

EVICTING THE CREATOR

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A review of Stephen W. Hawking, *A Brief History of Time: From the Big Bang to the Black Holes*. Introduction by Carl Sagan, Illustrations by Ron Miller (New York: Bantam Books, 1988), x + 198pp. \$18.95.

The statements between square brackets are present in the original text, but not in the published text. A.C.

“What place then for a Creator?” This question of Professor Hawking received wide publicity in a two-page profile on him in *TIME*^[1] just about a month before his book hit the bookstores. [When I picked up my copy on April 14th, the cashier of Princeton University Store remarked: “It sells like hotcake.”] Professor Hawking, the present occupant of the Lucasian chair (once held by Newton) offers the spectacle of a vibrant intellect within a body confined to a wheelchair and an electronic voice simulator. Such a gripping combination has not failed to produce catchy headlines. [The attraction is irresistible when the intellect in question probes into the origin of all or the Universe and does so in that overpowering perspective which science has become in our times.]

Professor Hawking makes no secret of his aim: it is to find answer to the question of the *why* of the existence of all matter, mind and will in terms of that science, physics, which presumably can answer questions only about the *how* of purely physical processes.

[The reader will not complain about the style for which Professor Hawking generously credits the copy-editor. The wittiness is at times overdone, on occasion smacks of bad taste, and is flippant time and again.] As a high-level popularization the book is not at all first-rate about the very early phases of the Universe. *The Moment of Creation* by J.S. Trefil^[2] is far more to be recommended to those who wish to be instructed in elementary technicalities and who would tolerate very shabby philosophy only if it comes at the end of the book. Professor Hawking philosophizes from the start and he does it badly. He does not notice the irony when at the end he complains about the comedown of philosophy from its Aristotelian heights to its Kantian shallows and to the wastelands where philosophers offer only talk about talk.

Trefil’s book, and the even better known *First Three Minutes* by Professor S. Weinberg are now dated.^[3] The latter has nothing about the inflationary universe that, following its first formulation by Professor A. Guth of MIT in the mid-1970s, has become the rage among cosmologists. Trefil’s book, published in 1983, is very brief about Hawking’s developments of that theory because they began only around 1981.

Hawking’s book is less about the history of time than about his ideas on time insofar as they are for his very esoteric subject. There is no trace in the book about the puzzlement [—“If you don’t ask me about time I know it, if you ask me I don’t know it”] —which Augustine and similarly deep minds felt in writing about time. Nor does Hawking betray any familiarity with Bergson’s memorable discourses about time as a most unique, irreducible experience.

Worse, if in any prestigious post of physics, then certainly in the Lucasian chair one should have at least been familiar with a famous twentieth-century remark that the reality—so fleeting and so fundamental—of the *now* is beyond the competence of physics. Coming as it does from

Einstein,^[4] the remark should seem important for two reasons. One is the rather unfortunate predicament of our culture which takes note of a basic philosophical truth only when registered by a prominent scientist. The other is that Professor Hawking has Einstein for his chief antagonist, though for a reason which was not altogether unknown to Einstein but for which Professor Hawking's insensitivity is almost complete. [His insensitivity is even more glaring in the appendix-like brief portrait he gives about Einstein, which is followed by one about Galileo and Newton. In speaking about Einstein, Professor Hawking tells us only of his pacificism during World War I, of his opposition to the hydrogen bomb (after throwing his full weight behind the construction of the atomic bomb), and of his Zionism.] Yet, would not it have been very much in keeping with the subject to say something about why Einstein rejected the very basis on which Professor Hawking hopes to construct the ultimate theory of the cosmos and evict thereby the Creator?

