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Stephen Hawking's A Brief History of Time and the Teleological and cosmological arguments

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STEPHEN HAWKING'S *A BRIEF HISTORY OF TIME* AND THE TELEOLOGICAL AND COSMOLOGICAL ARGUMENTS

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The author argues that Stephen Hawking makes implicit reference to and attempts to undermine two classical arguments for the existence of God: the teleological and the cosmological arguments. Further, the author shows that, in fact, Hawking's "No Boundary Proposal"—even if it were to be empirically verified—would not entirely discredit these two arguments, but would, instead, transform them into epistemic icons that reveal the immanent presence of God in the cosmos.

Stephen Hawking's *A Brief History of Time* is "a book about God—or perhaps about the absence of God." So says the late Carl Sagan in his introduction to the book. According to Sagan, Hawking presents to his readers "a universe with no edge in space, no beginning or end in time, and nothing for a Creator to do."¹ Given the fact that Hawking repeatedly intimates that cosmology leaves scientists with serious doubts about the existence of God, Sagan's reading of the book seems to be a fair one.

A Brief History of Time can be taken as an extended argument for Hawking's famous "no boundary proposal" (NBP). Common sense dictates that the universe is either infinite in age and without boundary, or else finite in age with a boundary at a singularity.² In flagrant violation of common sense, Hawking's proposal states that the universe is both finite and edgeless (without a singularity). The first seven chapters of Hawking's book lay out the essential evidence for the NBP. Hawking describes advances in physics during this century, making special note of confirmations of quantum mechanics and the general theory of relativity. These are the two theories upon which the NBP rests. It is in fusing these two

theories³ that Hawking hopes to make a case for the NBP.

But how does the NBP relate to Hawking's insinuation of God's absence? The following paper is an attempt to answer this question. According to Hawking, "if the universe is completely self-contained, with no singularities or boundaries, and completely described by a unified theory, that fact has profound implications for the role of God the creator."⁴ The reader is to assume, I think, that these implications are almost entirely negative for God. Joseph Zycinski puts it this way, "cosmological edgelessness implies metaphysical denial of the existence of God."⁵ Hawking takes the NBP to be pointing to (hinting at) the absence of God in the universe. As Darwin seemingly forced the hand of God out of human creation, a century later Hawking seems to be forcing the hand of God out of universal creation.

I have serious doubts about the NBP's negative implications for God. I will argue here that, even if the reality of the NBP be admitted, that is a long way from removing God from the cosmos. But, before I argue that point I want to closely examine the context in which the NBP arises in *A Brief His-*

tory of Time. I am interested in the metaphysical mileage that Hawking gets out of the NBP. What I hope to show is that Hawking uses the NBP to fend off both the teleological and cosmological arguments for God's existence—arguments that immediately come to mind in light of the kind of physical evidence presented by Hawking in *A Brief History of Time*. It would be too much to say that Hawking, foreseeing the theistically tinged implications of the physical evidence, dredges up the NBP deliberately to undercut the teleological and cosmological arguments. However, I think it

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is clear that Hawking, although he doesn't explicitly mention them, is conscious of these arguments throughout his discussion of the NBP. One could even read his discussion of the NBP as revolving around the teleological and cosmological arguments for God's existence.

In brief, it is my objective in this paper to argue the following points. Firstly, I hope to demonstrate that the NBP arises out of an attempt to circumvent the teleological and cosmological arguments. Secondly, I purpose to demonstrate that Hawking's arguments for the NBP are based on a misguided notion of the laws of nature. I will argue that he understands the laws of nature to have an unwarrantedly high ontological status and comprehensibility. Thirdly, I contend that even if Hawking is granted the reality of the NBP, the presence of God is still not excluded from the cosmos. Finally, I will recast the teleological and cosmological arguments for God's existence in light of the previous discussion. Rather than proving a wholly transcendent Creator God, I propose that these ar-

guments are signals of God's immanence in the order of the universe.

In the eighth chapter of *A Brief History of Time*, Hawking introduces the NBP and uses it to explain, without recourse to theism, two perplexing physical phenomena: the existence of cosmic order⁶ and the existence of a singularity. These two phenomena give rise to two traditional arguments for God's existence. Cosmic order gives rise to the teleological argument and a singularity gives rise to the cosmological argument. As I shall point out, Hawking's attempt to explain away the

former (order) will eventually lead him to do away with the latter (singularity).

