

# David Deutsch's strange reality

*The Beginning of Infinity: Explanations that Transform the World*

David Deutsch

Viking, New York, 2011

Jim Melnick

Oxford theoretical physicist David Deutsch is best known as ‘the father of quantum computing’. But quantum computing for Deutsch is just a way station for something more significant—his quest for “a new and deeper and better way to understand the laws of physics, and hence understanding physical reality as a whole”.<sup>1</sup> He also contends that “a successful implementation of a quantum computer would constitute incontrovertible evidence” for parallel universes.<sup>2</sup>

Jim Holt, author of *Why Does the World Exist?*, considers Deutsch “one of the most daring and versatile thinkers alive”.<sup>3</sup> Physicist Lee Smolin contends that “There is no more foundational thinker than Deutsch; he was motivated to invent quantum computers by his disquiet with foundational problems in both mathematics and quantum theory.” Smolin adds that Deutsch’s originality and clarity as a thinker “can be seen in his provocative [first] book, *The Fabric of Reality*, in which he elaborates on his many-worlds theories. I disagree with much of what he writes, but I loved it.”<sup>4</sup> Deutsch believes in multiple universes, or the *multiverse*. Our universe is “just a tiny facet of the

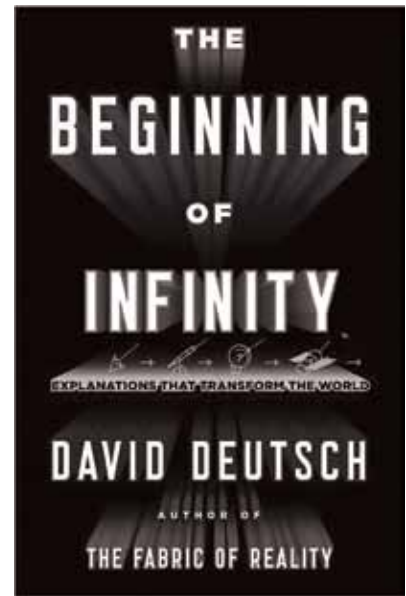
whole of physical reality”, in his view.<sup>5</sup>

Born in Israel in 1953, Deutsch now lives in the village of Headington, near Oxford, once the home of J.R.R. Tolkien, creator of the fictional ‘universe’ of Middle Earth.<sup>6</sup> While I’m sure that Middle Earth at times felt real to Tolkien and to many millions of us who have loved *The Hobbit* and *The Lord of the Rings*, Tolkien certainly didn’t believe that what flowed from his pen actually existed somewhere in reality. But for David Deutsch, multiple and parallel universes are very real indeed, and the strangest things imaginable exist somewhere in this extended reality.<sup>7</sup>

## Deutsch—we are all ‘multiversal objects’

Deutsch’s 2011 book, *The Beginning of Infinity: Explanations that Transform the World*, builds on his aforementioned 1997 work, *The Fabric of Reality: The Science of Parallel Universes and Its Implications*. According to “classical (pre-quantum) physics”, he says, “the world was thought to consist of only one *universe*”. But those days are now gone, according to Deutsch. “It is time”, he says, “to sever that last link with the classical, single-universe conception of reality”.<sup>8</sup> Otherwise, we are just ‘clingers’—those who ‘cling’ to the single universe view.<sup>9</sup>

According to Deutsch, “every atom in an everyday object is a multiversal object”. What this means is that “Whenever we observe anything ... what we are actually seeing is a single-universe perspective on a larger object that extends some way into other universes” (p. 302). We



supposedly don’t see into these other universes because the quantum-based interference that would otherwise occur or be visible to us is suppressed. This occurs because of our size and complexity as ‘objects’ in this universe (p. 293).

This conclusion about reality does not sit well with *New York Times* reviewer David Albert, who is both a philosophy professor at Columbia University and holds a doctorate in theoretical physics. Albert branded Deutsch’s multiverse views—developed from Hugh Everett’s 1957 ‘Many Worlds’ thesis<sup>10</sup>—as “simply, wildly wrong”. Otherwise, Albert largely praised *The Beginning of Infinity* as “a brilliant and exhilarating and profoundly eccentric book”.<sup>11</sup> But there was much that Albert did not cover in his review that is of interest to the creationist and ID communities.

