Science and Theology: The Conflict between Dialogue and Argumentation

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"The difference between science and theology, as I understand

is one over whether you see the world as a gift or not"

Terry Eagleton

Reason, Faith, and Revolution (2009)

Dialogue or Argumentation?

The 21st century has begun and the dialogue, or perhaps the argument, between the scientific community and the theological community appears to be as relevant as ever. Of course, it is the perspective of the individual that determines whether the relationship between science and theology is one of dialogue or of argument. I intend to use the two terms "dialogue" and "argument" to highlight the differences between two contradictory perspectives. The term "dialogue" is used to represent mutual respect, open-mindedness, and the desire for understanding; while the term "argument" is used to represent hostility, closed-mindedness, and the desire to "win" out of resentment. I am not interested in taking sides with "science" or "theology" and I do not designate the opposing terms of "dialogue" and "argument" solely with one group. Both scientists and theologians are capable of approaching the relationship between science and theology as a dialogue or as an argument. However, I do intend to take sides with the idea that dialogue is both preferable to and more constructive than argumentation. Setting up the comparison in this manner rejects the established frameworks and dualities that begin with the assumption that science and theology are at odds, thereby building into the issue the idea of conflict.

The "tension" between Science and Theology

I intend to discuss science and theology not as opposing camps, but as two distinct camps that have at times complemented each other and at other times been in conflict. It is significant to view the relationship between science and theology as one of constant change, rather than a fixed battle because this allows for the recognition that whether the two are complementary or in conflict is determined by those engaged in either pursuit, rather than by some inherent tension that is beyond our control. The manner in which the comparison between science and theology is constructed determines what is possible for the relationship between the two. This paper will examine the historical development of modern science and that development's effect on theology, provide an understanding of the evolution of the "conflict" between science and theology that will cultivate a deeper understanding of how each side contributes to the supposed tension, and explore recent attempts from both the scientific and theological communities to engage in a healthy dialogue, rather than an unhealthy argument.

The work of Dinesh D'Souza, Francis Collins, and Michael Dowd will be explored as contemporary representatives seeking to cultivate a dialogue between science and theology. D'Souza is a Roman Catholic, conservative political commentator, and author of *What's So Great About Christianity (2007)*. Collins is a physician-geneticist, evangelical Christian, former leader of the Human Genome Project, current Director of the National

Institutes of Health, current member of the Pontifical Academy of Sciences, and author of *The Language of God (2006)*. He has coined the terms "theistic evolution" and "BioLogos" to describe his religious and scientific views and is the founder of the BioLogos Foundation. Dowd is a Pentecostal Evangelical, evolutionary theologian, and author of *Thank God for Evolution (2008)*. He has coined the term "creatheism" to describe what he considers a combination of theism and pantheism. While these authors are all characterized by different professions, denominations, and politics they all agree that evolution is something that all Christians must accept as the most compelling explanation currently available for the diversity and complexity of life. Furthermore, they all agree that the supposed "tension" between science and theology over the issue of evolution is something that should be overcome and that science and theology can be complementary and mutually enriching pursuits.

The Science of Christendom

I will begin the discussion of the relationship between science and theology in medieval Europe; however, references to ancient Greece will be necessary, as well. The destruction of the Roman Empire in the fifth century created a power vacuum in Western Europe that was filled largely by the Catholic Church and for many centuries the monasteries were the only institutions of intellectual and educational pursuit. Eventually, the development of the university occurred in the 11th and 12th centuries and this contributed to the rise of modern science later in the 16th century. Dinesh D'Souza argues in his apologetic *What's So Great About Christianity (2007)* that the rise of modern science in Western Europe was due in part to the influence of Christianity. He points to medieval theologians and philosophers such as St. Augustine (354-430), Anselm of Canterbury (1033-1109), and St. Thomas Aquinas (1225-1274) to demonstrate that Reason was being employed within the medieval monasteries and universities to prove the existence of God and that this early use of Reason contributed to the later development of modern science in Western Europe. Augustine developed the concepts of "original sin" and "just war," Anselm is considered the founder of Scholasticism and originator of the "ontological argument," and Aquinas was a proponent of natural theology who synthesized Aristotle's philosophy with Christianity. In fact, D'Souza argues that it is Christianity's emphasis on Reason that allowed modern science to develop when and where it did. He explains that Judaism and Islam are religions of law, but that "Christianity, by contrast, is not a religion of law but a religion of creed. Christianity has always been obsessed with doctrine" and the "Christian theologian is charged with employing reason to understand the ways of God."[1] However, it should be stressed that Augustine was influenced by Plato

[1] D'Souza, Dinesh. *What's So Great About Christianity*. Tyndale House Publishers, 2008. 87.

(428-348 BCE) and that Aquinas was influenced by Aristotle (384-322 BCE). Thus, the actual source of the Reason being used by theologians during the medieval period resides in ancient Greece. The idea that the universe is rational stems from the pre-Socratics, specifically Thales (624-546 BCE), and D'Souza merely insists that "Christianity reinvigorated the idea of an ordered cosmos by envisioning the universe as following laws that embody the rationality of God."[2] In other words, aspects of Christianity reinforced and enhanced existing intellectual tendencies. Islamic societies were also influenced by the science and philosophy of ancient Greece, but science remained subordinate to theology in a manner that prevented the rise of modern science as it occurred in Western Europe. Ultimately, Christianity allowed for the "idea of science as a means to gain insight into the Creation and thereby glorify God."[3] The development of science in Western Europe constitutes the beginning of the relationship between science and theology. Whether this new relationship was complementary or characterized by the subordination of science to theology is debatable. It is certainly true that theology was "queen" of the medieval period, but the fact that scientific pursuits began at all is a positive development. In my opinion, if Christianity is given credit for contributing to the rise of science then the subordinate position of science to theology during the medieval period should not be criticized or used as evidence that the two were in conflict.

