

# *Einstein, God, and Time*

“IF I WERE GOD”: EINSTEIN AND RELIGION

by *John Hedley Brooke*

*Abstract.* Designed as an introductory lecture for the conference “Einstein, God and Time,” this essay provides a brief survey of three sets of relations—between Einstein and time, God and time, and Einstein and God. The question is raised whether Einstein’s rejection of absolute time held any implications for theology. It is argued that, despite Einstein’s denial and his exemplary caution, the fact that Isaac Newton had associated absolute space and absolute time with a deity who constituted them meant that a revisitation of theological questions was inevitable. Consideration is then given to the timelessness and changelessness of God, with a brief reference to eschatological issues. The question whether there might be parallels between the renunciation of Newtonian time by physicists and by Christian theologians is discussed with reference to recent commentary on the eschatological thinking of Jürgen Moltmann. Whether Einstein himself would have sympathized with these theologies is to be doubted, given his antipathy to anthropomorphic and anthropopathic concepts of deity. Finally, in exploring Einstein’s sometimes whimsical use of theological language, it becomes necessary to acknowledge that his well-known affirmation of the complementarity of science and religion rested on a distinctive construction of religion that allowed him to say he was a “deeply religious unbeliever.” Attempts to categorize his convictions, or to appropriate them for conventional theistic purposes, miss their subtlety and their apophatic resonances.

*Keywords:* anthropomorphism; atheism; beauty; complementarity between science and religion; “cosmic religious feeling”; determinism; eschatology; free will; Judaism; pantheism; quantum theory; relativism; relativity; time; unity of nature.

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There is an old joke, doubtless apocryphal, that when Albert Einstein once boarded a train in London he asked the guard: "Does Crewe station stop at this train?" In September 2005, the University of Oxford managed to stop at many vehicles of transport as the Ian Ramsey Centre, in collaboration with the UK Forum for Science & Religion, hosted an international conference titled "Einstein, God and Time," which attracted a hundred and fifty participants. The essay that follows was designed as an introductory lecture for the conference and should be read as such. My hope is that it may have some value as an overview; it does not pretend to be a penetrating new analysis.

Einstein is already well known for his aphorisms. The Ian Ramsey Centre Web site is not the only one to carry his assertion that "science without religion is lame, religion without science is blind" (Einstein [1954] 2005, 46). It is a formula that has appealed to many who, as with Einstein himself, have preferred to affirm complementarity between science and religion rather than opposition. As we shall see, however, there is a big question concerning what Einstein meant by religion. He once described himself as a "deeply religious unbeliever" (Holton 2005, 82).

The three subjects of the conference title (Einstein, God, and time) are as challenging a trio as one would ever find, but this has not prevented connections from being made between them. Accordingly, the number three features prominently in this essay: my three main sections refer to Einstein and time, God and time, and Einstein and God—the "Old One," as God was described by Einstein in a letter to Max Born 4 December 1926 (Born 1971, 90).

#### EINSTEIN AND TIME

Why did Einstein enjoy such a high profile in 2005? This was, of course, the centenary of his *annus mirabilis*, in which three domains of physics were advanced through Einstein's perspicacity. One was the study of Brownian motion, reflecting his drive to establish the reality of physical molecules. Einstein's work resulted in a formula for the variation of the mean free path of a Brownian particle as a function of the time interval during which it is observed. This has been described as the "first example of the successful theoretical treatment of a stochastic process" (Stachel 2005, 87). The second domain was that of thermal radiation. It was in this context that Einstein proposed that an explanation for the laws of radiation, and of the energy exchange between matter and radiation, would require quantum theories. In his first quantum paper he suggested that electromagnetic radiation in the high frequency region could be thought of as composed of "light quanta." The third breakthrough was in the understanding of time. The special theory of relativity dispensed with the concept of absolute time.

When historians of science are invited to comment on scientific celebrations, they have an annoying habit of being spoilsports. Many a crucial experiment or theoretical innovation applauded by posterity has been shown, on closer analysis, either not to have been crucial at the time or to have been continuous with preceding work. With reference to the year 1905, science historians have no need to strain after iconoclasm because Einstein, obligingly, undertook the demythologizing himself. Of his three major innovations the one he considered revolutionary was not special relativity but his hypothesis of light quanta. This was so radical a suggestion that not even Max Planck was impressed, and almost twenty years would elapse before the photon became respectable (Stachel 2005, 87).

