

# Evolution is Real

## And Maybe a Miracle

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I have always believed in God. I have also always been a Christian, which means I have always believed, at some level of understanding, Christian assertions about Christ. But during all of my adult life—I am now 65—I have struggled with many seeds of doubt brought on by modern science, objective history, the question of why a loving god would allow so much suffering in the world, and difficulties with seemingly conflicting moral precepts.

Evolution is an example from science. Darwinian natural selection of random genetic mutations, as refined and better explained by modern-day biologists like Oxford's Richard Dawkins and the University of Chicago's Jerry Coyle, makes perfect sense. We call evolution a theory, but not in the sense that some critics imply when they say it is 'only a theory.' Scientists mean 'theory' in the full scientific sense of the word: a scientifically accepted general principle about reality, one that is well tested and understood to be true. Isn't this a gigantic problem for Christianity and other major religions? How can we reconcile this with belief in a creator god?

The ongoing quest for the historical Jesus during the last two centuries raises many thorny questions. How accurate is the history in the Gospels given what we know about the political and cultural settings for these stories? This has given rise to many interpretations and even complete revisions of the stories. Jesus is sometimes portrayed as a revolutionary leader, an icon of the messianic hopes of a people, or a bigger than life character whose life was creatively retold to fit prophetic longings. Modern scientific worldviews, which are reluctant or at least taciturn about the possibilities of miracles, prompt further scrutiny and modern revisionism. "Get real," science seems to say to history. There is no way to test these hypotheses: Jesus overcame death. He is the son of God, the Christ, the Word made flesh, God incarnate?

The problem of suffering is big. How is it that a god of love and justice—a common understanding of God by the three major Abrahamic religions—allowed centuries of racial, ethnic, national, cultural and religious intolerance; discrimination and genocide. Why did God allow the Holocaust, Hiroshima and Nagasaki? Why does God allow (or cause) natural disasters and horrific diseases? Dawkins in his best selling book, *The God Delusion*, describes the god of Christianity, Judaism and Islam as a "a misogynistic, homophobic, racist, infanticidal, genocidal, filicidal, pestilential, meglomaniacal, sadomasochistic, capriciously malevolent bully." It is, after all, possible, in reading the *Old Testament*, to see God that way. Theologians and philosophers have wrestled this problem and not fully answered these tough questions. Anyone who has loved animals, as I have, quickly realizes that animals suffer too. In the wild, animals painfully kill and devour other animals. They suffer and die from draughts, floods, ice storms and disease. They suffer at the hands of cruel people. What sort of a loving god allows this?

The morality of the Christian church and its adherents can seem so very duplicitous. In the *Old Testament*—a source for much of Christianity’s morality—we find the commandment to not kill as well as God’s instructions to the Israelites to kill their enemies. St. Paul never condemned slavery; nor did Jesus. Slave holders in America used scripture to defend slavery. And throughout the history of Western civilization, some of the worst atrocities were precipitated or supported by the elite of the church. Pagans and indigenous people of many lands were told to ‘believe in our loving God, who commands us not to kill, or we’ll burn you at the stake, burn your villages and take your women and children and make slaves of them.’ The inquisitions in Spain and elsewhere stand out as permanent stains on history of the Church. The armies of Christian empires, with missionaries and bibles in tow, conquering nations and people of the world seem so very unchristian.

When I was sixteen, these thoughts—not yet well articulated and not yet carefully examined—were troubling. The modern worldview challenging the veracity of the Gospel stories made sense. Miracles, it seemed, did not seem likely; hence the full story of Jesus did not seem plausible. There was suffering in the world and it seemed that God allowed it on a grand scale. God’s moral prescriptions did not always make sense. But to this 16 year-old, evolution, as I learning it in school, was most problematic. God did not make sense.

## God is Dead

“Gott ist tot,” suggested Friedrich Nietzsche in the late 1800s. Of course, he did not mean it in a literal sense. The idea of a god as a source of moral authority was something that could not be taken seriously anymore by Nietzsche. Nor did he think that there was a creator God. His view of creation was that since matter was finite and time infinite, every possible world would evolve repeatedly over and over again. I had not heard of Nietzsche when I was in high school but if I had, I might have agreed with him.

We easily see Nietzsche’s anti-theistic philosophy as products of modernism. We tend to equate such thinking—atheism and rational agnosticism—with the Renaissance, the Enlightenment, the Age of Reason and the emergence of modern science. But these were not entirely new ideas. Questions and doubts about the existence of God (or some god or gods) can be traced back through antiquity. Diagoras, a Greek philosopher who lived about 400 years before the birth of Jesus, was an atheist. He was not alone among the philosophers of his age. And it is hard to imagine that these were not important considerations for Aristotle and Plato when postulating their arguments for a ‘first cause.’ Both of these great philosophers believed that matter always existed but that a “Prime Mover” or a “First Cause,” an eternal process of pure thought, initiated movement and created order.

It is also hard not to imagine that Anselm, Thomas Aquinas, medieval Arab scholars of Kalām and the Jewish Maimonides scholars did not consider God’s existence a serious

question as they sought logical proofs that God existed. Why seek proof if there are no questions, no doubts?

It is fair to say that in medieval times, particularly in Christendom, we would not expect to hear doubts about God discussed openly. Heresy was dangerous. But that danger progressively died away between the 15<sup>th</sup> and 18<sup>th</sup> centuries and by the 19<sup>th</sup> century, open expressions of skepticism were widespread. The world was ready, at least in Europe and America, when James Hutton's paper, *Theory of the Earth* and Charles Lyell's famous book, *Principles of Geology*, challenged widely held biblical notions of the earth's age. Charles Darwin's 1859 book *On the Origin of Species* demonstrated that evolution featuring natural selection and common ancestry explained why we are here, not Genesis. These works were not only intellectually brilliant, and thus seminal, but acceptable in academia and to a significant part of the public at large.

What preceded these works was a worldview revolution aided by an information revolution: the printing press. Copernicus, Kepler and Galileo radically changed the long-held view of the earth at the center of the universe. Isaac Newton's explanation of gravity and laws of motion prompted new ways of thinking about the universe. Theories replaced myths. Observations replaced imagination. Mathematics became axiomatic. The Scientific Revolution, The Renaissance The Age of Reason, The Enlightenment: these bold descriptions of thinking in the centuries that preceded the shock of geology and evolution of species are fitting. And God seemed, bit by bit, less a part of the explanation for the world.

