies, P. *The Cosmic Blueprint*, New York: Simon & Schuster (1988), pp. 196-197.

30 *ibid.*, pp. 128, 133-135.

31 Davies, P. *The 5th Miracle: The search for the Origin and Meaning of Life*, New York: Simon & Schuster (1999), pp. 258-259.

32 Davies *op. cit.*, (20).

33 Davies *op. cit.*, (27).

existence of human beings with free will'.³⁴

Yet having attempted to explain the development of complexity (and, ultimately, of life) in terms of a teleological force, Davies still requires some sort of mechanism to explain the cause of the universe itself. To this end, he turns to quantum mechanics and the possibility of downward causation.³⁵

Quantum mechanics and a self-causing universe

Davies, in his latest writings, rebels against the concept of something 'outside' the physical universe explaining the physical universe. The only solution is a self-explaining universe, and quantum mechanics provides the key.

It is beyond the scope of this paper to provide a primer for quantum physics.³⁶ Suffice it to say that quantum mechanics introduces an element of unpredictability at the most basic level of matter and energy. For example, at the macro level one may know that a polariser will allow half of a light beam through, but on the quantum scale one cannot predict whether or not a *particular* photon will emerge successfully. Hence, 'only the betting odds can be given'. This unpredictability, or 'indeterminism', becomes 'a universal feature of the microworld'.³⁷

Davies asserts that this indeterminism, coupled with the apparent blurring of the interaction of cause and effect, may allow something to 'pop' into being *ex nihilo*³⁸ (though the reader should note that Davies's views do not necessarily reflect those of mainstream physics). At the universal level, Davies submits the controversial thesis that 'space-time could pop out of nothingness as the result of a causeless quantum transition'.³⁹ For Davies, then, if the connection between cause and effect in quantum me-

34 Davies *op. cit.*, (6), p. 139. See also Davies *op. cit.*, (29), p. 142. Davies places his theory of an emergent universe in direct opposition to the standard view of 'the pointless universe', declaring them to be 'diametrically opposed'. (Davies *op. cit.*, (31), pp. 272- 273).

35 An excellent visual aid for Davies's idea of emergent complexity (and one that Davies himself mentions frequently) is mathematician John Conway's game 'Life'. See Gardner, M. 'The fantastic combinations of John Conway's new solitaire game "Life"', *Scientific American* (October 1973) 223, 120-123, cited 21 November 2009, online: [http://ddi.cs.unipotsdam.de/HyFISCH/Produzieren/lis_Project/proj_gamelife/ConwaySci entificAmerican.htm](http://ddi.cs.unipotsdam.de/HyFISCH/Produzieren/lis_Project/proj_gamelife/ConwaySci%20entificAmerican.htm) Davies refers to the 'Life' universe as one that 'has the capacity to generate unlimited complexity' (Davies *op. cit.*, (6), p. 111).

36 The interested reader is advised to examine the following sources for an introduction: Davies, P. & Betts, D. *Quantum Mechanics*, 2nd edn; Physics and Its Applications, Boca Raton, Florida: CRC (2002), pp. 1-14 (the chapter entitled 'preliminary concepts'); and Ford, K. *The Quantum World*, Cambridge, MA: Harvard University Press (2004), esp. pp. 1-7.

37 Davies and Betts *op. cit.*, (36), p. 4.

38 Davies, P. *About Time: Einstein's Unfinished Revolution*, New York: Simon & Schuster (2005), p. 188.

39 Davies *op. cit.*, (3), p. 216.

chanics can truly be weakened, this would essentially do away with one of the major problems of the universe's origin. No laws of physics are violated if the universe comes into being as a result of a quantum fluctuation and 'the existence of the universe without an external cause need no longer be regarded as conflicting with the laws of physics'.⁴⁰

The paradox of quantum mechanics, however, is that there must exist a 'macroworld' that allows for observation of the microworld in order for the microworld to exist.⁴¹ Not only that, in order for the universe to come into being via a quantum fluctuation, one must presuppose quantum physics itself!⁴²

Yet here is where Davies ingeniously brings in the role of the observer. According to Davies, electrons and other miniscule particles are not 'out there' in the sense that they are truly 'elementary'. Rather, 'these "elementary" particles are actually essentially *abstract* constructions based upon the solid ground of irreversible "observation events" or measurement records'⁴³ (though one must once again point out that Davies's views here are not necessarily those of most physicists).

