EINSTEIN'S COSMIC RELIGION

By Dean R. Fowler

While best known for his scientific genius, Albert Einstein had diverse interests, including a concern for understanding the role of religion in an age of science. According to him science "is the attempt at the posterior reconstruction of existence by the process of conceptualization."[1] By contrast religion deals with the moral, ethical, and emotional life of individuals.[2] Religion, unlike science, is not a function of the conceptual creation of individual persons. As Einstein explains in his essay "Science and Religion," ". . . mere thinking cannot give us a sense of the ultimate and fundamental ends. To make clear these fundamental ends and valuations, and to set them fast in the emotional life of the individual, seems to me precisely the most important function which religion has to perform in the social life of men."[3] Consequently his position represents a "two-spheres" approach to science and religion.

However, this neat compartmentalization of science and religion breaks down when Einstein addresses the question of God. At this point in his thought the otherwise distinct spheres overlap in both positive and negative ways. On the positive side belief in the existence of God is correlated with the rationality of the universe. On the negative side belief in the existence of God contradicts the absoluteness of causality. The first part of this paper provides an exposition of Einstein's views concerning belief in the existence of God. The second part provides a critical evaluation of his approach to the science-religion issue in the context of contemporary thought which has been shaped in part by his revolutionary ideas.

Belief in the Existence of God

Opposing the orthodox Judeo-Christian approach to the problem of God, Einstein developed a theology of cosmic religion, rooted in the feeling of the "nobility and marvelous order which are revealed in nature and in the world of thought."[4] Cosmic religion and science are deeply interrelated in that, Einstein believed, the cosmic religious

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feeling is the motivating force behind scientific research: "... What a deep faith in the rationality of the structure of the world and what a longing to understand even a small glimpse of the reason revealed in the world there must have been in Kepler and Newton to enable them to unravel the mechanism of the heavens, in long years of lonely work."[5] Einstein understood the task of science as the discovery of the rationality and order in the universe.

However, an epistemological dilemma emerges in Einstein's program—a dilemma between realism and idealism. His epistemology involves a cyclical process of conjecture and discovery. For the most part, Einstein is basically Kantian; but whereas Immanuel Kant argued that our concepts were a priori categories, Einstein held that they were freely invented through leaps of the imagination. Once invented, Einstein's concepts, like Kant's categories, function to provide the structures upon which the world is experienced. Accordingly there is a bifurcation of mind and nature running throughout Einstein's thought.[6]

This bifurcation of mind and nature leads to a tension between the two positions. On the one hand, Einstein argues that our concepts are freely created inventions which are only intuitively connected with our sense experience. No logical relation exists between our sense experience and our theoretical concepts of the universe. On the other hand he argues that there is ultimately some way in which the world is structured and that the scientist is capable of discovering the structure. He believes in the knowability of the universe. But here the two directions of the cyclical process contradict each other. How can there be no logical connection between the world of sense experience and our concepts and how can there be at the same time a method for discovering the rational structure of the universe? How do we know that our theories are in fact about the world?

Einstein suggests that there are two criteria for measuring the validity of a theory: the principle of falsification, which involves the empirical testing of the consequences and predictions of a theory, and the logical simplicity of the basic concepts of the theory itself. But both of these criteria rest upon the conviction that the universe is ultimately rational in its structure and design. If the universe itself displays no inherent structure, empirical tests of a theory (which is a mental creation, not a product of inductive inference from experience) are meaningless. Likewise the requirement of an unambiguous foundation for theories is rooted in the conviction that the world itself is logically simple in its structure. (In part this accounts for Einstein's dissatisfaction with quantum theory.) While it is not necessary a priori that the

universe has a rational design, a rational design has been largely confirmed by the advance of science.

