

# Christianity Is a Science-Starter, Not a Science-Stopper

By Nancy Pearcey

To everyone's surprise, the 2004 presidential election became in part a referendum on science and religion. At the Democratic National Convention, Ron Reagan, son of the former president, labeled opposition to embryonic stem cell research an "article of faith" and stated that it did not belong in the realm of public policy, which is based on science. During the presidential debates, John Kerry told audiences that while he "respected" voters' moral concerns about abortion and embryonic stem cells, he could not impose that "article of faith" through political means.[1]

After the election, the dichotomy between religion and science was stressed even more heavily in the stunned reaction in Blue States. Liberal commentators like Maureen Dowd warned darkly that moral conservatives would replace "science with religion, facts with faith." A Kerry supporter complained that Bush voters "are faith-based, rather than reality-based." The cover of *Stanford Medicine* (Fall 2004) featured a man holding up a Bible on one side of a jagged crevice, facing off against a lab-coated scientist holding up a test tube.[2] An extensive analysis of this commonly held dichotomy is offered in my latest book *Total Truth: Liberating Christianity from Its Cultural Captivity* (Crossway).

The default position for many Americans in the Blue States seems to be that Christianity is a "science stopper"--that religion implies a world of perpetual miracle, closing off the search for natural causes.[3] This is often coupled with the familiar cliché that over the centuries the Christian church has intimidated, silenced, and persecuted scientists. A few months ago, a journalist repeated the shop-worn stereotype, writing that "proponents of Copernicus' theory were denounced as heretics and burned at the stake." [4] A columnist recently wrote that Copernicus "scandalized the world--and more important, the Catholic Church--with his theory of heliocentric cosmology." The same pattern continues today, the columnist goes on: "The conflict of religion and science sounds all too familiar. Darwin still has trouble getting past creationist gatekeepers in some school districts." [5]

The story of conflict does sound familiar, because it is the standard interpretation of history taught all through the public education system. In fact, it is so widely accepted that often it is treated not as an interpretation at all, but simply as a fact of history. Yet, surprising as it may sound, among historians of science, the standard view has been soundly debunked. Most historians today agree that the main impact Christianity had on the origin and development of modern science was positive. Far from being a science stopper, it is a science *starter*.

One reason this dramatic turn-around has not yet filtered down to the public is that the history of science is still quite a young field. Only fifty years ago, it was not even an independent discipline. Over the past few decades, however, it has blossomed dramatically, and in the process, many of the old myths and stereotypes that we grew up with have been toppled. Today the majority view is that Christianity provided many of the crucial motivations and philosophical assumptions necessary for the rise of modern science.[6]

In one sense, this should come as no surprise. After all, modern science arose in one place and one time only: It arose out of medieval Europe, during a period when its intellectual life was thoroughly permeated with a Christian worldview. Other great cultures, such as the Chinese and the Indian, often developed a higher level of technology and engineering. But their expertise tended to consist of practical know-how and rules of thumb. They did not develop what we know as experimental science--testable theories organized into coherent systems. Science in this sense has appeared only once in history. As historian

Edward Grant writes, "It is indisputable that modern science emerged in the seventeenth century in Western Europe and nowhere else."<sup>[7]</sup>

This fact is certainly suggestive, and it has prompted scholars to ask why it is that modern science emerged only out of medieval Europe. Sociologist of religion Rodney Stark identified the 52 figures who made the most significant contributions to the scientific revolution, then researched biographical sources to discover their religious views. He found that among the top contributors to science, surprisingly *only two* were skeptics (Paracelsus and Edmund Halley).

Stark then subdivided his subjects once again into those who were "conventional" in their religious views (that is, their writings exhibit the conventional religious views of the time), and those who were "devout" (their writings express a strong personal investment). The resulting numbers show that more than 60 percent of those who jumpstarted the scientific revolution were religiously "devout."<sup>[8]</sup> Clearly, holding a Christian worldview posed no barrier to doing excellent scientific work, and even seems to have provided a positive inspiration.