For Davies, then, *observation* actualises existence (this writer could not find where Davies technically defines the observer per se, but Davies does link it closely to the concept of the human mind).⁴⁴ As John Wheeler argues, 'The past is not really the past until it has been registered... the past has no meaning or existence unless it exists as a record in the present.'⁴⁵ Davies seems to follow Wheeler's interpretation and concludes that since 'the laws of physics are symmetric in time, so quantum uncertainty works both forwards into the future and backwards into the past'.⁴⁶ Therefore the very existence of observers today helps determine the state of the universe emerging from the big bang:

Observations made throughout the entire duration of the universe can contribute to fashioning the form of the laws in the first split second after the Big Bang, when they were still significantly malleable. Thus the potential for future life acts like an attractor, drawing the emerging laws towards a bio-friendly region of the available parameter space. In this way, life, mind and cosmos form a self-consistent explanatory loop.⁴⁷

40 Davies *op. cit.*, (6), pp. 61, 73.

41 Davies *op. cit.*, (29), p. 168.

42 Davies *op. cit.*, (3), p. 217.

43 Davies *op. cit.*, (29), 175.

44 Davies *op. cit.*, (8), pp. 228-232.

45 Interview in Davies, P. & Brown, J. R. (eds.) *The Ghost in the Atom*, Cambridge: Cambridge University Press (1999), pp. 67-68; see also Davies *op. cit.*, (23), p. 11, and Davies *op. cit.*, (21), pp. 46-50.

46 Davies *op. cit.*, (14).

47 *ibid.*

Davies further states, 'In the eternal quest to explain life, the universe and everything, it could be that life explains the universe even as the universe explains life.'⁴⁸ Thus 'life' itself functions as the observer in cosmic quantum mechanics.

For Davies, this quantum, backwards self-causation, combined with the concept of an emergent universe, explains all. The universe is forced to propel itself towards the emergence of consciousness by the very consciousness that observes it. Without observation, the universe could not exist. Without the universe, observers could not exist. The observers of the universe not only actualise the universe itself, but also the laws that ultimately allow for the observers themselves: 'The universe explains observers, and the observers explain the universe.'⁴⁹ In this way, 'the universe has engineered its own self-awareness'.⁵⁰ In conclusion, Davies states, 'I have suggested that only self-consistent loops capable of understanding themselves can create themselves, so that only universes with (at least the potential for) life and mind really exist.'⁵¹

Davies is essentially attempting to circumvent cosmological arguments for the existence of a deity. Cosmological arguments have generally focused on the issue of origins and first causes, especially that of the universe; thus the medieval Arab philosopher Ishaq al-Kindi, for example, formulates his *Kalam* cosmological argument on the basis of the finiteness of both time and the universe, the inability for something to cause its own existence, and so on.⁵² Davies himself is aware of why the cosmological argument offers a certain attraction; he states in *The Mind of God* that 'the enigma of the cosmic origin is probably the one area where the atheistic scientist will feel uncomfortable'.⁵³ Yet rather than postulate a theistically-caused universe as an alternative to an un-caused universe (where the matter of origins is simply left unexplained), Davies prefers the *self*-caused universe. The universe, then, is not caused by something outside it but rather by something inside it. If the universe is self-explanatory, then it needs no external cause, theistic or otherwise.

48 *ibid.*

49 Davies *op. cit.*, (8), p. 249 (building on the work of John Wheeler); see also p. 256.

50 *ibid.*, p. 231.

51 *ibid.*, p. 267.

52 Craig, W. L. *The Kalam Cosmological Argument*, Eugene, OR: Wipf&Stock, (2000), pp. 34-35. For a different kind of a cosmological argument, one that builds on Aristotle's discussion of the 'unmoved mover', see Aquinas, T. 'The Classical Cosmological Argument', in Peterson, M., Hasker, W., Reichenbach, B., & Basinger, D. (eds.) *The Philosophy of Religion: Selected Readings*, 3rd edn, Oxford: Oxford University Press (2007), pp. 194-196 (from *Summa Contra Gentiles* 1, chap. 13).

53 Davies *op. cit.* (6), p. 39; see also Habermas, G.R. 'The Plight of the New Atheism: A Critique', *Journal of the Evangelical Theological Society* (December 2008) 51, 821, where Habermas comes to the same conclusion.

Davies on faith and God

As we have seen, Davies's cosmology does not recognise the need for any god. Indeed, Davies himself raises various objections against a theistic God and is strongly opposed to the idea of 'faith' in connection with supernatural revelation, while simultaneously being driven to demonstrate that conventional secular cosmology rests on the same sort of 'faith' (as he defines it).

Science and faith

In *The Goldilocks Enigma*, Davies delights in telling the story of a woman who interrupts a philosopher lecturing on the nature of the universe. The lecturer is wrong, declares the woman, for she knows how the universe is constructed: the earth sits on the back of a huge elephant which, in turn, rests on the back of a huge turtle. The lecturer then asks the woman what is supporting the turtle. The woman retorts, 'It's turtles all the way down!'⁵⁴

This, for Davies, represents the heart of the problem of modern science. One cannot posit an infinite regress of turtles, for this would be to ignore the issue of origins all together. The solution, of course, is to discover an 'über-turtle' that is self-explanatory and that supports all the other turtles. Theists, M-theorists and multiverse-theorists are all ultimately forced to posit such an 'über-turtle'. However, 'all three camps denounce the other's super-turtles in equally derisory measure. But there can be no reasoned resolution of this debate because at the end of the day one super-turtle or another has to be taken on faith.'⁵⁵ In other words, 'However successful our scientific explanations may be, they always have certain starting assumptions built in... sooner or later we all have to accept something as given, whether it is God, or logic, or a set of laws, or some other foundation for existence.'⁵⁶ Here, it must be noted, Davies lumps all presuppositions together, regardless of their complexity or significance.

