# Some Reflections on the Relationship between Religion and Science, especially Evolution

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**Abstract:** The relationship between religion and evolution is complex and controversial. This article explains the position known as theistic evolution, a version of which was defended by St. Augustine, and shows how religion and evolution are compatible with each other. After a brief overview of various ways in which evolution and religion are often thought to be related today, including Creationist and secularist reactions to the theory, the article considers three central questions about evolution: what does the theory claim to be true; what is the evidence for these claims; and what are the implications of evolution for issues outside of science, especially with regard to religious belief? The article illustrates the deeper design present in the universe, and questions the significant role that chance is supposed to play in the process of evolution.

**Keywords:** *religion, evolution, design, naturalism, science, chance, theism, secularism*

The relationship between religion and science always arouses curiosity in anyone who has even a remote interest in the key beliefs of their religious worldview, in what their religion holds to be objectively true about God, about the type of universe we live in, about the kind human beings are, and about moral and political values. Yet this is not only a topic of concern for the

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religious believer because *any* worldview, religious or secularist, should be interested in the ways in which the discipline of science, its theories and distinctive method of inquiry, might be relevant for understanding and assessing the claims the worldview makes about reality, about the universe, and about our lives in it.

Although there has been great interest in this topic throughout history, and many famous thinkers—philosophers, theologians, and scientists—were greatly exercised by the relationship between religion and science, it is in the present age that the dialogue and debate between them is at its most keen, and has taken on a new urgency. Indeed, it is not an exaggeration to say that the relationship between religion and science has become one of the most interesting and significant topics of our times.[1] In terms of increasing our understanding of ourselves and of the universe we live in, as well as in thinking about the meaning of life, and about our moral behavior and our ultimate destiny, it ranks alongside other important 21st century topics, such as debates about climate change, the spread of democracy, the influence of capitalism, geopolitical issues (such as widespread drug addiction or the refugee crisis), and how to deal with the threat of terrorism.

In this article, I wish to focus on the relationship between religion and evolution in particular because of the negative implications many leading thinkers say the theory has for religious belief, and because of the great confusion the whole discussion has caused for our understanding, more generally, of the relationship between religion and science. There is no doubt that the theory of evolution and its alleged implications for religion are very controversial. One only has to mention the topic in the appropriate circles to start an often contentious and sometimes unsettling argument, in which those engaged feel they need to take sides. Whenever people think deeply about the meaning of evolution and its implications for various areas of life, including religion and ethics, it inevitably raises questions of a most foundational kind, questions that provoke a significant response of one sort or another. These questions are not easily resolved and require careful reflection, yet reflection is rarely decisive on many of the challenging issues, which in itself generates debate, suspicion, and further controversy. In this article, I wish to make several important distinctions and to consider a few ways we might approach the overall discussion about religion and evolution. I will also consider several central questions that will help us understand the issues of the debate further, and then develop the argument by recommending St. Augustine's approach to the subject of religion and science as the most fruitful. We must emphasize that this is a very large topic, and that we can

[1] For some general discussions of the topic, see John Haught, *Responses to 101 Questions on God and Evolution* (New York: Paulist Press, 2001); Cardinal C. Schoenborn, *Chance or Purpose? Creation, Evolution and a Rational Faith* (San Francisco: Ignatius Press, 2007); Brendan Sweetman, *Religion and Science: An Introduction* (London: Continuum Books, 2010).

do little more than scratch the surface in a short space. I hope our reflections here will whet the appetites of readers for further study and reflection on this crucial topic for Christian philosophy.

## I

When one thinks of the topic of religion and evolution, one is often tempted to think immediately of the contentious debate between evolution and Creationism (often called Creation Science, especially in the United States, where the position is perhaps best known). There are different versions of Creationism, but they usually have in common the belief that the scientific theory of evolution contradicts a (fairly literal) reading of the Bible, and this immediately puts the theory on a collision course with religion in the eyes of many believers.[2] Creationists generally hold that God created the universe, and living things, more or less as described in the Book of Genesis, and so, given this reading, the theory of evolution must be rejected. If the creation story is to be read as literally true, or mostly as literally true, then any scientific account of the origin of the species that differs significantly from the biblical story, such as evolution, cannot be true.