Medieval and Modern

The term "modern science" is used to designate the work of Johannes Kepler (1571-1630) and Galileo Galilei (1564-1642), which influenced the 17th century prior to the Enlightenment, but "science" was developing within Western Europe much earlier than these two figures. In fact, the scientific views of the medieval period were largely influenced by Aristotle and it was the work of Nicolaus Copernicus (1473-1543) in the mid-16th century that began to challenge Aristotelianism and pave the way for "modern science." The work of Copernicus, specifically the publication of *On the Revolutions of the Heavenly Sphere (1543)*, which outlined his heliocentric theory, represents the beginning of the Scientific Revolution. D'Souza argues that "modern science" has its roots in the "science" being developed earlier in the 13th and 14th centuries. He points to a debate taking place within theology between two competing approaches, "the first kind held that scholastic debate, operating according to the strict principles of deductive reason, was the best way to discover God's hand in the universe. The other held that inductive experience, including the use of experiments to interrogate nature, was the preferred approach."[4] The debate between deduction

[2] D'Souza. 96.
[3] Barret, Peter. *Science and Theology Since Copernicus*. University of South Africa, 2004. 19.
[4] D'Souza. 98.

and induction was not solved in the monasteries or early universities and both continued to influence theology, science and philosophy throughout the Renaissance and the Enlightenment. An understanding of two philosophers, Rene Descartes (1596-1650) and Francis Bacon (1561-1626), will highlight the uses of both deduction and induction within "modern science" and the Enlightenment; however, in order to grasp what constituted the Scientific Revolution leading to the Enlightenment we must return back to an earlier philosopher, Aristotle.

In the 13th century, Thomas Aquinas synthesized Aristotle's metaphysics and Christianity; as a result, Aristotelianism informed much of the medieval period's scientific knowledge. Aquinas emphasized the aspects of "design" in the world and "the universe was seen to be essentially organismic, with all processes goal-oriented, arranged to achieve their particular purpose."[5] Aristotle's notion of *teleology*, goal-oriented change internal to a thing, was used to reinforce the idea of a Creator and science was considered the means to understand Creation. According to Aristotle, nothing moved unless it was caused to move and his notion of "God" was the Unmoved Mover. The fact that every movement necessitates a "mover" is central to the Aristotelian world-view and it is the idea of a "mechanical" universe introduced by Copernicus in the mid-16th century that constitutes the shift in thinking that began to take place. This shift in thinking is called the Scientific Revolution and represents a departure from the Aristotelian and medieval world-view in favor of a "mechanical" world-view which does not seek explanations of first causes or ultimate purpose.

The hypothesis of Copernicus that the Earth was not the center of the universe, but rather one planet orbiting the sun was very controversial. The ideas of Copernicus were perceived to be an objection to the Christian notion that man was the center of God's creation; however, Copernicus was a loyal Catholic. His work paved the way for later observations by Kepler and Galileo in the late 16th century and early 17th centuries, which confirmed his ideas. Kepler is regarded as the first influential Protestant scientist and he brought to astronomy "the Platonist assumption that the world is patterned on perfect Forms."[6] Copernicus had attempted to convince the Catholic Church that his heliocentric view was not inconsistent with Scripture and Kepler was also concerned that "no conflict should appear between the 'book of Scripture' and the 'book of Nature.'"[7] Galileo too engaged in an effort to convince the Catholic Church that Copernicus' ideas were compatible with the Bible, but the theology of the Catholic Church remained tied to the Aristotelian philosophy that "modern science" was gradually leaving behind.

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[5] Barret. 13.
[6] ibid. 29.
[7] ibid. 30.

Collins, speaking about contemporary Christianity, points out that the Church is constantly reacting to scientific discoveries and seeking to maintain a synthesis between science and Scripture, but when the Church becomes too attached to a specific idea about the natural world and has "incorporated that into its core belief system"[8] the reaction to new scientific discoveries is usually tentative.

The Aristotelian view would not be abandoned completely in favor of a "mechanical" view until the work of Isaac Newton (1642-1727), but Copernicus, Kepler, and Galileo laid the groundwork for what would become the central tenet of the Enlightenment and ultimately the idea which would seemingly represent a direct challenge to the claims of Christianity. It is the work of Kepler and Galileo that signifies the beginning of "modern science" and it is they who began to describe the natural world with mathematical formulations. While these scientists all considered themselves Christians and their work was considered to be towards the glorification of God, the proposal of the heliocentric theory and the rise of "modern science" contributed to the first division between science and theology. The life of Galileo represents this initial division and both scientists and theologians spend a great deal of time arguing about the controversial events surrounding Galileo's "persecution" by the Catholic Church.

Science vs. Theology "myth"

The Catholic Church did force Galileo to reject the Copernican heliocentric theory, but his confrontation with the religious authorities is hardly the epic battle between science and theology that many today describe it as. D'Souza, in responding to what he considers an atheist assault on religion in the 21st century, argues that the portrayal of the relationship between science and theology as a battle between opposing forces is perpetuated by references to the Galileo case. D'Souza admits that the Catholic Church was wrong, but insists that Galileo was not targeted by the church for his support of heliocentrism, but rather because he "argued that the Bible was largely allegorical and required constant reinterpretation to excavate its true meaning."[9] Interestingly, Galileo's assertion that Scripture should be reinterpreted due to new scientific discoveries was a sentiment also expressed by Augustine and Aquinas. In effect, what is considered to be the initial conflict between science and theology is more accurately an example of the later debates that would take place between textual/historical studies and the Church. An important consequence of the Galileo case was the shift of scientific pursuits from Catholic Italy to the Protestant countries in Northern Europe. Thus, the Scientific Revolution would follow the movement of the Renaissance northward. This geographical shift was significant because the Protestant Reformation in Northern Europe, having

[8] Collins, Francis. *The Language of God*. Simon and Schuster, 2006. 59.
[9] D'Souza. 111.

been a challenge to the Catholic Church, ultimately paved the way for a broader challenge to religion. The rise of "modern science" and the emerging "mechanical" view of the universe would reinforce the initial concerns of the Reformation and lead to the growth of Deism during the Enlightenment.

Athens to Agnosticism

Sir Isaac Newton, an Englishman, represents the climax of the Scientific Revolution. The publication of *Principia Mathematica (1687)* essentially synthesized two currents of thought:

> "the Platonic-Pythagorean tradition which described nature in geometric terms, believing the cosmos to be constructed according to principles of mathematical order; and the Democritean tradition or "mechanical philosophy" in which nature is perceived as a vast machine and which sought, by empirical investigation, to explain the causal mechanisms of the phenomena of nature."[10]

Newton gave full expression to the "mechanical" view of the universe in his formulation of the three laws of motion and universal gravitation. The result of his work was the complete abandonment of Aristotle's metaphysics and a view of the universe that allowed the question to be asked: what is the role of God now? Newton's work constituted the most comprehensive "mechanical" view of the universe produced and science was increasingly viewed as the discipline which posed the most serious threat to theology. Despite historical and Biblical criticism, as well as philosophical skepticism and rationalism, it was the work of scientists beginning with Copernicus and ending with Newton that came to be viewed as the catalyst of the collective assault on Christianity that characterized the Enlightenment. What were the methods of scientists like Newton and why was science posing such a threat to theology? To understand the intellectual shift that took place during the 18th century it is necessary to understand the philosophy that underpinned the development of "modern science" and the "mechanical" view of the universe produced by the Scientific Revolution. Francis Bacon and Rene Descartes, two philosophers who contrast markedly in their methodologies, influenced the development of "modern science" and fueled the skepticism and empiricism which would further challenge the dominance of theology.