Consequently, Davies declares, 'Both religion and science are founded on faith.'⁵⁷ The ultimate 'super-turtle,' that which scientists do not even bother attempting to explain, consists of the physical laws themselves: 'The idea that laws exist reasonlessly is deeply anti-rational.'⁵⁸ For Davies, this is unacceptable. Science must come up with an explanation within

54 Davies *op. cit.*, (8), p. 215.

55 *ibid.*, pp. 216-217; note also Davies *op. cit.*, (20).

56 Davies *op. cit.*, (6), p. 15; see also Davies *op. cit.*, (3), p. 173.

57 Davies, P. 'Taking Science on Faith', *Edge* (2007), (cited 21 November 2009), online: http://www.edge.org/3rd_culture/davies07/davies07_index.html.

58 *ibid.*

itself *for* itself. The concept of immutable laws is ‘monotheistic’ and platonic and must be discarded. According to Davies, “The time has come to seek a theory of the laws, to bring the laws of physics within the scope of scientific inquiry, and if possible to explain their intelligibility, their “unreasonable” mathematical efficacy and their celebrated (and baffling) bio-friendliness.”⁵⁹

Thus rather than embracing the concept of ‘faith’ (or, at least, the idea of a foundational presupposition), Davies rebels at the fact that ‘both monotheistic religion and orthodox science fail to provide a complete account of physical existence’.⁶⁰ Here, then, is where Davies’s self-explanatory universe enters the picture. If the universe does explain observers (and the laws that lead to observers), and if observation, in turn, explains the origin of the universe (and the development of biofriendly laws), then Davies has no need for an infinite regress of super-turtles or an über-turtle hovering at the bottom. His solution attempts to circumvent the problem by positing that the turtles collectively support themselves. The physical laws are explained by the universe itself, and at first glance no need exists to appeal to some sort of transcendent agency (whether a god or the physical laws).⁶¹

Thus, for Davies, the very concept of ‘faith’ (as he defines it) is antithetical to true science. Whether or not Davies’s definition of faith is acceptable may be debated; likewise, his desire to equate scientific ‘faith’ (as he calls it) with religious faith may or may not be fair to either side. Epistemology is certainly a difficult topic and deserves further exploration than either Davies or this paper provides.⁶² Clearly, however, it is essential to Davies’s own cosmology that he link the prevailing cosmology to religious faith; by doing so, he simultaneously raises objections against both and offers his views as a more rational alternative.

The Christian God

In addition to his objections to ‘faith’, Davies questions whether or not the idea of a theistic God is even coherent by investigating the following supposed characteristics of a theistic God: timelessness, necessity and intervention.

Regarding the first, Davies argues that the concept of God ‘acting’ or ‘interacting’ with the universe contradicts the concept of the timeless God

59 Davies, P. ‘Response to Critics’, *Edge* (December 2007), (cited 21 November 2009), online: http://www.edge.org/discourse/science_faith.html.

60 Davies *op. cit.*, (57).

61 *ibid.*

62 See Swinburne, R. *Faith and Reason*, 2nd edn., Oxford: Clarendon (2005), pp. 137-158 for a helpful discussion of the various views on faith.

necessary for the creation of the universe in the first place.⁶³ Since Albert Einstein demonstrated that time is relative and is affected by gravity,⁶⁴ the conclusion for Davies is that time, as part of the physical universe, began with the big bang – ‘The coming-into-being of the universe is therefore represented not only by the abrupt appearance of matter, but of space and time as well.’⁶⁵ If that is the case, and if God exists, he ‘acts to create all that is, including space, time, and the laws of nature’.⁶⁶ Furthermore, ‘A God who did not create time, created space neither.’⁶⁷

The problem for Davies is that ‘a supernatural creation cannot be a causative act in time, for the coming-into-being of time is part of what we are trying to explain. If God is invoked as an explanation for the physical universe, then this explanation cannot be in terms of familiar cause and effect.’⁶⁸ Davies elsewhere argues, ‘Qualities which most people attribute to God only make sense within the context of time.’ The concepts of planning, answering prayers, thinking, and interacting with creation, for example, all seem to presume temporality.⁶⁹ Ultimately, ‘A timeless God could not be considered a ‘person’ or individual in any sense that we know.’⁷⁰ Indeed, if God designed and created the universe, he must be atemporal. But if he created and designed the universe, he must be temporal because the very act of creating and designing assumes temporality, according to Davies.⁷¹

Secondly, Davies opposes the notion of God as a ‘necessary being’. On the face of it, a necessary being is not an absurd idea. Yet the problem arises when one attempts to relate a necessary God to a contingent universe (especially one where humans possess free will) Davies, citing A. J. Ayer, declares, ‘From necessary propositions only necessary propositions follow.’⁷² Davies further argues, ‘The problem is, whichever way you cut the cake, you come back to the same basic difficulty, that the truly contingent cannot arise from the wholly necessary.’⁷³ Ultimately, an immutable God is incompatible with a changing universe.⁷⁴

63 At the basic level, Davies defines time as ‘what (accurate) clocks measure. Mathematically, it is a one-dimensional space, usually assumed to be continuous, although it might be quantized into discrete “chronons”, like frames of a movie’ (Davies, P. ‘That Mysterious Flow’, *Scientific America* (2006) 16(1), 8. For further discussion, see Davies *op. cit.*, (38), pp. 56-58, and Davies, P. ‘What Happened Before the Big Bang,’ in Stannard, R. (ed.) *God For the 21st Century*, Philadelphia: Templeton Foundation (2000), pp. 11-12.