What were the key elements in that inspiration? Let's highlight several basic principles by drawing a series of contrasts to other religions and philosophies. If we make the claim that Christianity played a causative role in the rise of modern science, to be scientific about the matter, we must also rule out other possible causes. Since as a matter of historical fact, no other religion or philosophy did play the same causative role, the best way to phrase the question is, Why didn't they?

### **Polytheistic Religions**

Other religions typically differ from Christianity on one of two major points. The God of the Old and New Testaments is a *personal* being, on one hand, while also being *infinite* or transcendent. Many religions throughout history have centered on gods who are personal but *finite*--limited, local deities, such as the Greek or Norse gods. Why didn't polytheistic religions produce modern science?

The answer is that finite gods do not create the universe. Indeed, the universe creates *them*. They are generally said to arise out of some pre-existing, primordial "stuff." For example, in the genealogy of the gods of Greece, the fundamental forces such as Chaos gave rise to Gaia, the great mother, who created and then mated with the heavens (Ouranos) and the sea (Pontos) to give birth to the gods. Hence, in a polytheistic worldview, the universe itself is not the creation of a rational Mind, and is therefore not thought to have a rational order. The universe has *some* kind of order, of course, but one that is inscrutable to the human mind. And if you do not *expect* to find rational laws, you will not even look for them, and science will not get off the ground.

This insight into polytheism goes back to Isaac Newton, who once argued that the basis for believing there can be universal laws of nature is monotheism, since it implies that all of nature reflects the creative activity of a single Mind. Newton was arguing against the Greek notion, still prevalent in his day, that the earth was a place of change and corruption, whereas the heavenly bodies were perfect and incorruptible. Against that view, Newton believed that *both* were products of a single divine Mind and therefore *both* were subject to the same laws. This opened the way for his breakthrough concept of gravity--the then-revolutionary idea that the same force that explains why apples fall to the ground also explains the orbits of the planets.<sup>[9]</sup>

More recently a similar argument was made by the Nobel Prize-winning biochemist Melvin Calvin. Speaking about the conviction that the universe has a rational order, he says, "As I try to discern the origin of that conviction, I seem to find it in a basic notion . . . enunciated first in the Western world by the ancient Hebrews: namely, that the universe is governed *by a single God*, and is not the product of the whims of many gods, each governing his own province according to his own laws. This monotheistic view seems to be the historical foundation for modern science."<sup>[10]</sup>

## Eastern Pantheism

What about Eastern religions, which are in vogue even in Western cultures today? If polytheism involves personal but finite gods, then pantheism involves the opposite--a *nonpersonal* and *infinite* deity. Why didn't this kind of religion produce modern science? The answer is that the god of pantheism is not really a being so much as what we might call an essence, a spiritual substratum to all reality. And essences do not create worlds; in fact, because they are not personal agents, they do not actually *do* anything. As a result, once again, there is no confidence that the universe is the creation of a rational Mind. Moreover, rationality implies differentiation, and the god of pantheism is an all-encompassing unity, beyond all differentiation. This explains why Eastern religions typically led to meditation, which aims at *transcending* rational categories, but they do not typically foster rational investigation of nature.

When the Marxist historian Joseph Needham studied Chinese culture, he wanted to know why the Chinese did not develop modern science. Being a good Marxist, he first exhausted all materialist explanations, then finally concluded that the reason lay in the Chinese view of creation: "There was no confidence that the code of Nature's laws could be unveiled and read, because there was no assurance that a divine being, even more rational than ourselves, had ever formulated such a code capable of being read."<sup>[11]</sup>

What general principle emerges from these examples? It is that science depends on certain prior assumptions about the nature of the universe--specifically, that the universe has an intelligible structure that can be rationally known. Both logically and historically, that belief arises only from the conviction that the universe is the creation of an intelligent, rational Mind.