Philosophy and Science

Bacon argued that organized experiments could be used to examine the natural world and that generalizations could be drawn from the results. This methodology is called "induction" and it became the preferred

[10] Barret. 50.

method for scientists such as Newton during the 17th century. However, Bacon's influence extended beyond Newton and "induction" became the foundation of all the empirical sciences that would follow the Scientific Revolution. Newton "began with observation and analysis of the phenomena and proceeded to describe them mathematically"[11] and this is called "empirical induction: moving from particular facts towards the possibility of general laws."[12] Newton shared the assumption of many other scientists and theologians that the universe was ordered rationally and was capable of being understood through empirical induction.

Descartes, in contrast to Bacon, argued that firm foundations for knowledge needed to be established *prior* to any investigation. This methodology is called "deduction" and Descartes' aim was to establish certain truths from which to proceed in order to combat skepticism. However, Descartes' search for a firm foundation and aim of preventing skepticism had unintended consequences. Cartesian "rational deduction" involves coming to a conclusion based on established principles and Descartes insisted that he could only trust his senses, or empirical observations, if he established that God existed and could also be trusted. In relying on established principles, or truths, Descartes represents a bridge between the philosophy and theology of the medieval period and the critical doubt central to the Enlightenment. The attempt by Descartes to establish a firm foundation of knowledge from which to proceed is the initial break from a reliance on tradition that represents the main difference between the Enlightenment and the Renaissance. Descartes' attempt to prove the existence of God ultimately led to a further separation between science and theology. Furthermore, the dualism of Cartesian metaphysics developed into the philosophical debate between rationalism and empiricism that fueled a departure from the authority of Scripture that characterized medieval philosophy. Descartes' rationalism was challenged by the empiricism of John Locke (1632-1704), but it was the earlier contributions of Bacon which "laid the basis for the independence of science from pre-determined philosophical or religious interpretations of nature."[13]

The Enlightenment

Rene Descartes (1596-1650) and Immanuel Kant (1724-1804) represent parameters for the Enlightenment and it is during this period that separate institutions representing theology and science begin to study in isolation from each other. While the Enlightenment constituted a threat to religion from multiple disciplines, science is generally viewed as the catalyst, "as knowledge of the natural world grew it became ever more difficult for the

[11] Byrne, James. *Glory, Jest, and Riddle: Religious Thought in the Enlightenment*. SCM Press, 1996. 151.
[12] ibid. 151.
[13] ibid. 10.

religious authorities to hold together the particular synthesis of science and religion which had been so characteristic of medieval thought."[14] The rise of institutions devoted solely to scientific research resulted in a situation where education was no longer controlled by the Church and believers and non-believers were not forced to reconcile their findings or opinions. Thus, the Enlightenment marks the beginning of opposing groups in the intellectual culture. The Protestant Reformation represented an initial criticism of Christianity that spread into the domains of science where a common attitude "was to downgrade the authority of the past, including that of the biblical writers."[15] D'Souza remarks that the Protestant Reformation "was a charter of independent thought, carried out not by institutions but by individuals. The early Protestants didn't know it, but they were introducing new theological concepts that would give new vitality to the emerging scientific culture of Europe."[16] Also, the increase in literacy and publications aided the development of ideas and opinions outside the realm of the Church. As a separate body of knowledge began to develop that was not subordinate to the authority of Scripture, "the Church was somewhat torn between its commitment to preserve the faith and the need to adapt its apologetics to the new age of science."[17] In effect, with scientists no longer asking the Church for its opinion, the Church for the first time had to ask whether or not it was going to respond to the new findings of science. The Church appeared to be at a crossroads; however, the overall mood of the Enlightenment was such that the Church did not feel compelled to join science on its journey. The Enlightenment ultimately replaced God with Reason and "was not afraid to ask whether the past had anything more to offer than the present."[18]

Philosophy vs. Theology

The philosophy underpinning the Enlightenment and "modern science" was empiricism. In effect, the 18th century conception of Reason shifted from that of the 17th century in that, "reason came to be seen not so much as a way of penetrating to the eternal truths of the divine mind, but rather as a way of investigating the here and now of the empirical world."[19] In other words, as the Enlightenment progressed, "reason is no longer equated with established *a priori* certainties but rather with an activity of investigation."[20] The scientists of the Enlightenment were committed to discovering truth empirically, rather than rationally or from religious authorities. D'Souza

[14] ibid. 12.
[15] Barret. 58.
[16] D'Souza. 99.
[17] Barret. 58.
[18] Byrne. 7.
[19] Byrne. 99.
[20] ibid. 100.

remarks that, "the Enlightenment fallacy holds that human reason and science can, in principle, gain access to and eventually comprehend the whole of reality."[21] Obviously, such a mindset has no need for theology and it is easy to see how the Church may have viewed the rise of science as an emerging hostility towards religion, in general. Yet, it is also understandable why science felt the need to establish a space of inquiry that was not subject to the opinions of the Church. Could a more complementary relationship have existed between science and theology during the Enlightenment? Of course, but I do not think that science should be blamed as an aggressor and the Church perceived as a victim. The methodology of "modern science" being empiricism inevitably led to questions about the truth of specific Biblical accounts and this led to a rejection of the miraculous aspects of Scripture, which resulted in the rise of Deism. The emergence of Deism, however, does not represent the main battle between science and theology. Many writers of the Enlightenment were anti-Christian not because of the questions arising from the empiricism of science, but due to moral, social, political, and economic objections. These writers, known as the *philosophes*, were often not scientists. Thus, the Enlightenment was characterized by a multifaceted attack on religion, but it is unfair to blame science as the main aggressor. In other words, science was not anti-religious, but it offered "an alternative rationale which helped form an atmosphere in which the rejection of religion was possible."[22]