But God was not dead, yet. Deism evolved as a way of thinking. It was, because of new found laws of nature, possible to think that a creator God merely formed the universe, set it in motion, and left it to be naturally controlled by the laws of nature. Perhaps there were no supernatural events, no miracles, no mysteries that could not eventually be explained. Thus the authority of the bible was challenged. Thomas Jefferson is a good example. He did not believe in the divinity of Jesus or the miracles described in the New Testament including the resurrection. He wrote his now-famous, *The Life and Morals of Jesus of Nazareth*, also popularly known as *The Jefferson Bible*. He did not publish it in his lifetime and it had little impact on the deist movement at the time. It is, however, representative of deism then and it presages much of today's more historically robust biblical revisionism. A few years earlier, Thomas Woolston, a British theologian, also a deist, predicted that Christianity would die out by the beginning of the twentieth century.

The greatest skeptical thinker of this era was probably the Scottish philosopher and historian David Hume (1711-1776). Best known, today, for his arguments against the possibility of miracles, he was perhaps most influential for his arguments against a designing creator. If a well-ordered existence requires a designer mind, he argued, then God's mind, by necessity well ordered, also requires a designer mind. This designer therefore also needs a designer, on and on, ad infinitum. He also argued that design can not account for suffering caused by mankind or by nature. Modern atheism was emerging. Nietzsche would soon declare it strongly. Dawkins in his best selling book, *The God Delusion*, would revisit Hume's arguments and argue them again.

But Christianity did not die out as Woolston predicted. As the 20th century dawned, Gilbert K. Chesterton wrote:

[Christians] went forth across the radiant abyss of the Renaissance and in fifty years were using all its light and learning for new religious foundations, new apologetics, new saints. [Christianity] was supposed to have been withered up at last in the dry light of the Age of Reason; it was supposed to have disappeared ultimately in the earthquake of the Age of Revolution. Science explained it away; and it was still there. History disinterred it in the past; and it appeared suddenly in the future.

Today, Christianity thrives in most parts of the world. About a third of the world's population is Christian. One in every two people in the world believe in the Abrahamic god—God, YHWH, Allah. Only about fifteen percent of all people are not religious. But sociologists have noted that a significant portion of this last group tends to be 'don't care' people, who when pressed, may express a belief in God or some spiritual reality. It is hard to determine a percentage for 'reflective' atheists or agnostics, but it is reasonably and widely assumed that the largest numbers are found in communist or formerly communist countries. Andrew Higgins, a journalist for the *Wall Street Journal* in Europe, in an article entitled, "As Religious Strife Grows, Europe's Atheists Seize Pulpit," reports that, "The number of atheists is hard to pin down. Some surveys put the figure at under 3%, but others say it is much higher."

The percentage of atheists in Europe (as opposed to worldwide) is certainly much higher than 3%. Statistics suggest, it but it is not clear what constitutes atheism. As one commenter wrote in Richard Dawkins' website:

[Higgins] is correct that the number is difficult to pin down as a majority of theist Europeans are religious in theory and atheists in practice. When confronted, they will say that perhaps, maybe they believe in a higher power, or God, but otherwise that question has no impact on their lives . . . [it] isn't quite religion, but isn't atheism either. People are just indifferent to the whole thing.

Higgins, wrote a subsequent, follow-up article in the *Wall Street Journal*. The title is, "In Europe, God Is (Not) Dead." A subtitle reads: "Christian groups are growing, faith is more public." He wrote:

Most scholars used to believe that modernization would extinguish religion in the long run. But that view always had trouble explaining why America, a nation in the vanguard of modernity, is so religious. The God-is-finished thesis came under more strain in the 1980s and 1990s after Iran, a rapidly modernizing Muslim nation, exploded with fundamentalist fervor and other fast-advancing countries in Latin America and Asia showed scant sign of ditching religion.

Now even Europe, the heartland of secularization, is raising questions about whether God really is dead. The enemy of faith . . . is not modernity but state-regulated markets [national churches] that shield big, established churches from competition. In America, where church and state stand apart, more than 50% of the population worships at least once a month. In Europe, where the state has often supported—but also controlled—the church with money and favors, the rate in many countries is 20% or less.

After decades of secularization, religion in Europe has slowed its slide toward what had seemed inevitable oblivion. There are even nascent signs of a modest comeback. Most church pews are still empty. But belief in heaven, hell and concepts such as the soul has risen in parts of Europe, especially among the young, according to surveys. Religion, once a dead issue, now figures prominently in public discourse.

Religion, and specifically Christianity, if not by the numbers, is nonetheless alive in Europe. It is still the majority religion and it is still a powerful voice “in public discourse.” The numbers are indeed hard to pin down. So are opinions about what is happening to Christianity in Europe. But there is ample evidence that the decline of church attendance in the national churches may be slowing as they shed past practices leftover from medieval Christendom and the age of empires. Some Church of England dioceses are actually growing, particularly dioceses in urban areas with younger communicants.

Evangelical Christians, both fundamentalist and non-fundamentalist, make up only about two percent of Western Europe’s population. But their numbers have grown eightfold in the last half of the twentieth century and their numbers are still growing exponentially. They are mostly young, well educated and committed. Immigrants, thought of as largely Muslim, are also significantly Christian and their numbers are growing as well.

Boston University sociologist Peter Berger notes that the modern world, pretty much everywhere, is “as furiously religious as ever.” But it is outside of Europe that this is particularly so. It is outside of Europe where Christianity really thrives.

The growth of Christianity in China has been explosive. Today there are about 16 million members of government sanctioned Christian churches and an estimated 50 to 100 million Christians who belong to non-sanctioned house churches. This is a communist country, and though the constitution of the Peoples Republic of China officially guarantees freedom of religion, it is highly restricted in the same way that the right of assembly is restricted. It is thus significant, as the University of Birmingham’s Edmond Tang reports that,

Today it is an open secret that Christian fellowships—a new kind of 'house church', run by Chinese professors and students, are active in most Chinese universities. More than 30 academic faculties and research centres are devoted to the study of a once maligned religion. The question is why.

