Paper Title: Einstein, Beauty, and Natural Theology: Elementary Reflections!
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This paper was prepared for "Science and Religion: Global Perspectives," June 4-8, 2005, in Philadelphia, PA, USA, a program of the Metanexus Institute (www.metanexus.net)

Paper Abstract:
The year 2005 has been declared the "Year of Physics" by the United Nations in order to commemorate the one hundredth anniversary of three seminal papers published in 1905 by the great theoretical physicist, Albert Einstein (1879-1955). The first paper addressed certain problems concerning electromagnetic energy, the second concerned an aspect of electron theory, which came to be known as Einstein's special theory of relativity, and the third addressed features related to statistical mechanics. I have neither the competence, nor the intention to address these achievements in any sort of technical way. What I do propose rather is to address in a general way (1) the role that *beauty* played in the conception and birth of Einstein's theory of special relativity, (2) the relation, in the broadest terms, of this theory to his theory of general relativity, and (3) the immense positive effect, still vastly underestimated, of his theory of general relativity on the science of Natural Theology, while highlighting what I consider to be the best arguments in this tradition. Points one and two are simply introductory points. My focus shall be on the third point. Thus, my claim will be that Einstein's presentation of a "contradiction-free, scientific account of a gravitational universe" had enormous positive implications for Natural Theology in general, and for the Thomistic proofs in particular.

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Paper Text:
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As we address in a general way the role of *beauty* in the conception and birth of Einstein's theory of special relativity, we must first turn our attention to another great theoretical physicist, who died in the very same year that Einstein was born. The year was 1879. The scientist was James Clerk Maxwell (1831-1879). He is most famous for his four fundamental equations which capture in a simple and precise way the behavior of electric and magnetic fields. Commenting on these equations, the great scientist Heinrich Hertz (1857-1894), once said "One cannot escape the feeling that these mathematical formulae have an independent existence and an intelligence of their own, that they are wiser than we are, wiser even than their discoverers, that we get more out of them than was originally put into them." And similarly when the young Einstein was first exposed to the equations, he was so struck by the force of their *beauty,* even, it seems, before the power of their truth, that he simply referred to their beauty as pure "revelation."[2] Lest we be tempted to think that by using the term "revelation," Einstein had simply been engaging in rhetoric or hyperbole to describe how such beauty had so impressed him, it is enough to say that his efforts at protecting the beauty of these equations from possible distortion was the main impetus behind his theory of special relativity. In the words of the great Hungarian theologian and physicist, Stanley L. Jaki, "Since beauty is inseparable from form, it was all too natural for [Einstein] to be [gravely] concerned about the distortion of the simple form of [Maxwell's] equations [when and if] they are applied to a reference system moving with respect to the observer. Einstein's great insight consisted in perceiving that the transformation of those equations from one reference system to another would leave intact their [beautiful and simple] form *provided* the speed of light is taken for something absolute, independent even of the speed of its source."[3] His hypothesis, therefore, concerning the absolute speed of light, a fundamental hypothesis in his theory of special relativity, was conceived and born, we might say, from his desire to protect the virginal beauty of the equations from any blemish or mutilation.

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[1] Stanley L. Jaki, *Miracles and Physics* (Front Royal, Virginia: Christendom Press, 1999) 42. The idea for this paper comes originally from my own reading and study of this book.

[2] Phillip A. Schillp, ed. *Albert Einstein Philosopher-Scientist* (New York: Harper Torchbook, 1959) vol. 1, 33. I am reminded in this regard of what F. Schiller said in his well known work on aesthetic education, wherein he claimed that the whole magic and power of Beauty dwelt in its mystery.

[3] Jaki, *Miracles and Physics* 41.

The relation of his theory of special relativity to his theory of general relativity might best be summed up, in broad terms, by stating that the former is simply a particular case or instance of the latter. Having said this, however, one may get the false impression that he proposed the general theory first, and then the special theory later, as a particular and special instantiation of the general claim. But this was not the order of development. The theory of general relativity, which dealt with accelerated frames of reference, gravitational motion being the most obvious case, was not complete until 1917 when he presented the last of his elucidations on general relativity. What Einstein presented in this last memoir on general relativity, which dealt with the "gravitational interaction of all matter"[4] was nothing less than the "first, contradiction-free scientific account of a gravitational universe."[5] This had enormous implications not only for physics, needles to say, but also for Natural Theology. So, we could say that this "first, contradiction-free scientific account of a gravitational universe," was the fruit and culmination of a life-time's work, which had its beginning in his perception of the beauty of Maxwell's equations. Be this as it may, and regardless of whether I am totally accurate with respect to my limited understanding of the progression of his theories, I am convinced about the key role that beauty played in the formulation of the these theories from the very beginning. And what I am most committed to, and what I want to focus upon now is the importance of what his general theory of relativity meant for Natural Theology.