Creationists usually defend their position in both a positive and a negative way. The former emphasizes the point that for Christians who regard the Bible as a revealed text, as the word of God, it is more reasonable to think that, in general, it should be read in a literal way because it is unlikely that God would reveal his essential actions and message in metaphors or stories because of the risk of misunderstanding. The latter involves leaving all issues of theological interpretation aside, and considering the theory of evolution simply as a scientific theory, and offering an appraisal and critique of the evidence on its own merits. Creationists sometimes mix both approaches in their work and research on this matter.

However, there is a second approach to evolution and religion which is almost the reverse of the Creationist approach, an approach that I think is best described as the secularist interpretation of evolution. Its influence in contemporary culture should not be underestimated. Yet, although the secularist approach has been extremely influential, it is not nearly as well understood as the creationist approach, so we need to introduce this approach in a little more detail. This secularist interpretation of evolution involves the way in which atheists and secularists in contemporary intellectual work, especially those inclined to defend atheism in a quite militant manner, have in effect co-opted the theory of evolution (and perhaps other scientific

[2] For a discussion of creationist views, see Richard Carlson (ed.), *Science and Christianity: Four Views* (Downers Grove, IL: InterVarsity Press, 2000); and J.P. Moreland and John Mark Reynolds (eds.), *Three Views on Creation and Evolution* (Grand Rapids, MI: Zondervan, 1999).

theories) for the deliberate purpose of attempting to explain and justify their atheism. This is the approach of well-known contemporary atheists of the dogmatic variety such as Richard Dawkins, Daniel Dennett, and Jerry Coyne, among several others.[3] These thinkers, and others who are sympathetic to this approach, are best described as positive atheists. This is because their primary approach is not that of the typical atheist, who mainly defines himself in terms of what he does *not* believe or in terms of what he *rejects* (the existence of God, religious tradition, religious morality, etc.). Traditional atheists also usually defend their position mainly by *attacking* some other view (the religious worldview), an unusual approach when one thinks about it from a logical point of view—to define oneself in terms of what one does not believe, in terms of what one rejects, rather than in terms of what one believes to be true in a positive sense. Yet, it is obvious that from a logical point of view the alleged failure of arguments supporting religious belief would not show that the atheistic, secularist worldview is true. So atheists like Coyne and Dawkins, and others, realize that they must make a conspicuous attempt to present a more sophisticated face for the contemporary world. It is now incumbent upon them to work out what they believe on ultimate questions of metaphysics, as well as on social, political, and moral issues, and also how they will defend their beliefs on all of these matters. In short, it is incumbent upon these thinkers to eventually develop a more detailed theoretical, philosophical account of their worldview. They must work out what they hold to be true about the nature of the universe, about human life, about morality, and indeed about everything, for in the end, they will have to develop a comprehensive theory that applies to all the kinds of things and issues one might have beliefs about.

What this means in practice is that sophisticated contemporary atheists now try to state what they believe in a more positive way, to lay out what they believe is true about reality (specifically about the universe, about human life, and about morality). Secularists or naturalists have attempted to find a way to express some of their views in positive statements, such as: "all that exists, including human beings, is physical in nature consisting of only matter and energy," "human beings originated as a result of an evolutionary process that operates in a largely random way," "human consciousness is produced by and is reducible to the brain," and so forth. We should also note that as these thinkers develop their moral and political views, they have become more politically active, and are not shy about trying to influence society and culture by means of their secularist worldview, usually in opposition to various religious worldviews (despite their occasional rhetoric that religious believers

[3] For some works representative of the view known as naturalism or secularism, see Richard Dawkins, *The Blind Watchmaker* (New York: Norton, 1996); Jerry Coyne, *Why Evolution Is True* (New York: Penguin, 2010); and Daniel Dennett, *Darwin's Dangerous Idea* (New York: Simon & Schuster, 1995).

should stay out of politics!).[4] This philosophical task for the secularist is a slow and difficult one, and is an on-going process in which many thinkers are involved in an uncoordinated and somewhat piecemeal way. Indeed, some secularists, such as Kai Nielsen and Richard Dawkins actively promote it, others such as Stephen J. Gould are more subtle, some emphasize science like Francis Crick and Steven Pinker, others work in the area of politics and the human person like Paul Kurtz and Sam Harris.[5]

This is where the connection between secularism and science becomes most obvious. It is necessary in order to defend a more positive articulation of one's views that one must also have positive arguments and evidence to support one's positive claims. And so it is to science that modern atheists turn to find this evidence, and especially (but not only) to the theory of evolution. The unfortunate consequence of this approach, and it has become a cultural problem (and not just a problem confined to the esoteric disciplines of philosophy and theology), is that these secularist philosophers exaggerate both the evidence, and indeed the implications, for various scientific claims and conclusions. This is particularly true with regard to the theory of evolution. They do this because they are attempting to put an atheistic spin on these theories; as a result they frequently claim more for the theories than the theories themselves can support, and even more than the scientific theories *officially claim* to support.