Deism as "dialogue" and Atheism as "argumentation"

Many theologians today are critical of both the Deism and Atheism that came out of the Enlightenment. D'Souza accurately summarizes the general orientation of modern Christians towards these two developments in saying that thinkers of the Enlightenment "viewed science as a privileged form of knowledge based on reason and criticism and testing, and they viewed religious doctrine as a form of ignorance rooted in myth, coercion, and fear."[23] While it is easy today to criticize those who would seek to deny the miraculous aspects of Christianity as "subversives" with an agenda to oppose religion and pave the way for atheism, the rise of Deism during the Enlightenment is much more complex. Deism is the term used to describe those thinkers who rejected "revealed religion yet who consistently held to the existence of a Creator."[24] Deism describes "those who believed in a creator God but who rejected Christian revelation and the divinity of Christ."[25] For many thinkers of the Enlightenment, the empiricist argument that faith be subject to reason resulted in a rational religion with no need for revelation at all

[21] D'Souza. 173.
[22] Byrne. 177.
[23] D'Souza. 28.
[24] Byrne. 100.
[25] ibid. 103.

and this contributed to the rise of Deism. The miraculous aspects of Christianity were ultimately rejected because "if nature was governed by laws which could be discovered by the correct scientific procedure, the natural explanations offered by science could be taken as a wholly adequate explanation requiring no further religious interpretation."[26] In other words, scientists felt that theology was going beyond its limits of comprehension by insisting on the truth of the miraculous aspects of the Bible despite the refutations of science that such aspects were contrary to the laws of nature.

There were challenges to Deism from both David Hume (1711-1776) and Baruch Spinoza (1632-1677). Hume criticized the theologians' belief in miracles and the deists' belief in a Creator because both individuals went beyond the limits of their reason. Spinoza rejected the dualism of Descartes and argued that thought and matter is essentially the same thing. In other words, God is not a distant Creator that set the world in motion with the laws of physics but rather *everything* is God. Spinoza's claim that Nature *is* God is referred to as "pantheism" and is considered a form of Deism, but it differs markedly from the Deism that was aligned with Newtonian physics and a mechanical view of the universe. The work of Isaac Newton (1642-1727) was the culmination of the "mechanical" view that had been developing since the beginning of the Scientific Revolution with Copernicus. The Enlightenment view of the universe as a machine was an outgrowth of Newton's mathematical explanations of how Nature operated and this analogy was central to the rise of Deism. Yet, it is important to note that Newton himself was not a Deist and believed in the God of the Bible. Michael Dowd points out that, "if your primary metaphor or analogy for the Universe is a machine, then not only will you fail to experience the world as an expression of divine presence, or as a revelation of divine goodness or grace; you will naturally and necessarily relate to it as you relate to human-made machines - as lifeless, soulless."[27] The Enlightenment view of the universe as a machine was also compatible with Bacon's ideas about Nature being something that can be interrogated, subdued, and manipulated by man to bring about a better world here and now. The significance of this idea is that Nature is viewed as something *external* to man and something that exists *for* man. Furthermore, the universe is perceived to be impersonal and lacking a spiritual realm.

While Deism did remove the miraculous from Christianity, it is important to note that Deism is *not* Atheism. Dowd points out that Deists believed, "God is the Creator of the universe but essentially nonexistent

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[26] ibid. 175.
[27] Dowd, Michael. *Thank God for Evolution*. Plume Printing, 2009. 111.

within it."[28] Also, Deists do not believe that God intervenes in the world. It seems obvious that Deism is more in "dialogue" with religion than Atheism due to the fact that Deism at least recognizes the beauty of Creation and approaches the perceived orderliness of Nature with a sense of appreciation and awe. Moreover, Spinoza's pantheism represents a form of Deism that argues that God is present within the world. Overall, it seems that Deism is simply the attempt by scientists committed to empiricism to somehow avoid rejecting religion completely and this seems less like "argumentation" and more like "dialogue." Deism was not an attempt to destroy the authority of the Church or a belief in God, but was rather an attempt to investigate Nature according to specific methodologies while retaining what aspects of religion were compatible with new scientific discoveries. Ultimately, "the movement of science away from theology and towards autonomy in its own sphere led to the emergence of a more explicit atheistic materialism."[29] D'Souza blames the Enlightenment for atheism and points out that, "modern science seems to be based on an unwavering commitment to naturalism and materialism. Naturalism is the doctrine that nature is all there is. According to naturalism, there are neither miracles nor supernatural forces."[30] The Enlightenment and modern science *are* committed to materialism, but there is nothing wrong with such an approach if both science and theology recognize the limits of their reason and engage in dialogue, rather than argumentation. It seems unfair for modern Christians to attack the Enlightenment simply because it gave birth to ideas that are contrary to their own. The Enlightenment *happened*:

> "*Reason*, in both its rationalist and empiricist forms called into question the truths of religion either by elevating the power of the human intellect so that no external revelation was required (basic principle of rational religion), or being skeptical about the power of reason to know anything beyond experience (basic principle of Hume's critique of both rational and revealed religion)."[31]

Given the extent to which science and empiricism was challenging traditional orthodoxy during the Enlightenment it seems entirely expected that Deism would develop. In general, "many Christian denominations have combined a respect for the authority of Scripture in the theological and ethical realms with a critical approach to its meaning and

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[28] ibid. 131.
[29] Byrne. 160.
[30] D'Souza. 164.
[31] Byrne. 148.

interpretation, thereby facilitating a constructive engagement between science and Christian theology"[32] and I would argue that Deism is an example of a willingness to consider both theology and science. D'Souza attacks "the atheistic wing of the Enlightenment"[33] for promoting naturalism and materialism, but the reality is that most scientists were Deists or Christians. Atheism did arise out of the Enlightenment, but it was not a widespread position and was not part of the political and social "Enlightenment Project."