In Africa, the growth of Christianity is astounding. Stanford University's Dinesh D'Souza in his book, *What's So Great About Christianity*, writes in the first chapter entitled "The Twilight of Atheism: The Global Triumph of Christianity:"

A century ago, less than 10 percent of Africa was Christian. Today it's nearly 50 percent. That's an increase from 10 million people in 1900 to more than 350 million today. Uganda alone has nearly 20 million Christians and is projected to have 50 million by the middle of the century. Some African congregations have grown so big that their churches are running out of space. While Western preachers routinely implore people to come every Sunday to fill the pews, some African preachers ask their members to limit their attendance to every second or third Sunday to give others a chance to hear the message.

D'Souza, and many others who are studying the phenomena of Christian growth are reporting significant growth in every part of the world except the Middle East, North America, Australia and Western Europe. But in the United States, though Christianity is not growing, it remains strong. Ninety percent believe in God and eighty percent believe in the central tenet of the Christian assertion, the resurrection of Jesus. About fifty percent of the population attends church regularly.

But just as Christianity is showing extraordinary growth, perhaps the most significant growth since the first-century birth of this religion, there can be no denying a clamorous new outburst of atheism—the atheists that Higgins tells us are taking to the pulpits. Pundits have labeled this phenomenon as new atheism, evangelical atheism, anti-theism and even fundamentalist atheism. The names of its thinkers and writers are becoming household words: Richard Dawkins, Christopher Hitchens, Sam Harris, Daniel C. Dennett. Their books are trade books, readily found in popular bookstores. Sales are brisk for titles such as (in order), 1) *The God Delusion*, 2) *God Is Not Great: How Religion Poisons Everything*, 3) *The End of Faith: Religion, Terror, and the Future of Reason*, 4) *Darwin's Dangerous Idea*.

The new atheists are raising the same issues that I confronted at an early age and have pondered all my life. They argue that most of the ills in this world are caused or justified by religion and religious strife. History, they say is distorted by the church. But mainly it is the thesis that science, particularly evolution, contradicts religious beliefs. Dennett in *Darwin's Dangerous Idea* put it simply. "Is there a conflict between science and religion here? There most certainly is."

As people become better educated, so the new atheists contend, and learn more about science, religion will wither away; particularly Christianity. Do they have a point?

The same Harris Poll (February 2003) that reported that 90% of American believe in the existence of God and that 80% believe in the resurrection, shows that these beliefs do, in fact, decline with education level. Among Americans with post-graduate degrees, belief in God drops to 85% and belief in the resurrection drops to 64%. The drops (5%

and 16%) are not all that significant but it has led some to conclude that education is directly related to disbelief. Some, particularly bloggers on the internet, have interpreted this as a correlation between intelligence and disbelief. But then why is that women are more likely to believe in God than men (93% vs. 86%) or blacks more likely than whites (96% vs. 90%). These factors suggest that maybe—just maybe—other factors could be at play including family traditions, income and life style. There isn't enough data to draw a coherent conclusion.

## **The Belief of Scientists**

A more interesting consideration is the belief of scientists. We need to particularly consider evolution, which is very much the focus of apparent and real conflicts between science and religion. Now almost a century later, we might wonder if Chesterton premature in saying that “Science explained [Christianity] away; and it was still there?”

In a sense he was. Science has not finished, in the opinion of many, trying to explain it away. It is the very nature of science to never be finished so long as everything is not explained—and that is as it should be. In the field of evolution significant progress has been made in solidifying the theory that humans, like all species, evolved over time from a single primordial life-form. We share a common ancestry with bugs and cats and dandelions and great apes. Everything points to natural selection.

Some religious apologists, and indeed some scientists, take issue with this. Some simply have decided to believe the description of creation as it is told in Genesis. They reject or ignore evolution. They are young earth creationists and they argue that all of creation happened in six days—and God rested on the seventh. Others argue that what we think of as a day—24 hours—is not necessarily one of God's days, thus the world could really be 4.5 billion years old and the universe three times as old. Nonetheless, the story in Genesis is literally true. They are old earth creationists.

Others acknowledge evolution but see in it clear, supposedly-scientific evidence of intelligent design. Some parts of living things seem far too complex for Darwinian evolution to have worked. They refer to this concept as irreducible complexity. It suggests intelligent design. It is a seductive idea that has become the heart of an agenda to teach a form of supernaturally guided evolution in our secular school systems. (It is not, however, as some of its critics contend, creationism in disguise.)

Lehigh University's Michael Behe, who supports this idea, describes irreducible complexity as “A single system which is composed of several interacting parts that contribute to the basic function, and where the removal of any one of the parts causes the system to effectively cease functioning.”

What does this mean? Think of a Roman-style stone arch. Every stone is a part. Remove one stone and the arch collapses. Not all the stones in an arch are the same shape; some are rectangular blocks. Others have angular, wedge-like shapes. Now, if we can imagine

that an arch is a biological system, we have to imagine that not only the entire arch-system would have needed to evolve, but the stones, themselves would have needed to evolve. The stones would need to evolve independently before nature could construct the arch. So, why would the stones independently evolve since natural selection would not be able to anticipate their purpose? Hence, the proponents of irreducible complexity argue there must be guidance. There must be intelligent design.

Bacterial flagella, it is suggested, are irreducibly complex biological systems. They consist of microscopically small filaments attached to a microscopically small rotary engine. (Yes, that is exactly what it is, a small engine). The engine has a part, a rotor that turns at up to 1000 rpm. The attached filament whips about when the rotor turns and this action propels bacteria through fluids. Altogether, more than forty different protein parts are required to make the flagellum function. Remove any one part and the system will not work. Genetic instructions must exist not only to make each of the parts but also to assemble them correctly in the correct sequence. It is quite an amazing thing. And it is easy to surmise that this is beyond Darwinian evolution.

But this may not be such a solid argument. Computer models have been used to show that complex systems of mutually-exclusive interacting parts may be able to evolve. And there are logical arguments, by way of analogy, to explain convoluted ways that a complex system might develop. Dawkins presents one such analogy, using the arch. Nature, he suggests, might simply build a scaffold first, then build the arch, then remove the scaffolding.

It is only a metaphor to counter a metaphor, but it does sound ridiculous. It isn't very elegant and it seems unimaginative. But that isn't the point. So long as possible solutions can be proposed, and undoubtedly there will always be some proposals, one can not argue that complexity—in this sense—is evidence of a creator.