The reason why Einstein did not consider his special theory of relativity revolutionary is that the ground had been prepared by Hendrik Antoon Lorentz and Henri Poincaré. As the Einstein scholar John Stachel has pointed out, Einstein regarded his development of a new kinematics as the culmination and completion of classical physics. The story in a nutshell is that, while reflecting on the electrodynamics and optics of moving bodies, Lorentz had introduced a transformation from the Newtonian absolute time to a new time variable, different for each inertial frame moving through the ether. As the relation between the absolute time and his new time varied from place to place Lorentz called it the “local time” of that frame. Whereas Lorentz interpreted the transformation from absolute to local time as a purely mathematical device, Poincaré was able to give a physical interpretation of the local time, though within the context of Newtonian science. Einstein’s innovation was to affirm that the local time of one inertial frame is as physically meaningful as that of another since there is no absolute time that would allow the two to be compared (Stachel 2005, 85).

Despite Einstein’s modesty, we surely want to ask whether his rejection of absolute time held any implications for theology. Einstein himself had a succinct and simple answer. When Archbishop of Canterbury Randall Davidson asked him what effect relativity would have on religion, Einstein’s reply was “None.” He did give a reason: “relativity is a purely scientific matter and has nothing to do with religion” (Jammer 1999, 155). Not everyone agreed. Arthur Eddington drew an analogy between Einstein’s theory and that of Darwin, pointing out how wide of the mark it would be to suggest that the theory of evolution had no implications for religion (Jammer 1999, 156). But we should remember Einstein’s caution because it still constitutes an important protest against much that goes on in the world of science and religion, where imaginative but often imaginary connections are too frequently drawn between the two spheres of discourse.

In one respect, however, it cannot be said that Einstein’s theory would have no ramifications for theology. This is because the concept of absolute time that Einstein dissolved had been associated with a concept of deity in no less a figure than Isaac Newton. For Newton, space had been absolute

because it was constituted by God. Divine omnipresence had an almost physical meaning. And similarly for time—duration had an absolute quality. For Newton, as Stephen Snobelen has put it, “God comes first, and hence absolute space and time are predicates of God’s infinite extension and eternal duration” (2005, 254). In this respect we might ask whether Einstein’s science might not have been more dangerous than appealing to theology in its dislocation of time from deity.

#### GOD AND TIME

Discussion of the relations between God and time is often philosophically complex and can be extremely forbidding. But in keeping with my triads, here are three issues that have captured special attention: the timelessness of God, the changelessness of God, and the character of eschatological thinking—if there is some ultimate future, will it be continuous with human history, as we might expect from a linear extrapolation of modern ideas of progress, or will it come as a new dispensation?

The timelessness of God has been a dominant theme in Christian theology. To assert this atemporality has been an influential way of handling the seeming incompatibility between human free will and divine foreknowledge. In his *Summa Theologiae*, Thomas Aquinas put it this way: “All things that are in time are present to God from eternity, not only because He has the type of things present within Him, as some say, but because His glance is carried from eternity over all things as they are in their presentness” (Jammer 1999, 171).

But there is a problem. Modifying an example given by Sir Anthony Kenny, if my writing this essay is simultaneous with the whole of eternity, and if the great fire of Rome is simultaneous with the whole of eternity, then, even as I write, Nero fiddles (Kenny 1979, 220–21). Einstein was a better fiddler, and we shall come to his musical tastes later. For the moment let us simply note that his special theory of relativity has inspired sophisticated attempts to deal with problems of this kind. By homing in on Einstein’s principle of the relativity of simultaneity, some philosophers of religion have refined the analysis of the free will problem (Stump and Kretzmann 1981; 1987; 1992). Max Jammer, who has written the best book to date on Einstein and religion, even added that “theologians and philosophers do not seem to know that the special theory of relativity itself, by means of its space-time geometrical diagrams, offers perhaps the best representation of the eternity-time relation” (1999, 172).