The conviction that the universe is ultimately rational is at the core of Einstein's cosmic religion. Einstein himself holds that this conviction is grounded in the belief that a superior intellect exists. In response to some questions raised by a Japanese scholar he remarked: "Certain it is that a conviction, akin to religious feeling, of the rationality or intelligibility of the world lies behind all scientific work of a higher order.... This firm belief, a belief bound up with deep feeling, in a superior mind that reveals itself in the world of experience, represents my conception of God. In common parlance, this may be described as 'pantheistic' (Spinoza)."[7] In this quotation and other passages in Einstein's works there is some ambiguity concerning the status of Einstein's conception of God. If a "superior mind" is the source of the rationality of the world, then Einstein is theistic. If "God" refers to the inherent structure of the universe itself, rather than the source of that structure, then he is pantheistic. In either case his recognition that belief in the intelligibility of the universe is a matter of faith defends a mutually supportive relationship between scientific thought and religious belief, which Einstein terms cosmic religious feeling.

In this respect, Einstein's position is very similar to the view defended by Galileo Galilei: "... human wisdom understands some propositions as perfectly and is as absolutely certain thereof, as Nature herself; and such are the pure mathematical sciences, to wit, Geometry and Arithmetic. In these Divine Wisdom knows infinitely more propositions, because it knows them all; but I believe that the knowledge of those few comprehended by human understanding equals the Divine, as to objective certainty, for it arrives to comprehend the necessity of it, than which there can be no greater certainty."[8] In the discovery of the rational structure of the universe man is discovering God.

This discovery is the liberating catalyst freeing man from his concern with personal goals and values, which characterize the "God of personal religion." Einstein expresses this conclusion: "... whoever has undergone the intense experience of successful advances made in this domain [science] is moved by profound reverence for the rationality made manifest in existence. By way of the understanding he achieves a far-reaching emancipation from the shackles of personal hopes and desires, and thereby attains that humble attitude of mind toward the grandeur of reason incarnate in existence, and which, in its profoundest depths, is inaccessible to man. This attitude, however, appears to me to be religious, in the highest sense of the word."[9]

Einstein therefore believed that advances in science actually encourage a maturing in the religious life of man, freeing him from what he considered primitive notions.

For Einstein belief in the existence of God is correlated with the rationality of the universe. His view in this regard is in continuity with other appeals to the cosmological argument made in the history of science. But notice the argument from design primarily accounts for the rational, orderly structure of the universe and does not deal with the ongoing creative interaction between God and the world. We may speak of God as the cause of the rational structure of the universe or as continually having causal efficacy in the world. While Einstein's cosmic religion supports the former (if cosmic religion is understood theistically), it explicitly rejects the latter understanding of God.

The absoluteness of causality is a crucial presupposition underlying Einstein's theory of relativity as witnessed in his formulation of the special theory of relativity and in his challenges to the development of quantum mechanics. In relativity theory nothing is relative about causality. In fact it is on the basis of the absoluteness of causality that the distinction of space and time is made: "The concept of causal chain can be shown to be the basic concept in terms of which the structure of space and time is built up. The spatio-temporal order thus must be regarded as the expression of the causal order of the physical world. The close connection between space and time on the one hand and causality on the other hand is perhaps the most prominent feature of Einstein's theory, although this feature has not always been recognized in its significance."[10] Timelike intervals, which represent causally related events, are timelike in all frames of reference, and similarly spacelike intervals, which represent noncausal relations, are spacelike in all frames of reference. Consequently no confusion concerning which events are causally related and which are noncausal is introduced because of the multiplicity of frames of reference.

Furthermore, Einstein's defense of causal determinism is paramount in his refusal to accept the indeterminism of the quantum mechanical interpretation of reality. In defense of his strong belief in causality he wrote to Max Born in a letter dated April 29, 1924: ". . . I should not want to be forced into abandoning strict causality without defending it more strongly than I have so far. I find the idea quite intolerable that an electron exposed to radiation should choose *of its own freewill*, not only its moment to jump off, but also its direction. In that case, I would rather be a cobbler or even an employee of a gaming-house, than a physicist."[11]