Proponents of intelligent design often point to Darwin's own words to address another so-called irreducibly complex system, the human eye.

To suppose that the eye with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection, seems, I confess, absurd in the highest degree.

Sadly, they often use these words out of context. Darwin understood the problem and proposed that a solution to the eye's complexity was possible (if not yet proposed):

Reason tells me, that if numerous gradations from a simple and imperfect eye to one complex and perfect can be shown to exist, each grade being useful to its possessor, as is certainly the case; if further, the eye ever varies and the variations be inherited, as is likewise certainly the case; and if such variations should be useful to any animal under changing conditions of life, then the difficulty of believing that a perfect and complex eye could be formed by natural selection,

though insuperable by our imagination, should not be considered as subversive of the theory.

University of Chicago Jerry Coyle doesn't try so much to offer speculative solutions to so far unexplained complexities. He simply argues that in assuming that these complexities can not be explained by evolution, Behe is being unscientific. He wrote in the *New Republic*:

For a start, let us be clear about what Behe now accepts about evolutionary theory. He has no problem with a 4.5-billion-year-old Earth, nor with evolutionary change over time, nor apparently with its ample documentation through the fossil record—the geographical distribution of organisms, the existence of vestigial traits testifying to ancient ancestry, and the finding of fossil "missing links" that show common ancestry among major groups of organisms. Behe admits that most evolution is caused by natural selection, and that all species share common ancestors. He even accepts the one fact that most other IDers would rather die than admit: that humans shared a common ancestor with chimpanzees and other apes.

By listing what Behe accepts about evolution, Coyle in a single carefully worded paragraph defines a common criterion for believing in evolution as it is understood by evolutionary biologists, certainly most scientists and a large segment of the population. The essential difference between Behe and most evolutionary scientists is the word 'most.' Behe thinks most evolution is caused naturally but what can't be explained is caused by a creator god. Most evolutionary scientists believe—even if they can't prove it yet—that all evolution is caused naturally. And theologians, who in large numbers agree with Coyne and most biologists, refer to this a "God of the Gaps" theology and say it is faulty.

The Gallup Organizations, for the past three decades, have attempted to measure beliefs of the American population about evolution. They have developed three categories, given them definition, and polled the public. The three views are:

- Creationist View: God created man pretty much in his present form at one time within the last 10,000 years. 44% of the general population believes this but only 5% of scientists do.
- Theistic evolution: Man has developed over millions of years from less advanced forms of life, but God guided this process, including man's creation. 39% of the general population believes this, but so do 40% of scientists.
- Naturalist Evolution: Man has developed over millions of years from less advanced forms of life. God had no part in this process. Only 10% of the population believes this but 55% of scientist do.

What stands out in this survey is that 40% of scientists believe that evolution was guided by God. A smaller percentage, 5%, adheres to the creationist view. The implication is clear: at least 45% of scientists (among those surveyed) believe in God. What is not clear is how many scientists who believe in Naturalist Evolution also believe in God, do not or simply have no considered opinion.

That such a percentage of scientists believe in God is largely substantiated by a survey published in *Nature*, a prestigious international weekly journal of science. According to an article, "Scientists are still keeping the faith," by Edward J. Larson and Larry Witham (April 3, 1997, Volume 386), 39% of scientists (selected randomly and limited to American biologists, physical scientists and mathematicians) "believe in a God in intellectual and affective communication with humankind, that is, a God to whom one may pray in expectation of receiving an answer. By 'answer' [meaning] more than the subjective psychological effect of prayer."

That is a very detailed qualifier of a personal, theistic god. We can only wonder if the definition of God used in the survey was more general—not confined to expectation of receiving an answer to prayer that is more than a psychological effect—would the percentage of believers have been higher.

A study conducted by Rice University's Elaine Howard Ecklund found that about 38% of scientists teaching at leading universities in the United States believe in God, 31% do not, and 31% do not know if God exists and do not think there is any way to find out. (The numbers who do not believe in God are somewhat higher for natural scientists at 38% and higher still for biologists at 41%). Recently, in following up on the survey, Ecklund noted:

I continued to raise this question as I crisscrossed the country over the past three years, completing 275 personal interviews with natural and social scientists at our nation's top institutions of higher education. These interviews were a follow-up to a survey conducted with 1,646 scientists about their religious and spiritual beliefs and practices. I found that many scientists are not as anti-religion as volumes like evolutionary biologist Richard Dawkins' *The God Delusion* might lead us to believe.

Indeed there were the expected atheists and agnostics. Yet, a surprising number of those who teach the sciences at the nation's top universities are also part of a religious tradition (about 50%). . . (Social Science Research Council Blog, Saturday, February 23rd, 2008).

All this tends to confirm what the famous biologist Stephan Jay Gould observed, that about half of his colleagues were religious.

It is important to note two observations in Ecklund's findings. Of those who believe in God, only about one quarter of them (10% of the total survey population) have "no

doubts about God's existence." It is also important to notice about a third of the scientists do not know if God exists and do not think there is a way to find out.

From a personal perspective, as I have explored my own faith for many years, I find that I identify with the small group, the one in ten, who are certain that God exists. But that conclusion has little to do with science. If I must confine myself to a scientifically-based conclusion, then I must identify with the one in three who does not think that the question can be answered.

It is also important to note that these statistics do not imply that a large percentage of scientists agree with Behe's irreducible complexity. My sense, from much literature, is that hardly any scientists agree with Behe. Serendipitously, he might be correct. We can't deny that some complex biological systems exist, remain unexplained and seem extraordinary. But what Behe proposes—he claims that is findings "must be ranked as one of the greatest achievements in the history of science,"—is simply not good science. In science, it is completely inappropriate to propose a non-scientific explanation (e.g. supernatural) when science does not (yet) have an explanation.

Geneticist Francis Collins agrees. Collins, is the Director of the Human Genome Project that completed the mapping and sequencing of the human DNA, a study sponsored by the National Institutes of Health, the Department of Energy and a consortium of laboratories in seventeen other countries. He provides a useful perspective in a recently published book, *The Language of God: A Scientist Presents Evidence for Belief*.