Against the classical view of the atemporality of God, some theologians have revisited the second issue—whether God is changeless, impassible. If there can be change in God, some form of temporality would seem to be required. Keith Ward typifies this alternative approach:

This will entail that there is temporality in God, since some of God's knowledge of and God's particular intentions for the universe will logically be subsequent to ("after") the occurrence of some contingent states of the universe, which God has not determined. The divine plan for the universe cannot be completed all at once. Some of it must wait for decisions made in the course of the history of the universe. That means there must be different successive states of the divine being, and that is possible only where time exists. (Ward 2006, 210)

Ward does not argue that the whole of the divine life is constrained to go along moment by moment with us. Indeed, special relativity might itself compromise such an idea. If there is no such thing as absolute simultaneity throughout the universe, where *is* God's "now," which the deity could observe or share in? But Ward does argue that if the "ultimate mind" behind the universe is one of supreme compassion, it will feel the sufferings of others, sharing their experiences and co-operating with their actions. These attributes involve a "temporal and continuing responsiveness to the experiences of finite subjects" (2006, 213). In Ward's theology the concept of divine memory plays a crucial role because whatever is actualized in human history is never lost. In the addition of new memories there is, perforce, change in the divine mind.

My third issue in relating God to time is the character of eschatological thinking. Because two other contributors to this volume, Antje Jackelén and John Polkinghorne, have written on this theme I do no more than introduce it here. We might ask, for example whether there is anything in Christian theology that might parallel the physicists' renunciation of Newtonian time. According to a recent study of Jürgen Moltmann's eschatology, there is. In an essay on "Time and Eternity," Richard Bauckham identifies what he calls the modern time myth. It is a linear image with all times in past, present, and future located along a single line (Bauckham 1999, 160). This is not simply a way of representing the irreversibility of the time process. More than that, it fosters a sense of the future as no more than a prolongation of the past and present. The unhappy consequence is that it obscures the openness of the present and the future to unpredictable possibilities.

Against the modern myth, Moltmann has levelled three telling criticisms. First, from the standpoint of Christian theology, an undifferentiated, quantitatively measurable flow of time misses the messianic aspects of Christian faith. A Christian understanding of time must insist on a qualitative difference between past, present, and future. The notion of historical time as a single line moving into the future smacks more of a deistic model in which a predetermined divine plan is implemented. Or it assumes a quasi-scientific view of historical causality in which the past simply determines the future (Bauckham 1999, 162). By contrast, Moltmann privileges the future: it should be understood not as an extrapolation of the past but as a sphere of indefinite possibilities and novelty. Each

moment is qualitatively unique, opening a variety of possible futures (Bauckham 1999, 165).

Second, for Moltmann, the Newtonian model of time also fails theologically because it excludes the unrealized possibilities of a past time. There can still be a future in the past, in the taking up of once discarded and suppressed possibilities. A theological understanding, in other words, requires what Moltmann calls “networks of time” in which linear and cyclical temporal concepts are combined (Bauckham 1999, 167).

Third, Moltmann observes that the inadequacy of the modern myth is thrown into relief by the practice of Sabbath observance. The Sabbath “brings interruption, interval and rhythm into human temporal experience” (Moltmann 1985, 286; 1996, 138, 283). In his commentary, Bauckham notes that the modern concept of time as homogeneous has increasingly removed the rhythmical elements in Western societies—of which Sunday trading is a manifestation. As he wittily adds, “There is . . . much to be said for the view that economic considerations (‘time is money’) have played a dominant role in promoting the notion of linear time, just as the axiom of economic growth has proved the most enduring aspect of the idea of progress” (Bauckham 1999, 169).

I have identified these particular issues because there is an intriguing question as to what Einstein might have thought about such theologizing. And one has to say that the answer would be Not very much. Placing God above time in order to safeguard free will could hardly excite him when he resolutely denied that we have free will. In his 1930 essay “Religion & Science,” written for the *New York Times*, he made his own views clear. To anyone taking what he called the hypothesis of causality really seriously, “a God who rewards and punishes is inconceivable . . . for the simple reason that a man’s actions are determined by necessity, external and internal, so that in God’s eyes he cannot be responsible, any more than an inanimate object is responsible for the motions it undergoes” (Einstein [1954] 2005, 39). Some ten years later he was still sticking to his guns:

If this Being is omnipotent, then every occurrence, including every human action, every human thought, and every human feeling and aspiration is also His work; how is it possible to think of holding men responsible for their deeds and thoughts before such an Almighty Being? In giving out punishments and rewards he would to a certain extent be passing judgement on Himself. How can this be combined with the goodness and righteousness ascribed to him? ([1954] 2005, 46–47)

Einstein would have objected, too, to Ward’s compassionate, changing, temporal deity, a deity without forgetfulness, because these epithets, even if they are not anthropomorphic, are certainly anthropopathic. Einstein made his position clear in a letter to one inquirer (Murray Gross) in 1947: “It seems to me that the idea of a personal God is an anthropomorphic concept which I cannot take seriously. I feel also not able to imagine some

will or goal outside the human sphere. My views are near to those of Spinoza: admiration for the beauty of and belief in the logical simplicity of the order and harmony which we can grasp humbly and only imperfectly” (Jammer 1999, 138–39).

Elsewhere Einstein repudiated the notion of a personal God believing it to be the “main source of the present-day conflicts between the spheres of religion and of science” (Einstein [1954] 2005, 47). As for Moltmann’s view of the future as an *adventus* that transcends a scientific or quasi-scientific view of causality, there is no doubt that Einstein is the perfect exemplar of a strict determinism that does tie the future to the present and thence to the past. What mattered to Einstein was what he called the “rule of fixed necessity” ([1954] 2005, 47).

#### EINSTEIN AND GOD

In exploring this conjunction, we encounter several trios within trios. It is generally agreed, for example, that there were basically three phases in Einstein’s religious development. The first was what he called the “religious paradise of youth” (Holton 2005, 75). Despite having entirely irreligious parents, there were elements in his early education that seem to have fired religious feeling. In Munich he attended a Catholic primary school and was simultaneously given private tuition in Judaism. According to his first biographer, Alexander Moszkowski (1921, 221), he extracted what was common to both rather than concentrate on what conflicted. His sister would recollect that for a time he was so fervent that, of his own volition, he observed religious prescriptions in every detail, for example eating no pork. It was her view that, though religious feelings eventually gave way to philosophical thought, a strict loyalty to conscience remained a guiding principle (Jammer 1999, 16).

This first phase was relatively short-lived. Reading some popular books on science and devouring Kant’s *Critique of Pure Reason*, he started questioning the truth of many biblical stories—and this by the age of twelve. Recounting this transformation in his “Autobiographical Notes,” his language was unequivocally forthright: “The consequence was a positively fanatic [orgy of] freethinking coupled with the impression that youth is intentionally being deceived by the state through lies; it was a crushing impression” (Einstein 1949, 5; Jammer 1999, 25). It was also during his teenage years that he became captivated by a study of a different kind, but one that offered the same opportunity for fervent application, “inner freedom and security.” This was the lure of science, which by his own account presented itself “like a great, eternal riddle” (Holton 2005, 75–76). By age sixteen he had his father declare him to the authorities as “without confession,” and for the rest of his life he tried to dissociate himself from organized religious institutions.

Out of the dialectic between these first two phases there eventually emerged a third. In his mature years he referred to a “cosmic religious feeling” that permeated and sustained creative scientific work ([1954] 2005, 39). The pursuit of science, the quest for a simplified and lucid image of the world, was not a coldly rational endeavour (Holton 2005, 76). For Einstein, it involved strong emotion. He once declared that perseverance in tackling difficult scientific problems required a state of feeling similar to that of a religious person or a person in love (Pais 1982, 27). Science was unreservedly a religious activity as it had been for two of Einstein’s exemplars, Johannes Kepler and Isaac Newton (Einstein [1954] 2005, 39). In both Kepler and Newton there had been a profound sense of the unity of creation, its beauty transparent in the geometrical harmonies that underpinned it (Brooke and Cantor 1998, 214–28). Einstein also spoke of the wish to “experience the universe as a single cosmic whole,” a sentiment to be found in the Psalms of David and even more strongly, as he learned from Artur Schopenhauer, in Buddhism (Einstein [1954] 2005, 38). There had been religious geniuses in every age who had experienced this cosmic religious feeling. But typically they were to be found not among dogmatists or those who created gods in their own image but rather among heretics ([1954] 2005, 38). Democritus, Francis of Assisi, and Benedict Spinoza were kindred spirits.