Hawking begins the eighth chapter by describing cosmic order. The initial high temperature of the universe, the critical rate of expansion of the universe, the near

uniformity of the early universe, and the local irregularities in the early universe (which allow for the formation of stars and galaxies) are examples of cosmic order.⁷ Hawking admits that cosmic order is colored with theistic possibility when he says, "one possible answer is to say that God chose the initial configuration of the universe."⁸

Hawking is certainly dealing with the teleological argument for God's existence. He never explicitly mentions the argument by name, but he gives wonderful expression to it at one point in the text:

[I]t seems clear that there are relatively few ranges of values for the numbers that would allow for the development of any form of intelligent life. Most sets of values would give rise to universes that, although they may be beautiful, would contain no one able to wonder at that beauty. One can take this either as evidence of a divine purpose in Creation and the choice of the laws of science or as support for the strong anthropic principle.⁹

Although he is aware of the theistic implications of cosmic order, Hawking suggests

that the strong anthropic principle (SAP)¹⁰ might be adequate to explain the cosmic order.¹¹ However, Hawking rejects the SAP.¹² But having rejected it, Hawking does not stay true to his earlier either/or proposal. Instead, he attempts to circumvent theistic fine-tuning in another way. In order to minimize the improbability of the cosmic order, Hawking turns to the inflationary model¹³ of the universe. The crucial characteristic of this model for this discussion is that it does not require fine-tuned initial conditions of the universe.

Quite a number of different initial configurations for the universe would have evolved to produce a universe like the one we observe. If this is the case, a universe that developed from some sort of random initial conditions should contain a number of regions that are smooth and uniform and suitable for the evolution of intelligent life.¹⁴

This model undermines the teleological argument by positing an initial configuration in just the sort of chaotic state that would be expected from purely naturalistic assumptions. “This is important, because it shows that the initial state of the part of the universe that we inhabit did not have to be chosen with great care.”¹⁵

After a thorough discussion of various inflationary models, Hawking concedes that none of them can completely explain the presence of cosmic order in our universe.

[I]t cannot be the case that every initial configuration would have led to a universe like the one we observe. [...] There must have been initial configurations that would not have given rise to a universe like the one we see today. So even the inflationary model does not tell us why the initial configuration was not such as to produce something very different from what we now observe.¹⁶

So, the thorn in Hawking’s flesh, the pug-nacious fact of cosmic order, remains.

Hawking’s discussion of cosmic order now becomes enmeshed in his singularity theorem. Cosmic order is linked to the singularity theorem in the following way. The absence of a singularity (the NBP) can account for the resiliently inexplicable cosmic order. How does the NBP explain the cosmic order?

First of all, the laws of nature break down at a singularity, leaving us completely in the dark as to the initial conditions of the universe. But the NBP avoids this breakdown by removing the infinite conditions found at the point of singularity. So, given the NBP, the laws of nature apply across the whole universe. Secondly, if a theory of quantum gravity is the ultimate physical theory, and if it can span the whole universe, then it might be able to explain why we live in a universe that happens to have cosmic order. After all, the quantum theory of gravity predicts which history of the universe, among the many, is the most probable.

Under the no boundary proposal one learns that the chance of the universe being found to be following most of the possible histories is negligible, but there is a particular family of histories that are much more probable than the others.¹⁷

Thus, the quantum theory of gravity (read in the context of the NBP) might show that a universe with cosmic order is by far the most probable universe.

The NBP, then, is a bold theoretical move. As Hawking jettisons the point of singularity—the very theory that he was responsible for legitimating¹⁸—he not only explains the existence of cosmic order without recourse to theism, but also diminishes the plausibility of a divine creation event.

So long as the universe had a beginning, one could suppose it had a creator. But if the universe is completely self-contained, having no boundary or edge, it would have neither beginning nor end: it would simply be. “What place then for a creator?”¹⁹

Notice that the NBP kills two birds with one stone. Not only does it explain the cosmic order, but it also rids the universe of a theistically-pregnant singularity. Hawking is aware of these theistic implications within the singularity when he writes, “many people do not like the idea that time has a beginning, probably because it smacks of divine intervention.”²⁰ With the NBP, Hawking removes these smatterings of divine intervention. He also accounts for the presence of cosmic order in a random universe.