64 Davies *op. cit.*, (38), pp. 53-54.

65 Davies *op. cit.*, (6), p. 50.

66 Davies *op. cit.*, (24), p. 101.

67 Davies *op. cit.*, (3), p. 133.

68 Davies *op. cit.*, (6), p. 58.

69 Davies *op. cit.*, (3), pp. 38-39.

70 *ibid.*, p. 134.

71 Davies *op. cit.*, (8), p. 200; see also Davies *op. cit.*, (6), p. 38.

72 Davies *op. cit.*, (6), p. 178.

73 *ibid.*, p. 180.

74 *ibid.*, p. 189.

The difficulty is accentuated when discussing God's creative act. Did God necessarily have to create *this* particular universe? If so, then one is forced to conclude that change and free will are an illusion. Yet if God had a choice, then God is not a true designer and one can just as soon posit the universe as the bottom turtle rather than God.⁷⁵ Davies asks, 'Can a necessary being act in a manner that is not necessary? Does that make sense? On the face of it, it doesn't. If God is necessarily as God is, then God's choices are necessarily as they are, and the freedom of choice evaporates.'⁷⁶

Finally, Davies objects to the concept of an interventionist God (i.e., one who performs miracles, etc.).⁷⁷ An interventionist, miracle-working God is unacceptable to Davies because this concept paints a picture of God as a 'force', manipulating and competing with the very physical laws he created. If God, the author of the physical laws, is seen competing against them, this implies 'a shoddy craftsman who is obliged to intervene from time to time to fix up a flawed product'.⁷⁸

While some of Davies writings seem to indicate a preference for some kind of 'force' or 'god' operating outside the universe that causes the physical laws and its emergent complexity, Davies both rejects the concept of a Christian God and attempts to circumvent the need for any god by positing a self-causing universe. If such a thing as 'god' exists for Davies, it is only in the sense that the universe is 'a coherent, rational, elegant and harmonious expression of a deep and purposeful meaning'.⁷⁹

God and ultimate meaning: some apparent contradictions in Davies's work

There seems to be a progression of thought in Davies's work so that some of his earlier writings are contradictory to what he writes later. The following is not a critique of Davies (since Davies is certainly allowed to change his mind over time), but rather an attempt to draw the reader's attention to a certain progression in Davies's thought (where later works may stand opposed to earlier works) in order to avoid the sort of confusion

75 Davies *op. cit.*, (8), pp. 200-201.

76 *ibid.*, pp. 202-203.

77 See Davies *op. cit.*, (3), pp. 191-198 for an extensive critique of the concept of miracles.

78 See also Davies *op. cit.*, (8), pp. 191-221 for a critique of the intelligent design movement and *op. cit.*, (38), pp. 39-40 for a discussion of the 'mature creation' view. Davies's objection to miracles perhaps echoes that of Albert Einstein who, according to Nancy Abrams and Joel Primack, viewed miracles as 'the greatest sacrilege' because they would render 'truth' (or 'rationality') impossible (Abrams, N. & Primack, J., 'Einstein's View of God', in Stannard, R. (ed.) *God For the 21st Century*, Philadelphia: Templeton Foundation (2000), p. 154).

79 Davies *op. cit.*, (27).

that initially plagued the writer of this paper.⁸⁰

First, in earlier writings, Davies seems to acknowledge and embrace the *need* for something outside the physical universe to explain the physical universe. In *The Mind of God*, for example, he argues, 'If the laws are not transcendent, one is obliged to accept as a brute fact that the universe is simply *there*, as a package, with the various features described by the laws built in. But with transcendent laws one has the beginnings of an explanation for why the universe is at it is.'⁸¹ Yet in the chapter immediately following, Davies provides a hint that he believes mathematics may not be the transcendent laws that many believe they are, that even 'the "unreasonable effectiveness" of mathematics in its application to the natural world would then be due to unreasonably effective initial conditions'.⁸² Surprisingly, however, even later in *The Mind of God* Davies argues, 'The search for a closed logical scheme that provides a complete and self-consistent explanation for everything is doomed to failure.'⁸³ Yet later on, in *The Goldilocks Enigma*, Davies clearly indicates his preference for a universe that is 'a closed explanatory or causal loop'.⁸⁴

