

EINSTEIN, DAWKINS, AND WONDER AT THE INTELLIGIBILITY OF THE WORLD

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Both Plato and Aristotle said that philosophy begins in wonder, and the latter at any rate included what we call science today in this claim, for he writes at the beginning of his *Metaphysics* of our wondering at questions of astronomy and the origins of everything (*Met.* 982b11ff.); and elsewhere, when discussing the beauty of animals' limbs, of our finding something wonderful in all natural things (*De Part. An.* 645a16ff). Many early modern scientists echoed Aristotle's sentiments here.

Nearer to our own times, Albert Einstein and Richard Dawkins are both outstanding among scientists in their repeated expressions in their writings of wonder at the world, and in conveying the delight and inspiration that such wonder brings. (I am using the term in the strong sense, which would include awed delight, admiration and amazement, as opposed to the weak sense of mere puzzlement or questioning). What is striking, however is that from this common starting-point they go in very different directions. Dawkins is led to aesthetics, for he repeatedly hymns both the amazing beauty and intricacy of the universe and the aesthetic pleasure that can be derived from scientific study. Whereas Einstein, besides wondering at the beauty and complexity of the world, is also struck by its intelligibility, and this leads him towards a religious stance. My purpose in this article is to point the contrast between them, and then to discuss what Einstein infers from this intelligibility.

I. DAWKINS AND WONDER

The significance of wonder for Dawkins is indicated by the title of his autobiography, *An Appetite for Wonder*, and it is an underlying theme in his popular illustrated book, *The Magic of Reality*. Early on in the latter, he pays tribute to 'the wonder and joy of science', and tells us that the world as understood scientifically 'has magic of its own – the kind I call poetic magic: an inspiring beauty which is all the more magical because it is real and because we can understand how it works.'¹ He devotes a chapter of the book (pp. 140–58) to the phenomenon of the rainbow, which he regards not just as wonderfully beautiful but as raising fascinating and important scientific questions.

Dawkins had already discussed this phenomenon in an earlier and more substantial book, *Unweaving the Rainbow*. In the preface to that book Dawkins writes again of the 'feeling of awed wonder that science can give us', which is, he says, 'a deep aesthetic passion to rank with the finest that music and poetry can deliver'; and he quotes later the astrophysicist Subrahmanyan Chandrasekhar as speaking in a lecture of 'shuddering before the beautiful' (with reference to mathematics).² The title of the book refers to Keats' *Lamia*, in which the poet exclaims 'Do not all charms fly at the mere touch of cold philosophy?', giving the example of the rainbow,

which, he thinks, once it had been explained by Newton, is just another item in ‘the dull catalogue of common things.’ (Keats may well have had at the back of his mind the tradition from Gen. 9:12–14 that the rainbow is a sign of the covenant between God and the human race, and possibly also the ancient Greek idea of Iris, goddess of rainbows and messenger of the gods). But Dawkins goes on to argue that we can know the physical explanation of the occurrence of rainbows, and so lose our initial puzzlement about them, and yet still wonder at them, and he criticizes Keats for thinking otherwise (pp. 39–42). For him wonder and scientific understanding are not incompatible, and indeed wonder may be increased by such understanding. Later on in the book he says that science ought to be feeding humanity’s appetite for wonder, and not let this task be hijacked by charlatans (p. 114).

To give another and very different example, Dawkins devotes the final chapter of his book *Climbing Mount Improbable* to what he calls the ‘complex dance’ between figs and the fig wasps that pollinate them, and describes it as a ‘subtle wonder’. He says that the facts about figs are as enthralling as anything in myth or literature.³ This is a strong claim, but it is certainly true that you will not look at figs in the same way after reading this chapter.

Of course Dawkins’ view of science may well seem a very exalted one to those who just regard its scope as being to explore particular aspects of nature, to make discoveries that will remedy our lack of understanding, and to make predictions or to solve practical problems. Such a limited view of science, however, may lead to disenchantment: hence many educationalists today follow Dawkins and stress that, to encourage young people to take up the study of science, teachers need to arouse their sense of wonder.