An unfortunate consequence of this general secularist approach has been to confuse the general public who often make the mistake of identifying science and atheism, or at least of thinking that modern science is a form of atheism. Many people do not follow these abstract debates too closely, so when they hear those who are often spokespersons for contemporary science, such as Dawkins or Stephen Hawking or Neil deGrasse Tyson (who recently denigrated philosophy[6]) express the view that science is the only legitimate way to knowledge or that science leads to atheism and represent this as a scientific conclusion (and not as their *philosophical* position), they make the erroneous but understandable conclusion that modern science must be a type of atheism. When the general public reads of scientists like Dawkins arguing

[4] The works of Daniel Dennett and Richard Dawkins, in particular, are full of moral and political sermonizing in addition to philosophical and scientific discussion and analysis. There is also an overt political form of secularism; a recent example from a long line of such works is Steven Pinker, *Enlightenment Now: The Case for Reason, Science, Humanism and Progress* (New York: Viking, 2018).

[5] In addition to works already mentioned, see Sam Harris, *The End of Faith* (New York: Norton, 2005); Stephen Hawking and Leonard Mlodinow, *The Grand Design* (New York: Bantam, 2010); Steven Pinker, *How the Mind Works* (New York: Norton, 1997); Paul Kurtz, *Living without Religion* (New York: Prometheus, 1994); Francis Crick, *The Astonishing Hypothesis* (New York: Touchstone, 1995); Kai Nielsen, *Naturalism and Religion* (New York: Prometheus, 2001), Stephen J. Gould, *Rocks of Ages* (New York: Ballentine, 1999).

[6] DeGrasse Tyson's criticism of philosophy, and responses to it, are widely available on the internet.

that evolution should turn people to atheism, and urging teachers to push evolution in public education, not just to teach science, but as a way of undermining religion, then one can easily understand why they would adopt a suspicious, and even hostile, attitude towards science, which might then carry over towards programs of scientific education. Unfortunately, secularists who appeal to science in this way have fostered the view that science as a discipline is anti-religion, and this view has done much harm to the cause of scientific education in a number of countries. Of course, it has the effect also of making fruitful dialogue between religion and science much more difficult.

We must also keep in mind the logical point that naturalism is not to be confused with science; contemporary naturalists often appeal to science to defend their view, and ironically in their own way have great faith in science, but science and naturalism are not the same. Indeed most scientists are not naturalists (which in itself is a significant point). Most scientists do not believe that all that exists is physical and that science can explain all of reality (including providing an ultimate explanation for the existence of the universe, the scientific laws that govern the universe, the nature of consciousness, the power of reason, the phenomena of freewill, morality, etc.). We need to realize that as soon as one goes *beyond* the scientific evidence, and makes a claim about the ultimate origin of the universe, or about the nature of human beings, or about the correct moral theory, one is crossing the line from science proper and moving into philosophy/religion, and the general area of worldviews. This is a line that scientists, *as scientists*, should not cross, not does science as a discipline cross this line. It is only when naturalists appeal to science that there is an all too real danger of confusing the lines of demarcation that must exist between the two, and so science is pressed into the service of atheism.

## II

While the above positions often get the most attention in media and indeed even in academic discussions of this topic, because they lend themselves to conflict and sensationalism, these are not the only, and perhaps not even the most interesting, positions on religion and evolution. There is a more mainstream view which is perhaps the most popular position held today by a majority of thinkers. This view is sometimes called "theistic evolution," though the term is not without controversy. It is held by a variety of mainstream religions, across many denominations, as well as by many philosophers, theologians, and scientists. Proponents of this view hold that our commitment to reason and science requires us to examine the evidence for various scientific theories, including evolution, and to follow it wherever it leads. If the evidence supports evolution, then we must accept the theory and then should consider the ways in which evolution and religion might fit together in our

understanding of human life. Proponents of this approach hold that religion and evolution are compatible and that our task as responsible thinkers is to explore the ways in which they are compatible, to reflect on how an evolutionary account of life might fit into, or be part of, God's creative plan for the universe. More generally, we need to think through the various philosophical, theological, and moral implications that the theory of evolution might raise, which, as responsible thinkers, we have to work through rationally and critically.