Formerly an atheist, Collins is now an Evangelical Christian who unquestionably believes in a creator God, the likelihood of miracles, the divinity of Christ and Christ's physical resurrection. But Collins also believes that evolution (in the full sense from Coyle's description) is unquestionable reality. Collins identifies himself as a theistic evolutionist but rejects the notion that God actively guided the process of evolution. He rejects Behe's irreducible complexity. Nature, he explains, could have adapted simpler molecular "machines" to create complex biological systems. He points to new research on bacterial flagella that supports this belief. Evolution, as he sees it, required no guidance from God. In an op-ed piece for CNN, Collins wrote:

Actually, I find no conflict here [= science and faith], and neither apparently do the 40 percent of working scientists who claim to be believers. Yes, evolution by descent from a common ancestor is clearly true. If there was any lingering doubt about the evidence from the fossil record, the study of DNA provides the strongest possible proof of our relatedness to all other living things.

But why couldn't this be God's plan for creation? True, this is incompatible with an ultra-literal interpretation of Genesis, but long before Darwin, there were many thoughtful interpreters like St. Augustine, who found it impossible to be exactly sure what the meaning of that amazing creation story was supposed to be. So attaching oneself to such literal interpretations in the face of compelling scientific

evidence pointing to the ancient age of Earth and the relatedness of living things by evolution seems neither wise nor necessary for the believer.

What Collins has done is to state, very well, what many Christians accept and have long accepted: the story in Genesis is myth.

## **What Many Christians Believe About Evolution**

The largest denomination of Christians in the United States and the world is unquestionably the Roman Catholic Church. One in four Americans is Catholic and about one in five people in the world are. It is therefore particularly useful to look at what scientists in the Pontifical Academy of Science and Catholic theologians are saying about evolution. The Theological Commission in 2004 issued a report entitled "Communion and Stewardship: Human Persons Created in the Image of God." The report was endorsed by then-Cardinal Joseph Ratzinger—now Pope Benedict XVI. Two particular paragraphs say a lot:

- [Paragraph 63]: According to the widely accepted scientific account, the universe erupted 15 billion years ago in an explosion called the 'Big Bang' and has been expanding and cooling ever since. Later there gradually emerged the conditions necessary for the formation of atoms, still later the condensation of galaxies and stars, and about 10 billion years later the formation of planets. In our own solar system and on earth (formed about 4.5 billion years ago), the conditions have been favorable to the emergence of life. While there is little consensus among scientists about how the origin of this first microscopic life is to be explained, there is general agreement among them that the first organism dwelt on this planet about 3.5 - 4 billion years ago. Since it has been demonstrated that all living organisms on earth are genetically related, it is virtually certain that all living organisms have descended from this first organism. Converging evidence from many studies in the physical and biological sciences furnishes mounting support for some theory of evolution to account for the development and diversification of life on earth, while controversy continues over the pace and mechanisms of evolution.
- [Paragraph 69]: A growing body of scientific critics of neo-Darwinism point to evidence of design (e.g., biological structures that exhibit specified complexity) that, in their view, cannot be explained in terms of a purely contingent process and that neo-Darwinians have ignored or misinterpreted. The nub of this currently lively disagreement involves scientific observation and generalization concerning whether the available data support inferences of design or chance, and cannot be settled by theology. But it is important to note that, according to the Catholic understanding of divine causality, true contingency in the created order is not incompatible with a purposeful divine providence. Divine causality and created causality radically differ in kind and not only in degree. Thus, even the outcome

of a truly contingent natural process can nonetheless fall within God's providential plan for creation.

This is representative of the beliefs of many Protestants, Evangelicals and Anglicans (Episcopalians in the U.S.). The official website of the Episcopal Church includes a set of questions and answers that deal with evolution, creationism and intelligent design in a document entitled, "A Catechism of Creation: An Episcopal Understanding." It was prepared by The [Church's] Committee on Science, Technology and Faith. Here are some excerpts:

- Is it proper to speak of an evolving creation? Yes. When astronomers look out into space they look back in time. Thus, they are able to see our universe at many stages of cosmic evolution since its beginning in the Big Bang. Here on earth biologists, paleontologists, geneticists and other scientists are showing that life has evolved over four billion years, and are reconstructing evolution's history. None of these scientific discoveries and the theories that explain them stands in conflict with what the Bible reveals about God's relationship to the creation.
- Isn't evolution just a theory? Theories are not mere guesses or hypotheses, as people often suppose. When enough evidence supports a hypothesis that has been created to explain some facts of nature, it becomes a theory. A theory is a well-established concept that is confirmed by further scientific discoveries and is able to predict new discoveries. The Big Bang theory and cosmic evolution are confirmed by discoveries in physics ranging from the smallest known particles of matter to the processes by which galaxies are formed. Biological evolution is a web of theories strongly supported by observations and experiments. It fits in with what we know about the physical evolution of the universe, and has been confirmed by evidence gathered from the remains of extinct species and from the forms and environments of living species.
- What is biological evolution? Biological evolution means that living things change over time. A great variety and diversity of organisms have come into existence over the past four billion years from one or a few original life forms. All living things—bacteria, archaeobacteria, protists, fungi, plants and animals, including human beings—are descendants of other life forms, most of which are extinct. The evidence for evolution shows that all life on earth is related and interconnected, and is often depicted as a great "Tree of Life." Evolution happens gradually, sometimes at a rapid rate and sometimes slowly, but never with discontinuities. Evolution happens because of natural selection; in the face of environmental pressures, some organisms will survive at higher rates than others. Charles Darwin was the first to bring together all these ideas. Scientific researchers since Darwin have refined and added to them, but never thrown out his basic theoretical framework.
- What is "Young Earth Creationism"? Young earth creationists interpret the creation stories in Genesis as historical and scientific accounts about the way God

originated the universe. They believe that the earth and the whole cosmos were created in six literal twenty-four hour days some 6,000 years ago, and that God separately created each living “kind.” They claim that there is scientific evidence to back up their interpretation of the Bible. However, they reject any evidence that does not fit their biblical interpretation, including all of the compelling evidence that the universe is billions of years old and that species have evolved. Young earth creationists oppose the teaching of evolution not only because it is contrary to their interpretation of the Bible but also because they believe that the teaching of evolution is responsible for changes in modern society they consider harmful to Christian morality.