On a cursory look the basis in question is quantum theory and its best known implication: Heisenberg's uncertainty principle. Einstein, of course, never argued against the use of quantum mechanics which permits only the calculation of averages and never the exact measurement of individual interactions. Unfortunately for Einstein, and other allies of his, such as Planck, Schrödinger, and von Laue, they all subscribed to the logical fallacy implied in the following inference: an interaction that cannot be measured exactly (in the operational sense), cannot take place exactly (in the ontological sense). They all made ontological causality, that takes place in a reality existing independently of the thinking mind, a function of the possibility of measuring physical interactions with complete exactness. This is why Einstein tried (though in vain) to construct a thought-experiment that would, in principle at least, allow exact measurements.

If, however, the uncertainty principle is given that ontological sense, it becomes a cheating with reality.^[5] Of course, when, say in the decay of a radium atom, only a mere fraction of a minuscule proton is to be ignored, the cheating (or ontological imbalance) is so small as to pose no qualms to "purely" scientific consciences. They are trained to be sensitive to inaccuracies in measurements and not to doing justice to reality as such. But if petty thefts go for long unpunished, major bank robberies will cease to be prosecuted. This is in a sense the history of modern physics: it moved in 60 years from the innocent-looking device of alpha-tunneling in the decay of radioactive atoms to drawing countless universes out of the bottomless abyss of non-being [by giving to the same device colossal proportions]. Such is the deepest logic of cosmologies based on the prevailing philosophical interpretation of the uncertainty principle.

This logic, wholly hidden to Professor Hawking, is given in his book a full-scale unfolding and therein lies its real instructiveness. He begins with a brief summary, full of inaccuracies, of the historical development that lead, from the Greeks on, to the expanding universe. There follows a chapter on space-time from which the unwary reader would gather that time is invariably relative and a mere mathematical quantity. There is not a hint in the book that Einstein's relativity theory is the most absolutist theory ever proposed in the history of physics.

^[6]

Chapter 3 on the expanding universe will be the fairly digestible to the average reader. If the latter is unwary as he begins Chapter 4 on the uncertainty principle, he will have to muster

all his common sense lest he be swept off his feet by Professor Hawking's cosmogenesis. It is that chapter that contains (p. 54) the crucial phrase: "Heisenberg's uncertainty principle is a fundamental, inescapable property of the world." Contrary to that pivotal claim, the principle in question is not an ontological feature of things existent, but a mere operational restriction on the physicist's techniques of measurements.

It is at that point that Hawking's editor, who forced him to add many popularizing details, failed in his task. He should have asked Professor Hawking to do at least as much as was done by Trefil. The latter gave some self-defeating pictorial glimpses about the "explanation" by quantum mechanics of physical forces in terms of exchange particles. Such particles "exist" only within the range of unobservability (and therefore non-existence) set by quantum mechanics once it is combined with its Copenhagen pseudophilosophy. The result is a series of equivocations that makes its devotees shift from operationism to ontology and back, while constantly taking cover under the scientifically coated respectability of unobservability.

It takes philosophical sensitivity to be puzzled over the fact why modern scientific cosmology (largely equivalent to work on the four now known physical forces: gravitation, electromagnetism, nuclear, and weak) needs in each case particles that are unobservable insofar as they act as physical forces. The same is true when it comes to the admission that nature must have subtle departures from perfect symmetry in order to explain the enormous preponderance of matter over antimatter. Perfect symmetry has always been akin to complete homogeneity. The latter, when taken for the starting point of cosmogenesis, seemed to dispense with further and patently metaphysical questions. It is not so easy to take such liberties when the starting point is patently non-symmetrical or non-homogeneous.

Professor Hawking's chief purpose is to create the impression that a perfectly homogeneous beginning of the universe is a most plausible state of affairs and is therefore in no need to further explanation. His road there leads through a recount of the latest research on black holes to which he contributed greatly. Chapters 6 and 7 on black holes and their being not so black (insofar as they radiate energy) are the most intriguing parts of the book. There one learns about various classes of black holes, that is, of minute chunks of matter of exceedingly high density. Thus, a star with one and one-half times the mass of our sun becomes a black hole if its radius shrinks to less than three miles.