Theistic evolution does not necessarily assume that any one particular interpretation of the scientific evidence for the theory is the correct one. Theistic evolutionists are aware that the evidence can support different interpretations, particularly as regards key questions about design and chance. They often adopt a more critical stance towards the evidence, especially towards the more dramatic claims of the theory, than typical evolutionary biologists who are often reluctant to raise any critical problems for the understandable fear of giving ammunition to their critics. Theistic evolutionists hold that we should examine the evidence for the theory of evolution just as we would the evidence for any theory, without making any prior assumptions. We simply do science in this area in the same way we would do science in any other area, and rightly regard this kind of work as a branch of reason, and as part of our on-going attempts as rational beings to understand the universe in which we live. Our prior commitment to reason has already convinced us that the universe is intelligible, and so we must examine the topics of the origin and nature of species just the way we would examine any other topics that arise in our study of nature. So if the evidence supports the theory of evolution, which many theistic evolutionists believe it does, then we have to accept this conclusion, and probe the implications for religious questions concerning human origins, the relation of the human species to other species, and other important issues relating to the origin of life, the emergence of consciousness, the origin and content of morality, and so forth.

It is important to emphasize that theistic evolutionists are careful in their reading of the evidence for evolution, making sure that they are clear about what it shows and what it does not show. For example, many theistic evolutionists, including me, will disagree with the secularists that evolution shows that life originated by chance. They will dispute this, and argue that the actual scientific evidence does not show this—this is rather an extrapolation from the evidence that is often motivated by a secularist agenda. So theistic evolutionists will be extra-careful to be clear to distinguish between the actual biological and other empirical evidence and how it might be understood and interpreted, and the philosophical or religious implications that might be drawn from this evidence. Theistic evolution differs from creationism because it does not allow religious presuppositions to influence its reading of the scientific evidence; it differs from secularism because it does not allow secularist

presuppositions to influence its reading of the evidence. Let us now attempt to elaborate further the general outlines of this view in the space we have left.

## III

*The Theory of Evolution: The Central Questions*. I have found it helpful to approach evolution by focusing on three central questions, as a way of organizing our thinking about a very complex topic. The first question concerns the theses of evolution: what are the *main claims* of the theory?; what does the theory claim to be objective fact about its subject matter—the origin and development of the various life-forms, organisms, and species that live or have lived on earth? For example, what does the theory say about the origin of elephants, or about the relationship between fish and birds? The second question is about the evidence: what *evidence* is presented to support the objective claims of the theory, and is it good evidence? For example, what evidence would show that human beings and chimpanzees are related, or that modern elephants are descendants of elephants that lived millions of years ago, or that the beaks of various species of finch have changed significantly over time? The third question is the one in which we as philosophers and theologians are most interested—the *implications* of evolution: what are the implications of the theory for topics outside of science, especially in the areas of philosophy, religion, and morality? For example, if it is true that chimpanzees and human beings are related to each other, what might this imply, if anything, about the uniqueness of man in creation; what might it imply for the biblical story of creation? Although as philosophers our focus is primarily on the third question, in the general debate it is important to have a good knowledge of the first two questions before we can consider the third question in an adequate way. While leaving the science to the scientists, it is important to have a good general understanding of evolution in order to address some of the deeper philosophical and theological questions raised by the theory.

*What does the theory of evolution claim to be (objectively) true*? The theory of evolution, as we know, was first proposed by Charles Darwin (1809-1882), an English biologist, in his book *The Origin of Species* (published in 1859).[7] Darwin's research around South America, especially on the Galapagos Islands in 1835 suggested to him the main concepts of evolution, which I like to list as follows: 1. adaptation of species over time; 2. natural selection; 3. microevolution; 4. survival of the fittest; 5. the development of life from simpler to more complex forms; 6.