Dawkins’ use of the word ‘magic’ is perhaps more significant than he realizes, for the term ‘disenchantment’, which became current through the work of Max Weber, is used as a translation of the German *Entzauberung*, which means literally ‘losing its magic’. But whereas in English it is usually people who are said to be disenchanting (somewhat like being disillusioned), Weber describes the modern world as being so, because it seems to have lost some of its significance and to have become lifeless in certain ways. He uses the term in his best-known work *The Protestant Ethic and the Spirit of Capitalism* (1904–05), with reference to the Puritans’ rejection of Catholicism’s sacramentalism and their favouring ‘worldly asceticism’, but his fullest discussion occurs in the lecture ‘Science as a Vocation’ delivered to students in Munich round about 1918, though not published until after his death in 1920. Weber claims there that the rationalisation brought about through science and technology shows that ‘there are no *mysterious incalculable powers at work*, but rather that one could in principle master everything through *calculation*. But that means the disenchantment of the world.’ Moreover, he says a little later, because of this ‘Nobody can doubt in his heart of hearts that science is irreligious.’⁴

Of course Weber’s claim has aroused a lot of opposition and criticism. Seemingly, he lacked a sense of wonder and delight. Thus not long after the lecture was published, the philosopher Heinrich Rickert commented on it in 1926,

But we can say that science does not need to lead to the demystification of the world, for it is quite capable of making us fully conscious of the ‘magic’ of life, and the clarity it creates can still give happiness and joy to a theoretically minded person.⁵

Rickert here anticipates Dawkins’ ambitious claims about science’s power to absorb and to fascinate. But of course Dawkins would also agree with Weber’s claim that science is irreligious. For, as all the world knows, Dawkins dismisses the question of whether increases in scientific understanding and wonder might not lead people in the direction of religion or theology. Unfortunately, this limitation prevents him, I believe, from understanding Einstein’s

religious views. In another of his books, *The God Delusion*, he discusses briefly those views.⁶ He notes Einstein's 'pantheistic reverence' and his rejection of the idea of a personal God, and finally labels his position as 'pantheistic' (pp. 35–6, 40). But I think that in many respects he distorts Einstein's thought, and that his views on religion were much more complex and interesting than Dawkins allows.

Not surprisingly, Dawkins is anxious to dismiss any suggestion that Einstein was a religious man in any deeper or more complex sense, for in general he rejects the claim that any distinguished modern scientists were really religious: 'Great scientists of our time who sound religious usually turn out not to be so when you examine their beliefs more deeply.' (p. 35). So later on, when discussing Gregor Mendel, the founding genius of genetics, he notes that he was a religious man and indeed an Augustinian monk, but then dismisses this fact brusquely: 'that was in the nineteenth century, when becoming a monk was the easiest way for the young Mendel to pursue his science. For him it was the equivalent of a research grant' (p. 125). There is no discussion of how devout a monk he was, of why he was elected abbot by his brethren, and of how he saw the relation between his science and his religion.

Dawkins is correct in saying that Einstein rejected the idea of a personal God, i.e. one who might be address as 'Father' and called just or loving (even if only by analogy), like that of Judaism and Christianity, but this does not, I think, make him a pantheist. There are other positions, and Dawkins' interpretation founders on the fact that, struck by the intelligibility of the universe, on occasion Einstein explicitly embraces a doctrine of Creation. If we are to pigeon-hole him, he was probably a deist, i.e. someone who believes in a powerful and intelligent creator, but one not involved in our welfare or giving special revelations. But before doing so let us look first on what he actually said. It is noticeable that Dawkins quotes Einstein's own writings here only briefly and from a secondary source, Max Jammer (who, as we shall see, does not share Dawkins' pantheistic interpretation). It might be replied that in most of *The God Delusion* Dawkins is writing polemic, not academic discourse, so we can hardly expect him to weigh Einstein's views carefully. Well, no doubt the book is meant to be popular and polemical, but I do not think that this fact should let him off the hook here. My main purpose now, however, is not to engage in more Dawkins-bashing, but to point a contrast. One might also ask, more seriously, about aesthetics in an evolutionary perspective: is Dawkins' attraction to some natural phenomena and to the elegant complexity produced by evolutionary forces just a subjective response, which may be biologically engendered? Similarly, what for him is the status of scientific laws and the nature of their elegance and simplicity? But, again, these questions are not my main concern here. Let us go on, therefore, to look at what Einstein actually said.

