

# What is the Relation between Science and Religion

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## SUMMARY

Examines several ways in which science and theology relate to each other.

### WHAT IS THE RELATION BETWEEN SCIENCE AND RELIGION

Back in 1896 the president of Cornell University Andrew Dickson White published a book entitled *A History of the Warfare of Science with Theology in Christendom*. Under White's influence, the metaphor of "warfare" to describe the relations between science and the Christian faith became very widespread during the first half of the 20th century. The culturally dominant view in the West—even among Christians—came to be that science and Christianity are not *allies* in the search for truth, but *adversaries*.

To illustrate, several years ago I had a debate with a philosopher of science at Simon Fraser University in Vancouver, Canada, on the question "Are Science and Religion Mutually Irrelevant?" When I walked onto the campus, I saw that the Christian students sponsoring the debate had advertised it with large banners and posters proclaiming "Science vs. Christianity." The students were perpetuating the same sort of warfare mentality that Andrew Dickson White proclaimed over a hundred years ago.

What has happened, however, in the second half of this century is that historians and philosophers of science have come to realize that this supposed history of warfare is a myth. As Thaxton and Pearcey point out in their recent book *The Soul of Science*, for over 300 years between the rise of modern science in the 1500's and the late 1800s the relationship between science and religion can best be described as an *alliance*. Up until the late 19th century, scientists were typically Christian believers who saw no conflict between their science and their faith—people like Kepler, Boyle, Maxwell, Faraday, Kelvin, and others. The idea of a warfare between science and religion is a relatively recent invention of the late 19th century, carefully nurtured by secular thinkers who had as their aim the undermining of the cultural dominance of Christianity in the West and its replacement by naturalism—the view that nothing outside nature is real and the only way to discover truth is through science. They were remarkably successful in pushing through their agenda. But philosophers of science during the second half of the 20th century have come to realize that the idea of a warfare between science and theology is a gross oversimplification. White's book is now regarded as something of a bad joke, a one-sided and distorted piece of

propaganda.

Now some people acknowledge that science and religion should not be regarded as foes, but nonetheless they do not think that they should be considered friends either. They say that science and religion are mutually irrelevant, that they represent two non-over-lapping domains. Sometimes you hear slogans like "Science deals with facts and religion deals with faith." But this is a gross caricature of both science and religion. As science probes the universe, she encounters problems and questions which are philosophical in character and therefore cannot be resolved scientifically, but which can be illuminated by a theological perspective. By the same token, it is simply false that religion makes no factual claims about the world. The world religions make various and conflicting claims about the origin and nature of the universe and humanity, and they cannot *all* be true. Science and religion are thus like two circles which intersect or partially overlap. It is in the area of intersection that the dialogue takes place.

And during the last quarter century, a flourishing dialogue between science and theology has been going on in North America and Europe. In an address before a conference on the history and philosophy of thermodynamics, the prominent British physicist P. T. Landsberg suddenly began to explore the *theological* implications of the scientific theory he was discussing. He observed, "To talk about the implications of science for theology at a scientific meeting seems to break a taboo. But those who think so are out of date. During the last 15 years, this taboo has been removed, and in talking about the interaction of science and theology, I am actually moving with a tide."

Numerous societies for promoting this dialogue, like the European Society for the Study of Science and Theology, the Science and Religion Forum, the Berkeley Center for Theology and Natural Science, and so forth have sprung up. Especially significant have been the on-going conferences sponsored by the Berkeley Center and the Vatican Observatory, in which prominent scientists like Stephen Hawking and Paul Davies have explored the implications of science for theology with prominent theologians like John Polkinghorne and Wolfhart Pannenberg. Not only are there professional journals devoted to the dialogue between science and religion, such as *Zygon* and *Perspectives on Science and Christian Faith*, but, more significantly, secular journals like *Nature* and the *British Journal for the Philosophy of Science*, also carry articles on the mutual implications of science and theology. The Templeton Foundation has awarded its million dollar Templeton Award in Science and Religion to outstanding integrative thinkers such as Paul Davies, John

Polkinghorne, and George Ellis for their work in science and religion. The dialogue between science and theology has become so significant in our day that both Cambridge University and Oxford University have established chairs in science and theology.