According to Einstein the absoluteness of causality challenges the personalistic foundations of traditional religion. As personal, God has

the power to act in the world. Einstein focuses on the problem of evil as the rallying point for his criticism of the traditional doctrine of God as an all-powerful, all-good Being: "... if this being is omnipotent then every occurence, 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 punishment and rewards He would to a certain extent be passing judgment on Himself. How can this be combined with the goodness and righteousness ascribed to Him?"[12] To avoid the weakness of this theodicy Einstein believed that we should give up the anthropomorphic idea of God and our corresponding concern for human desires, aims, and values. He held as an alternative to a personal God that God does not interfere in the course of human events. Causality reigns supreme even over God, much as the concept of fate in Greek and Roman thought controlled the destiny of both man and the gods. Since God is not causally efficacious in the world, man is freed from the fear of God and a concern for personal salvation according to a works theology. As Einstein puts it, "the man who is thoroughly convinced of the universal operation of the law of causality cannot for a moment entertain the idea of a being who interferes in the course of events—that is, if he takes the hypothesis of causality really seriously."[13] That he took this hypothesis seriously is supported by his attacks on quantum mechanics. In these attacks he makes explicit the association of God and causality: "Quantum mechanics is certainly imposing. But an inner voice tells me that it is not yet the real thing. The theory says a lot, but does not really bring us any closer to the secret of the 'old one.' I, at any rate, am convinced that *He* is not playing dice."[14]

Is there any basis in Einstein's personal life to account for cosmic religious feeling? Gerald Holton has made an intriguing and, I believe, accurate analysis of the relation of Einstein's early religious beliefs and the motivations underlying his scientific discoveries. According to Holton the search of the scientist for simplicity and the description of the experience of the world in terms of a very few principles are a return to a primitive or childlike, utopian vision. He argues: "Einstein's attempt to restructure science, then, seems to me in several senses to be a return—first, to the childhood state of innocence by a secularization of the religious childhood paradise; second, to the early dream state or social environment greatly at variance with the harsh reality he saw all around him—to a dream of a social environment which, in a word, characterizes the social childhood paradise; third, to an early state of science in which the purity of a few hypotheses supposedly was a primary characteristic."[15] In describing

his boyhood religion Einstein explains that he was disenchanted with the emphasis on personal strivings and goals. The results of this disenchantment are manifested in his rejection of the personal God of some religious traditions. He sought to free himself from the "merely personal" where existence is dominated by wishes, dreams, and feelings: "The contemplation of this world beckoned like a liberation, and I soon noticed that many a man whom I had learned to esteem and to admire had found inner freedom and security in devoted occupation with it. The mental grasp of this extra-personal world within the frame of the given possibilities swam as highest aim half consciously and half unconsciously before my mind's eye."[16] This liberation found in the study of the extrapersonal world is exactly what Einstein promotes as the basis of cosmic religion.

Einstein's Approach to the Science-Religion Issue

While Einstein's cosmic religion modifies the standard two-spheres model of science and religion, it shares dualistic presuppositions with that model. Dualism was forged by such philosophers as René Descartes and Kant in part as a response to the rise of modern science. From the dualistic perspective religion and science function in separate spheres grounded in the dichotomy between subject and object. Religion belongs to the subject side of the dichotomy, which includes such concepts as mind, soul, spirit, values, morality, purposes, and the supernatural. Science belongs to the object side, which includes such concepts as matter, energy, objectivity, and the natural.

Two issues concerning the existence of God were of crucial importance in Einstein's cosmic religion: the rationality of the universe and the absoluteness of causality. While Einstein affirms the significance of the rational design of the universe, he rejects any notion of God's causal efficacy in the ongoing creativity of the universe. In the light of these two issues cosmic religion may be seen as a modification of the two-spheres model of science and religion. Rather than bridging the dichotomy between science and religion, or integrating the two spheres into a new unity, Einstein's cosmic religion is the result of the elimination of the subject side of dualism. Cosmic religion seeks to be free from values, purposes, aims, goals, and desires. In short, it seeks to be free from subjectivity.