As much as Hawking's NBP arises within the context of his rejection of the teleological and cosmological arguments for God's existence, I do not suggest that Hawking is motivated by these arguments to construct his NBP. Such a statement would require analysis of his inner thoughts. Nevertheless, a comment from Jane Hawking, Hawking's former wife, reveals something of his repugnance to theism:

There doesn't seem to be room in the minds of people who are working out these things for other sources of inspiration. You can't actually get an answer out of Stephen regarding philosophy beyond the realms of science.²¹

If one really cannot get an answer out of Hawking beyond the realm of science, then the NBP is an ideal preservative for him. The NBP excises all extra-scientific elements from the discussion of the cosmos. Debate over the order and origin of the universe is hermetically sealed from meddling theologians. As has already been shown, the NBP also protects the laws of nature from breakdown at the singularity. So, protection from potential breakdown and preservation from unintelligible outside influences are significant philosophical aspects of the NBP. Both functions ensure the final intelligibility of the laws of nature. To see how determinative this maintenance of intelligibility is for Hawking's NBP requires a few quotations from his book.

- Hawking assumes that positing God is inextricably bound to positing an "initial configuration of the universe—that we cannot hope to understand."²²

- Hawking complains that "if [God] had started it off in such an incomprehensible way, why did he choose to let it evolve according to laws that we could understand?"²³

- Hawking reasons that "it would be only natural to suppose that—order should apply not only to the laws [of nature], but also to the conditions at the boundary of space-time that specify the initial state of the universe."²⁴

- Hawking writes, "in order to predict how the universe should have started off, one needs laws that hold at the beginning of time."²⁵

- Hawking constantly avoids what he calls "a counsel of despair, a negation of all our hopes of understanding the underlying order of the universe."²⁶

- In Hawking's analogy of the universe to the globe, he hopes that "the laws of science will hold at the [beginning and end of the universe], just as they do at the North and South Poles on the earth."²⁷

- Hawking's great hope is that "if we find an answer to [the final laws of nature], it would be the ultimate triumph of human reason—for then we would know the mind of God."²⁸

- Hawking makes the following argument for the complete comprehensibility of the laws of nature: "God could have started the universe off any way he wanted. But in that case he also could have made it develop in a completely arbitrary way. Yet it appears that he chose to make it evolve according to certain laws. It therefore seems equally reasonable to suppose that there are also laws governing the initial state."²⁹

- Hawking hopes that "the eventual goal of science is to provide a single theory that describes the whole universe."³⁰

- Hawking bemoans the fact that "at the singularity, general relativity and all other physical laws would break down: one couldn't predict what will come out of the singularity."³¹

It is clear from these quotations that Hawking is dedicated to laws of nature that are intelligible and unbreakable. But why is he so loathe to entertain the possibility that the laws of nature, fallible human constructions of reality, might be interfered with or broken? The answer is that Hawking does not think that the laws of nature are fallible human constructions of reality. More often than not, in his discussions of the laws of nature, Hawking's view is neo-Platonic. Zycinski labels this belief necessitarian, in that it holds that the essence of the laws of nature cannot be reduced to mere human observations of regularity. The necessitarian tradition "presupposes the existence of hidden necessary links that constitute the order of

nature."³² So, instead of human best guesses, approximate descriptions of the regularity observed in nature, Hawking believes that the laws of nature are fixed, real, independently-existing entities that prescribe what events must occur. From the above quotations, it obvious that this neo-Platonic view is Hawking's predominant reading of the laws of nature. Given this understanding, it is clear

The final test of the “no boundary proposal,” as Hawking admits, will be scientific—whether it can explain existing phenomena or accurately predict new phenomena; it will not be philosophical.

why Hawking would not want the laws to be broken.

Hawking's determination to preserve and protect the laws of nature is problematic for two reasons. First, Hawking is not consistent within his own treatment of the laws of nature. Secondly, he naively assumes an unwarrantedly high view of the laws of nature.

To begin, Hawking generally believes that the laws of nature are far more than concepts in the human mind. And yet, at the beginning of *A Brief History of Time*, he writes the following:

[A] theory is just a model of the universe, or a restricted part of it, and a set of rules that relate quantities in the model to observations that we make. It exists only in our minds and does not have any other reality (whatever that might mean).³⁴

Also, when Hawking needs to show that imaginary time might be just as real as so-called real time, he conveniently relativizes the laws of nature.

So, maybe what we call imaginary time is really more basic, and what we call real is just an idea that we invent to help us describe what we think that universe is like. But according to the approach I described in Chapter 1, a scientific theory is just a mathematical model we make to describe our observations: it exists only in our minds.³⁵

Hawking seems to be playing metaphysical ping-pong with the laws of nature. Do they exist only in our minds or are they inviolable, the very warp and woof of creation? If they are only mathematical models, then are they really worth preserving and protecting by constructing the NBP?