## A Dawkins disciple; views on creationism

Deutsch is an arch-disciple of Richard Dawkins.<sup>12</sup> While he appears to lack Dawkins’ vitriol against theistic religion, he doesn’t seem

to have the slightest patience with alternative Darwinian theories, such as the Gould–Eldredge theory of *punctuated equilibrium*.<sup>13</sup> He is also completely dismissive of many other concepts, such as the “Copenhagen interpretation” of quantum mechanics.<sup>14</sup>

Deutsch’s devotion to Dawkins<sup>15</sup> was already evident in *The Fabric of Reality*, where he wrote that “the way in which punctuated equilibrium and other variant evolutionary scenarios have been presented”, as if they seek to provide a solution to “some allegedly overlooked problem in the prevailing evolutionary theory”, merely “reveals the extent to which the explanatory power of Dawkins’ theory has yet to be assimilated”.<sup>16</sup> Amazing devotion as well as *chutzpah!*

Nevertheless, Deutsch’s assessments of creation (a ‘bad explanation’, he calls it) contain far less rancor than what one might expect from a Dawkins disciple. Deutsch is simply matter-of-fact in his dismissiveness: “it was once thought that living things must have been designed by a supernatural person”, but “now we know that living things, including humans ... were not designed by anyone” (p. 43). Deutsch then posits the negative theodicy<sup>17</sup> that “the biosphere is much less pleasant for its inhabitants than anything that a benevolent, or even halfway decent, human designer would design”. He believes that the “prospect of the unlimited creation of knowledge in the future” will eventually make “a supposed designer of *our* biosphere ... seem not only morally deficient, but intellectually unremarkable” (pp. 80–81).<sup>18</sup> Of course, for one thing, like many critics of Intelligent Design (and to be fair, like much of the Intelligent Design movement), Deutsch ignores the Fall.

While largely being devoid of rancor toward creationism, Deutsch also puts forward the most ridiculous and dishonest straw man when comparing alleged creationist views denying the existence of dinosaurs with scientists who deny the reported ‘evidence’ of parallel universes. In an interview about this book, he compares “creationists who say ... [regarding] fossils, [that] no one’s ever seen a dinosaur” with those who would say that “no one’s ever seen parallel universes; all we have is the circumstantial evidence of fossils and the *interpretation* of fossils as being the remains of dinosaurs” (!).<sup>19</sup> That he can’t name any creationist writer who believes such an absurdity doesn’t seem to matter.

### “Deep truth is often beautiful”

Deutsch’s views on what is ‘truth’ are fascinating. “It is a fact”, he writes, “often mentioned but seldom explained—that deep truth is often beautiful” (p. 355). He cites physicist John Archibald Wheeler’s famous comment in 1986 that “Behind it all is surely an idea so simple, so beautiful, that when we grasp it ... we will all say to each other, how could it have been otherwise?”<sup>20</sup> This is similar to the notion expressed by many physicists, including outspoken atheist Steven Weinberg,<sup>21</sup> co-winner of the 1979 Nobel Prize in physics, that “in any case, we would not accept any theory as final unless it were beautiful”.<sup>22</sup> Weinberg is not alone in this sentiment.<sup>23</sup>

Contrary to contemporary relativists and many post-modernists, Deutsch believes that “there is such a thing as objective beauty”. In a fictional conversation with Socrates in *The Beginning of Infinity*, Deutsch has Socrates say: “there is only one truth of any given matter” (p. 231). Deutsch also critiques the notion that everything is just a matter of

personal preference: “most insist that there is no such thing as one object being objectively more beautiful than another”, but he disagrees, asserting that, indeed, “There are objective truths in aesthetics”.<sup>24</sup> Objective knowledge, on the other hand, he says is “hard to come by, but attainable” (p. 226). Deutsch asserts that mathematics is “the study of *absolutely necessary truths*”. Or, put another way, he says that “the truths that mathematics *studies* are absolutely certain”.<sup>25</sup>

Given the relativism of much of our culture, these are extraordinary statements. Deutsch qualifies that this “does not mean that our knowledge of those necessary truths is itself certain”.