I stated in the introduction that the immense positive effect of Einstein's theory of general relativity on the science of Natural Theology is still vastly underestimated. One reason for this is that it is still vastly unexplored. And I think it is still so vastly unexplored simply because Natural Theology itself is still recovering from the decisive blow it took from what has been called the modern scientific revolution. But although it is recovering, it is still perceived to be an un-scientific discipline in most western academic circles. I mean what could sound more archaic in academic circles today than the claim that God's existence can be demonstrated? Yet, this is precisely what Natural Theology is ultimately all about! Now on one front, I understand why many academics and intellectuals are uncomfortable with such a claim, and I must say, that given the state of some popular Natural Theology these days, I am a bit uncomfortable with it as well, though I do teach and stand behind St. Thomas' five classical proofs, and aspects of the Aristotelian Metaphysics upon which they are based. On another front, however, I am compelled to confront this academic resistance to Natural Theology, especially as I continue to better understand how advances in physics force us to take at least the classical Thomistic proofs, if not the field as a whole, ever more seriously. But taking it ever more seriously in the light of the advances in modern physics must never be equated with the mistaken claim that modern physics proves all or any form of Natural Theology to be valid and true. This is an important distinction, and one that must be borne in mind, as such a topic is addressed. So, the question before us is this: how precisely did Einstein's general theory of relativity give more credibility to Natural Theology? The answer goes something like this: Einstein's general theory of relativity forced us to part with a conception of the universe as infinite in the Euclidian sense, for part of what Einstein had provided in his theory of general relativity included a set of beautiful

[4] Ibid., 42
[5] Ibid., 42

equations that described how a universe could arise out of nothing. Now "arising out of nothing" might well presuppose that it had a beginning, unlike a universe infinite in the Euclidian sense, which we could call the "Newtonian" universe, wherein the universe was understood to be static, infinite in age, infinite in Euclidian space, and where matter was seen to be evenly or uniformly distributed throughout the whole universe.[6] For many intellectuals in the late nineteenth century, this infinite universe had provided an ideal substitute for God, since the traditional theistic conceptions of God had by this time been almost completely rejected by the scientific elite in the West. This infinite universe, then, had in a sense become a new God, the new ultimate and absolute entity. However, there were some serious scientific problems with this "Newtonian" universe. One problem had to do with gravity; another had to do with certain optical paradoxes. Einstein's suggestion that the universe is not infinite in Euclidian space, and that it may very well be finite, but unbounded, provided solutions to many problems relating to gravity and optical paradoxes.[7] In Einstein's own words, "The theory of gravitation derived. . .from the general postulate of relativity excels not only in its *beauty*; nor in removing the defect attaching to classical mechanics. . . nor in interpreting the empirical law of the equality of inertial and gravitational mass; but it has also already explained a result of observation in astronomy, against which classical mechanics is powerless."[8] In the light of Einstein's theories, then, the former conception of an infinite universe, as a substitute for an ultimate entity, which had been in vogue in the nineteenth century, lost much of its deifying appeal. The collapse of this concept of the universe, coupled with Einstein's beautiful equations describing how a universe could have a beginning, brought to the forefront in academia, if only for a short time, the question of a creator, and thus there emerged a new interest in Natural Theology. But it didn't last long. Why we may ask? Above I implied that many modern scientists simply did not and do not consider Natural Theology to be a serious field of enquiry, as they think it lacks sufficient scientific rigor and proceeds from *a-prior* convictions about the existence of a creator. So even though Einstein's theories gave it an opportunity to be taken seriously again, the new interest in questions about whether there could be proofs for God's existence, simply could not last. But the reason for this has more to do with many of the natural theologians themselves, than it does with certain skeptical scientists. That is to say that not a few natural theologians moved simply too fast with the theological implications they drew from the new physics, and either gave up, or were never really privy to, some of the more solid philosophical principles upon which traditional proofs for the existence of God, like the Thomistic proofs, were based. So perhaps the first thing that needs to be clarified here, in support of the answer given above to the question concerning how Einstein's general theory of relativity gave more credibility to Natural Theology, is that not all Natural

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[6] Although such a universe is often referred to today as "Newtonian," Newton's own view on the distribution of matter in the universe is considerably more nuanced than this. Einstein himself pointed this out. See Albert Einstein, *Relativity: The Special and General Theory*. Cosmological Difficulties of Newton's Theory" (Chapter 30) Available online at http://www.bartleby.com/173/30.html, accessed on March 10, 2005.