It may be that there is a black hole at the center of each quasar with masses exceeding a hundred million times the sun's mass. At the very early stages of the universe, "primitive" black holes with masses similar to that of a large mountain, or about 1,000 million tons, but so condensed as to occupy a space no larger than the volume of an atomic nucleus. [How such black holes would radiate and therefore not being completely "black" is not the purpose of this review to appraise.]

Black holes are still to be discovered and it is highly hypothetical that they played a major role in the earliest phases of the universe about which a good deal is rather hypothetical. Not only hypothetical but philosophy wholly unjustified is the very earliest phase of the universe as imagined by Professor Hawking. He begins with a most unjust report about the address which Pope John Paul II gave to the participants in a conference on astrophysical cosmology at the Pontifical Academy of Sciences in the Fall of 1981. According to Hawking the pope told the

participants that “it was all right to study the evolution of the universe after the big bang, but we should not inquire into the big bang itself because that was the moment of Creation and therefore the work of God” (p. 116).

As anyone can ascertain from pp xxvii-xxxii in the thick volume of the proceedings of that conference, published in 1983, under the title, *Astrophysical Cosmology*, the Pope merely noted that it was not within the competence of the physical method to discuss the origin of the universe insofar it is a creation out of nothing.^[7] The Pope’s reminder was merely the echo of a remark by James Clerk Maxwell, after Newton the greatest physicist at Cambridge University: “One of the severest tests of a scientific mind is to discern the limits of the legitimate application of scientific methods.”^[8] Only physicists who think that physics enables them to observe the nothing would ever have any problem with that wise and fully scientific reminder.

Professor Hawking makes it clear right there and there that he wants to be one of those physicists. Their number is fairly large as most physicists have subscribed for over two generations to the ontological fallacy of the Copenhagen interpretation of quantum mechanics, though relatively few of them are so flippant with reality as Professor Hawking and some of his colleagues.

Flippancy with plain reality, let alone with reality on a cosmic scale, can readily invite flippancy with the facts of history, including its scientific kind. Flippant remarks about the relation between science and the Catholic Church are hardly ever absent in the popularizing writings of leading physicists. They still have to reflect on a remark—now half a century old—of an American Protestant publicist, Peter Viereck, that anti-Catholicism is the only means whereby some liberals feel to indulge with impunity in antisemitism.^[9]

A standard means of making the Catholic Church ridiculous or ominous is the plain distortion of statements of the Church. Distortion becomes a howler when Professor Hawking’s claims that Pope Pius XII declared it a Catholic dogma that the universe is expanding [and that he did so on the advice of astronomers]. Only slightly less revolting is Professor Hawking’s claim that the Church as such condemned Galileo. Everybody knew in 1616 and 1632 that the decisions of the Holy Office were not papal acts and, much less *solemn* papal acts that alone qualify as infallible utterances according to Catholic teaching. And if Professor Hawking takes this for a Roman Catholic quibble, he should consult explicit statements on the Galileo case by such seventeenth-century giants of science as Descartes and the Lutheran Leibniz.

A subtle kind of howler is Professor Hawking’s quoting St. Augustine about the question concerning what God did before He created the world. In reply to the remark—“God was preparing hell for people who pry into mysteries”—Augustine did not reply, as Professor Hawking would have it, “that time was a property of the universe that God created and that time did not exist before the beginning of the universe.”

While this is not essentially different from the substance of Augustine’s reflection on time and physical existence, the context is worth recalling:

This frivolous retort has been made before now, so we are told, in order to evade the point of the question. But it is one thing to make fun of the questioner and another to find the answer. So I shall refrain from giving this reply. For in matters of which I am ignorant I would rather admit the fact than gain credit by giving the wrong answer and making a laughingstock of a man who

asks a serious question.[\[10\]](#)

The appropriateness of all this will be clear after two details pertaining to the history of science are dealt with. One has to do with Professor Hawking's claim that nobody before Galileo asked the question why objects of different weights fall at the same rate and not at various rates as Aristotle claimed. In the sixth century the Christian philosopher Philoponus listed this as one of debilitating contradictions of Aristotle's cosmology. In the centuries immediately preceding Galileo that discrepancy between Aristotle's physics and facts had been repeatedly pointed out by representatives of the so-called *impetus* theory of motion.