So, we therefore have ‘absolutely necessary truths’, but mankind falls short of understanding them perfectly! Whether Deutsch has realized it or not, with these statements he has nearly expressed two key elements of biblical truth—first, that there is such a thing as Absolute Truth, and, second, that we apprehend such truth imperfectly because all our means of apprehension are themselves imperfect: “For now we see through a glass darkly but then face to face ...” (1 Corinthians 13:12).

### Anthropic reasoning, Leonard Susskind, Popper and the ‘Popperazzi’

Some Darwinists, such as physicist Leonard Susskind, have resorted to anthropic reasoning to try to explain away the problem of extreme fine-tuning in our universe.<sup>26</sup> Deutsch partially rejects some anthropic reasoning. He says that

“... there is something special—*infinitely* special, it seems—about the laws of physics as we actually find them, something exceptionally computation-friendly, prediction-friendly and

explanation-friendly ... anthropic arguments alone cannot explain it” (p. 189).<sup>27</sup>

Deutsch admits that “... while anthropic reasoning may well be part of the explanation for apparent fine-tuning, it can never be the whole explanation for why we observe something that would otherwise look too purposeful to be explicable as coincidence [emphasis added]” (p. 103).

In defending anthropic reasoning, Susskind has deridingly labeled its critics ‘Popperazzi’, after Sir Karl Popper, the famous philosopher of science who developed well-known falsification criteria for scientific theories.<sup>28</sup> Deutsch himself has been deeply influenced by Popper.<sup>29</sup> Physicist Lee Smolin takes Susskind to task for this attitude about falsification and concludes: “In this regard, I am proud to be a Popperazzo”.<sup>30</sup> Having dedicated his earlier book, *The Fabric of Reality*, in part, to the memory of Karl Popper, Deutsch probably would agree.<sup>31</sup>

### Elegance and beauty

“When we understand better what elegance really is”, Deutsch posits, “perhaps we shall find new and better ways to seek truth using elegance or beauty” (p. 367). Building on that thought, he asserts: “We already see that we do not live in a senseless world. The laws of physics make sense: the world is explicable”, with “higher levels of emergence and higher levels of explanation” available to us if we just pursue them (p. 459). Indeed, ‘good explanations’ (and how we arrive at them) constitute the main theme of the book—Deutsch sees explanations as the engines that drive human progress.<sup>32</sup> All problems not otherwise limited by the laws of physics can eventually be solved, he

believes. Problems only indicate that “our knowledge must be flawed or inadequate” (p. 18).

Before us is an ‘infinity’ of opportunities and choices, much like a secular restatement of Deuteronomy 30:19: “... I have set before you life and death, blessing and cursing: therefore choose life ...”. Deutsch closes his book with these words: “All we can choose is whether it is an infinity of ignorance or of knowledge, wrong or right, death or life” (p. 459).

### Debunking Hawking, anti-anthropocentrism, and SETI

World-famous physicist Stephen Hawking once opined, ‘The human race is just a chemical scum on a moderate-sized planet, orbiting round a very average star in the outer suburb of one among a hundred billion galaxies’.<sup>33</sup> But Deutsch has countered that: “We are not merely chemical scum ...”.<sup>34</sup> Instead, “the Earth and its chemical scum” (*us*, that is) “are actually quite *untypical*” (p. 47). Deutsch also seems a little irritated at his fellow atheists who just don’t seem to appreciate the significance of this. Instead, because of their theistic or teleological implications, anthropocentric ideas have been thoroughly resisted and attacked by atheist cosmologists and most Darwinians in general. This has led to an unhelpful “*anti-anthropocentrism*” in Deutsch’s view. This anti-anthropocentrism has then “increasingly been elevated to the status of a universal principle, sometimes called the ‘Principle of Mediocrity’”. Deutsch defines this universal principle as follows (in terms of what its followers actually believe): that “*there is nothing significant about humans (in the cosmic scheme of things)* [emphasis in original]” (pp. 43–44). He deplores

this view as being “irreparably parochial and mistaken” (p. 76). This is a remarkable conclusion by an atheist Darwinian.