## Classical Greek Philosophy

What about non-religious philosophies? Many historians give the ancient Greeks credit as the forerunners of scientific thinking, on the grounds that they were the first to attempt to explain the world through rational principles. Certainly, it is undeniable that Greek philosophy had an immense formative impact on Western culture. Yet it was not enough to produce science--for several reasons.<sup>[12]</sup>

First, the classical philosophers defined science as logically necessary knowledge--knowledge of the eternal rational Forms embodied in Matter. The problem with this definition is that once you have grasped the essence of any object by rational insight, then you can spin out all the important information about it by sheer deduction. Take, for example, a saucepan: Once you know that the purpose of a saucepan is to boil liquids, then you can deduce that it must have a certain shape to hold the liquid, that it must be made of material that will not melt when heated, and so on. This deductive method was the model for classical Greek thinkers.

As a result, however, they had little use for detailed experiments and observations. Thus the experimental methodology of modern science did not come from the Greeks; rather it was derived from the biblical concept of a Creator. Medieval theologians reasoned that if God is omnipotent, as the Bible teaches, then He *could* have made the world in any number of different ways. The order in the universe is not logically necessary, contrary to what the Greeks thought, but is contingent, imposed externally by God acting according to His own free will. This was called voluntarism in theology, and Newton expressed the idea in these words: "The world might have been otherwise than it is . . . .Twas therefore no necessary *but a voluntary and free determination* it should be thus."<sup>[13]</sup>

What does the conviction of divine freedom imply for science? It means that we cannot gain knowledge of the world by logical deduction alone. That is, we cannot simply deduce what God *must* have done; instead we have to observe and experiment to discover what God *in fact* did. This was nicely stated by Newton's friend Roger Cotes, who wrote that Nature "could arise from nothing but the perfectly free will of God

directing and presiding over all." And because the universe is a free and contingent creation, Cotes goes on, "*Therefore* we must . . . learn them [the laws of nature] from observations and experiments."[14]

The debate over divine freedom took place first in theology, then later were translated into the language of the philosophy of science. In the seventeenth century, the French mathematician Marin Mersenne took issue with Aristotle's logical argument that the earth *must* be at the center of the cosmos. As historian John Hedley Brook explains, "For Mersenne there was no 'must' about it. It was wrong to say that the center was the earth's *natural* place. God had been free to put it where He liked. It was incumbent on us to find to where this was."[15] The biblical concept of God opened the door to a methodology of observation and experimentation.

### **Mind Your Math**

Many historians have offered Euclid and Pythagoras as important precursors to modern science, since they made possible the mathematical treatment of nature. That is true, of course--with one crucial qualification: For the Greeks, mathematical truths were not fully instantiated in the material world. This is expressed symbolically in Plato's creation myth, where the world is fashioned by a demiurge (a low-level deity) who does not actually create matter but works with pre-existing stuff. Because his starting materials exist independently, they have independent properties over which the demiurge has no control. He just has to do the best he can with it. As a result, the Greeks expected the world to be nothing more than an approximation of the ideal forms--an unpredictable realm of irrational anomalies. They did not expect to find mathematical precision in nature. As Dudley Shapere explains, in Greek thought the physical world "contains an essentially irrational element: Nothing in it can be described *exactly* by reason, and in particular by mathematical concepts and laws."[16]

In contrast, the biblical God is the Creator of matter itself. As a result, He is in complete control of His starting materials, and can create the world *exactly* as He wants to. This is the operative meaning of the doctrine of creation *ex nihilo*--that there was no pre-existing matter, with its own eternal, independent properties, limiting what God can do with it. Consequently, there is nothing merely arbitrary or irrational in nature. Its orderly structure can be described with mathematical precision. In the words of physicist Carl von Weizsacker, "Matter in the Platonic sense, which must be 'prevailed upon' by reason, will not obey mathematical laws exactly." On the other hand, "Matter which God has created from nothing may well strictly follow the rules which its Creator has laid down for it. In this sense I called modern science a legacy, I might even have said a child, of Christianity."[17]