Elsewhere Davies declares, 'It seems to me that, if one perseveres with the principle of sufficient reason and demands a rational explanation for nature, then we have no choice but to seek that explanation in something beyond or outside the physical world – in something metaphysical – because, as we have seen, a contingent physical universe cannot contain within itself an explanation for itself.'⁸⁵ Indeed, the whole point of *The Mind of God* seems to be that the universe cannot explain itself.⁸⁶ Furthermore, while in *The Goldilocks Enigma* Davies seems very favourable towards John Wheeler's concept of observation causing the universe, in *The Mind of God*, he seems somewhat dissatisfied with it.⁸⁷

This brings us to the second paradox in Davies's writings. At times he seems to speak positively of a kind of non-interventionist 'god'. Even in something as relatively recent as 'Teleology without Teleology' (2004), Davies speaks of a 'modified uniformitarianism' where God selects the

80 In an attempt to sort out some of the apparent discrepancies, this writer sent an e-mail (11/17/09) to Davies's public address at his personal website. The response (dated 11/19/09), presumably from an assistant associated with his 'Beyond Center for Fundamental Concepts in Science' was that *The Goldilocks Enigma* should be taken as his current opinion on these matters. The reader, then, should follow that advice and view Davies's later works as best articulating his current view.

81 Davies *op. cit.*, (6), p. 92.

82 *ibid.*, pp. 140-160, esp. 160.

83 *ibid.*, p. 226.

84 Davies *op. cit.*, (8), p. 267.

85 Davies *op. cit.*, (6), p. 171.

86 See esp. *ibid.*, pp. 229-231.

87 cf. Davies *op. cit.*, (8), pp. 249-256 with Davies *op. cit.*, (6), pp. 224-226; cf. also Davies *op. cit.*, (6), p. 231, with Davies *op. cit.*, (20).

initial laws and then allows those physical laws to create the universe (resulting in emergent complexity, etc.) Indeed, ‘God selects very special laws that guarantee a trend toward greater richness, diversity, and complexity through spontaneous self-organization, but the final outcome in all its details is open and left to chance.’⁸⁸ Davies even argues that his ideas are ‘panentheistic’ in that ‘the world is located within the divine, although God is more than the physical universe... the rational order of the physical universe is grounded in God’.⁸⁹ Also, in *The Mind of God*, Davies declares, ‘I belong to the group of scientists who do not subscribe to a conventional religion but nevertheless deny that the universe is a purposeless accident.’ For Davies in this phase, whether or not one wishes to refer to that ‘deeper level of explanation’ as ‘God’ is ultimately ‘a matter of taste and definition’.⁹⁰ Later, after citing Richard Swinburne favourably, Davies declares, ‘Personally, I feel more comfortable with a deeper level of explanation than the laws of physics. Whether the use of the term “God” for that deeper level is appropriate is, of course, a matter of debate.’⁹¹ Yet later Davies argues strongly against ‘appealing to something outside it that must simply be accepted on faith, be it an unexplained God or an unexplained set of mathematical laws’.⁹² Apparently, then, Davies’s thoughts on nature and reality and the possibility of God have undergone a significant change within the past decade.

A Christian response to Davies

On the one hand, Davies raises important questions and is quite frank about some of the issues science must face. He has had scorn heaped on him from others in the scientific community, especially due to his use of the term ‘faith’ in connection with science, but he seems to have remained reasonably calm in his responses⁹³ (though his use of epistemological terminology should eventually be explored further). Furthermore, Davies is not as dogmatic in his assertions as some of his colleagues. In *The Goldilocks Enigma*, after reviewing the various solutions to the cosmological problem (including those that, by his own admission, he leans towards), he states, ‘At the end of the day, all the approaches I have discussed are likely to prove unsatisfactory. In fact, reviewing them they all seem to me to be either ridiculous or hopelessly inadequate.’⁹⁴

88 Davies *op. cit.*, (24), pp. 101-105.

89 *ibid.*, p. 108.

90 Davies *op. cit.*, (6), p. 16.

91 *ibid.*, p. 189.

92 Davies *op. cit.*, (20).

93 e.g. Davies *op. cit.*, (59), and Grayling, A.C. ‘No, Science Does not “Rest on Faith”’, *New Scientist* (December 8th, 2007) 2633, (cited 21 November 2009), online: <http://www.newscientist.com/article/mg19626331.200-commentary-no-science-does-not-rest-on-faith.html>.

94 Davies *op. cit.*, (8), pp. 258-259.

Thus Davies may be praised for both a comprehensive grasp of the issues inherent in cosmology as well as a relatively humble outlook. Yet ultimately his solutions do not solve the problem of the existence of the universe and are clearly incompatible with the Christian notion of God. In the space below this writer will raise objections to Davies's view of a self-explanatory universe and then attempt to answer his objections against a Christian God.

Still a turtle: how the existence of the universe remains unexplained

As noted above, Davies acknowledges that the universe needs a cause but, via quantum mechanics, places that cause in the observers that the universe creates. Thus, for Davies, the universe contains the cause of its own existence *within* its own existence. This allows him to circumvent the need for an external creator.