Of course, ignorance about this is widespread not only in the editorial offices of major American publishers, but also in Oxbridge senior commons rooms. There the historical record, first set forth on a pioneering and colossal scale by Pierre Duhem (1861-1916) on the origins of Newtonian science in a Christian medieval conceptual matrix, is still a bitter pill to swallow. There, understandably, the Catholic priest, Georges Lemaître, the one to predict in 1927 the exact rate at which the Einsteinian universe is to expand, is also to be conveniently forgotten. Professor Hawking's astonishing silence about the Abbé Lemaître constitutes another gigantic proof of the truth of Chesterton's remark: "Catholics first and to be forgotten." [\[11\]](#) About Lemaître's achievement no one spoke more emphatically than Eddington, Plumian Professor of Astronomy at Hawking's own Cambridge University.

To register these historical and distinctly anti-Catholic *faux-pas* in an all too brief and very narrow-minded history of time has an unabashed ideological motivation. Ideologies (metaphysical or anti-metaphysical preferences) are avoidable only if one chooses to say nothing, to recall a now half a century-old remark of a positivist expounder of the metaphysical foundations of Newtonian physics. [\[12\]](#) Fortunately, Professor Hawking is not eager to hide his flippantly agnostic (if not plainly materialistic) ideology. That he welcomed the militantly materialistic Carl Sagan's introduction to his book speaks louder than exclamations made at the top of one's voice.

For the ultimate aim of Professor Hawking's book is to make it appear that quantum mechanics, insofar as it is made the vehicle of the anti-ontology of its Copenhagen interpretation would assure the success of the supreme trick available to mere mortals. It is to eat from the tree of knowledge that hybrid fruit made of good physics and bad philosophy and make thereby man's mind equal to that of God. That Professor Hawking has clearly had that hybrid fruit in mind is evident from the shrinking of philosophical memory that goes with that *dégustation*. Less than a page separates the grand conclusion, Hawking celebration of a God-like human mind, from a crucial admission. The latter is preceded by his outlining in the last two chapters a generalized geometry that in his view is so natural (that is, three-dimensional and infinite in all directions and consequently eternal too in terms of space-time) as to dispense with questions about the Creator.

But then Professor Hawking seems to be seized, however momentarily, by common sense as he faces up to the strictly *abstract* character of any geometry. It is there that he raises the only philosophical question worth remembering from the entire book: "What is it that breathes fire into the equations and makes a universe for them to describe?" (p. 174). He does not have either

the philosophical depth or the intellectual courage to answer: God or the Creator, the only answer if indeed the universe is truly a Universe with which all physics stops. To go beyond the universe is possible only if one is not contemptuous of metaphysics.

If Professor Hawking is taken to task on the basis of metaphysics, it is because he mixes an awful lot of bad epistemology into a short book. As one who fails to see the Copenhagen pseudophilosophy of quantum mechanics, he should not complain about the comedown of philosophy from the heights of Aristotelian wisdom.

Those heights meant the unquestioned priority of the real over mere ideas, a priority that was an anathema to Niels Bohr and to countless physicists who directly or indirectly learned philosophy of physics at his famed Institute in Copenhagen.

Scientifically the saddest aspect of Professor Hawking's book is his failure to refer to Gödel even once. I cannot imagine that Professor Hawking would be as ignorant about Gödel's incompleteness theorems as was

a world-famous Nobel-laureate expert on quarks, gluons, and charms, who as late as 1976. The luminary in question, a fellow panelist with me at a conference attended in that year by more than 2000, was rather miffed when I told him that he would certainly fail in his attempt to come up within three months or even three years with a *necessarily* true theory of fundamental particles. Such a theory, he believed, would tell us why the universe is what it is and cannot be anything else, and that therefore it could not have been created.