Geology, Biology, and Genesis

During the Enlightenment both science and theology became distinct disciplines that no longer had to reconcile competing worldviews and this led to what can now be seen as "spiritual fragmentation" as the medieval synthesis no longer existed. The Enlightenment can be understood as the triumph of empiricism and the scientific method and these methodologies were employed in the new disciplines of biology and geology during the 18th and 19th centuries. Geology was "the first science to be concerned with the reconstruction of the past development of the natural world."[34] The discoveries of geology pointed to "a greatly lengthened time-scale for the earth's history"[35] and the realization "that life has developed from very simple to highly complex forms."[36] Jean Lamarck (1744-1832) was an early proponent of evolution and "brought to his study of natural history a deistic view of harmony in the universe - harmony arising from underlying design."[37] James Hutton, considered the father of modern geology, established the "uniformitarian" approach to geology and Charles Lyell established geology "as a rigorous science, free from the distorting effect of any theological presuppositions or speculation about origins."[38] A debate ensued within geology between "uniformitarianism" and "catastrophism" in which the latter idea argued that God acted upon the world in specific circumstances. Ultimately, "uniformitarianism" became the accepted approach and God was not used as an explanation for certain geological events. "Catastrophism" was also associated with the idea of "fixity" regarding species; in effect, the argument that species were designed as they presently appear in Nature. Proponents of "uniformitarianism" often related biological change to geological change, but few accepted the idea of transformation within species.

Charles Darwin (1809-1882) was influenced by both Lyell's *Principles of Geology* and Thomas Malthus'

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[32] Byrne. 8.
[33] D'Souza. 28.
[34] Barret. 64.
[35] ibid. 64.
[36] ibid. 64.
[37] ibid. 71.
[38] ibid 83.

Essay on the Principle of Population in his proposal that evolution takes place through a process called "natural selection." Darwin argued that "variation," the slight differences within a species; coupled with "natural selection," results in the "adaption of organisms to their environment, giving the appearance of superb design."[39] Growing out of the debates within geology regarding the age of the Earth and the "fixity" of species, Darwin's theory argued "that evolutionary change occurred gradually, over vast stretches of time, with natural selection as the chief mechanism."[40] Darwin's first major work outlining the theory of "natural selection" was *The Origin of Species (1859)* and his second major work, *The Descent of Man (1871)*, explicitly linked humans to the natural world. Darwin was "uncertain that natural selection constituted the sole evolutionary mechanism - and several of his supporters, including Thomas Huxley, shared that doubt - but he considered it to be the main mechanism."[41] Initially, Darwin received more criticism from scientists rather than theologians. Many in the scientific community felt that Darwin's theory was not based on the inductive methodology that had originated with Bacon before the Enlightenment and demanded empirical proof of his hypothesis. The reaction from theologians was mixed and "the main theological objection to Darwin's theory lay in the perception that it undermined the idea of design in nature, thus bringing into question the very existence of God."[42]

Arguably, the "antagonism" shown towards theology by science during the 19th century was as much of a myth as it was during the Enlightenment. D'Souza blames "modern science" for atheism, but it was predominantly philosophers criticizing traditional morality and institutionalized religion during the Enlightenment who were responsible for the rise of atheism. In other words, science is often blamed as being the main source of "antagonism" towards theology, but it is often the liberal arts that have posed the greatest threat to traditional revealed religion. During the 19th century "the real issue was not between Genesis and Geology or between Darwin and the Bible, but between the traditional and the critical approaches to biblical-historical study and interpretation."[43] Challenges to theology often originate from *within* the Church itself or are precipitated by separate developments in literary criticism or historical studies, rather than from some concerted attack from scientists. Again, many Christians approached the Bible as a text containing ethical and spiritual truths, while recognizing that advances in science may prompt certain reinterpretations. However, the ideas of Darwin were more difficult to deal with and "the problem

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[39] ibid. 93.
[40] ibid. 96.
[41] ibid. 95.
[42] ibid. 99.
[43] ibid. 99.

from the point of view of Christian belief was that natural selection came to be seen as a rigorous naturalism in which no external agency was required either to direct the course of development or to guarantee that a transcendent purpose was being realized as species changed over time."[44]

Darwinism as Ideology

Interestingly, the "division" between science and theology during the 20th century that took place over Darwin's theory of natural selection developed at a time when Darwin's ideas were being clarified and affirmed in other scientific disciplines. Many scientists were skeptical about some of Darwin's ideas, but since the rise of modern genetics "it has become clear that the existence of variations within each species, on which the process of natural selection depends, arises from mutations of the underlying genes and chromosomes."[45] Scientists with previously competing ideas about natural selection came to a common synthesis in the 1930s and 1940s. This synthesis is the framework within which biologists work today and Francis Collins explains that, "no serious biologist today doubts the theory of evolution to explain the marvelous complexity and diversity of life. In fact, the relatedness of all species through the mechanism of evolution is such a profound foundation for the understanding of all biology that it is difficult to imagine how one would study life without it."[46] Unfortunately, a political and cultural development that arose within the United States during the 1920s contributed to the "division" between science and theology before Darwin's ideas could be further clarified. After WWI, the United States experienced a cultural shift as a new urban, secular, and consumerist society developed in contrast to the traditional, rural, and religious society. Essentially, the 1920s represents the beginning of the "culture wars" as science, feminism, and morality became controversial issues. The emergence of Christian Fundamentalism during the 1920s represents the "point of departure" for understanding the present "division" between science and theology. While it is debatable whether science has ever explicitly attacked theology, it is clear that during the 1920s theology explicitly organized in opposition to science. D'Souza explains that, "*fundamentalism* is a term drawn from Protestant Christianity. It is an American coinage that refers to a group of early twentieth-century Protestant activists who organized against Darwinian evolution and who championed the literal reading of the Bible."[47] Fundamentalism was not simply a religious movement, but constituted a political coalition that aimed to influence public school curriculum and impose a specific interpretation of the world onto the larger American public. Since the 1920s, the Christian

[44] Barret. 100.
[45] ibid. 107.
[46] Collins. 99.
[47] D'Souza. 5.

community has generally been unwilling to accept, reconcile, or incorporate Darwin's ideas with their religious beliefs and multiple generations have now grown up being exposed to science as something that contradicts or threatens theology. The result is a general public that is either scientifically illiterate or has been taught to compartmentalize science and theology in a manner that precludes a complementary and mutually enriching synthesis.