II. EINSTEIN'S RELIGIOUS VIEWS

Like Dawkins, Einstein often stresses the fundamental importance of wonder. In an essay 'The World as I see it', for example, he writes of the experience of the mysterious (something not equally appreciated by Dawkins) as leading to wonder, which he describes as 'the cradle of true art and true science', and as engendering religion.⁷ More specifically, in an essay 'The Religious Spirit of Science' he writes:

His [the scientist's] religious feeling takes the form of a rapturous amazement at the harmony of natural law, which reveals an intelligence of such superiority that, compared with it, all the thinking and acting of human beings is an utterly insignificant reflection.⁸

And in another essay, 'Religion and Science', Einstein writes of a 'cosmic religious feeling' whereby we feel 'the sublimity and marvelous order which reveal themselves both in nature and in the world of thought'. This feeling is 'the strongest and noblest motive for scientific research', exemplified in Kepler and Newton. But it has, he says, no definite notion of a God, and no theology;⁹ and indeed a few pages later Einstein explicitly rejects the idea of a personal God 'interfering' (as he puts it) in the world, and claims that science 'purifies the religious impulse of the dross of its anthropomorphism'.¹⁰ Similarly, in 'The World as I see it', he says that he cannot conceive of a God who punishes or has a will like our own; nor can he conceive of our surviving death. He goes on:

I am satisfied with the mystery of the eternity of life and with the awareness and the glimpse of the marvelous structure of the existing world, together with the devoted striving to comprehend a portion, be it ever so tiny, of the Reason that manifests itself in nature.¹¹

One might construe statements like the last one as endorsing pantheism. Dawkins adopts this interpretation; and in Einstein's own lifetime he was sometimes so labelled. And indeed he told Rabbi Herbert S. Goldberg in 1929 'I believe in Spinoza's God'; but he went on immediately to explain this belief in terms of One 'who reveals himself in the orderly harmony of what exists, not in a God who concerns himself with fates and actions of human beings'. He does not mention pantheism here, and indeed about this time he put on record that 'I'm not an atheist, and I don't think I can call myself a pantheist'.¹² Hence Jammer concludes that although Einstein had read and appreciated Spinoza, he did not accept the latter's identification of God and nature, and he rejected a pantheistic interpretation of his own thought.¹³ Another writer, L.S. Feuer, thinks that Einstein moved away from Spinozism to a more Leibnizian position that God actualised out of infinite possible universes the one that had the most beautiful simple laws and the maximum architectural detail.¹⁴ Such an interpretation finds support in some of the things Einstein wrote, e.g.

The aim of physics is not only to know how nature is and how her transactions are carried through, but also to reach as far as possible the utopian and seemingly arrogant aim of knowing why nature is thus and not otherwise ... thereby one experiences, so to speak, that God Himself could not have arranged these connections in any other way.¹⁵

Similarly, I think that Jammer is right in suggesting that, despite criticism of his idea of God by theologians like Fulton Sheen and Paul Tillich, Einstein should not be classified as an atheist. As we have just seen, he rejected that position; he wrote sarcastically to Max Born about 'the faithful of the Church of the Atheists'¹⁶, and was angry when some of them claimed him as one of their own.¹⁷ In answer to the mockery of the writer Alfred Kerr, Einstein said in 1927 'behind all the discernible concatenations, there remains something subtle, intangible and inexplicable. Veneration for this force beyond anything we can comprehend is my religion.'¹⁸ In a similar vein he wrote to a Sunday school student in 1936:

... the laws of nature manifest the existence of a spirit vastly superior to that of men. ... The pursuit of science leads therefore to a religious feeling of a special kind which differs essentially from the religiosity of more naive people.¹⁹

This spirit is often described by Einstein in terms of a creator. Gunther Siegmund Stent recalls that when a theory seemed to him forced or arbitrary, he would say 'God does not do anything like that', or 'Subtle is the Lord, but malicious he is not'. He also told a young physicist 'I want to know how God created this world. ... I want to know His thoughts, the rest are details.'²⁰

Martin Buber recalls that, when he pressed Einstein on his position some time in the 1920s, he replied, ‘What we [physicists] strive for is just to draw his lines after *Him*.’²¹ Writing to Max Born in 1926 about Quantum Mechanics Einstein said ‘The theory says a lot but does not really bring us any closer to the secret of the “old one”’, and went on to make his famous comment ‘I, at any rate, am convinced that He is not playing dice.’²²

Why then does Dawkins refuse to regard Einstein as ‘really religious’? Besides the question of the former’s anti-religious *animus*, there is the fact that although Einstein’s God would have vast power as well as the intelligence he singled out, he said nothing about the third of the major attributes conventionally ascribed to Him, goodness, which would include notions like justice, love, and generosity. He does not rule it out specifically, but, as we have seen, he explicitly rejects the idea of a personal God. In particular, there is no room in Einstein’s picture for Providence, whether general or particular. He dismisses the ideas of petitionary prayer and of miracles *qua* violations of laws of nature; and he would probably have classified, for example, the events described in Exodus as ‘divine interference’, an idea which he certainly rejects. Dawkins is right here.