- How have the scientific community and other Christians responded to young earth creationism? All but a very few natural scientists, including the great majority of those who are Christians, have rejected the scientific claims of the creationists, because the evidence both for an earth and universe billions of years old and for biological evolution is decisive. Social scientists have pointed to the lack of evidence for making the teaching of evolution responsible for changes in morality that upset many Christians. Christian critics point out that its advocates mix science and theology together in a confusing manner and insist that their interpretation of the Bible must be accepted over contradictory scientific evidence, no matter how valid.
- What is “Intelligent Design”? The proponents of the Intelligent Design Movement assert that it is possible to discern scientifically the actions of God in nature. They claim that certain features of living organisms are “irreducibly complex,” too complex to believe that they could ever have developed through biological evolution. Therefore, they can be accounted for only by the direct action of an Intelligent Designer. Most advocates of “Intelligent Design” oppose biological evolution, which they equate with what they call “Naturalism.” They define “Naturalism” as a philosophical belief system that claims that nature is all that exists, and therefore there is no God who acts in nature. To scientists, however, “naturalism” has a far different meaning: they seek to study and seek to understand nature using methods that make no claims either for or against the existence of God.
- How have the scientific and theological communities responded to the Intelligent Design Movement? Some within the scientific community are persuaded by the arguments of Intelligent Design advocates, particularly by their writings on the various levels of complexity in organisms. Many Christians accept the arguments of the Intelligent Design advocates because they believe they confirm their faith in a creating God. However, the great majority of scientists say that claims of “Intelligent Design” have not been backed up by valid scientific research and evidence. Christian critics reject the notion that God should or can be brought in as a part of scientific explanation. The “Intelligent Design” argument implies that God has to step in from time to time to keep creative processes going because living things lack powers and capacities God did not give the universe earlier. . .

Intelligent Design advocates fail to distinguish between “evolutionism” as a philosophy and “evolution” as a science with a web of theories based upon a great deal of scientific evidence.

## **Maker of Heaven and Earth**

“We believe in one God, the Father, the Almighty, maker of heaven and earth, of all that is, seen and unseen.” So goes the first line of the Nicene Creed (from the Episcopal Church 1979 *Book of Common Prayer*). This creed is one of Christianity’s oldest creeds, having originated at a council of bishops at Nicaea in 325 CE. With little or no change since then, it is regularly and widely used by Anglican, Catholic, Orthodox, and Protestant Christians around the world. I recite it every week. I fully believe it.

What can possibly be the basis of such a belief? If Genesis is mythology and evolution of the species offers no assurance of God’s existence or an apparent role for God in creation, why believe in a creator God?

But indeed God may very well have a role in evolution and all of creation, a role much more amazing than a notion of intervening from time to time to make adjustments or to create awesomely complex systems. Evolution is a process that worked and works still.

There is a wellspring of reasons to believe in God, a creator God and indeed a personal God. We can find evidence of this God in science and outside of science. We can find this God when we open ourselves up to the possibility that God may not be part of scientific process but the reason for the process.

Scientists on occasion describe the question of God’s existence as the ‘God Hypothesis.’ Dawkins and his fellow new atheists use it often and for them it is a scientific expression, something to be examined by carefully considering empirical evidence, something that can be tested and verified or falsified.

A friend—who prefers that I not mention his name because he is the head of a major corporation—who had converted from atheism to fundamentalism and eventually to Anglicanism explained to me why.

I was totally unprepared by my education—public schools, Duke University and Stanford Law School. Though I did not major in science, I did study it extensively. I understood evolution very well and it was, for me, all the reason I needed to be an atheist. When, through a family crisis, I discovered Christ—when your daughter is dying even atheists will try prayer—I thought I had to disbelieve evolution. Why? Because I thought that science and religion were diametrically opposed to each other.

Like me, adults who joined the large fundamentalist church I attended, did not arrive there to suddenly learn that evolution was false. They came in the door

already convinced. They were bright people. They understood evolution, perhaps better than most people I know. But somewhere along the line they had been convinced that there was a conflict between science and religion, that somehow, science proves that God does not exist, or at least science demonstrates that God is unlikely. But God was very real to them. Perhaps like me they had a conversion experience that was too real to ignore. So they rejected science. Faith is a very powerful thing. Critics sometimes call this a lemming mentality. That is probably a good metaphor.

I don't think our schools teach that there is a conflict between science and religion. But by only teaching evolution and not allowing God to be discussed, they foster the idea. A teacher can be fired in my son's school district if he or she allows God to be discussed in the classroom. When, in biology class, my son asked about the bible account of creation, the teacher ducked the issue by simply stating that evolution was just a theory. I don't think he believed it; he was just ducking. What a dumb thing to say. Evolution is part and parcel of the laws of nature. It is factual.

Fundamentalism—or to be more precise, biblical literalism or intelligent design—may very well be a backlash, a blowback, an unintended consequence of our squeamishness about God in the secular classroom. Religious faith is a powerful force. Throughout history, in ancient times and modern time, people have chosen to die rather than renounce their faith. Is it surprising that many, rather than renounce their faith, will renounce science.

At the time of the Scopes Trial, many thought that a generation of teaching evolution would curb creationism. It has been, what now, four or five generations. Creationism, as a belief is as strong as ever and more widespread.

The first thing and the last thing we should teach about evolution is that it is perfectly possible to believe in God, as a Christian or a Jew or a Muslim, and also accept scientific reality. We should show our student the words of Stephen Jay Gould from his now famous book, *Rock of Ages*: “Either half my colleagues are enormously stupid, or else the science of Darwinism is fully compatible with contemporary religious belief—and equally compatible with atheism.”

There is another famous quote by Gould from an essay he wrote called *Nonoverlapping Magisteria*. It reads so well, it must be quoted from at length:

Incongruous places often inspire anomalous stories. In early 1984, I spent several nights at the Vatican housed in a hotel built for itinerant priests. While pondering over such puzzling issues as the intended function of the bidets in each bathroom, and hungering for something other than plum jam on my breakfast rolls (why did the basket only contain hundreds of identical plum packets and not a one of, say, strawberry?), I encountered yet another among the innumerable issues of contrasting cultures that can make life so interesting. Our crowd (present in Rome

for a meeting on nuclear winter sponsored by the Pontifical Academy of Sciences) shared the hotel with a group of French and Italian Jesuit priests who were also professional scientists.