Professor Hawking seems to be unaware of a point I have been making since 1966 in the pages of books published by leading university presses, including my Gifford Lectures given at the University of Edinburgh in 1975 and 1976.^[13] The point is that Gödel's theorems exclude the possibility of *necessarily* true theories about the universe. Apparently I must be resigned to the truth of a statement *catholica non leguntur*, a statement now almost a century old. In coining it, Professor Harnack, a famous Protestant theologian, advises his students that books written by Catholic scholars, let alone by Catholic priests, be they scientists too, need not be read.

The essential argument implied in that point is that scientific cosmology has two main ingredients: one is heavily mathematical, the other is vastly empirical. A cosmology which at present can account for all empirically known phenomena cannot provide assurance that no data contradicting that theory would turn up in the future. And if that cosmological theory claims to have proven experimentally the eternity of the universe, the experiment itself must be of eternal duration.

Physical or cosmic infinity can have no abstract or purely geometrical proof. The geometry of a cosmology may of course be so consistent, so satisfactory, so simple, and so symmetrical as to suggest that it is the necessary form of physical existence. The philosophical fallacy latent in that suggestion should be clear. Here the scientific fallacy should be recalled briefly. According to Gödel's theorems, no non-trivial set of mathematical propositions can derive its proof of consistency from the set itself. Consequently, the cosmological theory in question, that obviously implies many non-trivial mathematical propositions, has to obtain its proof of consistency from a proposition lying outside the set of those propositions.

Those familiar with the fallacy of regress to infinity would now be fully entitled to say, *sapienti sat*. Those not so wise should perhaps turn to Professor Hawking for an answer to the

question why he as a cosmologist chose to ignore Gödel's incompleteness theorems. Had he considered them, his book would not have become a futile move to evict the Creator from the business of creating nothing less than the universe itself.

[1] Feb. 8, 1988, pp. 58 and 60.

[2] New York: Macmillan, 1983.

[3] London: André Deutsch, 1977.

[4] In a conversation with Carnap, reported in his autobiography in *The Philosophy of Rudolf Carnap*. P.A. Schilpp, ed (La Salle, IL: Open Court, 1968), pp. 37-38.

[5] For details, see ch. 5, "Turtles and Tunnels," in my *God and the Cosmologists* (Edinburgh: Scottish Academic Press, 1989).

[6] As I argued in ch. 1 of my *The Absolute Beneath the Relative* (Lanham, MD: University Press of America, Intercollegiate Studies Institute, 1988).

[7] As can be seen from a perusal of the Pope's address to the participants of the study week on cosmology and fundamental physics held at the Pontifical Academy of Sciences, September 28-October 2, 1981. See *Astrophysical Cosmology*, H.A. Bruck *et al.*, eds. (Vatican City, 1982), pp. xxvii-xxxii.

[8] J.C. Maxwell, "Paradoxical philosophy" (1878) in *The Scientific Papers of James Clerk Maxwell* (1890; New York: Dover Publications, n.d.), p. 759.

[9] "Catholic biting is the anti-Semitism of the liberals." P. Viereck, *Shame and Glory of the Intellectuals* (Boston: Beacon Press, 1953), p. 45.

[10] Saint Augustine, *Confessions* (Book XI, ch. 12), tr. R.S. Pine-Coffin (Harmondsworth: Penguin Books, 1961), p. 262.

[11] G.K. Chesterton, *The Thing* (London: Sheed and Ward, 1929), p. 100.

[12] "The only way to avoid becoming a metaphysician is to say nothing." E.A. Burt, *The Metaphysical Foundations of Modern Science* (2nd rev. ed. 1932; Garden City, NY: Doubleday, n.d.), p. 227.

[13] *The Road of Sciences and the Ways to God* (Chicago: University of Chicago Press, 1978).