Even if allowances are made for the inconsistencies in Hawking's treatment of the laws of nature, it is hard to excuse his naive statements about their high ontological status. If Hawking is going to treat the laws of nature as binding realities that can never be broken, then he needs to make an argument for it. This contention is especially true in light of the

multiple critiques of a neo-Platonic view of the laws of nature in the last forty years. One such critique comes from William Stoeger. In a paper entitled “Quantum Cosmology and the Laws of Nature,” Stoeger lists at least five reasons to doubt a neo-Platonic reading of the laws of nature.³⁶ I simply list them here, without explication:

1. We observe the laws of nature with limited/indirect instruments.
2. The laws of nature are always idealized from experimental data. The data never quite fit the theory.
3. The laws of nature are always underdetermined by the data that they explain. Several contradictory theories could often account for the same data.
4. The history of science shows that cultural presuppositions, human creativity, and reigning paradigms play a crucial role in the creation of theories.
5. The history of science shows that long-established laws of nature are constantly being subsumed or replaced by new laws.

Although I will not draw out here a balanced theory of the laws of nature based on these five arguments, I think that they are sufficient to undercut Hawking's assumptions.

To summarize, a critical role of Hawking's NBP is to circumvent teleological and onto-

logical reasoning for the existence of God; the NBP is deeply motivated by Hawking's desire to preserve and protect his high view of the laws of nature; and finally, Hawking's high view of the laws of nature is deeply problematic. To return to my basic concern in this

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essay, one way of relating the NBP to the question of God's existence is to reject the NBP on grounds of faulty reasoning. What I have just summarized seems to legitimate that claim. Argumentative theists could take what I have just said and use it as a polemic against the NBP.

In spite of what I have just said, the final test of the NBP, as Hawking admits, will be scientific—whether it can explain existing phenomena or accurately predict new phenomena; it will not be philosophical. Thus, before I conclude with a re-examination of the teleological and cosmological arguments, I want to assume that the NBP is true, and to see how it relates to the question of God's existence. Unlike Hawking and Sagan, I think that one can take the view that the NBP and God's existence are cooperative "doctrines," rather than competitive ones.

One is forced to pit God and the NBP against one another, I think, only if one assumes what Zycinski calls a "Clarkean physico-theology in which the God of scientific gaps invented by Samuel Clarke is replaced by the God of cosmological edges."³⁷

Hawking's dictum "if there is no edge, there is no God, the Creator" expresses the essence of the same philosophy which we find in Clarke's gaps.³⁸

The essence of both philosophies is that God operates only in realms unexplored by science. So, the more that science explains (say, at the edge of the cosmos), the farther God's activity recedes (beyond the boundary of the cosmos). If God really is only a magi-

cal explanation for all that is mysterious, then Hawking is right to say that the NBP deals a fatal blow to God as Creator, because one of the greatest mysteries of all—the existence of Creation, the cosmos—would be solved.

Thankfully, this Clarkean physico-theology need not be ac-

cepted. It would be more theologically adequate to agree with Arthur Peacocke:

God is *semper* Creator—God is creating now and continuously in and through the inherent, inbuilt creativity of the natural order, both physical and biological—creativity that is itself God in the process of creating.³⁹

Paul Davies expresses the same idea with greater flourish.

The idea of God who is just another force or agency at work in nature, moving atoms here and there in competition with physical forces is profoundly uninspiring. To me, the true miracles of nature are to be found in the ingenious and unswerving lawfulness of the cosmos, a lawfulness that permits complex order to emerge from chaos, life to emerge from inanimate matter, and consciousness to emerge from life, without the need for the occasional supernatural prod; a lawfulness that produces beings who not only ask great questions of existence, but who, through science and other methods of inquiry, are even beginning to find answers.⁴⁰

So, the laws of nature, even if they turn out to be neo-Platonic, do not have to be in competition with God. Hawking said as much several years after he wrote *A Brief History of Time*.⁴¹

In Hawking's new reading, the laws of nature can be expressions of God's continuing sustenance of creation. He might even say that in the lawfulness of the cosmos God is present in creation. This doctrine of divine immanence is heuristically useful, I think, towards integration of the NBP and the presence of God in the cosmos.