In certain respects cosmic religion follows the general direction of reductionistic views propounded by other twentieth-century scientists such as Francis Crick in *Of Molecules and Men* and B. F. Skinner in *Beyond Freedom and Dignity*. But notice that reductionistic views depend on dualistic presuppositions for the content of terms such as

"objectivity" and "value-free." The meaning of "objective" and related categories depends at least tacitly on the meaning of "subjective," even if the subjective categories are being rejected or ignored. It follows that alternatives to reductionism must challenge the presuppositions of dualism itself. Similarly the two-spheres approach to science and religion cannot be critiqued without challenging the foundations of dualism. Einstein's cosmic religion is an attempt to make religion scientific by extricating it from the subjective characteristics of the dualistic dichotomy. Consequently in order to critique cosmic religion one must show the weaknesses in the dualistic framework. Obviously to develop a thorough critique of dualism is not within the scope of my short essay. Instead I will show how Einstein's own writings on the nature of scientific discovery and the metaphysical implications which may be drawn from the theory of relativity undercut the foundations of the dualistic framework and other approaches to reality that share dualistic presuppositions. I will argue that cosmic religion fails because it is inconsistent with the broader implications of Einstein's thought.

Recent studies in the philosophy and history of science have been highly critical of the positivist-empiricist accounts of the nature of scientific activity. By shifting attention to the process of scientific discovery authors such as Karl R. Popper, N. R. Hanson, Michael Polanyi, and Thomas S. Kuhn have presented science as a human endeavor. According to their views conjecture, theoretical presuppositions, personal knowledge, and the impact of a paradigm-affirming community are crucial elements in the formulation of scientific positions. As Polanyi has argued, "... we may distinguish between the personal in us, which actively enters our commitments, and our subjective states, in which we merely endure our feelings. This distinction establishes the conception of the *personal*, which is neither subjective nor objective. In so far as the personal submits to requirements acknowledged by itself as independent of itself, it is not subjective; but in so far as it is an action guided by individual passions, it is not objective either. It transcends the disjunction between subjective and objective."[17] According to this analysis science is not merely a process of empirical verification and justification but, more important, a process of constructing interpretative frameworks for understanding the nature of reality. Science involves a weltanschauung.

Of course this conclusion challenges the traditional understanding of science as detached, disinterested, and objective. But science is not merely the reading of what is given; it is the creative and imaginative interpretation of sense experience. There are no raw sense data, only interpreted sense data. Science, as interpretative, involves intellectual

commitment, a quest for "truth," and, most important, judgment concerning the selection, organization, and processing of information. But commitment, truth, and judgment are far from being value-free terms since they themselves are values. Perhaps in physics the role of value assumptions is minimal, but in the application of the scientific method to biology and the soft sciences, such as psychology, sociology, anthropology, and economics, it is apparent that the data selected, the questions pursued, the research priorities established (e.g., decisions concerning the funding of projects), the strategies promoted, and the explanations given depend upon the axioms and principles of the particular theory. These judgments depend upon a particular vision of reality.

To say that science is personal and hence not detached, disinterested, and objective does not mean that science is merely a form of subjectivism. Science involves intersubjective criteria, but these criteria are established by a paradigm-affirming community of scientists and hence are not strictly objective.

In addition to the role that judgment and interpretation play in the methodology of science, the world view underpinning a scientific theory often fosters particular values. For example, in the nineteenth century Charles Darwin's theory of evolution by natural selection provided a picture of a world in conflict and struggle where the strongest survived; this was used by some to justify competitive practices in business. More recently Skinner's behaviorism challenged the meaningfulness of freedom and dignity but supported technological expertise and control in the harmonious functioning of the social order. Contemporary theories in quantum physics and biology emphasizing the interconnectedness and interdependence of all being have fostered ecological ethical values such as cooperation, stewardship, and respect for the intrinsic value of nature.