At lunch, the priests called me over to their table to pose a problem that had been troubling them. What, they wanted to know, was going on in America with all this talk about "scientific creationism"? One asked me: "Is evolution really in some kind of trouble, and if so, what could such trouble be? I have always been taught that no doctrinal conflict exists between evolution and Catholic faith, and the evidence for evolution seems both entirely satisfactory and utterly overwhelming. Have I missed something?"

A lively pastiche of French, Italian, and English conversation then ensued for half an hour or so, but the priests all seemed reassured by my general answer: Evolution has encountered no intellectual trouble; no new arguments have been offered. Creationism is a homegrown phenomenon of American sociocultural history—a splinter movement (unfortunately rather more of a beam these days) of Protestant fundamentalists who believe that every word of the Bible must be literally true, whatever such a claim might mean. We all left satisfied, but I certainly felt bemused by the anomaly of my role as a Jewish agnostic, trying to reassure a group of Catholic priests that evolution remained both true and entirely consistent with religious belief.

I think my friend has a point about Gould and the possible effect of the way evolution is taught. However, I also think that the reasons for the growth of fundamentalism are more complicated than unintended backlash. Karen Armstrong in *The Battle for God: A History of Fundamentalism* as well as numerous scholars writing for the American Academy of Arts and Sciences sponsored study, *The Fundamentalism Project* argue that fundamentalism in America is a response, not just to science, but to many aspects of modernity. Though American fundamentalism can be traced to colonial America it is now a modern, multifaceted. Shifts in social and cultural norms, highlighted by the contrast between the 1950s and the 1960s are important factors and by the 1970s fundamentalist gained widespread acceptance and momentum. Woodstock and what it symbolized, the abolishing of school prayer and other forms of increased secularism in public institutions, the growth of a pluralistic society, the growth of 'big' government and an explosion of scientific knowledge, were all contributing factors. A cherished, seemingly wholesome, predictable way of life seemed threatened by a surge of liberal advances. Writes Armstrong: "The modern world, which seems so exciting to a liberal, seems Godless, drained of meaning, and even satanic to a fundamentalist."

The circus-like, Scopes Trial of 1925 was a defining moment in American religious history. John Scopes, a high school teacher, in Dayton, Tennessee, was tried and convicted of violating a state law that read, in part,

it shall be unlawful for any teacher in any of the Universities, Normals and all other public schools of the State which are supported in whole or in part by the public school funds of the State, to teach any theory that denies the story of the Divine Creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals.

The ongoing battle between science and religion became sensational, nationwide news. The trial was broadcast by radio across the country. Clarence Darrow, in defending Scopes, ridiculed William Jennings Bryan, who on behalf of the prosecutor was representing the World Christian Fundamentals Association. The famous journalist H.L. Mencken, in his dispatches for the Baltimore Sun, ridiculed all of the town's people by calling them yokels and morons. He called William Jennings Brian, a buffoon.

Pepperdine University's Edward J. Larson, won the Pulitzer Prize for his book about the Scopes Trial, *Summer for the Gods: The Scopes Trial and America's Continuing Debate Over Science and Religion*. In a recent article published on the George Mason University website: *Is Evolution "Just a Theory"?*, Larson writes:

"Evolution is just a theory," is the refrain heard in countless conservative Christian churches. "It is guesses strung together," orator William Jennings Bryan liked to say during America's first anti-evolution crusade in the 1920s. The refrain continues today.

He goes on to say how the refrain is repeated on Christian talk radio to "reach millions of households on hundreds of stations in every state of the union. And:

Add to this tapes, videos, children's books, sermons, Sunday school classes, Christian schools and even Christian theme parks reinforcing the refrain, and one can hardly blame Americans living in the Christian subculture for believing that evolution is an all-but discredited theory propped up mostly by the philosophical biases of its atheistic proponents. Doubters are urged to read biologist Richard Dawkins's book or, better yet, selected quotes from Dawkins, paleontologist Stephen Jay Gould, and others agnostic evolutionists as reprinted in creationist literature.

Larson goes on to explain how the Cobb County (Georgia) school board mandated that a warning sticker be placed on biology textbooks that read: "Evolution is a theory, not a fact, regarding the origin of living things. This material should be approached with an open mind, studied carefully, and critically considered."

A federal district court judge in Atlanta, Clarence Cooper, declared that the stickers violated the separation of church and state. He also asserted that,

the Sticker undermines science education by playing on two meanings of the word "theory." In science, a theory is a well-tested explanation for observed facts, backed by substantial scientific evidence. Evolution is such a theory. In common

conversation, however, "theory" suggests little more than a guess. Using this word in a textbook sticker, Cooper writes, "suggests to the informed, reasonable observer that evolution is only a highly questionable 'opinion' or a 'hunch'."

Larson noted that Cooper concluded that,

"the Sticker's primary effect surpasses accommodation and endorses religion." In particular, it aids the belief of a particular group of religious believers that Cooper identifies as "Christian fundamentalists and creationists."

Although Cooper does not expand on this last point, it raises an important issue. Many Christians accept the theory of evolution. For some liberal Christians, evolution is central to their religious world view. Even many conservative Christians accept organic evolution as God's means of creation, and see no conflict between it and a high view of scripture. Theistic theories of evolution have a long and distinguished pedigree within evangelical Christian theology.

## **A Better Job Teaching Evolution**

My own doubts, at an early age, were rooted in the poor way I was taught. But for the 'grace of God,' or luck if you prefer, I did not have a compelling religious experience then. Nor did I learn anything in church or family that might have caused me to be a creationist. I was taught raw, factual science in school, and because I had no frame of reference other than the Bible, I was confronted with conflict. In high school, I also learned about the Scopes Trial. It was not only portrayed as a conflict between science and religion but as a conflict between intelligent people and, to borrow Menken's words, yokels and morons. (I later saw the movie, *Inherit the Wind*, a highly fictitious account of the Scopes Trial, which further exaggerated to differences).

Fundamentalists, creationists and intelligent design proponents alike, are not ignorant about science. They are not ignorant about evolution. They understand it very well. They know about fossils and genetics. But they reject evolution out of religious belief either because they believe the Bible is inerrant, because there isn't an obvious role for God in the process or simply because they believe that science and what they believe are in conflict. Creative explanations abound: God created the world old with fossils, radiocarbon dating doesn't really work, a day is not a day and humans are exceptions. Mostly it is the refrain that evolution is just a theory.