If there were three phases in his own religious development, Einstein also saw three in the religious development of humankind. These did not entirely coincide with his own except in their final stage. In what he had to say about the origins of religion, Einstein had nothing particularly distinctive to contribute. Echoing Thomas Hobbes, he considered that, in its earliest phase, it was largely a response to ignorance and fear. It involved the creation of illusory beings who had to be propitiated. It could also be a response to pain, because “everything that the human race has done and thought is concerned with the satisfaction of deeply felt needs and the assuagement of pain” ([1954] 2005, 36). Even in its earliest, primitive phase there was space for a priestly caste arrogating to itself the role of mediator between the fearful and the beings that were feared.

In the Jewish Scriptures Einstein detected the development of religious belief and practice into a second stage. This he called “moral religion.” It was characterized by anthropomorphic conceptions of God, and this included the “God of providence, who protects, disposes, rewards, and punishes; the God who . . . loves and cherishes the life of the tribe or of the human race, or even life itself; the comforter in sorrow and unsatisfied longing; he who preserves the souls of the dead” ([1954] 2005, 37).

All religions, he insisted, were a blend of these two types. It was reserved for men of exceptional discernment to rise above them to the third stage of religious experience. This was the cosmic religious feeling that so affected him personally. He admitted that it could be difficult to articu-



late—certainly to anyone who was entirely without it—especially, he added, “as there is no anthropomorphic conception of God corresponding to it” ([1954] 2005, 38).

It may be tempting to see parallels between Einstein’s three stages and the threefold progression delineated by Auguste Comte many years before. But Einstein in his mature years was no positivist, and underpinning his religiosity was not the rejection of metaphysics but a deep sense of mystery. This was associated with his conviction that the universe is structured in such a way that it is intelligible. Why should it be so? There is on record a conversation in which Einstein was chided by the Berlin critic Alfred Kerr. “I hear that you are supposed to be deeply religious,” Kerr intoned with incredulity. Einstein’s response was apparently calm and dignified: “Yes, you can call it that. Try and penetrate with our limited means the secrets of nature and you will find that, behind all the discernible concatenations, there remains something subtle, intangible and inexplicable. Veneration for this force beyond anything that we can comprehend is my religion. To that extent I am, in point of fact, religious” (Jammer 1999, 39–40).

With this understanding of religion, it is not difficult to see why Einstein proclaimed that science and religion were compatible. In June 1948 he explicitly addressed two questions: “Does there truly exist an insuperable contradiction between religion and science? Can religion be superseded by science?” His answer to both was a resounding “No” (Einstein [1954] 2005, 49–50). Religion, in Einstein’s sense, could not be superseded by science because the very possibility and rationality of science ultimately depended on it. Einstein was perfectly explicit on this point:

The interpretation of religion, as here advanced, implies a dependence of science on the religious attitude, a relation which, in our predominantly materialistic age, is only too easily overlooked. While it is true that scientific results are entirely independent from religious or moral considerations, those individuals to whom we owe the great creative achievements of science were all of them imbued with the truly religious conviction that this universe of ours is something perfect and susceptible to the rational striving for knowledge. ([1954] 2005, 52)

As Gerald Holton recently put it, Einstein “invented a religion that offered a union with science” (Holton 2005, 80).

So the intriguing question now becomes: What bearing, if any, did Einstein’s religious belief have on his science? The danger here is to overstate the case, given that Einstein wished to speak of the dependence of science on religion, not the interpenetration of the two. It would surely be difficult to show that any of the scientific papers of 1905 were directly influenced by religious considerations (Sanderson 2003). The mistake is to confuse levels of discourse that Einstein did not wish to conflate. Nevertheless, and especially later in life when he dissented from the Copenhagen interpretation of quantum mechanics, it is possible to see connections.

There were, arguably, three respects in which Einstein's religion became relevant to his own science. First, it informed his conviction of the unity of the universe and consequently the high value he placed on theories that held out the prospect of unification. Unifying space and time, electric and magnetic forces, energy and mass, he would devote years of his life to the quest for a unified field theory. As Holton observes, Einstein lived under the compulsion to unify—in his social and political as well as scientific ideals: “He abhorred all nationalisms, and called himself, even while in Berlin during World War I, a European; later he supported the One World movement, dreamed of a unified supernational form of government, [and] helped to initiate the international Pugwash movement of scientists during the Cold War” (Holton 2005, 78).