Divine immanence can also be a guiding hermeneutic in attempts to make sense of the teleological and cosmological arguments for God's existence. Joseph Zycinski rightly points out the following:

[O]ne should not expect that Hawking's cosmology would provide a new argument for the existence of God the Creator and strengthen the standpoint of Christian theism.⁴²

And yet, Hawking's cosmology does have interesting metaphysical implications which, I think, are helpful in reworking the teleological and cosmological arguments.

An icon is a useful concept for what I am suggesting about the teleological and cosmological arguments. In the Orthodox Christian tradition, icons are images (paintings, murals, frescos) that induce the observer to perceive a deeper, supernatural reality⁴³ beyond the image. I suggest that the teleological and cosmological arguments are also iconic, in that meditation upon them reveals the hidden order of God's immanent presence. I think that this iconic reading is more useful than the traditional way⁴⁴ of thinking of them as proofs to convince unbelievers of the existence of God.

In regard to the teleological argument, Sir Edmund Whittaker in his 1946 *Donnellan Lectures* noted that modern cosmology discloses an intramundane God in the "order, system, adjustment, fitness in the nature of things and in their relations to other things."⁴⁵

The fact that the laws of mathematics are valid over the entire cosmos, showing that everything is interrelated and consistent, leads to the inference that there is only a single mind involved in the whole creation.⁴⁶

Zycinski makes mention of this same fact, but adds another element to his conclusion.

[P]hysics itself...never asks why the laws of nature exist when nature itself could have been an uncoordinated disorder in which no regularities could have been determined. Physics presupposes the uniformity of nature, and this presupposition constitutes a *conditio sine qua non* for the existence of physics in its present form.⁴⁷

So, Zycinski and Whittaker see that the essential presupposition of modern science is that the order observed in the world extends throughout the chaos. This assumption of uniform order (which itself can never be explained by science) is undoubtedly a feature built into the human mind. It is a feature that corresponds, one hopes, to a deeper, true order that actually exists in the cosmos. And this cosmic order may itself correspond to a deeper, divine immanence in creation. The jumps from psychology to metaphysics, and from metaphysics to theology in these last two statements are not too large, and seem entirely warranted to me. Meditation on these features of existence—psychological order corresponding to cosmic order corresponding to divine immanent order—unveils the immanent God whose glory the orderly heavens declare.

In regard to the cosmological argument, Zycinski writes:

[I]n this approach a Clarkean God of edges is replaced by an immanent God sustaining his creation in all moments of time. He remains also transcendent to the created world in the sense that, as the Creator he remains the fount of being for all creation.⁴⁸

There is an important intellectual tradition within Christianity that defines the status of creation in terms of dependence of the created object on its Creator. It was Thomas Aquinas who wrote the following:

Creation is none other than the relation of the creature to the creator as to the principle of its very being.⁴⁹

This relation remains independent of time; in the Christian intellectual tradition it is described as either *creatio continua* or *creatio passiva*.

So, in an iconic reading of the cosmological argument, this meditation comes to rest upon a God who is constantly upholding the universe with the divine breath. In brief, the teleological argument is transformed from a proof of a deistic watchmaker into an epistemic pointer, a suggestive sign or symbol that exposes, unveils, and reveals the ordering activity of an immanent God. The cosmological argument, instead of being a proof for a cosmic jump-starter, becomes an icon pointing the way to the presence of the immanent God, who constantly upholds, sustains, and makes real a creation that would have no reality apart from God.

A major theme in this paper is the thorough enmeshment of Hawking's NBP with the teleological and ontological arguments for the existence of God. I have shown that Hawking's presentation of the NBP is embedded in evasions of the logic of those arguments. I have also shown that the NBP was motivated by dubious assumptions about the laws of nature and their incompatibility with the existence of God. And yet, however precarious are the philosophical foundations of the NBP, and however wrongheaded its implications for theism, the NBP is an amazing achievement. In the final estimate, the NBP must be praised as a work of creative scientific genius. Also, the NBP can be a source of creative thinking about God's relationship to the universe and a prod for theists to reinterpret adequately the teleological and cosmological arguments, with greater attention to God's immanence. I find that the relationship between the NBP and the existence of God is at least amicable, if not entirely cordial.

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Endnotes:

1. Hawking, p. x.
2. A singularity is the idea that at the beginning of time, the universe was once a point of infinite density and infinite space-time curvature. A singularity is predicted mathematically by Einstein's theory of General Relativity. However, the idea was unacceptable to most scientists until Hawking and Roger Penrose showed that Black Holes (whose existence can be empirically demonstrated) contain these singularities.
3. Interestingly, quantum mechanics and general relativity have generally been taken

to be contradictory (the former being indeterministic, the latter being deterministic). Hawking predicts that they will be reconciled (perhaps by superstring theory).

