Einstein and Religion: Physics and Theology

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of this device is to measure the expected relativistic curvature of space in an Earth orbit by measuring the rate of precession of the gyroscopes. One cannot, she argues, adequately understand the activity of designing and constructing this device in empiricist terms. Rather, one should see the physicists involved as carefully fitting together the various powers of rotational inertia, superconductivity, etc., to construct a one-of-a-kind device that will operate reliably in just the ways required to make the desired measurements.

The Dappled World contains a number of such scientific examples drawing on principles of classical physics, quantum physics, probability theory, and economics. Some more general philosophical readers may be misled by the presence of such examples into thinking that she is concerned primarily with the philosophy of physics or of economics. Nothing could be further from the truth. The issues she raises, and her approach to resolving them, are as fundamental as any for the whole of the philosophy of science, and for philosophy more generally.

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Max Jammer, ***Einstein and Religion: Physics and Theology.*** Princeton: Princeton University Press (1999), 268 pp., $22.95 (cloth).

As the author himself notes, it is astonishing that none of the hundreds of books about Einstein's life and science so far have given an adequate account of "an important facet of his life: his undogmatic and yet profound religiosity and his philosophy of religion" (4). With his book, this strange omission has been rectified in great style. Doing so probably took precisely Max Jammer's combination of expertise and inclinations, for he is a distinguished historian and philosopher of science who knew Einstein, and who, based at Bar-Ilan University in Israel, is personally well informed on religious matters. Even the extensive footnotes will aid future scholars to find hitherto untapped material.

The first of Jammer's three interrelated chapters concern Einstein's attitude toward religion throughout his life cycle. As a child of a nonobservant, assimilated family, he was exposed to divergent religions, in his primary school (Catholic) and his separate instruction, arranged for him to learn the principles of Judaism. Thus for a time, in Einstein's own words, he was led to a "deep religiosity . . . the religious paradise of youth" (19, 28), before a fascination with science abruptly captivated him at about age twelve.

The second chapter analyzes Einstein's ecumenical concepts of the nature of religion and its social expressions, as evidenced in his correspondence and essays. And the final chapter conveys the sometimes quite con-

troversial and even misguided conclusions in the literature, showing how others imagined the influence of Einstein's scientific work—from the worries of the Archbishop of Canterbury to the implications faced by the Big Bang theory and Stephen Hawking. Perhaps because of Jammer's decision to be meticulously unbiased and remain at the historical-philosophical level, avoiding politics, the complex relation between Einstein and Zionism is not covered here; but it can be found in many other books.

The best way to understand Einstein's idiosyncratic concept of religion, which he perhaps best presented in his several essays in *Ideas and Opinions* culminating in his description of cosmic religion, is to see that effort as just one aspect of Einstein's inability to be satisfied with common opinions in science, in his personal life, in politics, as well as in religion. He reinvented each of those in his own idiosyncratic way. And each, as a more detailed study might show, was part of one grand mission he saw for himself.

Thus politically he railed against nationalism, hierarchies, and anything that would stand in the way of his goal for One World. Similarly, in his science, from his first publication in 1901, he looked for coherence and unification, as expressed for example in his letter of April 1901 to his friend Marcel Grossmann, "It is a wonderful feeling to recognize the unity of a complex of experiences which, to direct sense experience, seem to be separate things." It is in this spirit that he broke down the barriers between space and time, mass and energy, electromagnetism and mechanics, and expanded special relativity to what he first called "generalized" relativity theory, and then on to the hoped-for unified field theory.

The aim in all these matters was to arrive at a conception of the world, in all its aspects, in which the fundamental themata are unity, simplicity, causality, and an aesthetic conviction of its inevitability. As he remarked to his associate Ernst Straus: "What really interests me is whether God had any choice in the creation of the world" (124).

At age twelve, Einstein discovered the "holy" book of Euclid's geometry, and was impressed by its demonstration that from a very few definitions, axioms and propositions, an essentially infinite amount of information could be deduced. This model stuck with him throughout his life as a desirable method within science and outside. It is well known that Einstein's religious ideas were deeply influenced by his reading in and admiration for Spinoza, especially his *Ethics*, organized on the Euclidean model, as well as by Spinoza's personal life of independence of mind, his deterministic philosophical outlook, and his skepticism about organized religion and orthodoxy. Einstein wrote an introduction to a book on Spinoza's life by Rudolf Kayser, Einstein's son in law, and also contributed to the *Spinoza Dictionary* edited by Dagobert Runes. (He even composed a poem in honor of Spinoza.) For Einstein, as for Spinoza, God and Nature were one (*Deus sive Natura*), and he often referred to Spinoza's

concept of *Amor Dei Intellectualis*. In this spirit, Einstein wrote in 1929 that the "perception of the profound reason and beauty [of the universe] constitute true religiosity; in this sense, and in this alone, I am a deeply religious man."