Even when writing about the world's religions, Einstein would stress their common elements. Once divested of their myths, their essential substance became clear. This means, and some might see an irony here, that Einstein opposed what he called the “relativistic” theory of religion ([1954] 2005, 51). There were common structures because the “moral attitudes of a people . . . supported by religion need always aim at preserving and promoting the sanity and vitality of the community and its individuals, since otherwise this community is bound to perish. A people that were to honor falsehood, defamation, fraud and murder would be unable . . . to subsist for very long” ([1954] 2005, 51).

Einstein's religion was relevant to his science in a second respect. There were consequences of his belief in a strict causal determinism—the belief that he also recognized in Spinoza. Einstein's well-known discomfort with indeterminacy meant that he was deeply unhappy with the conclusion that, at the quantum level, one could predict only probabilities, not certainties. In a letter to Born, 29 April 1924, he confessed to finding it “quite intolerable that an electron exposed to radiation should choose of its own free will, not only its moment to jump off, but also its direction” (Sanderson 2003, 38). Recall what Einstein believed about human freedom: “A God who rewards and punishes is inconceivable . . . for the simple reason that a man's actions are determined by necessity, external and internal, so that in God's eyes he cannot be responsible, any more than an inanimate object is responsible for the motions it undergoes” ([1954] 2005, 39). If human beings were not allowed free will, Einstein was hardly going to bestow free will on an electron. In his Spencer Lecture of 1933 he reaffirmed that he still believed in the possibility of giving “a model of reality which shall represent events themselves and not merely the probability of their occurrence” (Sanderson 2003, 36).

A third respect in which Einstein's religion impinged on his science concerns the role of aesthetic judgment in the evaluation of scientific theories. As with Kepler and Newton, Einstein had a profound sense of the beauty of the world that was best captured in the elegance of mathematical for-

mulation. The beauty of a theory did not, of course, establish its correctness, but an ugly theory was not to be entertained (Brooke and Cantor 1998, 227). There may even have been an enduring link in his mind between musical and mathematical structures. We know that he loved Bach and Mozart and hated Wagner—not primarily, if at all, because of Wagner’s anti-Semitism but because of the formlessness of his music. Moszkowski, Einstein’s biographer, claimed that in his earliest religious awakening “music, nature and God became intermingled in him in a complex of feeling, a moral unity, the trace of which never vanished” (Jammer 1999, 18). This does not mean that the highly technical details of Einstein’s physics can be reduced to aesthetic categories. Addressing the question of how Einstein found his way back to field equations discarded in his Zurich notebook, Michel Janssen and Jürgen Renn observe that “considerations of mathematical elegance did play a role at various junctures but were always subordinate to physical considerations” (Janssen and Renn 2004, 79).

Three famous aphorisms capture these different respects in which Einstein’s cosmic religious feeling could be relevant to science. The aphorisms have become well known—perhaps, in part, because God makes an appearance in them. The fact is that, although Einstein was disenchanted with theology, he would use theological language as a vehicle for articulating his deepest convictions. This, as Karl Popper complained, made it difficult to argue with him, Popper himself finally losing interest in so doing (Holton 2005, 79). Underlining Einstein’s quest for ultimate unity and harmony in nature was the reply he gave when asked point blank whether he believed in God. His reply was: “I believe in Spinoza’s God who reveals himself in the orderly harmony of what exists, not in a God who concerns himself with fates and actions of human beings” (Jammer 1999, 49). We should perhaps note here that this may be to say more than a strict pantheism would require. Nature and God are not identified. There is a God revealed in nature. Jammer records a salient anecdote concerning Einstein’s response to a cable from Eddington. The context was the outcome of the 1919 expedition to measure the deflection of light in a gravitational field. Einstein’s assistant expressed her joy at the confirmation of the general theory of relativity. Einstein himself was less ecstatic, saying that he knew the theory was correct. But what if there had been no confirmation? she asked. “Then,” said Einstein, “I would have been very sorry for the dear Lord—the theory is correct” (Jammer 1999, 53).