A historical example can be found in the work of Johannes Kepler. Since the Greeks regarded the heavens as perfect, and the circle as the perfect shape, they concluded that the planets must move in circular orbits, and this remained the orthodox view for nearly two millennia. But Kepler had difficulty with the planet Mars. The most accurate circle he could construct still left a small error of eight arc minutes. Had he retained the Greek mentality, Kepler would have shrugged off such a minor difference, regarding nature as only an approximation to the ideal forms. (In this case, Greek thought was a science-stopper.) As a Lutheran, however, Kepler was convinced that if God wanted something to be a circle, it would be *exactly* a circle. And if it was not exactly a circle, it must be *exactly* something else, and not mere capricious variation. This conviction sustained Kepler through six years of intellectual struggle, and thousands of pages of calculations, until he finally came up with the idea of ellipses. Historian R. G. Collingwood goes so far as to say, "The very possibility of applied mathematics is an expression . . . of the Christian belief that nature is the creation of an omnipotent God."[18]

### **It Was Good**

A final problem with Greek thought was the low value it placed on the material world. Matter was seen as less real, the realm of mere appearance, sometimes even the source of evil. Many historians believe this is

one reason the Greeks did not develop an empirical science. The intellectual elites had no interest in dirtying their own hands with actual experiments, and they had contempt for the farmers and craftsmen who might have acquainted them with a hands-on knowledge of nature.

The early Christian church took strong exception to this attitude. The church fathers taught that the material world came from the hand of a good Creator, and was thus essentially good. The result is described by a British philosopher of science, Mary Hesse: "There has never been room in the Hebrew or Christian tradition for the idea that the material world is something to be escaped from, and that work in it is degrading." Instead, "Material things are to be *used* to the glory of God and for the good of man."<sup>[19]</sup>

Kepler is, once again, a good example. When he discovered the third law of planetary motion (the orbital period squared is proportional to semi-major axis cubed, or  $P^2 = a^3$ ), this was for him "an astounding confirmation of a geometer god worthy of worship. He confessed to being 'carried away by unutterable rapture at the divine spectacle of heavenly harmony'."<sup>[20]</sup>

In the biblical worldview, scientific investigation of nature became both a calling and an obligation. As historian John Hedley Brooke explains, the early scientists "would often argue that God had revealed himself in two books—the book of His words (the Bible) and the book of His works (nature). As one was under obligation to study the former, so too there was an obligation to study the latter."<sup>[21]</sup> The rise of modern science cannot be explained apart from the Christian view of nature as good and worthy of study, which led the early scientists to regard their work as obedience to the cultural mandate to "till the garden."

### **The War That Wasn't**

Today the majority of historians of science agree with this positive assessment of the impact the Christian worldview had on the rise of science. Yet even highly educated people remain ignorant of this fact. Why is that?

The answer is that history was founded as a modern discipline by Enlightenment figures such as Voltaire, Gibbon, and Hume who had a very specific agenda: They wanted to discredit Christianity while promoting rationalism. And they did it by painting the middle ages as the "Dark Ages," a time of ignorance and superstition. They crafted a heroic saga in which modern science had to battle fierce opposition and oppression from Church authorities. Among professional historians, these early accounts are no longer considered reliable sources. Yet they set the tone for the way history books have been written ever since. The history of science is often cast as a secular morality tale of enlightenment and progress against the dark forces of religion and superstition.

Stark puts it in particularly strong terms: "The 'Enlightenment' [was] conceived initially as a propaganda ploy by militant atheists and humanists who attempted to claim credit for the rise of science."<sup>[22]</sup> Stark's comments express a tone of moral outrage that such bad history continues to be perpetuated, even in academic circles. He himself published an early paper quoting the standards texts, depicting the relationship between Christianity and science as one of constant "warfare." He now seems chagrined to learn that, even back then, those stereotypes had already been discarded by professional historians.<sup>[23]</sup>

Today the warfare image has become a useful tool for politicians and media elites eager to press forward with a secularist agenda on abortion, embryonic stem cell research, various forms of genetic engineering, and so on. When Christians raise moral objections, they are quickly discredited as reactionary, and the old "religion-versus-science" stereotype is trotted out. It has become more important than ever for thoughtful people to educate themselves on the latest findings in the history of science. Between now and the next election, a formative truth needs to become embedded in the cultural matrix: That Christianity is not a science stopper, it is a science starter.