From Deutsch’s perspective, we are not just an insignificant little world of beings without any purpose in an insignificant little corner of an unremarkable galaxy:

“... *people* are the most significant entities in the cosmic scheme of things ... . Once they have suitable knowledge ... they are capable of sparking unlimited further progress [emphasis in original]” (p. 76)

Regarding the Search for ExtraTerrestrial Intelligence (SETI), Deutsch expresses his doubts: “We do not know where life and intelligence exist, if at all, outside our solar system” (p. 2). He once admitted: “For all we know, the planet Earth is the only place in the Universe where life exists. Certainly we have seen no evidence of its existence elsewhere”.<sup>35</sup> This seems a much more sober and realistic view than that to which we are constantly bombarded by the news media and much of the scientific community—where the implication is that the never-ending search for extraterrestrial life could yield results at any time, just as long as we keep funding projects to go look for it. These SETI programs are worse than useless—not only have they *not* yielded any substantive results—they continue to keep the populace in a false state of expectation that the discovery of ‘life’ beyond planet Earth could be just around the corner. Deutsch is at least being more honest about it than most Darwinists who perpetuate SETI mythologies.

### ‘Spontaneous’ watches

Deutsch claims that “Everything physically possible will eventually be revealed”. By this he means that,

given a multiverse of near endless possibilities, ‘all possible worlds are real’—a re-stated form of the Many Worlds thesis.

Somewhere out there, goes this thinking, in the greater quantum multiverse, absolutely everything is possible, will happen, or has already happened. And apparently there is no reason to think that all events must occur slowly as per gradualistic evolution. In Deutsch’s multiversal reality, there are watches that have come “into existence spontaneously; asteroids that happen to be good likenesses of William Paley”. Deutsch says that those things *already exist* out there somewhere, “according to the prevailing theory” (according to *his* interpretation of quantum theory), but they are “many times too far away for light to have reached us from them—yet” (p. 452). It’s that old *horizon problem* again—we just can’t see far enough over our universe’s horizon to confirm that they exist!

This is both ridiculous and contradictory. If the only evidence of life,

consciousness and rationality is here on our own little biosphere of planet earth, then one can’t reasonably say that every other possible form of life and matter is also spontaneously coming into existence somewhere else in the multiverse but just has no impact on us because light hasn’t reached us yet from those other realities.

### Controlling the sun

Beyond that, in Deutsch’s view, projects such as actually controlling the sun (figure 1) are within the future reach of mankind’s efforts: “there is every reason to conjecture that our descendants will eventually control the Sun and much more”.<sup>36</sup> We can’t even begin to ‘control’ *the weather* now on planet Earth (figure 1), *yet we will someday control the sun?! And why can’t we adequately predict or control the weather (per Deutsch)? Don’t blame the weatherman—it’s apparently the fault of parallel universes—there are just too many quantum effects*

across too many universes: “This parallel-universe multiplicity is the real reason for the unpredictability of the weather.”<sup>37</sup> So, now you know why we can’t predict the weather, but we’re going to control the sun!