I share all this to illustrate a point. Folks who think that science and religion are mutually irrelevant need to realize that the cat is already out of the bag; and I daresay there's little prospect of stuffing it back in. Science and religion have discovered that they have important mutual interests and important contributions to make to each other, and those who don't like this can choose not to participate in the dialogue, but that's not going to shut down the dialogue or show it to be meaningless.

So let's explore together ways in which science and religion serve as allies in the quest for truth. Let me suggest six ways in which science and religion are relevant to each other, starting with the most general and then becoming more particular.

1. *Religion furnishes the conceptual framework in which science can flourish.* Science is not something that is natural to mankind. As science writer Loren Eiseley has emphasized, science is "an *invented* cultural institution" which requires a "unique soil" in order to flourish. [1] Although glimmerings of science appeared among the ancient Greeks and Chinese, modern science is the child of European civilization. Why is this so? It is due to the unique contribution of the Christian faith to Western culture. As Eiseley states, "it is the Christian world which finally gave birth in a clear, articulate fashion to the experimental method of science itself." [2] In contrast to pantheistic or animistic religions, Christianity does not view the world as divine or as indwelt by spirits, but rather as the natural product of a transcendent Creator who designed and brought it into being. Thus, the world is a rational place which is open to exploration and discovery.

Furthermore, the whole scientific enterprise is based on certain assumptions which cannot be proved scientifically, but which *are* guaranteed by the Christian world view; for example: the laws of logic, the orderly nature of the external world, the reliability of our cognitive faculties in knowing the world, and the objectivity of the moral values used in science. I want to emphasize that science could not even exist without these assumptions, and yet these assumptions cannot be proved scientifically. They are philosophical assumptions which, interestingly, are part and parcel of a Christian world view. Thus, religion is relevant to science in that it can furnish a conceptual framework in which science can exist. More than that, the Christian religion historically *did* furnish the conceptual framework in which modern science was born and nurtured.

2. *Science can both falsify and verify claims of religion.* When religions make claims about the natural world, they intersect the domain of science and are, in effect, making predictions which scientific investigation can either verify or falsify. Let me give some examples of each.

First, examples of falsification. Some examples are obvious. The views of ancient Greek and Indian religions that the sky rested on the shoulders of Atlas or the world on the back of a great turtle were easily falsified. But more subtle examples are available, too.

One of the most notorious examples was the medieval Church's condemnation of Galileo for his holding that the Earth moves around the sun rather than *vice versa*. On the basis of their misinterpretation of certain Bible passages like Ps. 93.1: "The Lord has established the world; it shall never be moved," medieval theologians denied that the Earth moved. Scientific evidence eventually falsified this hypothesis, and the Church belatedly finally came to admit its mistake.

Another interesting example of science's falsifying a religious view is the claim of several Eastern religions like Taoism and certain forms of Hinduism that the world is divine and therefore eternal. The discovery during this century of the expansion of the universe reveals that far from being eternal, all matter and energy, even physical space and time themselves, came into existence at a point in the finite past before which nothing existed. As Stephen Hawking says in his 1996 book *The Nature of Space and Time*, "almost everyone now believes that the universe, and time itself, had a beginning at the big bang." [3] But if the universe came into being at the Big Bang, then it is temporally finite and contingent in its existence and therefore neither eternal nor divine, as pantheistic religions had claimed.

On the other hand, science can also verify religious claims. For example, one of the principal doctrines of the Judaeo-Christian faith is that God created the universe out of nothing a finite time ago. The Bible begins with the words, "In the beginning God created the heavens and the Earth" (Gen. 1.1). The Bible thus teaches that the universe had a beginning. This teaching was repudiated by both ancient Greek philosophy and modern atheism, including dialectical materialism. Then in 1929 with the discovery of the expansion of the universe, this doctrine was dramatically verified. Physicists John Barrow and Frank Tipler, speaking of the beginning of the universe, explain, "At this singularity, space and time came into existence; literally nothing existed before the singularity, so, if the Universe originated at such a singularity, we would truly have a creation *ex nihilo* (out of nothing)." [4] Against all expectation, science thus verified this religious prediction. Robert Jastrow, head of NASA's Goddard Institute for Space Studies, envisions it this

way:

[The scientist] has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries. [5]