Dialogue vs. Argumentation

In the last decade, there has been a series of books claiming that an acceptance of evolution demands atheism. Richard Dawkins has become the symbol of this explicitly anti-religious standpoint and D'Souza, Collins, and Dowd all directly respond to Dawkins and the assertion that evolution is incompatible with Christian faith. The relationship between science and theology has been seemingly polarized in the last decade due to the argument that an evolutionary worldview requires atheism and the fundamentalist insistence on a literal interpretation of the Bible. These two groups, atheists and fundamentalists, represent the extremes of the science/theology spectrum and their "argument" tends to receive all of the coverage in the media while other viewpoints are not adequately represented. D'Souza, Collins, and Dowd represent a Christian response to the arguments of Dawkins and other atheists that science and theology are not complementary. This contemporary Christian response argues that a healthy "dialogue" between science and theology is needed, but this "dialogue" insists on an acceptance of evolution. D'Souza simply argues that evolution should be taught in a manner that lacks an atheistic agenda and Collins reinforces D'Souza's concerns in asserting that, "the major and inescapable flaw of Dawkin's claims that science demands atheism is that it goes beyond the evidence. If God is outside of nature, then science can neither prove nor disprove His existence. Atheism itself must therefore be considered a form of blind faith."[48] Collins more explicitly calls for a "dialogue" between science and theology than does D'Souza in saying, "one of the strongest motivations of humankind is to seek answers to profound questions, and we need to bring all the power of both the scientific and spiritual perspectives to bear on understanding what is both seen and unseen."[49] Dowd acknowledges that the relationship between science and theology is characterized by "argumentation," at least as seen between atheists and fundamentalists, but insists that "today's conflict between science and religion is the catalyst by which both will mature in healthy ways."[50] Speaking about evolution specifically, Dowd says, "only when the evolutionary history

[48] Collins. 165.
[49] ibid. 6.
[50] Dowd. 12.

of the Universe is articulated in a way that conservative religious believers feel in their bones is holy, and in a way that liberal believers are passionately proud of, will evolution be widely and wholeheartedly embraced."[51] In other words, Dowd understands that the "division" between science and theology is as much a product of a debate *within* the Church over interpretation as it is any overt anti-religious agenda on the part of science. Dowd appears to take on the debate *within* the Church in the name of science in order to contribute to a new "dialogue" between science and theology that will enrich both.

D'Souza's *What's So Great About Christianity (2007)* examines issues relating to history, philosophy, morality, and science. D'Souza's position on evolution is that, "it seems improbable that the small group of intelligent design advocates is right and the entire community of biologists is wrong."[52] He argues that "Darwinism" has become an ideology that is anti-religious and he aims to refute those who insist that evolution requires atheism. D'Souza summarizes his position thus: "Evolution is a scientific theory; Darwinism is a metaphysical stance and a political ideology. In fact, Darwinism is the atheist spin imposed on the theory of evolution. As a theory, evolution is not hostile to religion. Far from disproving design, evolution actually reveals the mode by which design has been executed."[53] The theological objections to Darwin's ideas expressed by D'Souza are the same objections originally expressed in the 19th century. D'Souza argues that many biologists teach evolution in a way that presents it as undermining the argument from design and he argues that this constitutes the atheistic agenda. In other words, the issue is over whether or not natural selection allows for design. D'Souza seems to be undecided regarding revisions or approaches to the teaching of evolution within the public school system and he argues that public institutions of higher education are committed to secularizing their students. This unfair argument simply reinforces the notion that public schools must be rejected in favor of private schools, or home-schooling, and in effect, widens the division within society between believers and non-believers, those who are scientifically illiterate and those possibly half-literate, those who consider the United States an Anglo-Saxon, Protestant nation and those who understand that multiculturalism has permeated our entire history. D'Souza claims that evolution should not be threatening to Christians, but advises them to remove their children from public schools. I would argue that most parents who choose to remove their children from public schools due to the science curriculum are not concerned with the "atheistic agenda" within evolution, but with evolution itself. Ultimately, D'Souza does take a stance in suggesting

[51] ibid. 7.
[52] D'Souza. 150.
[53] ibid. 157.

that, "instead of suing to get theories of creationism and intelligent design into the science classroom, Christians should be suing to get atheist interpretations of Darwin out."[54] Of course, for Christians to want to do that they must first realize that an evolutionary worldview can be compatible with their faith.

Collins' *The Language of God (2006)* begins with a consideration of morality, and continues with a detailed explanation of how the theory of evolution by natural selection has been enhanced by genetics, and concludes with a critique of religious "alternatives" to an evolutionary worldview. Collins disagrees with arguments that an atheist agenda perpetuates the theory of evolution and that scientists are explicitly committed to rejecting alternative viewpoints. He explains that "science is progressive and self-correcting: no significantly erroneous conclusions or false hypotheses can be sustained for long, as newer observations will ultimately knock down incorrect constructs."[55] He admits that scientists do work within an accepted framework, or "paradigm," but he insists that "any assumption that a conspiracy could exist among scientists to keep a widely current theory alive when it actually contains serious flaws is completely antithetical to the restless mind-set of the profession."[56] Collins points to the work being done within physics and cosmology during the 20th century as an instance where many scientists allow the evidence to speak for itself. Previously, most scientists believed that the universe had simply been in existence without a beginning, but the second law of thermodynamics (entropy is constantly increasing) indicated that this may not be true. The work of Albert Einstein (1879-1955) and Edwin Hubble (1889-1953) pointed towards a beginning and many scientists were opposed to this idea, including Einstein himself. D'Souza argues that the discoveries within physics and cosmology over the last century have given legitimacy to the belief in a Creator. D'Souza explains that, "not only did the universe have a beginning *in* space and time, but the origin of the universe was also a beginning *for* space and time. Space and time did not exist prior to the universe."[57]

The recognition that the universe had such a beginning has implications regarding the limits of science due to its methodology based on empirical induction. D'Souza stresses that, "it is very important to recognize that before the Big Bang, there were no laws of physics. In fact, the laws of physics cannot be used to explain the Big Bang because the Big Bang itself produced the laws of physics."[58] Collins points out that, "the consequences of Big Bang theory for theology are profound. For faith traditions that describe the universe as having been created by God from

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[54] D'Souza. 158.
[55] Collins. 58.
[56] ibid. 58.
[57] D'Souza. 118.
[58] ibid. 121.