### We can be immortal!—dispensing with illness and death

Nevertheless, the prospect of controlling the sun pales in comparison with Deutsch’s next claim: death itself will be conquered! According to the Deutschian worldview, if it weren’t for ‘dogma’, we already would have solved the “problem of how to avoid dying” (p. 69). Knowledge-creation could then press forward without hindrance. Deutsch predicts that “illness and old age are going to be cured soon—certainly within the next few lifetimes” (!),<sup>38</sup> with the “present generation”, he adds, “being one of the last that will have short lives” (p. 455). Who knew that this was the real solution to the

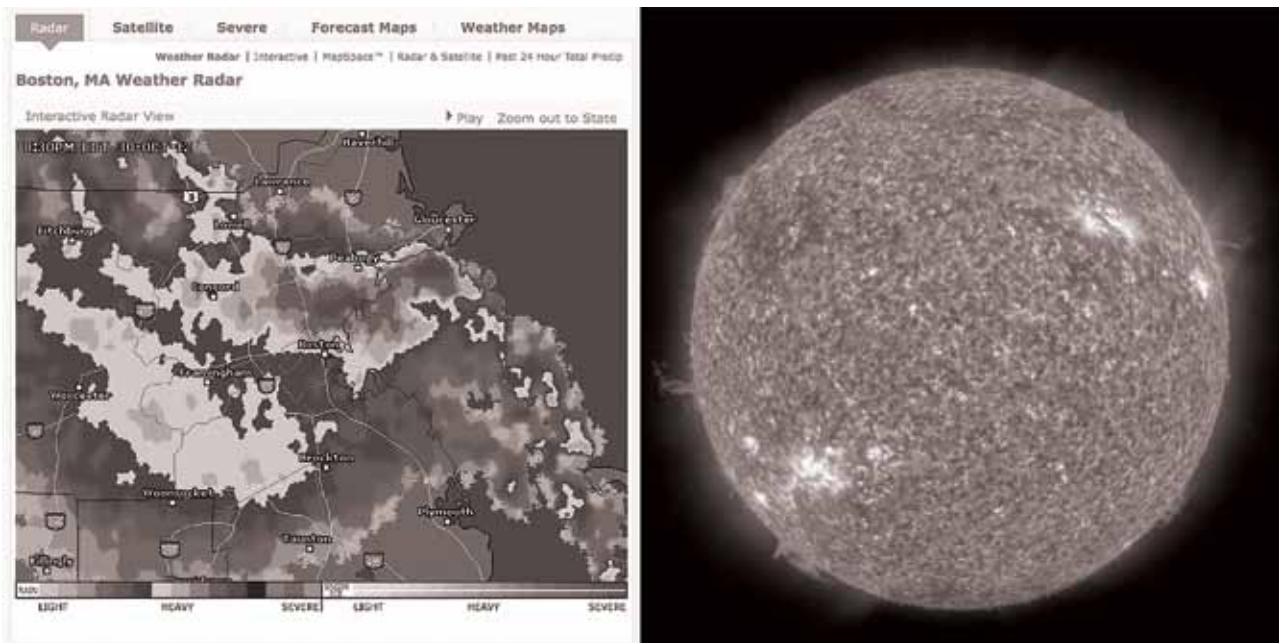


Figure 1. We can scarcely predict the weather tomorrow—let alone control it—but Deutsch believes mankind will someday control the Sun!



**Figure 2.** Deutsch believes that if knowledge–creation had progressed unhindered from the time of ancient Athens—unimpeded by things like ‘dogma’—“our species would be exploring the stars by now, *and you and I would be immortal.*”

healthcare debate and the end of the life insurance industry?!

Deutsch asserts that if earlier experiments following his philosophy of optimism (he uses Athens (figure 2) in 404 BC and Florence under the Medici family as the key examples) had gone further, “our species would be exploring the stars by now, *and you and I would be immortal* [emphasis added]” (p. 221). Immortal! And what has stood in the way of us becoming immortal? Again, it is ‘dogma’. One can quickly see where Deutsch is going with this with respect to religion, but he has more than religion in his sights—he is looking at how all of society is organized. The Medicis, he tells us, “valued knowledge above dogma” during the Golden Age of Florence (pp. 218–219), while now it is the West that has been carrying forward “the Enlightenment values of science, reason and freedom” (p. 31). The sky is definitely *not* the limit, according to Deutsch—nothing is, only the laws of physics. And while all this is happening, “our values and our objectives can continue to improve indefinitely” (p. 64). Society and its institutions are capable of “unlimited improvement” if they will only apply these principles.<sup>39</sup>