Einstein's own writings on the nature of science anticipate the weltanschauung approach to science. Einstein was well aware that invention and construction are key dimensions in the formulation of a scientific theory and was highly critical of Ernst Mach's sensationalism and the logical empiricists' accounts of science. He believed that the speculative nature of scientific conjecture was crucial: "... in my younger years, however, Mach's epistemological position also influenced me very greatly, a position which today appears to me to be essentially untenable. For he did not place in the correct light the essentially constructive and speculative nature of thought and more especially of scientific thought; in consequence of which he condemned theory on precisely those points where its constructive-speculative character unconcealably comes to light..."[18] Thus Ein-

stein is highly sensitive to the creative and speculative character of scientific theory, thereby opposing the view that science is merely the objective reading of nature. It should be noted, however, that while he anticipated the weltanschauung understanding of science he did not develop the full implications of that approach concerning the interplay of science and values.

Here we uncover the first inconsistency in Einstein's thought concerning science and religion. Einstein rejects the notion of pure objectivity at the core of dualism when understanding science, but he affirms that dualism when understanding religion. The distinction between subjectivity and objectivity are melded into the personal on the one hand but compartmentalized into separate spheres on the other hand. Cosmic religion seeks to be value free when science itself cannot escape values.

While Einstein addressed in some detail the methodological and epistemological dimensions of scientific activity, he did not develop the metaphysical implications of relativity theory to any great extent. This task has been left to other authors. Revolutions in twentieth-century science have challenged the Newtonian world view producing a new vision of reality. Einstein's theory of relativity and the theories of quantum mechanics and evolutionary biology are the central disciplines giving content to the contemporary view. That dimension of the contemporary view that follows from implications of Einstein's theory of relativity may be referred to as post-Einsteinian. The post-Einsteinian vision is best understood against the background of traditional Western dualism.

Western dualism understands subject and object as two distinct types of reality. Conscious experience (self-conscious awareness) has been the major paradigm giving meaningful content to the subject side of the dualistic dichotomy, as in René Descartes's famous *cogito ergo sum*. However, the use of conscious experience as the paradigm for understanding subjectivity is inadequate since conscious experience represents only one way in which we are aware of the world. For example, Sigmund Freud demonstrated the importance of subconscious experience, and Polanyi showed the importance of the tacit dimension in our experience of the world. Furthermore, the Western philosophical tradition considers human beings to be the only entities capable of subjective experience and holds that self-conscious awareness accounts for a difference of kind between humans and the rest of creation. This radical separation between mind and nature has been challenged by contemporary science, especially by evolutionary theory, which implies that subjectivity emerges gradually at different levels of the created order. Another, and perhaps more adequate, way

to understand the distinction between subject and object is by differentiating internal from external relations. According to Alfred North Whitehead and others an internal relation makes a difference in the constitution of an entity whereas an external relation does not.[19] Entities capable of internal relations are subjects.

This way of distinguishing subject and object is compatible with Einstein's views but stands in contrast to traditional dualism, which is an element in the Newtonian picture of reality. In the Newtonian world view external relations predominate the order of nature. The world consists of particles of matter which are spatially and temporally related to one another. These spatial and temporal relations are external, making no difference in the nature of particles. The world is matter in motion. According to this view the way to understand nature is to break it into its smallest particles. The whole of nature is merely the collection of these parts since the parts are what they are in isolation, independent of their relationships with the whole. Einstein's theory of relativity challenges the foundatons of the Newtonian world view. From a post-Einsteinian perspective the world is a complex, interconnected web or network of relationships. The interactions among entities create the structures of spatiotemporal relations. What happens in one place in the universe has an effect (even if minor) on the rest of the universe. Instead of a world constituted of independent bits of matter in motion the world is a field of interdependent events. According to this view the way to understand nature is to examine the patterned structure of its wholeness rather than to search for the character of its smallest, isolable particles. New properties and characteristics emerge by virtue of the relatedness of the whole of nature. While external relations characterize the Newtonian vision, internal relations characterize the post-Einsteinian vision.