nothingness (ex nihilo), this is an electrifying outcome."[59] The discoveries within physics and cosmology have resulted in the formulation of the "Anthropic Principle: the idea that our universe is uniquely tuned to give rise to humans."[60] In other words, evolution has not been confined to Earth, but has been taking place since the Big Bang for the last 14 billion years and has resulted in the formation of galaxies, stars, planets, and *life*. Collins gleefully informs us, "nearly all of the atoms in your body were once cooked in the nuclear furnace of an ancient supernova - you are truly made of stardust."[61] Collins accepts that science cannot investigate Nature and claim to understand how Nature was initially created. In other words, character analysis will not necessarily tell us anything about the author. He says, "If god exists, then He must be outside the natural world, and therefore the tools of science are not the right ones to learn about Him."[62] In his recognition of the limits of science, Collins represents a more humble science that is interested in what theology has to say. Collins, like D'Souza, is encouraging "dialogue" rather than "argumentation." He does not insist that people must believe in God due to the discoveries of science, but he does insist that atheism not be proclaimed as the logical conclusion of an evolutionary worldview. He simply says that, "no scientific observation can reach the level of absolute proof of the existence of God. But for those willing to consider a theistic perspective, the Anthropic Principle certainly provides an interesting argument in favor of a Creator."[63]

Theory and theory

If the work done during the 20th century in genetics, physics, and cosmology all seemed to confirm the ideas of Darwin and indicate that the universe had a beginning, then why has there not been a wider acceptance of the findings of science? Collins argues, at least in regards to the United States, that the lack of acceptance of Darwin's ideas is due to the connotations of the word "theory." He insists that the American public misunderstands what a *scientific* theory is and that this misunderstanding not only weakens the evolutionary worldview in the eyes of the public, but also contributes to the undue legitimization of other "theories" that do not qualify as *scientific* theories. In other words, the scientific "dialogue" is being forced to include "arguments" that do not qualify as science and this contributes to the "tension" between science and theology because each side feels that the other is making unreasonable demands and exercising undue influence. Science does not want theology claiming to be

[59] Collins. 66.
[60] Collins. 74.
[61] ibid. 68.
[62] ibid. 30.
[63] ibid. 78.

speaking the language of science (Creationism, Intelligent Design) and theology does not want science claiming to be speaking the language of theology (evolution demands atheism). Collins argues that if the American public understood what a *scientific* theory was and accepted that evolution and design are not mutually exclusive then more people of faith would appreciate an evolutionary worldview. However, evolution is interpreted by many to be a rejection of design and this is why so many Christians are eager to support Creationism and Intelligent Design. Collins perceives the difficulty that many Christians have and says, "The warm embrace of ID by believers, particularly by evangelical Christians, is completely understandable, given the way in which Darwin's theory has been portrayed by some outspoken evolutionists as demanding atheism."[64]

Collins criticizes both Creationism and Intelligent Design as "God of the gaps" theories that simply attack specific aspects of evolution without actually proposing an alternative explanation. He explains that neither Creationism nor ID qualify as *scientific* theories and says that Young Earth Creationism, "by attacking the fundamentals of virtually every branch of science, widens the chasm between the scientific and spiritual worldviews."[65] Aside from the alternative "theories" competing with evolution, Collins suggest that, "a major part of the problem in accepting the theory of evolution is that it requires one to grasp the significance of extremely long periods of time involved in the process."[66] Collins argues that evolution can be interpreted in a way that is complementary to the findings of cosmology and coins the term "theistic evolution." He summarizes his religious/scientific worldview thus:

> "God, who is not limited in space or time, created the universe and established natural laws that govern it. Seeking to populate this otherwise sterile universe with living creatures, God chose the elegant mechanism of evolution to create microbes, plants, and animals of all sorts. Most remarkably, God intentionally chose the same mechanism to give rise to special creatures who would have intelligence, a knowledge of right and wrong, free will, and a desire to seek fellowship with Him."[67]

D'Souza's work can be understood as theology reminding science that they were once good friends and that theology should listen to what science has to say. Conversely, Collins's work can be understood as science admitting to itself that theology can provide meaningful interpretations that go beyond the empirical limits of science. In other words,

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[64] Collins. 195.
[65] ibid. 177.
[66] Collins. 148.
[67] C. 201.

it seems that D'Souza is speaking primarily to Christians and that Collins is speaking primarily to scientists. Both writers recognize the limits of science and theology, the shortcomings of Creationism and Intelligent Design, and argue for the acceptance of an evolutionary worldview that is complementary with religious faith, specifically Christianity. Dowd's work represents the most complete and unorthodox synthesis between science and theology of the three writers being discussed. Dowd's work also represents a new relationship between science and theology in that his synthesis seems to make theology subordinate to science.

Evolution of Science and Theology

I understand the changing relationship between science and theology since the medieval period in these terms. The 21st century represents the arguments expressed in Dowd's *Thank God for Evolution (2009)*.

medieval Theology

science

Hierarchical: science is subordinate to capital "T" theology

"Medieval synthesis"

modern Theology >>> Science

Linear: capital "S" science replaces capital "T" theology

"Enlightenment progress"

20th century Theology | Science

Capital "S" science and capital "T" theology exist as competing arguments

"Separate, but Equal"

21st century Science

theology, theology, theology

Postmodern Synthesis: capital "S" science interpreted by a multiplicity of lower-case religious faiths

The Meta-Narrative

Dowd insists at the beginning of *Thank God for Evolution (2009)* that, "for religious traditions to fulfill their potentials in our postmodern world, each will be called to harmonize its core doctrines with the evolutionary worldview."[68] He suggests that the creation myth, or cosmology, of our world is the single most important story because, "it is the soil out of which all our beliefs, customs, and institutions grow."[69] Dowd points out that while many different creation myths exist for many different cultures, the story of evolution applies to all cultures and represents a unifying creation myth that must become the common soil for a global community to grow new institutions that recognize the interrelated structure of our reality. Dowd insists that science has provided the world a unifying creation story that consists of, "the 14-billion year science-based tale of cosmic genesis - from the formation of galaxies and the origin of life, to the development of consciousness and culture."[70] He argues that this story, "springs from the grand narrative of an evolving Universe of emergent complexity and breathtaking creativity."[71] Dowd is the most pluralist of the three writers being discussed in that he argues for the equality of different religious traditions. He says, "different religions are like different flowers. Each one has its own special fragrance and beauty. The Great Story embraces them all for the simple reason that it's the *Universe* story of how every religion came into existence at a particular time and in a particular place."[72] Dowd does not argue that science should become a new universal religion, but he does argue that science should become the primary source of knowledge about the natural world and that religion should secondarily interpret the facts of science. He sees the primary position of science and the secondary position of religion in these terms: "facts become the springboard for meaningful interpretation. Meaningful interpretations then become the foundation of religious responses."[73] Dowd formulates three key binary oppositions that he uses throughout *Thank God for Evolution (2009)*.