### Attractive to young atheists?

Deutsch’s general worldview is in many ways the polar opposite of the hopelessness and futility of life expressed by many atheists in the past, such as many existentialists. But it is still atheistic secular humanism—relying entirely on man without God. Many of the views expressed in *The Beginning of Infinity*, were they to be expressed by someone else, would be dismissed out of hand as those of a quack or a crank. Nevertheless, Deutsch has the force of his contributions to quantum computing behind him. These have generally earned him a respectful hearing by the atheist elites. My guess is that Deutsch’s brand of ‘ultra-optimistic atheism’ (that is my branding of it) is still waiting to be ‘discovered’ and will eventually become more popular within New Atheist ranks. Well-known Christian author R. Albert Mohler, Jr., has already noted what he calls one of the “most perplexing” features of the New Atheism—“its cultural cheerfulness”.<sup>40</sup>

Deutsch’s reality, strange as it is, offers some atheists an alleged ‘infinity’ of possibilities—even if those possibilities are ‘simply castles

in the air’—vain things imagined by the godless (Acts 14:15), versus accepting the reality of the present creation and putting their faith and hope in the living God.

### References

1. Norton, Q., The father of quantum computing, Wired.com, 15 February 2007, accessed 5 November 2013.
2. According to Alastair M. Rae, Deutsch also “argues that the reason a quantum computer can carry out some tasks very much faster than a classical one is because the former performs a large number of calculations simultaneously in parallel universes”. In Rae, A.M., *The flawed multiverse*, review of *The Beginning of Infinity*, *Physics World*, 22 September 2011.
3. Holt, J., *Why Does the World Exist? An Existential Detective Story*, Profile Books, London, p. 120, 2012.
4. Smolin, L., *The Trouble with Physics: The Rise of String Theory, The Fall of a Science and What Comes Next*, Houghton Mifflin, Boston, MA, p. 325, 2006.
5. John Horgan interview with David Deutsch, *bloggingheads.tv*, posted 24 September 2011. See also, Horgan, J., To err is progress, review of *The Beginning of Infinity*, *Wall Street Journal*, 20 July 2011; *online.wsj.com*. Also, Oxford Physicist: Information is Irreducible to Physics, *Evolution News & Views*, 26 September 2011; *evolutionnews.org*.
6. Holt, ref. 3, p. 124.
7. In defining *parallel universes*, Deutsch claims that there are parallel universes in the *quantum* multiverse where the same laws of physics apply versus parallel universes with *different* laws of physics (Deutsch, D., *The Beginning of Infinity*, p. 98 and footnote, 2011).
8. Deutsch, D., *The Fabric of Reality: The Science of Parallel Universes and Its Implications*, Allen Lane, London, p. 52, 1997.
9. Deutsch, ref. 8, pp. 93, 217, 1997.