So certainly Einstein’s God is very much less than the ‘God of Abraham, Isaac, and Jacob’. But is there actually a contradiction here? Could we not simply supplement Einstein’s concept of God by adding in, say, love and goodness? Maybe his concept is attenuated, but is it false in any particular respect? The trouble with this response, however, is that it assumes we can just add in bits like that, and, again, that Einstein does explicitly reject the idea of a personal God. So I think that Jammer is right in saying that Einstein’s concept of God is incompatible with Judaism, Christianity, Islam, and other theistic religions because it denies a personal God and thus rules out prayer.²³ One might rephrase the point, perhaps, and ask whether Einstein’s religion is inadequate because he had discerned only some of His actions and attributes. Had he gone further, he might have given a fuller account of God’s nature. But this further response, in turn, raises a host of questions. Is Einstein’s God a truly religious God, i.e. the focus of prayer and worship? Or is he just Pascal’s God of philosophers and men of letters in a scientific guise? Or a more sophisticated ‘God of the gaps’?

To answer these questions, we need to go on and look more closely at the roots of Einstein’s religious convictions. I have drawn attention to his sense of wonder, something shared by Dawkins. But what sources of knowledge was he drawing on? Does he have an argument? If so, of what kind?

III. THE WORLD’S INTELLIGIBILITY

What excited Einstein’s wonder was not just the universe’s vastness, beauty, and complexity, but its intelligibility. Without such intelligibility, science would be impossible, for then we could not theorize, or frame hypotheses and explanations. In 1952 he wrote in a letter to Maurice Solovine, an old friend and pupil of his Berne years, ‘... I regard the intelligibility of the world (in the measure that we are authorized to speak of such an intelligibility) as a miracle or an eternal mystery.’²⁴ Similarly, in an essay of 1936 ‘Physics and Reality’, he says, writing of the way in which our sense experiences are put in order by means of conceptual thinking, ‘the eternal mystery of the world is its comprehensibility.’²⁵ Although his appeal to the harmony of natural laws may suggest an argument from design, Einstein’s concern is much wider and deeper. In so far as he provides us with an argument for his position, it seems to be a transcendental one, in the sense that he is concerned with what might be called the conditions for the possibility of science.

That is why, I think, his God should not be dismissed as another version of the ‘God of the Gaps’ who, as Bonhoeffer pointed out, can be squeezed out of the world when an alternative scientific explanation can be found.²⁶ Again, Einstein is concerned with question of how any science at all is possible, of what is presupposed in its very existence.

Historically, Einstein’s approach can be traced back to ancient Greece and Rome, most obviously to Stoic philosophy, according to which a cosmic Word or Reason permeates and governs the universe (see, for instance, Cicero, *De Legibus* I.22). Philo of Alexandria and early Christian writers found parallels between such lines of thought and Judaeo-Christian teaching on the Word and wisdom of God. St Gregory of Nazianzen (c.329–c.390), for example, exclaims in one of his five *Theological Orations* at the beauty and complexity of nature, and sees it as evidence of God’s handiwork, and he appeals to Plato, *Laws* X.896aff., where the movement of the heavenly bodies is discussed, as a pagan anticipation of such an account (*Or.*28:26–9). Such an approach assumes that human reason is sufficiently akin to cosmic or divine reason that it is able to grasp something of the objectified reason in nature – an assumption perhaps questioned in David Hume’s *Dialogues concerning Natural Religion*, where we read ‘What peculiar privilege has this little agitation of the brain which we call *thought*, that we must thus make it the model of the whole universe?’²⁷

Despite Hume, however, the intelligibility of the universe still continues to amaze many people. The idea seems to have a perennial attraction. Among contemporary scientists it is emphasized by John Polkinghorne, for instance. In his *Science and Creation* he notes that every discipline has its foundational assumptions, and ‘science assumes the intelligibility of the world, that it is open to our rational inquiry.’²⁸ The cosmos might have been a disorderly chaos, or have had a rationality inaccessible to us. In his *One World: the interaction of Science and theology*, he goes a step further: again he says that science depends upon the fact that the physical world is intelligible and, more specifically, that there is a consonance between the ‘experienced rationality of our minds’ and the ‘perceived rationality of the world’. This situation calls for explanation and science itself will not give it, since it assumes the world’s intelligibility.²⁹ Hence we must look elsewhere for the answer, and Polkinghorne says that he himself looks to theology here. He finds that our ‘instinct to seek a unified view of reality is theologically underwritten by belief in the Creator who is the single ground of all that is.’³⁰