[7] Perhaps the most famous of these optical paradoxes is Olbers' paradox, proposed in the early 19th century by Heinrich Olbers.

[8] Albert Einstein, *Relativity: The Special and General Theory.* "The Solution of the Problem of Gravitation on the Basis of the General Principle of Relativity" (Chapter 29). Available online at http://www.bartleby.com/173/29.html, accessed on March 11, 2005. My emphasis on the word "beauty."

Theology is of equal value. There are, in fact, different schools of Natural Theology, which are well worth examining at this point.

First of all, the list of thinkers from the Western world who concerned themselves with what has come to be known as Natural Theology is impressive indeed: Plato, Aristotle, Cicero, Anselm, Aquinas, Descartes, Leibniz, Locke, Kant, William Paley, Samuel Clarke, Francis Bowen, and Luther Lee. There were others, naturally, but these are certainly among the most important. In contemporary natural theology, it is still too early of course to name those who will leave behind a lasting legacy, but I think people like William Lane Craig and Robert Koons stand out. Looking at this impressive list, one wonders how to divide it. It is customary in some circles to divide up the history of Natural Theology in the Western world into classical and contemporary, with everyone from Plato to Lee in the former category, and everyone else after them in the latter.[9] But I think such a division is rather misleading, for it obscures a fundamental point concerning why it is that so much of Natural Theology, beginning with Descartes, was destined to fail, not only from a modern scientific standpoint, but from a philosophical standpoint as well. What I mean here is that most attempts to prove the existence of God since Descartes, have been plagued by rationalism, beginning with Descartes' proof itself, and the rash attempts at the beginning of the century on the part of enthusiastic natural theologians to infer too much, too quickly, from Einstein's theories, generally follow the rationalistic roads first paved by Descartes. This particular kind of Cartesian rationalism has reduced most subsequent philosophy to an unhealthy obsession with epistemology.

Now it is certainly important to ask fundamental questions about how we gain knowledge, about the criteria of knowledge, and about the nature of knowledge and truth itself, and I do not want to claim that modern epistemological hairsplitting has been useless, but unless we acknowledge that there is an external and extra-mental world, not dependent for its existence upon "my own" mental perception of it, then such preoccupation with epistemology will only lead to more and more confusion and obscurity. I cannot help but quote here one of the greatest and bravest Russian thinkers of the twentieth century, Nicolas Berdyaev, who wrote the following opening lines in the first chapter of his immensely remarkable and soul stirring work, *The Destiny of Man*, in a subsection titled, "Philosophy, Science, and Religion": "I do not intend to begin, in accordance with the German tradition, with an epistemological justification. I want to begin with an epistemological accusation, or, rather, with an accusation against epistemology. Epistemology is an expression of doubt in the power and the validity of philosophical knowledge. Thinkers who devote themselves to epistemology seldom arrive at ontology. The path they follow is not one which leads to reality."[10] This is not to belittle the monumental undertaking of the great Immanuel Kant to finally solve the long epistemological dispute between the rationalists and the empiricists, but to point out that Kant, too, couldn't work his way out of the epistemological web spun by the fatal

[9] This is the division, for instance, that Michael Suddth provides in his very rich and useful website on Natural Theology. Available online at http://www.homestead.com/naturaltheology. Accessed on March 17 2005.

[10] Nicolas Berdyaev, *The Destiny of Man* (London: GF The Centenary Press, 1945) 1.