[7] Evolution is a difficult theory to approach for the first time. For excellent introductions, see Brian and Deborah Charlesworth, *Evolution: A Very Short Introduction* (New York: Oxford U.P., 2003); Stephen J. Gould, *Ever Since Darwin* (New York: Norton, 1992); Michael Ruse, *Darwinism and its Discontents* (New York: Cambridge U.P., 2006); Jerry Coyne, *Why Evolution is True*. See also my *Evolution, Chance, and God* (New York: Bloomsbury, 2015), in which I discuss in more detail some of the issues raised here.

macroevolution (sometimes called common descent, common ancestry or descent with modification). The concept of *species* refers to similar life forms that can be grouped together in some way. A species is usually defined as a group that interbreeds among themselves, and produces fertile offspring, but that does not breed with any outside group; biologists describe this by saying that a species is "reproductively isolated" from other groups (e.g., bobcat, cheetah, and cougar are different species of cat). A genus groups together all species of the same type (for example, all the species of cats). There are also varieties within a species; these would have slight variations in their characteristics; for example, the different varieties of finch Darwin observed on the Galapagos Islands. Of course, it is sometimes difficult to identify whether a particular life form constitutes a separate species, and to differentiate between a species and a variety.

Let us further illustrate with Darwin's famous example of the finches. Darwin had identified various species of finch on the Galapagos Islands. He speculated that millions of years earlier mainland finches had flown out to the Galapagos, and that these present finches were descendants of the mainland ones. Though similar, the Galapagos species had different colors, different body sizes, and, in particular, different beak sizes. How they got these various characteristics originally Darwin was not sure, though he believed this was not a crucial matter for his theory; the important fact is that they have these various features, and that they are passed on to offspring. Using the finches as an example, he proposed that over very long periods of time, there was a struggle for existence going on between the various species, and that those who survived this struggle did so because they had some kind of selective advantage over their competitors in the same environment.

He speculated that the beaks of the finches he studied might have evolved (changed) in various ways due to environmental factors that, in this particular case, influenced the source and supply of food. Long-beaked finches may have survived because the food was often inaccessible, requiring longer beaks to root it out, and so those with shorter beaks often died. At other times, those finches with beaks most suitable for digging out insects survived best in climates when insects were more plentiful, and those with beaks not suitable for hunting out insects gradually died off. Eventually, those finches with beaks suitable to find the available food came to predominate in a certain area, and interbreed, and passed on their characteristics to their offspring. So only finches with beaks suitable for eating the type of food available in that area survived. This explanation would account for why a species looks designed for the habitat in which it lives. It would also account for why the finches on the Galapagos Islands were similar to, but different from, the species on the mainland.

It is crucial to understand that what happens here in not that a particular finch with a short beak evolves a long beak because it can somehow identify the characteristics needed to survive; but that some have long beaks and some have short beaks to begin with, and those with long beaks survive better (relative to the environment they happen to find themselves in), and pass on their characteristics (including the long beak) to their offspring, so that eventually long-beaked finches dominate. Darwin called this process *natural selection*. It is the mechanism or process of change by which the characteristics of a species (like the beaks of finches) can change over time. The idea of natural selection was suggested to him by his study of artificial selection widely used by farmers in England to produce herds of cattle and dogs with desirable characteristics that could compete for prizes at animal shows. Later, he called the process by which one species survives and flourishes instead of another "the survival of the fittest." Those finches that survive do so because they are the "fittest," meaning not the strongest or healthiest, but that they are best able to cope with the particular environment they happen to find themselves in (due primarily, he believed, to a large slice of luck).

This leads to the concepts of microevolution and macroevolution. *Microevolution* refers to small changes in a species over time; it also entails that some of the species within a genus, e.g., within the genus of finches, *are related to each other genetically*. This means that more recent species are descendants of older species (in the way that you are a descendent of your great, great, grandfather). But this then raises the question as to whether *all* species of finch might have the same common ancestor? It suggested also to Darwin an even larger question: might it be the case that widely different species, such as human beings and chimpanzees, have a common ancestor (the question of *macroevolution*)? Might human beings and chimps and fish and birds have a common ancestor? Might it be that all the species that have ever lived are genetically related to each other, going back to a single life form that lived billions of years ago? This is what Darwin proposed, and what the modern theory of evolution now asserts.