10. Deutsch affirms his belief in the Everett 'Many Worlds' interpretation of reality. He estimates that only 10% of theoretical physicists today hold this Many Worlds view. Nevertheless, he believes that his view of multiple universes emerges from what "is an incontrovertible implication of quantum theory, which is our most fundamental theory in physics". (Horgan interview of Deutsch, ref. 5)
11. Albert, D., Explaining it all: How we became the center of the Universe, Sunday Book Review, *New York Times*, 12 August 2011; nytimes.com.
12. Jim Holt writes that Dawkins is one of Deutsch's "intellectual heroes". In Holt, J., *Why Does the World Exist?* Allen Lane, London, p. 122, 2012. Deutsch himself describes Dawkins' book, *The Selfish Gene*, as a "tour-de-force account of neo-Darwinism" (Deutsch, D., *The Beginning of Infinity*, p. 92).
13. Stephen Jay Gould and Niles Eldredge developed the alternate theory of *punctuated equilibrium* largely because of their serious concerns that the fossil record did not show the steady gradualism called for by neo-Darwinism. See Eldredge, N. and Gould, S.J., Punctuated equilibria: an alternative to phyletic gradualism; in: Schopf, T.J.M. (Ed.), *Models in Paleobiology*, Freeman, Cooper & Co., San Francisco, CA, 1972; and the posthumously published work by Gould, S.J., *Punctuated Equilibrium*, Harvard University Press, Cambridge, MA, 2007. Creationist critiques of punctuated equilibrium can be found at: Batten, D., Punctuated equilibrium: come of age? *J. Creation* 8(2):131–137, 1994, and Batten, D., Gould grumbles about creationist 'hijacking', *J. Creation* 16(2):22–24, 2002; I also published a very early critique in Melnick, A.J., Punctuated equilibrium and the macro-mutation controversy, *Creation Research Society Quarterly* 18(1):22–25, June 1981.
14. Deutsch defines the 'Copenhagen interpretation of quantum mechanics' as "An idea for making it easier to evade the implications of quantum theory for the nature of reality" (Deutsch, ref. 8, p. 342).
15. There are some areas in which Deutsch diverges from Dawkins. For example, Dawkins' view that our universe is "indifferent to human preoccupations" (Dawkins, *Unweaving the Rainbow*, 1998) is criticized by Deutsch as "a misconception associated with the Principle of Mediocrity" (Deutsch, *The Beginning of Infinity*, p. 53).
16. Deutsch, ref. 8, pp. 334–335.
17. A classic definition of *theodicy* is an attempt to explain the existence of evil or suffering—as in, why would God allow it? *Theodicy* was also the title of a book by the famous German philosopher and mathematician Leibniz. Evolutionists from Darwin to Dawkins have tried to be atheistic amateur theologians, telling us what God, or a god or creator, should have done, could have done, or might have done if the cosmos were truly designed. These are negative *theodicies* that are only meant to attack theism, not really answer the questions posed. A book that looks at how *theodicies* have been used by Darwinists is at Hunter, C.G., *Darwin's God: Evolution and the Problem of Evil*, Brazos Press, Grand Rapids, MI, 2001.
18. Deutsch adds that the world's religions at that point "will no longer want to claim the design of the biosphere as one of the achievements of their deities, just as today they no longer bother to claim thunder" (Deutsch, D., *The Beginning of Infinity*, pp. 80–81).
19. Deutsch continues: "Now, similarly, ... no one's ever seen parallel universes, but what we have seen is interference phenomena, and the interpretation of interference phenomena as being due to the interaction of different universes and there's no other explanation. So, if you want to say the other universes don't exist, you have to do it by fiat, rather like the people who say the world was created six thousand years ago *with fossils*" already in place. (John Horgan interview with David Deutsch, ref. 5). Whether any creationist anywhere in the world still believes or teaches such nonsense I don't know (Deutsch was apparently speaking about the present, not the past), but certainly no mainstream creationist organization, scholar, or ministry would hold or teach such a view today.
20. Statement of John Archibald Wheeler in *Annals of the New York Academy of Sciences* 480, 1986, cited by Deutsch, D., *The Beginning of Infinity*, pp. 1, 353.
21. Weinberg, S., "Positive Atheism's Big List of Steven Weinberg Quotations", [positiveatheism.org](http://positiveatheism.org). One of his better-known quotes is: "Religion is an insult to humanity."
22. Weinberg, S., *Dreams of a Final Theory*, pp. 250–251, Pantheon Books, New York, 1992.