Again, such an appeal to the explanatory power of belief in God can be traced back historically. Moreover, some thinkers have sought to set out arguments embodying what is implicit in the appeal. For example, in his paper of 1908 ‘A Neglected Argument for the Reality of God’ C. S. Peirce claimed to give a ‘thoroughly satisfactory explanation’ of the ‘whole threefold environment’ of brute reality, ideas or fancies, and the complex of consciousness, signs, and language. (*Collected Papers* VI. 452–93).

More recently, Hugo Meynell has devoted a book to such an argument, *The Intelligible Universe: A Cosmological Argument*. As the subtitle to the book indicates, Meynell is not offering an argument from design, and indeed his argument differs from teleological arguments like Aquinas’ Fifth Way or ones relying on an analogy between, say, an eye and a watch, like Paley’s or Cleanthes’ in Hume’s *Dialogues*. In any case, the idea of intelligibility is not the same as that of design: *qua* pattern, design is a much weaker notion; but *qua* purpose it is stronger than intelligibility, for it is one thing to say that the world is intelligible and another to say that therefore it has been created for certain goals or purposes, and that these, or the existence of their originator, can be inferred from the world.

Meynell says that he wishes to give an explanation of a state of affairs, albeit a very general one, namely ‘the existence of a world such that the sciences are possible.’³¹ Such a world is intelligible, and he argues that this is so because there is something analogous to human

intelligence in its constitution. His sequence of reasoning is to argue that it is perfectly proper to seek an explanation for such a general state of affairs, even though it is, he says, a transcendental one, in that it bears on the very conditions of knowledge; and then to discuss three rival explanations, namely that ‘It just is intelligible, that’s all’, that ‘the world’ is brought into being by our consciousness, or, better, that intelligibility is something that human minds impose upon the world. He finds these explanations variously obscurantist, incoherent, or implausible, and therefore concludes that his own explanation in terms of the ‘*fiat*’ of an ‘intelligent will which conceives all possible worlds and wills the one which we actually inhabit’ (p. 70) is the best explanation. Such a mode of arguing is an exercise of the hypothetico-deductive method (p. 89); it is not a simple inference or a logical deduction, but what C. S. Peirce called an ‘abductive inference’, often referred to as ‘inference to the best explanation’ (p. 36).

It has to be said that Einstein does not present his religious views as hypotheses among alternatives. Nevertheless this pattern of argument is common in science, and it is sometimes used elsewhere in philosophy of religion, e.g. in some recent versions of the ‘fine-tuning’ argument for God’s existence, which argue that the existence of God is the best explanation of the fact that the ability of our world to support life depends on a wide range of constants being just what they are, e.g. the force of gravity or the nuclear force that binds protons and neutrons together in an atom.³²

Meynell does not discuss how we rank competing explanations: he considers only four possible explanations for the intelligibility of the universe, and quickly dismisses three of them as non-starters, so he has made his task easy. But in more complex and difficult cases we would need to look at considerations like whether a putative explanation appeals to fewer entities, explains a wider range of phenomena, illuminates the data better, leaves fewer unanswered questions, or requires fewer revisions to our background beliefs.

He keeps his range of possible explanations simple, however, as we have seen; and it is striking that in looking at his own preferred explanation Meynell, like Einstein, appeals only to God’s intelligence and power, and not to His goodness. This is surprising, for he writes as a convinced Christian, and one who is trying to provide a natural theology drawing especially on the work of Bernard Lonergan. The trouble is, however, that even if Meynell is successful, he has, like Einstein, failed to give us a personal God.

Of course, Einstein and Meynell might respond that they are simply giving us all that can be concluded from their chosen starting-point, the intelligibility of the world; and the latter writer might add that more about God’s nature can be established from other sources. But Keith Ward raises a fundamental question about God’s nature and will, and one relevant to the point at issue, when he suggests that a very intelligent being would have consciousness and purpose, and thereby aim at some worthwhile goal.³³ It would seem then that, philosophically, we cannot evade the question of God’s goodness.