This shift to the centrality of internal relatedness undercuts the subject-object dichotomy at the foundations of dualism. While consciousness does not characterize the relations among all events in the world, the broader category of subjectivity defined in terms of internal relatedness is seen to be applicable throughout nature. The radical split between mind and matter is overcome. In the perspective based on Einstein's thought and evolutionary theory, consciousness—a very complex mode of subjective experience—emerges from lower forms of internal relatedness.

Here we uncover the second inconsistency in Einstein's thought concerning science and religion which is deeply interrelated with the first. The metaphysical implications of his theory of relativity help challenge the foundations of dualism; however, as I have argued,

cosmic religion receives its content from dualistic presuppositions. The first inconsistency arises from epistemological considerations, the second from metaphysical ones. In both cases Einstein's cosmic religion develops in a direction opposite that of the implications of his thought.

Einstein resolved the issue of religion in an age of science by defending cosmic religion. Cosmic religion must be understood within the framework of dualism because its content is rooted in the object side of the traditional dualistic dichotomy. However, Einstein's epistemological considerations in understanding the nature of scientific discovery and the metaphysical perspective emerging in the post-Einsteinian era suggest that the dichotomy between subject and object as formulated in the Newtonian world view is false. The world is a complex web of interrelations wherein the categories of subject and object merge, blurring the traditional dualistic distinctions. Cosmic religion, however, does not emerge from the epistemological and metaphysical insights of the contemporary scientific vision, a vision shaped largely by the Einsteinian revolution. Rather cosmic religion is an attempt to understand the relationship between science and religion in the framework of outdated categories. It is an attempt, I believe, which is unsuccessful.

NOTES

1. Albert Einstein, *Out of My Later Years* (reprint ed., 1950; Secaucus, N.J.: Citadel Press, 1973), p. 24.

2. This is consistent with Immanuel Kant's division of science and religion, in which the domain of science is confined to the phenomenal realm and religion to man's moral life.

3. Einstein, p. 22.

4. Albert Einstein, *Cosmic Religion* (New York: Covici-Friede, 1931), p. 48. Einstein avoids using the term "theology" because of its traditional overtones. However, the direction in which he proceeds is clearly "theological" in that it defends a particular understanding of the nature of God. The deep influence of Benedictus de Spinoza is evident in Einstein's treatment.

5. Ibid., p. 53.

6. For an excellent treatment of Einstein's epistemology see Gerald Holton, "Constructing a Theory: Einstein's Model." *American Scholar* 48 (1979): 309-40.

7. Albert Einstein, *Ideas and Opinions*, trans. Sonja Bargmann (New York: Dell Publishing Co., 1973), p. 255.

8. Galileo Galilei, "Dialog on the Great World Systems," in *The Achievement of Galileo*, ed. James Brophy and Henry Paolucci (New York: Twayne Publishers, 1962), p. 74.

9. Einstein, *Ideas and Opinions*, pp. 57-58.

10. Hans Reichenbach, "The Philosophical Significance of the Theory of Relativity," in *Albert Einstein: Philosopher-Scientist*, ed. Paul Arthur Schilpp (Evanston, Ill.: Library of Living Philosophers, 1949), p. 303.

11. Albert Einstein, *The Born-Einstein Letters: Correspondence between Albert Einstein and Max and Hedwig Born from 1916 to 1955*, trans. Irene Born (New York: Walker & Co., 1971), p. 82.

12. Ibid., p. 27.
13. Einstein, *Cosmic Religion*, p. 27.
14. Born, p. 91.
15. Gerald Holton, *Thematic Origins of Scientific Thought: Kepler to Einstein* (Cambridge, Mass.: Harvard University Press, 1973), p. 110.
16. Albert Einstein, "Autobiographical Notes," in *Albert Einstein: Philosopher-Scientist* (n. 10 above), p. 5.
17. Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (Chicago: University of Chicago Press, 1958), p. 300.
18. Einstein, "Autobiographical Notes," p. 21.
19. For a straightforward account of Alfred North Whitehead's analysis of the subject-object problem see Ivor Leclerc, *Whitehead's Metaphysics* (Bloomington: Indiana University Press, 1958), pp. 115-23.