A second scientific verification of a religious belief is the claim of the great monotheistic faiths that the world is the product of intelligent design. Scientists originally thought that whatever the initial conditions of the universe were, eventually the universe would evolve the complex life forms we see today. But during the last forty years or so, scientists have been stunned by the discovery of how complex and sensitive a balance of initial conditions must be given in the Big Bang in order for the universe to permit the origin and evolution of intelligent life in the cosmos. In the various fields of physics and astrophysics, classical cosmology, quantum mechanics, and biochemistry, discoveries have repeatedly disclosed that the existence of intelligent life depends upon a delicate balance of physical constants and quantities. If any one of these were to be slightly altered, the balance would be destroyed and life would not exist. In fact, the universe appears to have been incomprehensibly fine-tuned from the moment of its inception for the production of intelligent life. We now know that *life-prohibiting* universes are vastly more probable than any *life-permitting* universe like ours. How much more probable?

The answer is that the chances that the universe should be life-permitting are so infinitesimal as to be incomprehensible and incalculable. For example, Stephen Hawking has estimated that if the rate of the universe's expansion one second after the Big Bang had been smaller by even one part in a hundred thousand million million, the universe would have re-collapsed into a hot fireball. [6] P. C. W. Davies has calculated that the odds against the initial conditions being suitable for later star formation (without which planets could not exist) is one followed by a thousand billion billion zeroes, at least. [7] He also estimates that a change in the strength of gravity or of the weak force by only one part in  $10^{100}$  would have prevented a life-permitting universe. [8] There are a number of such quantities and constants present in the big bang which must be fine-tuned in this way if the universe is to permit life. So improbability is multiplied by improbability until our minds are reeling in incomprehensible numbers.

There is no physical reason why these constants and quantities should possess the values they do. The former agnostic physicist Paul Davies comments, "Through my scientific work I have come to believe more and more strongly that the physical universe is put together with an ingenuity so

astonishing that I cannot accept it merely as a brute fact.” [9] Similarly, Fred Hoyle remarks, “A common sense interpretation of the facts suggests that a superintellect has monkeyed with physics.” [10]

Our discovery of the fine-tuning of the big bang for intelligent life is like someone’s trudging through the Gobi Desert and, rounding a sand dune, suddenly being confronted with a skyscraper the size of the Empire State Building. We would rightly dismiss as mad the suggestion that it just happened to come together there by chance. And we would find equally insane the idea that any arrangement of sand particles at that place is improbable and so there is nothing to be explained.

Why is this? Because the skyscraper exhibits a complexity which is absent from random arrangements of sand. But why should the complexity of the skyscraper strike us as special? John Leslie says it is because there is an apparent explanation of the complex skyscraper that is not suggested by just a random arrangement of sand grains, namely, intelligent design. [11] In the same way, Leslie concludes, the fine-tuning of the initial conditions of the universe for life points to the apparent explanation of intelligent design.

Thus, science can both falsify and verify the claims of religion.

*3. Science encounters metaphysical problems which religion can help to solve.* Science has an insatiable thirst for explanation. But eventually, science reaches the limits of its explanatory ability. For example, in explaining why various things in the universe exist, science ultimately confronts the question of why the universe itself exists. Notice that this need not be a question about the temporal origin of the universe. Even if spacetime is beginningless and endless, we may still ask why spacetime exists. Physicist David Park reflects, “As to why there is spacetime, that appears to be a perfectly good scientific question, but nobody knows how to answer it.” [12]

Here theology can help. Traditional theists conceive of God as a necessary being whose non-existence is impossible, who is the Creator of the contingent world of space and time. Thus, the person who believes in God has the resources to slake science’s thirst for ultimate explanation. We can present this reasoning in the form of a simple argument:

1. Everything that exists has an explanation of its existence (either in the necessity of its own nature or in an external cause).
2. If the universe has an explanation of its existence, that explanation is God.
3. The universe exists.

4. Therefore the explanation of the existence of the universe is God.

4. *Religion can help to adjudicate between scientific theories.* Lawrence Sklar, a prominent philosopher of science, has remarked, “The adoption of one scientific theory rather than another, sometimes in very crucial cases indeed, rests as much upon . . . philosophical presuppositions as it does upon the hard data . . .” [13] Particularly in cases in which two conflicting theories are empirically equivalent, so that one cannot decide between them on the basis of the evidence, metaphysical concerns, including religious concerns, come into play.