Another consequence of confining our discussion of God’s nature to His power and intelligence is that we have to pass by the Problem of Evil. But what if the evil of the world is unintelligible? Thus someone might plead that an earthquake or a hurricane may be scientifically intelligible, but not morally so in view of the havoc or suffering that it causes. Einstein ignores this issue because, again, he firmly rules out a personal God, and so avoids any questions raised by His goodness in relation to the world. But he is still open, I think, to the challenge that evil in the world makes it to some extent unintelligible.

It is difficult to pursue this point any further in the present context because both Einstein and Meynell say relatively little about what it is for the world to be intelligible, other than that it is amenable to our propounding and testing hypotheses, so making science possible. So what would it be like for the world *not* to be intelligible? This question has many ramifications.

Intelligibility requires, for example, at least some regularity, especially in causal connections, though we can perhaps imagine a world somewhat less regular and predictable than our own, such as one seemingly controlled by capricious Homeric gods. But although Polkinghorne writes of the possibility of a disorderly chaos, we could not, by definition, understand a totally unintelligible world. So can we imagine one? And could we even survive in one? Maybe, however, a *partially* intelligible world is possible, and indeed the best we can hope for (again, what of evil?). But then can we preclude some future explanation of what seems at present unintelligible?

A different kind of issue concerns the role of mathematics here. One thinks of Galileo's famous statement in *Il Saggiatore*, with which Newton agreed, that 'the great book of nature which lies ever before our eyes. ... is written in mathematical language', or, a more recent example, the fascination of Alan Turing and others with the Fibonacci Sequence. This is a succession of numbers starting with 0 and 1, and proceeding by adding together the previous two, thus: 0, 1, 1, 2, 3, 5, 8, 13, and so on; and it is found embodied in the structures of snail shells, pineapples, pine cones, sunflower heads, and many other natural objects.

More generally, is the subsuming of events under natural laws the only way of making them intelligible? And in what sense is so subsuming them 'explaining' them? Why assume that appealing to God's action is to be regarded as an *alternative* explanation? Towards the end of his *Tractatus* Wittgenstein wrote

The whole modern conception of the world is founded on the illusion that the so-called laws of nature are the explanations of natural phenomena.

Thus people today stop at the laws of nature, treating them as something inviolable, just as God and Fate were treated in past ages.

And in fact both are right and both wrong: though the view of the ancients is clearer in so far as they have a clear and acknowledged terminus, while the modern system tries to make it look as if *everything* were explained.³⁴

But there are exceptions to this generalization about the modern world. Recent philosophers of history, for example, have distinguished between the appeal to beliefs, motives, and intentions that is appropriate in historical narratives and explanations, and the Covering Law model of explanation used in the natural sciences; and other philosophers, e.g. Richard Swinburne, have distinguished more generally between personal and scientific explanations.³⁵ In the case of personal and historical explanations intelligibility involves our finding a point or purpose in someone's actions. Furthermore, Mary Midgley argues that to understand the behaviour of all living things (not just human beings) we must treat them seriously as subjects, i.e. creatures with needs, tendencies, and directions of their own.³⁶

Of course, personal and historical explanations are most commonly used of human actions. But religious believers extend this pattern of explanation when they speak, for instance, of God working out His purposes in the world through Providence. Einstein dismisses such appeals as imagined 'interference' by a personal God. Yet, to judge from some of his remarks, he did not just wonder at the regular and intelligible character of natural laws, but he subsumed them under God's will. What is lacking in his brief discussions and scattered remarks is any consideration of secondary causation, i.e. the idea that God may act and achieve His purposes through the ordinary course of events, without 'interfering' or violating any law of nature.³⁷ In equating a personal God with one who interferes in the world, Einstein does not reflect that those who ascribe design, purposes, or wisdom to God are looking for a deeper intelligibility in the cosmos by combining a belief in laws of nature with an appeal to God's will. Polkinghorne, for instance, sees God as being at work within the flexibility of natural processes; thus he says that 'If the

Spirit is operating in the universe, part of his activity will certainly be through the scientific law which reflects his faithfulness.³⁸

IV. CONCLUSION

We might summarise the differences between some of the writers we have looked at by recurring to the example of the rainbow. Suppose that Keats, Dawkins, Einstein, and Polkinghorne are puzzled by the existence of rainbows, and that Newton's explanation in terms of the refraction of light through raindrops is correct. Keats thinks that thereby the world has become disenchanted to some extent. Dawkins disagrees: for although his puzzlement has been removed, his wonder and delight remain, both at the beauty of rainbows and at the discovery of a simple but ingenious explanation of their occurrence. Einstein agrees with Dawkins, but goes beyond him in seeing this explanation as evidence of the continued agency of a powerful intelligence in the world. This is, I think, a religious stance, but one weaker than that found in Judaism or Christianity. Hence Polkinghorne goes a step further, and identifies this agent with the God of Abraham, Isaac, and Jacob.