We must teach evolution just as we teach anything else in science. The word theory has a particular meaning in science and we must teach that meaning and not be afraid of parental repercussions. Richard Swinburne, an Orthodox Christian, an Oxford philosopher of both religion and science, refers to the 'law of evolution' to make sure his view is understood. But it isn't a law. It is a theory and good theory. And theory is a good word that must be understood.

But consider the fact that half of all American adults don't accept evolution. We must accept that reality in the classroom. If secular education means—and it should—that we welcome cultural, racial and gender diversity, we must welcome faith stances that seem to fly in the face of what we are teaching. That doesn't mean assenting to 'warning stickers.' But we should admit openly, without prejudice, that such beliefs exist. At the same time, we should inform students that other points of view are reasonable—atheism, agnosticism and theism. One way to do that within the confines of secularism is to explain that about half of all Christians (in America) accept evolution without conflict. And half do not. Because this is a science curriculum also tell students that about half of all scientists believe in God.

Talk about the notion of irreducible complexity, as well. Explain why many if not most scientists consider it unscientific. When we say—and we do—that matters of religion must be left strictly to parents and religious leaders beyond the school walls, we run a risk. We empower God-of-the-gaps beliefs such as intelligent design and the refrain that it just a theory.

The point of this discussion is not, however, to propose changes in the syllabus. It is to relate to the problem. Fifty years ago, I was unprepared to resolve what I thought was a conflict. It is hard to recollect now what it was, that as a 16 years old, I believed about God and why? I sometimes think I merely wanted to believe in God. Nonetheless there seemed to be a conflict: Either God wasn't real or there was something wrong with Darwinian evolution.

Quite by accident, I had a chance to discuss this with an Episcopal priest. As best as I can remember he said (or after fifty years I imagine he said):

The Bible is not a science text book. What it says about how the world came about is not accurate, not in the least. Nor is it even a good history of the Israelites. It is the story, told in myth and remembrances, of how a people, the Israelites who believed in God, sought over many centuries to understand God, his ways, and his intentions. I have not, myself, found a better way to understand God than to depend upon the perceptions of countless generations of these people. This doesn't mean that I need to believe that this or that happened as though it was real history or as a substitute for science.

We are still trying to understand where we came from. Today we have modern science to help us understand. Evolution is part of the story. It makes perfect sense and it is fully supported by evidence. And as I study it and try to better understand it, it occurs to me that there is probably no better way for creation to have worked. It is still working today. It is an amazing universe and an amazing world and we are an amazing species.

I'll grant you that many people look at evolution and say "aha," there is no need for God to explain how we came to be. They may be right. But you can't say that because there is no evidence from Darwinian evolution that there is therefore no

God. There are many reasons to believe in God. Whatever you end up believing, don't do so because you think that science and religion are in conflict.

A final comment by this Episcopal priest has stuck with me all these many years:

If God exists—as I believe he does—he gave us a mind. Use it. You have heard it said that oil and water don't mix. Well they do if you just add an ingredient such as a detergent. Science and religion don't mix, right? Reason and faith don't mix, right? Sure they do. Just add thinking.”

Jerry Coyne in his *New Republic* article wrote, “The explanation of seeming design by solely materialistic processes was Darwin's greatest achievement, and a major source of discomfort for those holding the view that nature was designed by God.”

I agree. But it need not be a discomfort. Believers in God, who comfortably and regularly make leaps of faith, see the leap of faith-into-disbelief in this. We can and should say that mankind and all living things were created by nature acting just as nature acts. Fine! But it is a leap to think, therefore, that nature was not designed by God.

There are many reasons to believe in God that have little or nothing to do with science, particularly evolution. The claims that God exists and created nature are religious and untestable. Coyne, as well as Dawkins and the other new atheists, agree with this. It is possible, if one believes in God, to imagine that every mutation might have been, not random, but as God intended. Or maybe every mutation is truly random, even seemingly indifferent, yet, and as counterintuitive as it seems, works to produce God's intended result. Francis Collins stated it this way in a PBS interview: “Evolution could appear to us driven by chance, but from God's perspective the outcome would be entirely specified.”

## **Evolution as Miracle?**

Hume, who did not believe in miracles, defined a miracle as a violation of the laws of nature. It is a definition that has stuck, one used by those who believe in miracles and those who do not. But St. Augustine, writing in the early part of the 5<sup>th</sup> century—who warned us fifteen centuries ago against taking *Genesis* literally—defined miracles differently. “Miracles are not contrary to nature,” he wrote, “but only contrary to what we know about nature.” They are perhaps enabled by potentialities placed by God into nature, he argued. C. S. Lewis, in large measure, agreed with Augustine: Miracles are consistent with nature but inconsistent with what our observations of nature lead us to expect or predict.

If Augustine is right, then we might think that evolution is both very real and a miracle.

I don't know if I agree with Augustine. But from fifty years of thinking about science and religion I'm warming to the idea. For it is not in the process of evolution, alone, that I see the hand of God. Rather it is in the reason, the potential and the outcome that I see God at work. God is very real to me. So is evolution. I see nothing in the Darwinian process to suggest that it is not God's process. In other words, belief in evolution does not preclude belief in God. Nor does belief in God preclude belief in evolution.

In *The Language of God*, Collins suggests a possibility:

But how could God take such chances? If evolution is random, how could He really be in charge, and how could He be certain of an outcome that included intelligent beings at all?

The solution is actually readily at hand, once one ceases to apply human limitations to God. If God is outside of nature, then He is outside of space and time. In that context, God could in the moment of creation of the universe also know every detail of the future. That could include the formation of the stars, planets, and galaxies, all of the chemistry, physics, geology, and biology that led to the formation of life on earth, and the evolution of humans, right to the moment of your reading this book-and beyond. In that context, evolution could appear to us to be driven by chance, but from God's perspective the outcome would be entirely specified. Thus, God could be completely and intimately involved in the creation of all species, while from our perspective, limited as it is by the tyranny of linear time, this would appear a random and undirected process.

Now that is something I feel safe in calling a miracle. As to why I believe in God, that is a subject for another day.