-public revelation / private revelation

-day language / night language

-evolutionary faith / flat-earth faith

He begins by discussing the differences between what he terms *public revelation* and *private revelation*. The former is represented by modern science and the latter is represented by institutional religion. He explains:

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[68] Dowd. 10.
[69] Dowd. 24.
[70] ibid. 24.
[71] ibid. 25.
[72] ibid. 61.
[73] ibid. 81.

> "private revelations, as subjective claims for which no evidence for or against would be universally compelling, can only be believed or not believed. Private revelations, thus, cannot be *known*. In contrast, the arena of public revelation offers opportunities for us to learn ever more about the nature of reality"[74] in such a way that "people of all philosophical and religious backgrounds can therein come to agree on the same basic understandings, regardless of differences in how those shared understandings will be interpreted."[75]

Dowd makes another distinction between *flat-earth faith* and *evolutionary faith*. He argues that *flat-earth faith* "refers to any perspective in which the metaphors and theology still in use came into being at a time when peoples really did believe the world was flat - that is, when there was no reliable way for humans to comprehend the world around them by means of science-based public revelation."[76]

These oppositions that Dowd formulates may seem to be somewhat unorthodox, radical, or even "argumentative," but they make sense given Dowd's metaphysics and concerns as an environmentalist. Dowd's view of the universe seems to resemble the pantheism of Spinoza, but is really a form of panentheism. Dowd believes that, "we humans are not separate creatures *on* Earth, *in* a universe. We are a mode of being *of* Earth, an expression of the Universe."[77] He views humanity as the universe coming to consciousness of itself and he argues, "we are at a turning point in human history, and it has everything to do with embracing a holy view of deep time."[78] Dowd, like Collins, recognizes the importance of comprehending the time scale involved in evolution and he suggests that a recognition of how long it took for us to be here (14 billion years of evolution); coupled with the fact that we are the universe coming to consciousness of itself (symbolic language, theology, science) constitutes an existential situation in which "we humans bear a responsibility for how the story will continue on Earth."[79] Basically, in understanding our origins and in considering what we are presently doing to our place of origin, Dowd is overcome with a simultaneous delight and sadness, awe and horror.

The West has colonized the globe spreading industrialism, capitalism, and Christianity. The Western orientation towards the natural world has been influenced by empiricism, Christianity, and capitalism. The result, we view ourselves as something *separate* from and *superior* to the natural world. In other words, the world exists *for* us

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[74] Dowd. 68.
[75] ibid. 68.
[76] ibid. 73.
[77] Dowd. 57.
[78] ibid. 65.
[79] ibid. 25.

to use. Essentially, Dowd suggests that theology become subordinate to science because *flat-earth faith* has become the tool of an exploitive capitalist system that views the natural world as something to conquer and manipulate. Bacon's idea that science can interrogate nature for the benefit of mankind, the Protestant "work ethic," Locke's theory of property, and the rise of industrial capitalism are the foundation of modern society. Postmodernism has shattered the Enlightenment ideal of "progress" and resulted in a science that is much more humble regarding its role in the world. Dowd argues that a paradigm shift is necessary and that, "nothing is more important for the future of the human species than the emergence of evolutionary forms of every religious tradition."[80] The paradigm shift that Dowd urges is a shift, "from perceiving the Universe mechanistically, as a lifeless *it* made by an otherworldly Supreme Being, to seeing the Universe as a creative revelation of divinity."[81] He insists that any religious tradition is characterized by *flat-earth faith* if it fails "to teach the basic principles of ecological living in this technological and populous era"[82] and is guilty of elevating "humans at the expense of Earth's millions of other species."[83] Again, theology becomes subordinate to science because for believers with *flat-earth faith*, the "words of God represent the standard against which believers reconcile their thinking. Believers conform to these words, they submit. Evolutionary religion's alternative to reliance on ancient scriptures is *empirical data.*"[84]

Dowd uses the opposition of *day language / night language* to discuss the uses of both science and Scripture. He argues that *day language* corresponds to *public revelation* and that *night language* corresponds to *private revelation*. As stated earlier, Dowd accepts a multiplicity of religious traditions and suggests that too much time and resources are spent fighting over *night language*. In other words, people aim to make their subjective meanings objective and universal. Dowd finds both *night language* and *day language* to be important, necessary, and complementary; however, he argues that *day language* should be primary and that *night language* should be secondary. He explains that, "if we first seek clarity on the measurable facts - which is the very mission of science - the twilight and night language stories and expressions of meaning that derive from those facts can enrich our lives and support cooperation across ethnic and religious differences."[85] While Dowd's apparent subordination of theology to science indicates that his ideas may represent "argumentation," his insistence that theology meaningfully interpret science may represent "dialogue." It is important to remember that Dowd believes humanity is the result of

[80] Dowd. 75.
[81] ibid. 112.
[82] ibid. 74.
[83] ibid. 74.
[84] ibid. 77.
[85] Dowd. 115.

a 14 billion year evolutionary process and that we are the Universe coming to self-consciousness. The process of increasing self-consciousness has not ceased and he suggests that, "creative interaction almost always centers on conversation. Individuals have a chance not only to speak but also to listen and consider new possibilities."[86] He understands the interpretations of theology, or *night language*, to be a conversation or "dialogue" with science, or *day language*; and "conversation mimics biological and cultural evolution."[87]

Dowd, like Collins, coins his own term to describe his religious and scientific worldview. He considers his position to be similar to panentheism, or process theology, and uses the term "Creatheism" to describe his position. He argues that this *evolutionary faith* "enables us to think of God not only as transcendent but also intimately revealed in and through this divinely creative Cosmos. Humans are recognized as an integral part of Earth - not superior to it."[88] In other words, according to Creatheism "our purpose is to consciously further evolution in ways that serve everyone and everything, not just ourselves."[89] Dowd presents a compelling view of the Universe and our role in evolution, but his ideas may leave the theologian with many questions regarding the role of God in Creation, the evolutionary process, and personal salvation. Theology may not like being subordinate to science and Christianity may not like other religions being considered equally valid *night language* interpretations, but Dowd's work does call for the unification of all religious traditions behind a common cause and does suggests a "dialogue" between different religious traditions. I find it difficult to decide whether Dowd's vision constitutes a "dialogue" or an "argument," but it seems to be a framework in which all religious traditions can flourish and be united in addressing our common global concerns.

[86] ibid. 267.
[87] ibid. 267.
[88] ibid. 245.
[89] ibid. 293.