It is probably, however, a mistake for us to look for any exactitude in Einstein's expressions of his religious views, which are known to us only through short essays, letters, and remarks conveyed by his biographers. Towards the end of his life he told Dr A. Vibert Douglas (biographer of Sir Arthur Eddington) that 'If I were not a Jew I would be a Quaker'.³⁹ I have argued that Dawkins misrepresents Einstein's position by labelling him as a 'pantheist'; but it would probably be equally crude to label him simply as a 'deist'. Such pigeon-holing fails to bring out what is most striking in his religious position, namely his emphasis on wonder and on the intelligibility of the world.

I think that both philosophers and theologians should devote more attention to these two topics. As regards the first of them, despite Plato and Aristotle, one could say as a crude generalization that relatively few later philosophers have devoted much attention to the nature and role of wonder, and its varieties, though Descartes, Kant and Wittgenstein all have interesting and valuable things to say about this fundamental human response, and there are other exceptions, like the Cambridge Platonists, Mary Midgley, and Ronald Hepburn. Einstein, as we have seen, ranges more widely and sees wonder as engendering art, science, and religion. He uses particularly strong language when discussing the Jewish tradition, especially the Psalms, many of which express, he says, 'a sort of intoxicated joy and amazement at the beauty and grandeur of this world. ... This joy is the feeling from which true scientific research draws its spiritual sustenance. ...'⁴⁰ It is certainly true that many of the Psalms express 'awesome wonder', as well as praise, thanks, joy, delight, and worship. This is particularly so in the case of 'Creation Psalms' like nos. 8, 95–6, 104, and 148, in which God is envisaged almost as a cosmic artist, and as deserving something akin to the kind of admiration that is given to artists, as well as praise and reverence.

We go a step further when God Himself, and not just His work, is seen as the focus of unending wonder. St Gregory of Nyssa, for example, says in one of his sermons on the Song of Songs

It is the same with one who fixes his gaze on the infinite beauty of God. It is constantly seen as something new and strange in comparison with what the world has always understood. And as God continues to reveal himself, man continues to wonder. ...⁴¹

Einstein does not go this far. But in directing his wonder at the world's intelligibility, he does approach another theme found in both Jewish and Christian tradition, that of the wisdom of God.⁴² We have come a long way here from Dawkins' interpretation of Einstein.