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*Schaeffer Scholar at World Journalism Institute. This article appears, with minor changes, in Areopagus Journal 5:1 (January-February 2005): pp. 4-9 (www.apologeticsresctr.org). Copyright © Nancy Pearcey.*

[1] Earlier versions of this paper were delivered at the Megaviews Forum, Los Alamos National Laboratory, September 24, 2003, and at the Veritas Forum at USC, February 18, 2004. See also Nancy Pearcey, "How Science Became a Christian Vocation," in *Reading God's World: The Scientific Vocation*, ed. Angus Menuge (St. Louis, MO: Concordia, 2004).

[2] For more information, see [www.totaltruthbook.com](http://www.totaltruthbook.com).

[3] Eugenie Scott of the National Center for Science Education has frequently made the assertion that Christianity is a "science stopper." See, for example, "Evolution and Intelligent Design," September 28, 2001, *Religion and Ethics Newsweekly*, Episode no. 504, at <http://www.pbs.org/wnet/religionandethics/week504/feature.html>

[4] Brendan O'Neill, "They have vilified the sun--and me," Spiked, July 23, 2004, at <http://www.spiked-online.com/Articles/0000000CA616.htm>.

[5] Kathleen Parker, Townhall, December 4, 2004, at <http://www.townhall.com/columnists/kathleenparker/kp20041204.shtml>. For an accessible introduction to the controversy over Darwinism, see my chapters on the topic (chapters 6, 7, 8, 9, 10) in *How Now Shall We Live?*, co-authored with novelist Harold Fickett and former Nixon aide Charles Colson (Tyndale, 1999). An updated discussion can be found in *Total Truth* (chapters 5, 6, 7, 8). For a discussion of the cultural and philosophical implications of Darwinism, explaining why it continues to be controversial among the American public, see my essay "Darwin Meets the Berenstain Bears: Evolution as a Total Worldview," in *Uncommon Dissent: Intellectuals Who Find Darwinism Unconvincing*, ed. William Dembski (Wilmington, Delaware: ISI Books, 2004), pp. 53-73.

[6] I have developed this argument in greater detail in *The Soul of Science: Christian Faith and Natural Philosophy* (Crossway 1994), which is a major source for this paper. For a shorter and more accessible treatment, see my chapter "The Basis for True Science," chapter 40 in *How Now Shall We Live?*

[7] Edward Grant, *The Foundations of Modern Science in the Middle Ages* (New York: Cambridge University Press, 1998 [1996]), p.168.

[8] Rodney Stark, *For the Glory of God: How Monotheism Led to Reformations, Science, Witch-Hunts, and the End of Slavery* (Princeton, NJ: Princeton University Press, 2003), pp. 160-163, 198-199.

[9] Morris Kline, *Mathematics: The Loss of Certainty* (New York: Oxford University Press, 1980), p. 52. It may be important to point out that many of the historians cited in this article are not themselves professing Christians, so that their views cannot be dismissed as driven by a religious agenda. They are simply seeking to be historically accurate and to do good scholarship.

[10] Melvin Calvin, *Chemical Evolution* (Oxford: Clarendon Press, 1969), p. 258, emphasis added. See my discussion in *Soul of Science*, p. 25.

[11] Joseph Needham, *The Grand Titration: Science and Society in East and West* (Toronto: University of Toronto Press, 1969), p. 327. See Stark, pp. 148, 150, as well as my discussion in *Soul of Science*, pp. 29, 22.