Yet some problems remain. First of all, even if backwards causation is allowed, there is still a large conceptual step between *backwards* causation and *self-causation*, especially when applied to the macro level of the universe as a whole.⁹⁵ Furthermore, while we may allow that observers *influence* particles in the past, can observers truly *create* that which is necessary for their own existence?

Secondly, to claim that quantum mechanics allows creation out of nothing is a little too simplistic. What quantum mechanics actually allows is the creation and annihilation of *paired particles* (more specifically, a particle and an anti-particle).⁹⁶ It is a rather large leap from the creation and *immediate* annihilation of paired particles to the creation of an entire universe (either with or without a transcendent system of quantum mechanics). When the former occurs (if it occurs), the creation and annihilation takes place within a pre-existent system, a framework (the universe itself, as well as the quantum laws). If the latter were to occur, by its very definition there would be no framework for it to take place in, unless quantum mechanics itself were to provide that framework. If quantum mechanics provides the framework, then such a framework would seem to possess an existence that transcends the physical universe that it gives birth to. Also, 'the problem', as Keith Ward aptly notes, 'is that of where and in what sense the laws of quantum physics exist... how can you get physical things out of sets of mathematical equations?'⁹⁷

Even Davies admits that 'quantum physics has to exist (in some sense) so that a quantum transition can generate the cosmos in the first place'.⁹⁸

95 Davies hints at this problem *op. cit.*, (6), p. 62.

96 Ford *op. cit.*, (36), p. 43.

97 Ward, K. *The Big Questions in Science and Religion*, West Conshohocken, PA: Templeton (2008), p. 234.

98 Davies *op. cit.*, (3), p. 217.

Would this not be true even in a self-caused universe? In other words, if quantum mechanics is the mode by which observers bring the universe into existence, does this not have to presuppose quantum laws in the first place? If so, then Davies, who strongly opposed the concept of eternal physical laws, would seem to be stuck with an eternal quantum force, for nothing can explain why the quantum laws exist to provide the means for backwards causation in the first place.

Davies would perhaps respond that it is the observers that bring into existence the quantum laws. In this case, the question is pushed back a step to the very laws of causation. In other words, *what is the mechanism that allows self-causation?* Does not Davies have to presuppose some form of self-causing mechanism in order to create the quantum laws which in turn allow self-causation? One may argue that the self-caused observers create the laws of self-causation that creates the laws of quantum mechanics that in turn creates the universe and its observers; yet what then gives the observers the ability to create the laws of self-causation? Why is there such a self-causing mechanism in the first place? If one argues that the observers provide the means for the self-causation of the universe, then what provides the means for the observers to provide the means for self-causation? One is left with both a circular argument (where the observers cause the universe and the universe causes the observers) and another 'endless turtle tower' (since the reason for the existence of self-causation is left unexplained). At the very bottom, one is forced to hypothesise that the universe possesses the ability via observers to cause itself, and that very assumption remains unexplained. The only way Davies can answer the question 'Why an emergent universe?' is to respond, 'In order to produce the observers necessary to cause the big bang (so that the complexifying, emergent force can appear) which then causes the emergent universe.' His explanation would then raise the question, 'But why the need for observers and a universe in the first place?'

Would this truly be a simpler explanation of the universe than a Christian deity? In *The Goldilocks Enigma*, Davies argues that any theory of the universe that can beat out theism and multiverse theory must be a 'simple and elegant description and not an unholy mishmash of complex mathematics'.⁹⁹ Yet it is difficult to see how a self-causing universe, utilising quantum mechanics, can in any sense be considered 'simple'.

Elsewhere, Davies follows Richard Dawkins in arguing that a theistic, infinite mind would have to be infinitely complex (to be fair, Davies also points out that an infinite collection of universes has the same problem).¹⁰⁰ On the one hand, one could respond that the issue of complexity versus simplicity should not be viewed as the primary litmus test of a particular

⁹⁹ Davies *op. cit.*, (8), pp. 219-220 (emphasis Davies's).

¹⁰⁰ *ibid.*, p. 219.

view. Thus Peter Bussey, for example, argues that ‘simplicity is a dubious principle to apply dogmatically in a scientific context... our goal is the best *correct* explanation, however complex that may be’.¹⁰¹ On the other hand, one could argue that an infinite being such as the Christian God may still be considered a simple being. Richard Swinburne, for one, argues that God is simple because ‘his essential properties all follow from the very simple property of having pure, limitless, intentional power’; thus God is ‘the simplest kind of person there can be’.¹⁰² Keith Ward states that ‘a divine mind is simple... [because] it does not depend on many contingent and separate things, all of which might be otherwise. Its mental content is necessary and self-generated.’¹⁰³ Regardless of which position one takes, Davies’s arguments for the superiority of his system on the basis of simplicity lose much of their force.