An excellent example is the Special Theory of Relativity. There are two ways to interpret the mathematical core of Special Relativity. On Einstein’s interpretation, there is no absolute “now” in the world; rather what is now is relative to different observers in motion. If you and I are moving with respect to each other, then what is now for me is not now for you. But on H. A. Lorentz’s interpretation, there *is* an absolute now in the world, but we just cannot be sure *which* events in the world are happening now because motion affects our measuring instruments. Moving clocks run slow and moving measuring rods contract. The Einsteinian and the Lorentzian interpretations are empirically equivalent; there is no experiment you could perform to decide between them.[14] But I want to argue that if God exists, then Lorentz was right. Here is my argument:

1. If God exists, then God is in time.

This is true because God is really related to the world as cause to effect. But a cause of a temporal effect must exist either before or at the same time as its effect. So God must be in time.

2. If God is in time, then a privileged observer exists.

Since God transcends the world and is the cause of the existence of everything in the world, His perspective on the world is the true perspective.

3. If a privileged observer exists, then an absolute now exists.

Since God is a privileged observer, His “now” is privileged. Thus, there is an absolute now, just as Lorentz claimed.

This is a very startling conclusion, indeed. But I am firmly convinced that if God exists, then a Lorentzian, rather than Einsteinian, theory of relativity is correct. It is hard to imagine how religion could have any greater relevance to science than this, to show that one theory is wrong and another is right.

5. *Religion can augment the explanatory power of science.* One of the pillars of the contemporary scientific view of the world is the evolution of biological complexity from more primitive life-forms. Unfortunately the current neo-Darwinian synthesis seems to be explanatorily deficient in its explanation of the gradual rise of biological complexity. In the first place, the neo-Darwinian mechanisms of random mutation and natural selection work far too slowly to produce, unaided, sentient life. In their *Anthropic Cosmological Principle*, Barrow and Tipler list ten steps in the evolution of *homo sapiens*, including such steps as the development of the DNA-based genetic code, the origin of mitochondria, the origin of photosynthesis, the development of aerobic respiration, and so forth, each of which is so improbable that before it would have occurred, the sun would have ceased to be a main sequence star and incinerated the earth. [15] They report that “there has developed a general consensus among evolutionists that the evolution of intelligent life, comparable in information processing ability to that of *homo sapiens* is so improbable that it is unlikely to have occurred on any other planet in the entire visible universe.” [16] But if this is the case, then one cannot help but wonder, why, apart from a commitment to naturalism, should we think that it evolved by unaided chance on this planet? Second, random mutation and natural selection have trouble accounting for the origin of irreducibly complex systems. In his recent book *Darwin’s Black Box*, microbiologist Michael Behe explains that certain cellular systems like the cilia or protein transport system are like incredibly complicated, microscopic machines which cannot function at all unless all the parts are present and functioning. [17] There is no understanding within the neo-Darwinian synthesis of how such irreducibly complex systems can evolve by random mutation and natural selection. With respect to them current evolutionary theory has zero explanatory power. According to Behe, however, there is one familiar explanation adequate to account for irreducible complexity, one which in other contexts we employ unhesitatingly: intelligent design . “Life on Earth at its most fundamental level, in its most fundamental components,” he concludes, “is the product of intelligent activity.” [18] The gradual evolution of biological complexity is better explained if there exists an intelligent cause behind the process rather than just the blind mechanisms alone. Thus, the theist has explanatory resources available which the naturalist lacks.

6. *Science can establish a premiss in an argument for a conclusion having religious significance.* The medieval theologian Thomas Aquinas always assumed the eternity of the universe in all his arguments for the existence of God, since to assume that the universe began to exist made things too easy for the theist. “If the world and motion have a first beginning,” he said, “some cause must clearly be posited for this origin of the world and of motion” (*Summa contra gentiles* 1. 13. 30).