Darwin sketched a diagram of what the whole process would look like, which biologists now refer to as the tree of life. It is thought to have begun approximately three and half billion years ago with one single-celled life form, according to most evolutionary accounts. For the first two billion years, life existed only in microbial, single-celled organisms, yet, gradually over the next billion years, more complex species began to evolve, and in the last half a billion years many of our most complex species began to appear, of which the present species are descendants. Only in the last two or three million years did the ancestors of human beings begin to appear; these species are all extinct (including one of our immediate ancestors, Neanderthal

man). Our own species, *Homo sapiens*, is thought to have originated in a line of descent from these earlier species about 60,000 years ago.[8] Carl Sagan used a helpful metaphor of the "cosmic calendar" to bring a sense of perspective to the timeline involved in not only evolution, but the origin and development of the universe. In this calendar, the history of the universe is compressed into a calendar year. Some of the significant dates would be: Jan. 1st: the Big Bang; May 1st: formation of the Milky Way (our galaxy); Sept. 14th: formation of the earth; Sept. 25th: appearance of life on earth; Dec. 16th: first worms; Dec. 24th: first dinosaurs; Dec. 30th: first hominids; Dec. 31st: first humans.[9]

*Brief overview of the evidence for evolution.* The above brief description is what the theory of evolution claims to be true, what is supposed to have really happened in the development of nature over billions of years (recall that the universe itself is thought to be between 15 and 20 billion years old.) Turning now to our second question concerning the evidence that is cited to back up these claims, this part of the theory has proved more controversial, and we must take care not to confuse an explanation for how evolution is supposed to work (such as the one above) with evidence that it occurred. These are two separate issues. There are several reasons that the evidence for evolution generates controversy; some are religious in nature; another is because we can't see evolution in action the way we can see, for example, electricity in action; still another is that there is an elusiveness about the evidence that worries many. A lot of the evidence is of a circumstantial nature; evidence from different sources that build a case, rather than clear proof that ends any doubt. Nevertheless, the vast majority of scientists who work in evolutionary biology are convinced that the evidence for evolution is very strong indeed.[10]

We can mention briefly two sources of evidence. First, there is the fossil record, which for many years was appealed to as the main source of support. Fossils are the skeletal remains of species, including plants and animals that have been preserved in sand and mud, and other strata, sometimes for millions of years. By studying and classifying fossils, paleontologists believe that they can identify specific species and learn something about how they lived. The close proximity of the fossils to each other, evolutionary biologists argue both in terms of time and in terms of

[8] See Kenneth Miller, *Finding Darwin's God* (San Francisco, CA: Harper, 2007), to whom I am indebted for this overview of the timeline of evolution (p.38ff). For an overview of human evolution, see Douglas Palmer, *Seven Million Years* (London: Phoenix, 2006).

[9] See Carl Sagan, *The Dragons of Eden* (New York: Ballentine, 1986), Chapter 1.

[10] This overview of the evidence is based on the discussion in my *Evolution, Chance, and God*; for critical discussion of the evidence, see (in addition to the works mentioned in footnote 6), Thomas Nagel, *Mind and Cosmos* (Oxford: Oxford U.P., 2012); Holmes Rolston, *Science and Religion* (Philadelphia, PA: Templeton, 1987), pp.95-100; and Peter Van Inwagen, *God, Knowledge and Mystery* (Ithaca, NY: Cornell, 1995), pp.128-162.

location, along with observed structural similarities, make it reasonable to conclude that various species are *genetically* related to each other (for example, modern elephants, 10,000 years old, and extinct elephants, 34 million years old, have very similar skull and trunk structures, and so it is argued that this makes it reasonable to conclude that the former is a *descendant* of the latter). Other examples often cited include species of whales and gorillas, whose lineages have been well-documented.

Critics of evolution often claim that in order to support macroevolution, many transitional species (or intermediary forms) would have to be found as well, and few have been found. A transitional species is a species that would be somewhere between two very different species, such as the line of common ancestors of apes and human beings, or the line of common ancestors of fish and birds, and so forth. While it can be difficult to describe or define what is meant by a transitional species, supporters of the theory argue there are many such transitional species, and that there can be no serious debate about the fossil evidence for macroevolution.