One of Einstein's most spectacular professions of allegiance to Spinoza took the form of a short telegram. In 1929, Boston Cardinal O'Connell branded Einstein's theory of relativity as "befogged speculation producing universal doubt about God and his Creation," and "cloaking the ghastly apparition of atheism" (48, quoting *New York Times* April 25, 1929). To dispel the atheism charge, New York Rabbi Herbert S. Goldstein asked Einstein by telegram whether he believed in God, adding that he had prepaid a reply for up to fifty words. In response, Einstein needed but 29 words (in German) to state his belief succinctly: "I believe in Spinoza's God, who reveals himself in the lawful harmony of the world, not in a God who concerns Himself with the fates and actions of human beings" (49). The Rabbi cited this as evidence that Einstein was not an atheist, and further declared that "Einstein's theory if carried to its logical conclusion would bring to mankind a scientific formula for monotheism" (49). Einstein wisely remained silent on that point.

In short, as he did with the apparently different parts of science, and as he desired for the fragmented portions of humanity, Einstein saw the need to bring some unity to science and religion. As he put it in a speech in 1918, "The longing to behold the pre-established harmony is the source of the inexhaustible patience and perseverance" of scientists. "The state of mind which enables a man to do work of this kind is akin to that of a religious worshiper . . . ; the daily effort comes from no deliberate intention or program, but straight from the heart." And, typically, his address ended with the hope that there be a unification of "quantum theory with electrodynamics and mechanics in a single, logical system."

Jammer devotes a substantial section of the first chapter to the interest of Einstein in Spinoza's ideas. It can be argued that Einstein adopted from, or was encouraged by, Spinoza's fundamental thesis of the eternity and unchangeability of the world (one reason for Spinoza's excommunication), and that helped Einstein in his first attempt to solve the cosmological equation following from general relativity theory, which resulted in a nonstatic universe. To make it static, Einstein added a term, the "cosmological constant," that would keep the universe from expanding. When the astronomer Hubble found experimentally the existence of expansion, Einstein called his action "my greatest mistake." But as the universe would expand indefinitely, the average mass density would tend to become zero. That possibility went against the grain both of Einstein and Spinoza, who would agree that God could not have wanted to make an essentially empty universe.

The author has given a good deal of attention to Einstein's controversial but beautiful developmental-stage theory of religion. At first, with primitive man, it is above all "fear that evokes religious notions" (76). As he put it, at that stage, rulers and priests would take advantage of that fear "for their own interest." (Einstein constantly remarked that organized religion tends to divide people.)

The next stage of development is "admirably illustrated in the Jewish Scriptures—from fear to a moral religion," and continued in the New Testament. But as in all other religions, the "anthropomorphic character of the conception of God" (by the masses) is a grave flaw. This attack on the notion of the *personal* God caused Einstein to suffer continued attacks, as Jammer carefully describes.

But the "flaws" in the second stage disappear in the third: the development of the "cosmic religious feeling" (52,78), which sheds all anthropomorphic elements: "The individual feels the futility of human desires and aims, and the sublimity and marvelous order which reveal themselves both in nature and the world of thought. Individual existence impresses him as a sort of prison, and he wants to experience the universe as a single, significant whole "both in personal and scientific life" (78). He continues, "a contemporary has said, not unjustly, that in this materialist age of ours the serious scientific workers are the only profoundly religious people . . . . I maintain that the cosmic religious feeling is the strongest and noblest motive for scientific research" (80).

Quotations such as these, and Jammer's analysis of them and their consequences for Einstein and for the culture of his time generally, should suffice to whet the appetite of anyone interested in these matters. One emerges from this scholarly and readable book with a new appreciation of the uniqueness of Einstein's spirit.

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Mathieu Marion, ***Wittgenstein, Finitism, and the Foundations of Mathematics.*** Oxford: Clarendon Press (1998), 260 pp., $65.00 (cloth).

Until recently, Wittgenstein scholars have paid very little serious attention to his remarks on mathematics and its foundations. Since the first publication of the *Remarks on the Foundations of Mathematics* (RFM) in 1956 there has been widespread agreement among Wittgenstein scholars that the philosophy of mathematics was simply not his strong point. As a consequence of this negative assessment, many of Wittgenstein's commentators have attempted to tackle the interpretation of his writings on philosophy of mind or philosophy of language in isolation from his comments on mathematics.