In defence of a personal God

The issue of simplicity is not Davies’s only critique of theism. As mentioned above, Davies levels three key objections that must be answered. Davies’s first major objection is that the concept of an atemporal God performing temporal acts is nonsensical. In response, one must first point out that many Christians in fact hold to a temporal God and would thus be unaffected by Davies’s argument at this point.¹⁰⁴ Yet accepting, for the sake of dialoguing with Davies, the assumption that God is outside time, one is then forced to ask, are such actions as deliberation necessarily temporal? Obviously all humans must necessarily *think* of ‘deliberation’ as temporal, but is there any logical reason why the deliberation of a deity would *of necessity* be measurable (if time is simply ‘that which clocks measure’)?¹⁰⁵ Is it even coherent to say that anything God does is ‘measurable’ (except, of course, for when he interacts with the *measurable*, physical universe)?¹⁰⁶

Paul Copan and William Lane Craig offer the following response to the objection that an atemporal God could act in time:

101 Bussey, P. ‘Explanations in Science and Beyond’, *Science and Christian Belief*, (2008) 20, 176 (emphasis Bussey’s).

102 Swinburne, R. *The Christian God*, Oxford: Clarendon (1994), p. 154; see also Richmond, P. ‘Richard Dawkins’ Darwinian objection to unexplained complexity in God’, *Science and Christian Belief* (2007) 19, 114, where he discusses how God can be ‘conscious of *limitless* possibilities’ yet still not necessarily possess ‘the sort of specificity that characterises organised complexity’.

103 Ward, K. *Why There Almost Certainly is a God: Doubting Dawkins*, Oxford: Lion (2008), p. 84.

104 e.g. Swinburne *op. cit.*, (102), pp. 137-144; Feinberg, J. *No One Like Him: The Doctrine of God*, Wheaton, IL: Crossway (2001), pp. 403-417.

105 See Davies *op. cit.*, (63 (‘That mysterious flow’), p. 8, for his definition of time.

106 See Smedes, T. *Chaos, Complexity, and God: Divine Action and Scientism*, *Studies in Philosophical Theology*, Leuven, Belgium: Peeters (2004), pp. 217-218 for a discussion of this issue.

The fallacy of this reasoning is that it conflates *common* properties of persons with *essential* properties of persons. The sorts of activities delineated above are certainly common properties of temporal persons. But that does not imply that such properties are essential to personhood. Arguably, what is necessary and sufficient for personhood is self-consciousness and free volition, and these are not inherently temporal. God could possess a free, changeless intention of the will to create a universe with a temporal beginning. Thus, neither self-consciousness nor free volition entail temporality. But since these are plausibly sufficient for personhood, there is no incoherence in the notion of a timeless, personal Creator of the universe.¹⁰⁷

Similarly, Eleonore Stump and Norman Kretzmann aptly point out, 'If an eternal God is also omnipotent, he can do anything it is not logically impossible for him to do; even though his actions cannot be located in time, he can bring about effects in time unless doing so is logically impossible for him.'¹⁰⁸

Furthermore, in what sense is creation *necessarily* a temporal act, especially if such creation includes time itself? Davies himself encounters this very same problem with his own conception of the universe. Since time came into being at the big bang, and since the observers are the compelling necessity behind the big bang, then the observers necessarily created time. Yet while God may exist outside time, the observers most certainly do not! How, then, can temporal observers necessitate the creation of time? Is it simpler to say that temporal observers created time, or to say that an atemporal God created time?¹⁰⁹ Either way the ability to create time is presupposed. This writer contends that nothing illogical exists for the latter option; for the former, at the least one can point out that there needs to be a *mechanism* by which observers in time can cause time itself, and such a mechanism would remain inexplicable.

Davies's second objection concerns a necessary being and contingent acts (including creation). Davies simply asks, 'Can a necessary being act in a manner that is not necessary. Does that make sense?'¹¹⁰ In response, there does not seem to be a problem with positing a necessary being who has, of necessity, the ability within itself to perform unnecessary acts (and allow

107 Copan, P. & Craig, W. *Creation out of Nothing: A Biblical Philosophical, and Scientific Exploration*, Grand Rapids, MI: Baker Academic (2004), pp. 260-261.

108 Stump, E. & Kretzmann, N. 'Eternity', *Journal of Philosophy* (August 1981) 78, 448. Elsewhere they state, 'We can see no reason for thinking it absurd to claim that a divine action resulting in the existence of a temporal entity is an atemporal action.' (pp. 449- 450). I am indebted to classmate David Stanford for directing me to the work of Norman Kretzmann, in particular, regarding the nature of God and time.

109 This question should be explored further, including the potential difference (raised by one of this paper's referees) between personal and impersonal action in relation to time.

110 Davies *op. cit.*, (8), p. 203.

for free will).¹¹¹ Ward argues, ‘God is both necessary and contingent... God is necessary in existence and in knowing all possible states, and in having the ability to actualize any possible state. But God is contingent in the choice of which states to actualize, and in any subsequent divine interaction with those states.’¹¹²

Furthermore, Davies’s argument that a ‘purely whimsical’ choice makes the universe into a ‘divine plaything’¹¹³ does not present a problem. Many Christians, after all, believe that God created the universe not only for his own pleasure and for the pleasure of his creation, but for the pleasure of possessing a relationship with his creation.¹¹⁴ In other words, even if God had a free choice of what universe to make, that choice was nevertheless still motivated by his gracious character and his desire for fellowship. Laying aside the question of suffering, which is beyond the scope of this paper, the concept of the universe as a ‘divine plaything’ does not sound so bad if God has allowed humanity to play alongside him.