4. *Ibid.*, p. 174.

5. Zycinski, "Metaphysics and Epistemology."

6. I refer to the brute fact of order in the cosmos as "cosmic order." This term does not imply any element of theistic involvement. A more theistically laden term for the same phenomenon is "fine-tuning."

7. These four physical constants (and many other similar examples of precisely balanced physical constants) deserve the appellation, "cosmic order." This is because, if they were just the tiniest bit higher or lower, the universe would be either instantly annihilated or intensely uninteresting.

8. Hawking, p. 122.

9. *Ibid.*, p. 125.

10. Hawking takes the SAP to mean that there are many different universes or regions of the universe each with a different initial configuration and set of laws.

11. The universe may be ordered, not because it is fine-tuned, but merely because we happen to be in one of the few universes that allowed for intelligent life. Our amazement at fine-tuning would grow dull if we learned that we live in one universe among many — the one that contains intelligent-life-generating laws.

12. Hawking rejects the SAP on two grounds: the principle of economy cuts out the idea of multiple universes, and the whole tide of the history of science flies in the face of gross anthropocentrism.

13. The inflationary model describes an extremely rapid expansion during the first moments of the universe. According to Hawking, this initial inflation inherently transforms the early chaos of the universe into order.

14. Hawking, p. 126.

15. *Ibid.*, p. 132.

16. *Ibid.*, pp. 132-33

17. *Ibid.*, p. 137

18. Hawking describes his own contribution to the singularity theorem on p. 50: "Penrose's theorem had shown that any collapsing star must end in a singularity; the time-reversed argument showed that any Friedmann-like expanding universe must have begun with a singularity."

19. *Ibid.*, p. 141.

20. *Ibid.*, p. 46.

21. Ross, p. 64.

22. Hawking, p. 122.

23. *Ibid.*

24. *Ibid.*, p. 123.

25. *Ibid.*, p. 133.

26. *Ibid.*

27. *Ibid.*, p. 138.

28. *Ibid.*, p. 175.

29. *Ibid.*, p. 11.

30. *Ibid.*, p. 10.

31. *Ibid.*, p. 122.

32. Zycinski, "The Laws of Nature," p. 7.

33. This assignment of a high ontological status to the laws of nature is often known as realism.

34. Hawking, p. 9.

35. *Ibid.*, p. 139.

36. Stoeger.

37. Zycinski, "Metaphysics and Epistemology," p. 270.

38. Zycinski, "The Laws of Nature," p. 4.

39. Peacocke, p. 95.

40. Davies, p. 34.

41. In a BBC interview in 1992, Hawking moderated many of his earlier philosophical comments concerning his no-boundary model of creation. Repudiating the naive Clarian theology, he admitted that the model itself justifies no conclusion regarding the existence or the nonexistence of God. It only illustrates that the possible creative act of God was not arbitrary in nature but depended on laws and principles known to theoretical physics.

41. "In a BBC interview in 1992, Hawking moderated many of his earlier philosophical comments concerning his no-boundary model

of creation. Eliminating the naïve Clarkean theology, he admitted that the model itself justifies no conclusion regarding the existence or the nonexistence of God. It only illustrates that the possible creative act of God was not arbitrary in nature but depended on laws and principles known to theoretical physics" (Zycinski, "Metaphysics and Epistemology," p. 281).

42. "[O]ne should not expect that Hawking's cosmology would provide a new argument for the existence of God the Creator and strengthen the standpoint of Christian theism" (Ibid., p. 283).

43. The function (not the result!) of icons is similar to those three-dimensional images that were in vogue several years ago. "One was supposed to gaze with intensity upon a

complex pattern of lines for several seconds, and then the real image-behind-the-image was supposed to appear.

44. I hesitate to use the word traditional here. I only mean "traditional" in the sense that contemporary philosophers and theologians often argue that tradition has held that the cosmological and teleological arguments are attempts to prove God's existence. I believe that an iconic reading is more in keeping with the historic intentions of the inventors of these arguments.

45. Quoted in Worthing, p. 38.

46. Ibid., p. 39.

47. Zycinski, op. cit., p. 282.

48. Ibid., p. 283.

49. Aquinas, I a.q. 45. Art. 3.

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