Cartesian error of claiming that when we know something, the *direct* object of our knowledge is the *idea* of the thing we know, and not the thing itself, whatever it my happen to be. But, again, this does not mean that Kant's distinction between *phenomenon* and *noumenon*, which, as the metaphysical foundation of his entire system of thought, was totally wrong. In fact, I think the distinction was brilliant and rich, and his way of trying to wiggle out of the Cartesian web. And it would help to remember here that this distinction had much in common with Aristotle's own brilliant distinction between act and potency. In this, at least, Kant could almost be considered an Aristotelian. I am convinced that had he went a bit further with all that this rich distinction implied, he may not have ended up in the very precarious position of having to claim that all we shall ever know is our own states of mind. How, we might ask, could he have gone further? What I suggest is that he could have gone further, had he first went back—back, that is, to a philosopher who was not almost an Aristotelian, but who was, perhaps, the greatest Aristotelian that ever lived, namely, St. Thomas Aquinas. For St. Thomas, too, says "[r]erum essentiae sunt nobis ignotae," (the essence of a thing remains unknown to us).[11] Had Kant really been privy to the profundity of this statement, or to the rich epistemological and metaphysical foundations from which it sprang, Kant's major work, *The Critique of Pure Reason*, would have had very different conclusions. It has often been said that after Kant's *Critique*, the Thomistic proofs should never be taken seriously again. But when we speak of Kant's attack on the proofs for the existence of God, what we are really talking about is an attack on the *rationalistic* proofs for God's existence. In Kant's day, all the proofs for the existence of God had begun to be mistakenly and confusedly classified together, without proper distinction, under the title of Natural Theology. But Aristotle had a different name for this science, he called it *first philosophy* or simply *wisdom*, and the principles which he sets forth in his *Metaphysics* to show that there is an Unmoved Mover are anything but rationalistic. And St. Thomas uses these principles, most notably, the epistemological/metaphysical *principle of analogy*, in his famous five proofs. Another epistemological/metaphysical principle, the *principle of limited regress*, along with the principle of analogy, plays a particularly key role in the first three proofs, and a close examination of these principles may show that, in spite of Kant's epic work, and given the changed climate in physics which Einstein had a major role in initiating, these proofs do demand to be taken seriously again. Thus, it is fitting now to briefly address these two principles.

First, the *principle of limited regress* states that an *endless series of essentially subordinate causes is impossible*. It is crucial to point out the distinction here between *accidentally subordinate causality* and *essentially subordinate causality*. The former refers to causes that precede their effects in time, the latter refers to causes that are always simultaneous with their effects. The key to understanding the force of this principle is to recall that for Aristotle, the world was eternal. The unmoved mover (self-thinking thought) eternally moved the world, while remaining unmoved. He wasn't claiming that there had to be a limit in this "eternal" series of *accidentally subordinate causality*, but that this eternal series had to be caused (or eternally kept in motion) by a cause that was uncaused. I do not intend to examine Aristotle's entire doctrine of causality here, I want only to suggest that Aristotle's doctrine of causality is decidedly

[11] Aquinas, *Quaestiones disputatae de veritate* 10, I.

richer and more complex than the modern, rationalistic doctrines which reduced all causality to one dimension of causality, namely, to causes that precede their effects in time. To appreciate Aquinas' first three proofs, we must first steep ourselves in this rich Aristotelian doctrine of causality. Incidentally, the rationalistic reduction of Aristotle's doctrine of causality is analogous to the way in which Aristotle's tremendously plentiful and nuanced account of matter as *potentiality* was reduced by Descartes and the rationalists to nothing but *extension*. Notably, contemporary physics, thanks in part to Einstein,[12] has opened up the possibility of more complex and richer accounts of both causality and matter, which, if not simply Aristotelian, are certainly more commensurate with the Aristotelian accounts than with the rationalistic, reductionist ones.