Moreover, there was simply no empirical way to prove the past finitude of the universe during the Middle Ages. But the application of the General Theory of Relativity to cosmology and the discovery of the expansion of the universe during this century appears to have dropped into the lap of the philosophical theologian precisely that premiss which had been missing in a successful argument for God's existence. For now he may argue as follows:

1. Whatever begins to exist has a cause.
2. The universe began to exist.
3. Therefore, the universe has a cause.

Premiss (2) is a religiously neutral statement which can be found in almost any text on astronomy and astrophysics. Yet it puts the atheist in a very awkward situation. For as Anthony Kenny of Oxford University urges, "A proponent of the big bang theory, at least if he is an atheist, must believe that . . . the universe came from nothing and by nothing." [19]

But surely that is metaphysically impossible. Out of nothing, nothing comes. So why does the universe exist instead of just nothing? It is plausible that there must have been a cause which brought the universe into being. Now from the very nature of the case, as the cause of space and time, this cause must be an uncaused, changeless, timeless, and immaterial being of unimaginable power which created the universe. Moreover, I would argue, it must also be personal. For how else could a timeless cause give rise to a temporal effect like the universe? If the cause were an impersonal set of necessary and sufficient conditions, then the cause could never exist without the effect. If the cause were eternally present, then the effect would be eternally present as well. The only way for the cause to be timeless and the effect to begin in time is for the cause to be a personal agent who freely chooses to create an effect in time without any prior determining conditions. Thus, we are brought, not merely to a transcendent cause of the universe, but to its personal a creator.

All this is not to make some simplistic and naive judgement like "Science proves that God exists." But it is to say that science can establish the truth of a premiss in an argument for a conclusion having religious significance.

In summary, we've seen six different ways in which science and religion are relevant to each other:

1. Religion furnishes the conceptual framework in which science can flourish.
2. Science can both falsify and verify claims of religion.

3. Science encounters metaphysical problems which religion can help to solve.
4. Religion can help to adjudicate between scientific theories.
5. Religion can augment the explanatory power of science.
6. Science can establish a premiss in an argument for a conclusion having religious significance.

Thus, in conclusion, we have seen that science and religion should not be thought of as foes or as mutually irrelevant. Rather we have seen several ways in which they can fruitfully interact. And that is why, after all, there is such a flourishing dialogue between these two disciplines going on today.

Footnotes:

[1] Loren Eiseley, "Francis Bacon," in *The Horizon Book of Makers of Modern Thought* (New York: American Heritage Publishing, 1972), pp. 95-96.

[2] Loren Eiseley, *Darwin's Century* (Garden City, N. Y.: Doubleday, 1958), p. 62. I am indebted for the Eiseley references to Nancy Percy and Charles Thaxton, *The Soul of Science* (Wheaton, Ill.: Crossway Books, 1994).

[3] Stephen Hawking and Roger Penrose, *The Nature of Space and Time*, The Isaac Newton Institute Series of Lectures (Princeton, N. J.: Princeton University Press, 1996), p. 20.

[4] John Barrow and Frank Tipler, *The Anthropic Cosmological Principle* (Oxford: Clarendon Press, 1986), p. 442.

[5] Robert Jastrow, *God and the Astronomers* (New York: W. W. Norton, 1978), p. 116.

[6] Stephen W. Hawking, *A Brief History of Time* (New York: Bantam Books, 1988), p. 123.

[7] P. C. W. Davies, *Other Worlds* (London: Dent, 1980), pp. 160-61, 168-69.

[8] P. C. W. Davies, "The Anthropic Principle," in *Particle and Nuclear Physics* 10 (1983): 28.

[9] Paul Davies, *The Mind of God* (New York: Simon & Schuster: 1992), p. 16.

[10] Fred Hoyle, "The Universe: Past and Present Reflections," *Engineering and Science* (November, 1981), p.12.

[11] John Leslie, *Universes* (London: Routledge, 1989), pp. 10, 121.

[12] David Park, *The Image of Eternity* (Amherst: University of Massachusetts Press, 1980), p. 84.

[13] Lawrence Sklar, *Space, Time, and Spacetime* (Berkeley: University of California Press, 1976), p. 417.

[14] Actually, this statement bears qualification; for as a result of the Aspect experiments verifying the predictions of quantum mechanics with respect to Bell's Theorem, we now have substantial empirical grounds for affirming relations of absolute simultaneity between distant events, thus vindicating the Lorentzian interpretation.

[15] Barrow and Tipler, *Anthropic Cosmological Principle*, pp. 561-65.

[16] *Ibid.*, p. 133.

[17] Michael J. Behe, *Darwin's Black Box* (New York: Free Press, 1996).

[18] *Ibid.*, p. 193.

[19] Anthony Kenny, *The Five Ways: St. Thomas Aquinas Proofs of God's Existence* (New York: Schocken Books, 1969), p. 66.