[12] The following discussion gives us the clue to why Islamic cultures did not produce modern science, either. One reason is that their intellectual life was dominated by Greek philosophy. In the Golden Age of Islam in the seventh and eighth centuries, Muhammad's armies annexed territory from Persia to Spain--and in the process, they also absorbed the philosophies of those places. Thus the Arab world had a rich tradition of commentary on the work of thinkers like Plato, Aristotle, and Pythagoras long before Europe did. Indeed, two of the most prominent Aristotelian philosophers of the middle ages were Avicenna and Averroes--known in their native lands, respectively, as Abu Ali al-Hussein Ibn Sina and Abdul Waleed Muhammad Ibn Rushd. What this means is that in terms of science, Arabic philosophy tended to have the positives but also the negatives of Greek philosophy. See a lecture I delivered based on *Total Truth* at the Heritage Foundation in Washington, DC, Oct. 19, 2004, transcript:

[www.heritage.org/Press/Events/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=71383](http://www.heritage.org/Press/Events/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=71383).

[13] Cited in Edward B. Davis, "Newton's Rejection of the 'Newtonian World View': The Role of Divine Will in Newton's Natural Philosophy," in *Science and Christian Belief*, 3, no. 1, p. 117, emphasis added.

[14] Roger Cotes, preface to the second edition of Newton's *Principia*, in *Newton's Philosophy of Nature: Selections from His Writings*, ed. H.S. Thayer (New York: Hafner, 1953), emphasis added.

[15] John Brooke and Geoffrey Cantor, *Reconstructing Nature: The Engagement of Science and Religion* (NY: Oxford University Press, 1998), p. 20. For more on this subject, see my discussion of how voluntarist theology led to a contingent view of nature in *Soul of Science*, pp. 30-33, 81ff. See also Nancy Pearcey, "Recent Developments in the History of Science and Christianity," and "Reply," *Pro Rege* 30, no. 4 (June 2002): 1-11, 20-22.

[16] Dudley Shapere, *Galileo: A Philosophical Study* (Chicago: University of Chicago Press, 1974), pp. 134-36, emphasis in original.

[17] C.F. von Weizsacher, *The Relevance of Science* (New York: Harper and Row, 1964), p. 163.

[18] R.G. Collingwood, *An Essay on Metaphysics* (Chicago: Henry Regnery, Gateway Editions, 1972; originally published by London: Oxford University Press, 1940), pp. 253-257. See *Soul of Science*, pp. 27-29.

[19] Mary Hesse, *Science and the Human Imagination: Aspects of the History and Logic of Physical Science* (New York: Philosophical Library, 1955), pp. 42-43, emphasis in original.

[20] John Hedley Brooke, "Scientists and their Gods," *Science and Theology News*, Volume 11/12 July/August 2001, at [http://www.stnews.org/archives/2001/Jul\\_feat2.html](http://www.stnews.org/archives/2001/Jul_feat2.html). See also John Hedley Brooke, "Can Scientific Discovery be a Religious Experience?," the Alister Hardy Memorial Lecture delivered at Harris Manchester College, Oxford on 4 Nov. 2000, at <http://users.ox.ac.uk/~theo0038/brookealisterhardy.html>; and John Hedley Brooke, "Science and Religion: Lessons from History?," *Science*, Volume 282, Number 5396 (11 Dec. 1998) pp. 1985 - 1986.

[21] John Hedley Brooke, *Science and Religion: Some Historical Perspectives*, Cambridge University Press, 1995), p. 22. See also *Soul of Science*, pp. 34-36.

[22] Stark, p.123.

[23] The background for this change was a shift in historiography from a progressive and even triumphalistic approach, rooted in philosophical positivism, that portrayed science as the gradual accumulation of empirical facts, to a more contextualized approach, rooted in philosophical idealism, that treats scientific change as a result of changes in worldview and culture. I devote an entire chapter to explaining this historiographical shift in *Soul of Science* (chapter two).