When we turn our attention to the other above-mentioned principle, the *principle of analogy*, we are likewise faced with an unfortunate historical development that has obscured many important epistemological and metaphysical insights. Originally, perhaps, related to the concept of proportion in mathematics, which attempted to determine qualitative correspondences established on the similarity of relations, the principle of analogy was put to philosophical use by both Plato and Aristotle. Aquinas' development of Aristotle's theory of analogy is presupposed in literally everything St. Thomas writes, but William of Ockham's nominalist interpretation of Aristotle confuses the issue so much so that, after him, logicians and philosophers slowly but surely came to discard the theory altogether.[13] Not a few neo-Thomists in the modern period attempted to revise the Aristotelian-Thomistic teaching on analogy, but it was often the case that in attacking nominalism in the modern climate of rationalism they ended up by succumbing to some of the rationalists errors they were attacking. Thus, their attempt to restore the Thomistic proofs fell short of the kind of fresh, genuine, and creative re-presentation of St. Thomas that was needed. If Kant could have appropriated this principle of analogy, as it is found in the work of St. Thomas, he would not have rejected the reason's power to prove the existence of God, for he would have seen that when St. Thomas says, at the end of each proof, "therefore, God exists," the term "exists," as it is predicated of God is an "analogy." If, as St. Thomas says, "the essence of a thing remains unknown to us," how much more is this true when the "thing" in question is God? Even our knowledge of God's "existence" is limited, not to mention our knowledge of his essence. To say that God "exists," for St. Thomas, is very close to saying that what the proofs tell us about God is that it is not the case that he does not exist. That is, we can prove that the assertion "God does not exist," is false. This is equal, for St. Thomas, to the assertion that the world did not cause itself, and he is careful not to even use the term "create,"(to bring *ex-nihilo* out of nothing) for this would mean something very different than

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[12]I have often wondered whether Einstein's disdain for quantum uncertainty was mostly a rejection of W. Heisenberg's 1927 claim that quantum mechanics invalidates the law of causality. I have also wondered what role this played in Heisenberg's decision to qualify his claim. At any rate, the later Heisenberg will not claim that quantum mechanics invalidates the law of causality, but that it forces us to enlarge our understanding of it. If enlarging our understanding of it means a new openness to the extremely rich Aristotelian account of causality on the part of both philosophers and physicists, then my hunch is that the classical Thomistic proofs will be celebrated anew in both science and philosophy.

[13] See Alberto Strumia's introductory piece on analogy in the *Interdisciplinary Encyclopedia of Religion and Science.* Available online at http://www.disf.org/en/Voci/29.asp Accessed on March 22 2005.

"cause,"—the term "create" for St. Thomas refers to something that the reason is too limited to prove, and something we only know through revelation. The point is that so much of what Kant was concerned about in the popular proofs for the existence of God in his day, namely, the unjustified glorification of reason in attributing powers to it that just couldn't be justified (i.e., rationalism), is nowhere to be found in the proofs of St. Thomas, once his doctrine of analogy is understood. To know the essence of anything, including, and especially, God, is simply beyond the power of reason.

In conclusion, it is worth noting that any kind of research according to the inductive method, so dear to modern science, could not have gotten very far without the procedure of the classification of objects according to their resemblance, which, of course, presupposes the *analogy* of objects to be classified. And not a few modern scientists have been led to something approaching the philosophical doctrine of analogy through their own work in the natural sciences. The famous French physicist and mathematician, Pierre Laplace, was able to extend and improve upon the work of his predecessors by showing how arguments from analogy can form the foundation of hypotheses. His well-known "nebular hypothesis," was arrived at largely on the basis of arguments from analogy.[14] If more scientists and philosophers, especially those philosophers who work in the area of Natural Theology, would take account of what some modern thinkers say about the philosophical importance of theories of analogy, they may begin to see the universal significance of this theory. I have in mind the great British economist, John Maynard Keynes, who said emphatically, and quite radically I would say, in his great book, *A Treatise on Probability*, that "[s]cientific method, indeed, is mainly devoted to discovering means of so heightening the known *analogy* that we may dispense as far as possible with the methods of pure induction."[15] Keynes was after something no less than a transformation of the scientific method itself, which would involve purifying this method from the hypothetical ingredients present in pure induction, so that the scientific method could be based instead on a form of *pure* experience that would transform it into *pure* analogy. In fact, he implies, that all the truly great and genuine scientific discoveries come about only when such a transformation has taken place. I suggest that Einstein's discoveries fall into this category, and I further suggest that the more we begin to appreciate this aspect of Einstein's genius, the more chance we have of rediscovering the power and beauty of Aquinas' doctrine of analogy. When such a rediscovery takes place, the traditional Thomistic proofs may just flourish again. If and when this takes place, scientists and theologians alike will be able to meet "again" on this newly found bridge for fruitful dialogue!

[14]Laplace observed an analogy in the direction of the circular movements involved in the planets themselves, in the planets around the sun, and in the satellites around planets. Based on this analogy, he suggested their *common* origin.

[15] John Maynard Keynes, *A Treatise on Probability* (London: Macmillan, 1920) 241.