Finally, Davies objects that an interventionist God is inferior to a God who ‘got it right’ in the first place. Yet Davies presupposes that the only reasons for interacting with the world (via miracles, etc.) are to ‘correct’ something. Christians, however, generally hold to other reasons for God’s interaction, whether it be revelation, the offer of redemption (brought about by humanity’s need for salvation, through no fault of God’s), or simply his own pleasure and that of his subjects. Indeed, one must ask, would not a God who *interacts* with his universe be superior to a God who *ignores* his universe?

So long as the existence of the universe remains within the realm of the physical, whether it be a self-caused universe or a multiverse, any ultimate explanation of such existence will remain elusive. Yet if the explanation is transferred out of the realm of the physical, one need look no further than the Christian deity. This is not a ‘god of the gaps’ but rather a ‘God of the beginning’, a beginning which science, by its very nature, cannot explain. As Ward notes, ‘We can account for the actual existence of this universe by appeal to just one simple principle – it exists for the sake of its distinctive goodness, and is selected by God for that reason.’¹¹⁵ In

111 Davies anticipates responses by arguing that attempts to reconcile this difficulty ‘descend into a quagmire of linguistic niceties concerning the many definitions of “necessity”, “truth”, and so on, and many seem to peter out with the frank acceptance of mystery’, (Davies *op. cit.*, (6), p. 189) This, of course, is hardly a satisfactory rebuttal. Furthermore, some would argue that the acceptance of ‘mystery’ is not necessarily a bad thing, if that mystery is located outside the physical. See Bussey, P. ‘Response to Richmond’, *Science and Christian Belief* (2008) 20, 204.

112 Ward *op. cit.*, (103), p. 86.

113 Davies *op. cit.*, (8), p. 201.

114 Ward *op. cit.*, (103), pp. 89-90.

115 *ibid.*, p. 81.

the end, this is preferable to Davies's self-causing universe, for the latter still cannot explain itself, since the mechanism by which observers create their own universe remains uncaused and thus transcendent. Davies's mechanism for self-causation of the universe still remains an 'über-turtle', and if one is forced to choose between two 'über-turtles', then at least the one located outside the physical universe has the advantage of completely explaining the physical universe. In this sense, then, the Christian God has an advantage so far as the existence of the universe itself is concerned.

Davies posits a self-explained universe that nevertheless remains unexplained. Christians posit a divine being who creates yet continues to interact with (and to possess a vested interest in) his universe.¹¹⁶ The latter, at least, affords both a cause and a purpose to creation beyond its own existence.

Conclusion

Davies fully realises the problem of cosmology. Either one must posit a force or principle external to the universe itself in order to explain it (one that needs no explanation in of itself), or one must argue for a self-explaining universe. Davies, in his latest writings, opts for the latter. The universe manifests emergent complexity to produce life, and this life observes the universe and thus causes the universe. Thus observation explains the universe and the universe explains life.

Yet despite his valiant effort, Davies still cannot answer the keys questions of *how* and *why*. Even if quantum mechanics itself can be caused by observation, the method by which it is caused remains unexplained. Davies cannot explain *why* this self-causing mechanism works, except that it has to work in order to allow the universe to produce observers that produce the universe. Furthermore, Davies's objections to a theistic God leave much to be desired and have already been answered by various philosophers.

One final point may be made. Throughout his writings, Davies takes a decidedly optimistic view of a self-emerging universe. For him, the emergent universe implies a purposefulness to human existence. Yet Davies does not adequately deal with issues of morality and suffering in his model. In Davies's scheme, an evil person would possess just as much significance in the universe as anybody else, and a suffering person can hope for nothing better in the future. Furthermore, death becomes the ultimate teleological goal, the one irreversible state that all observers are bound for.

116 For an excellent and entertaining discussion of God's interaction with his universe which draws on Edwin Abbott's *Flatland*, see Houghton, J. 'Where is God? Thinking in More Than Three Dimensions', in Stannard, R. (ed.) *God For the 21st Century*, Philadelphia: Templeton Foundation (2000), pp. 157-159.

Thus Davies's model offers no hope and no justice beyond what the present world offers, a justice and hope that is depressingly inadequate.

Yet Davies is at least asking difficult questions and genuinely *searching* for the ultimate reality. For Christians, that reality can only lie in a transcendent God who nevertheless takes a vested interest in creation. Indeed, not only has he taken an interest, he has become an active participant: 'the God out there has entered our world in the person of Jesus'.¹¹⁷ Thus, God, 'himself before all things' and through whom 'all things are held together' (Col. 1:17, NET) has entered his own creation to offer hope. Mysteries remain, but our ultimate purpose is not one of them. Meaning and hope lie in an infinite God, and infinity, of course, is greater than '42'.¹¹⁸

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117 *ibid.*, p. 158.

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