23. There are different degrees of commitment, however, among physicists to this concept of 'beauty' with respect to the laws of nature or a Final Theory of nature. Physicist Dan Hooper states: "Many physicists today are also driven—at least to some extent—by their ideas about how the world should be. Theories that are elegant and simple, and at the same time powerful and universal, can possess great appeal to scientists ..." (Hooper, D., *Nature's Blueprint: Supersymmetry and the Search for a Unified Theory of Matter and Force*, HarperCollins, New York, pp. 195–196, 2008).
24. Deutsch, D., *The Beginning of Infinity*, pp. 354, 368. See also the entire chapter, "Why Are Flowers Beautiful?", pp. 353–368.
25. Deutsch, ref. 8, p. 253.
26. This extreme fine-tuning refers in part to measurements (according to conventional modelling) of the cosmological constant out to 10<sup>-120</sup> places—a result completely unexpected by most physicists. How could the universe possibly be that extremely fine-tuned?, is the dilemma materialists face. See also de Repentigny, M., String theory—causing a disturbance of cosmic proportions, a review of *The Cosmic Landscape: String Theory and the Illusion of Intelligent Design*, *J. Creation* 21(3):47–48, 2007.
27. Although both Leonard Susskind and David Deutsch believe in the multiverse, Susskind's 'landscape' multiverse of 10<sup>500</sup> vacua pocket universes is not the same concept as Deutsch's Many Worlds multiverse emerging from quantum theory. The differences are beyond the scope of this review to explain, but clearly both men have different views of how Popper falsification tests should apply to their respective multiverse theories.
28. One recent edition of Popper's famous work is found at Popper, K., *The Logic of Scientific Discovery*, 1959, Routledge Classics, 2002.
29. In his 2011 interview with Deutsch, John Horgan discussed Karl Popper and stated: "Obviously, he [Popper] has been a big influence on you." Deutsch's reply: "He has." (Horgan interview of Deutsch, ref. 5).
30. Smolin adds: "It is one thing to accept the critiques of Popper holding that falsification is only part of the story of how science works, and quite another to advocate the acceptance on scientific grounds of a theory that makes no unique or specific predictions by which it might be either falsified or confirmed." Smolin, ref. 4, p. 369, footnote 5 in ch.17.
31. With respect to whether Popper might have eventually believed in multiverse theory, Deutsch has stated: "Popper, unfortunately, like Einstein, died too soon ... for the right understanding [of the foundations of quantum theory per a 'Many Universes' interpretation] to have reached him ..." (Horgan interview of Deutsch, ref. 5). This is a playful analogy by Deutsch regarding the well-known *horizon problem* in secular cosmology, the idea that light has not yet reached us from various edges of the universe that are 'beyond the horizon'. Deutsch believes that Einstein, had he lived, would have accepted the Many Worlds thesis as a true depiction of reality, because—so Deutsch asserts—the Many Worlds interpretation answered Einstein's objections to quantum mechanics. Einstein died in 1955, two years before Hugh Everett's thesis was presented to the world. According to Deutsch, "[Einstein] rejected the quantum theory of the time as not being realistic".
32. Horgan interview of Deutsch, ref. 5: "The basic theme of the book [*The Beginning of Infinity*] is that all human progress in the past has been fundamentally caused by a single type of activity which I call the quest for good explanations." Explanations themselves are defined by Deutsch as "being accounts of some kind of reality and how it works and why".
33. This quote is attributed to Stephen Hawking from Hawking, S., *Reality on the Rocks: Beyond Our Ken*, 1995, and is repeated by Deutsch in ref. 8, pp. 177–178.
34. Deutsch, ref. 8, p. 347.
35. Deutsch, ref. 8, p. 177.
36. Deutsch, ref. 8, p. 184.
37. Deutsch, ref. 8, p. 202.
38. Besides being absurd on its face, this is also completely contrary to the evidence which shows that, as a result of genetic entropy and mutational degeneration, the human race appears headed for extinction, not physical 'immortality' (see Sanford, J., *Genetic Entropy and the Mystery of the Genome*, 3<sup>rd</sup> edn, FMS Publications, New York, 2008). Deutsch would probably say in response that, given enough knowledge-creation, this 'problem' can be overcome.
39. Horgan interview of David Deutsch, ref. 5.
40. Mohler, R.A., Jr., *Atheism Remix: a Christian Confronts the New Atheists*, Crossway Books, Wheaton, IL, p. 23, 2008.