For the binding nexus of causality in nature, which predisposed Einstein against quantum indeterminacy, there is of course the most famous aphorism of all. It is contained in a letter to Born: “Quantum mechanics is very impressive. But an inner voice tells me that it is not yet the real thing. The theory produces a good deal but hardly brings us closer to the secret of the Old One. I am at all events convinced that *He* does not play dice” (Pais 1982, 443). A universe in which events were related only in

terms of probable outcomes simply gave too great a role to chance—to the whims, it seemed, of subatomic particles. Einstein's God was never whimsical. It has, however, been noticed that there is something odd about the image of a dice-throwing God. We might say that chance is playing a role in determining whether the number three comes up; but if we knew, as God surely would, what all the parameters were, we would regard the outcome as determined by those parameters—the force and direction of the throw, the spin, the air resistance, and so forth. And it is important to realize that, in context, Einstein was thinking more of the incompleteness of quantum mechanics than of its being erroneous (Pais 1982, 449).

My third aphorism is one from which the title of this essay is taken. It relates to the aesthetic virtues a theory must have if it is to pass muster. When judging a physical theory, Einstein wrote, "I ask myself whether I would have made the Universe in that way had I been God" (Chandrasekhar 1987, 68). It was a way of articulating his conviction that beauty had to be a guiding principle in the search for scientific results. Reminiscing about Einstein, Hermann Bondi recalled that "when I put down a suggestion that seemed to me cogent and reasonable, he did not in the least contest this, . . . he only said 'Oh, how ugly'. As soon as an equation seemed to him to be ugly, he really rather lost interest in it" (Brooke and Cantor 1998, 227).

Much more could be said about the roles of simplicity, unity, elegance, beauty, and intelligibility in theory construction. (For a range of views on these epistemic virtues see Brooke and Cantor 1998; Chandrasekhar 1987; McMullin 1988; 1993; Polanyi 1958). S. Chandrasekhar has rightly warned of the dangers of dilettantism in the explication of what it means to say that a theory is beautiful. It must, he suggests, have a certain strangeness, an exceptional quality, such that, as one follows the reasoning of its author, one has the sense of a veil being lifted. Michael Polanyi, too, spoke of an unfamiliar beauty when discussing Einstein's work (1958, 144). Rather than pursue this theme now, however, it is time to ask how, finally, we designate Einstein's God.

It is quite clear that he rejected the God of the Abrahamic faiths, a deity who took an interest in human affairs. The most he would say (and it is not negligible) was that "the highest principles for our aspirations and judgments are given to us in the Jewish-Christian religious tradition" (Einstein [1954] 2005, 43). When articulating his worldview in 1934, he stood his ground on that point, even as he repudiated clerical accretion: "If one purges the Judaism of the Prophets and Christianity as Jesus Christ taught it of all subsequent additions, especially those of the priests, one is left with a teaching which is capable of curing all the social ills of humanity" ([1954] 2005, 184–85). Though he is often categorized as a pantheist, the ascription is not unproblematic. To renounce a personal, anthropomorphic deity is not necessarily to abandon all thought of transcendence, and, as we

have seen, there is in Einstein no simple identification of nature with deity. Rather, the harmony of nature reveals an intelligence vastly superior to that of humanity ([1954] 2005, 40). Despite rejecting a personal God, Einstein did not regard himself as an atheist. Indeed, he became angry when his views were appropriated by evangelists for atheism. Their lack of humility offended him (Jammer 1999, 96–97). He was his own man with his own God. “The eternal mystery of the world,” he once wrote, “is its comprehensibility” (Jammer 1999, 42).

The Chapel in my Oxford college, Harris Manchester, is designated a place of worship for those who decline to be designated. Einstein, I think, would have liked that. Religious apologists of many hues have tried to assimilate him to their cause. In ignorance it is not difficult to do so. After all, there is always the argument that if there is one God, and if there is an ultimate mind revealed in nature, Einstein’s God and the God of one’s own tradition must be one and the same. But this is to ignore the subtlety of his position. It may yet be more subtle than we have come to believe. It is impossible to understand Einstein without reference to his subscription to an apophatic logic in which the transcendent is ultimately indescribable.<sup>1</sup>

#### NOTE

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