Notes

- 1 Richard Dawkins, *The Magic of Reality: how we know what's really true* (London: Bantam Press, 2011), pp. 16, 31.
- 2 Idem, *Unweaving the Rainbow: Science, Delusion and the Appetite for Wonder* (Harmondsworth: Penguin Books, 1999), pp. xii, 63. Another writer, Philip Fisher, also makes the phenomenon of the rainbow a central motif in his study *Wonder, the Rainbow and the aesthetics of Rare Experiences* (Cambridge MA: Harvard University Press, 1998), and he too makes the point that our wonder at it does not rule out scientific explanation (pp. 89–90).
- 3 Richard Dawkins, *Climbing Mount Improbable* (London: Penguin Books, 1997), pp. 278, 286.
- 4 Max Weber, *Science as a Vocation*, eds. P. Lassman, I. Velody, and P. Martins (London: Unwin Hyman, 1989), pp. 13–14, 17.
- 5 *Ibid.*, p. 84.
- 6 Richard Dawkins, *The God Delusion* (London: Transworld Publishers, 2007).
- 7 Albert Einstein, *Ideas and Opinions* (London: Souvenir Press, 1954), p. 11.
- 8 *Ibid.*, p. 40.
- 9 *Ibid.*, pp. 38–9.
- 10 *Ibid.*, 49. Cf. Einstein's letter to Murray W. Gross in 1947, also dismissing the idea of a personal God as an anthropomorphism, cited in Max Jammer, *Einstein and Religion: Physics and Theology* (Princeton NJ: Princeton University Press, 1999), p. 138.
- 11 *Ideas and Opinions*, p. 11.
- 12 Jammer, pp. 47–8.
- 13 *Ibid.*, pp. 47–9, 148–9. Cf. Ronald W. Clark, *Einstein: The Life and Times* (Hodder and Stoughton, 1973), p. 390.
- 14 L. S. Feuer, 'Noumenalism and Einstein's Argument for the Existence of God', *Inquiry* 26 (1983), pp. 251–85.
- 15 Contribution to a *festschrift* for Aunel Stadola (Zurich, 1929), quoted by Keith Ward in his *The God Conclusion: God and the Western Philosophical Tradition* (London: Darton, Longman and Todd, 2009), pp. 25–6.
- 16 *The Born-Einstein Letters* (London: Macmillan, 1971), p. 199.
- 17 Jammer, pp. 97, 148. Cf. Clark, p. 400.
- 18 *Ibid.*, pp. 39–40.
- 19 *Ibid.*, p. 93; cf. p. 148 for a similar passage.
- 20 *Ibid.*, p. 234. See also Clark, p. 33, and Abraham Pais, 'Subtle is the Lord ...': *The Science and Life of Albert Einstein* (Oxford and New York: Oxford University Press, 1982), pp. vi, 30, 41.
- 21 Martin Buber, *The Knowledge of Man* (London: George Allen and Unwin, 1965), p. 156.
- 22 *The Born-Einstein Letters*, p. 91.
- 23 Jammer, p. 149.
- 24 Cited by Feuer, p. 251.
- 25 In Albert Einstein, *Out of My later Years* (London: Thames and Hudson, 1950), pp. 59–97, at 61.
- 26 Dietrich Bonhoeffer, *Letters and Papers from Prison* (London: Collins/Fontana, 1959), pp. 103–4.
- 27 Nelson Pike (ed.), *Hume: Dialogues concerning Natural Religion* (Indianapolis: Bobbs-Merrill, 1970), p. 29. This comes shortly after Hume's suggestion that perhaps 'matter may contain the source or spring of order original within itself'.
- 28 John Polkinghorne, *Science and creation: the search for understanding* (London: SPCK, 1988), p. 19.
- 29 Idem, *One World: the interaction of science and theology* (London: SPCK, 1986), p. 46. For a similar approach, see also Stanley Jaki, *The Road of Science and the Ways to God* (Edinburgh: Scottish Academic Press; Chicago: University of Chicago Press, 1978), pp. 257–8.
- 30 Idem, *Science and creation*, p. 69.
- 31 Hugo Meynell, *The Intelligible Universe: A Cosmological Argument* (London: Macmillan, 1982), p. 70. See also his 'Criticisms of a Cosmological Argument', in J. J. MacIntosh and H. A. Meynell (eds.), *Faith, Scepticism and Personal Identity* (University of Calgary Press, 1994), pp. 43–60.
- 32 See, for example Robin Collins, 'A Scientific Argument for the Existence of God: the Fine-Tuning Design Argument', in Michael J. Murray (ed.), *Reason for the Hope Within* (Grand Rapids: Eerdmans, 1999), pp. 47–75.
- 33 Keith Ward, *The God Conclusion*, p. 84.

34 Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, trans. D. F. Pears and B. F. McGuinness (London: Routledge & Kegan Paul, 1961), 6.371–2.

35 Richard Swinburne, *The Existence of God*, revised edn. (Oxford: Oxford University Press, 1991), pp. 22–46.

36 Mary Midgley, ‘Why the Idea of Purpose Won’t Go Away’, *Philosophy* 86 (2011), pp. 545–61.

37 For the idea of secondary causation, see Aquinas, *Summa Theologiae* 1a.105.5; 116.4. For the similar notion of double agency, see Austin Farrer, *Reflective Faith: Essays in Philosophical Theology* (London: SPCK, 1972), pp. 222–3; *Faith and Speculation: An Essay in Philosophical Theology* (Edinburgh: T.& T. Clark, 1988), pp. 68–85.

38 J. Polkinghorne, *Science and Providence: God’s Interaction with the World* (London: SPCK, 1989), p. 38.

39 Clark, *Einstein*, p. 582.

40 ‘Is there a Jewish Point of View?’ in his *Ideas and Opinions*, p. 186

41 Jean Daniélou (ed.), *From Glory to Glory: Texts from Gregory of Nyssa’s Mystical Writings*, trans. H. Musurillo (Crestwood N.Y.: St Vladimir’s Seminary Press, 1979), p. 246.

42 Celia Deane-Drummond links these two topics in her *Wonder and Wisdom: Conversations in Science, Spirituality, and Theology* (West Conshohocken, PA: Templeton Foundation Press, 2006). See also my ‘The Varieties of Wonder’, *Philosophical Investigations*, 36 (2013), pp. 340–54.