A second source of support for evolution comes from DNA evidence. Recent work in genetics shows that there is a 95% similarity between the DNA of human beings and the DNA of chimps (and a 60-70% similarity between the DNA of human beings and mice).[11] This suggests, therefore, that such species are genetically related, based on the same principle that enables us to tell that two men are brothers, or that one man is the father of another. Other evidence cited by biologists includes: the similarity between the anatomies of different species (e.g., between the forelimbs of whales, birds, dogs, and human beings); the overall similarities between species (e.g., in their digestive, circulatory, and nervous systems); and the fact that the fossil evidence coheres with DNA evidence (for example, the DNA of human beings and chimps is similar, suggesting they are closely related, and this coheres with what fossils of both species show in terms of timeline, geography, and especially anatomical similarities, and so forth).

## IV

*How to reconcile evolution and religion*. Most scientific theories have no philosophical or religious implications and so we seldom give them a second thought when considering deeper philosophical questions. But the theory of evolution is an exception because it appears to have implications for matters outside of science. For example, if the theory is true, some suggest that it would undermine the Bible in a general sense because it seems to challenge the account of creation presented in

[11] For a good overview, see Francis Collins, *The Language of God* (New York: Free Press, 2007).

the book of Genesis. If the Genesis account is true, evolution cannot be true, and vice versa, is the argument. It also raises more general questions about the nature of human beings; the theory may suggest that human beings were not created specially by God but originated from the same type of process that produced all other species; it also seems to suggest that the existence of any species, including us, significantly depends on chance, because if the process of evolution had occurred in a different way in history it seems that no particular species had to come into being. This has led some to conclude that human beings differ not in kind from other species, but only in degree, with means that we are simply an advanced form along a continuum of species, but not in an entirely different category. More generally, some argue that the whole theory undermines the view that nature is in any way designed by an intelligent mind.

As noted above, however, we should be very careful to distinguish between what a theory actually claims, and can support with scientific evidence, and the implications one might then draw from the theory. In the case of evolution, this caution is especially appropriate because the theory officially makes no claims at all about the status of human beings in the universe, nor about whether the universe was designed by God, nor about whether evolution clashes with certain biblical passages, since these topics are completely outside its subject matter. Sometimes individual evolutionary biologists and others will express their philosophical opinions on what evolution means for these topics, but such views are not part of the theory of evolution. So we must be careful not to claim too much for the theory, a common mistake of atheists and secularists today; we must be particularly mindful not to exaggerate the evidence and go beyond what the theory can actually show.

On the point that the theory of evolution clashes with the Bible, and indeed challenges the literal truth of the Bible, especially the account of creation given in Genesis, it is very helpful to turn to the views of St. Augustine on this matter. Augustine proposed that the creation account in the Bible need not be understood as literally true. Given his acceptance of the view that God exists outside of time, his crucial insight was that the biblical writers have employed a story to make deeper points, *and it is these deeper points which are the truths we should take away from the biblical text*. The deeper points in the Genesis story are that God created the universe and life, according to a particular plan, and that human beings differ in kind from other species. These deeper philosophical points are *not* revisable, according to Augustine, but our understanding of the *manner* in which God brought about creation *is* revisable. Mainstream Catholic, Protestant, and Jewish religions have mostly adopted Augustine's reasonable response to this matter, and have argued that there is no major incompatibility between evolution and the Bible, so long as we

recognize that, especially in the creation story, biblical writers may have employed occasional literary license to illustrate crucial philosophical and theological points.[12] Moreover, the Bible in general is not undermined by the fact that some of it may be understood in this metaphorical way, because it is not difficult to distinguish between which parts might reasonably be read in this way and which parts are intended to be read literally (for example, the story of the Resurrection is clearly intended to describe a real event, and is not {as some would read it today} only a metaphor to make a deeper point about the special qualities of Jesus).

*Evolution and Design*. Is it true that evolution undermines the notion of design in the universe? To some it might appear that way until the deeper questions are examined more closely. The first point to make is that while evolution may explain the development of the species, this is not the only type of design that is evident in the universe. There are what philosophers call the ultimate questions: how did the universe come into existence, and how did the laws of physics that make science and life possible—this underlying design in nature— how did these come about? The key logical point of course is that evolution cannot answer these questions! We must acknowledge that it is a remarkable fact that the universe operates consistently according to a set of scientific laws, laws which are the *basis* of all scientific investigation. We discover such laws in nature and the patterns of regularity that they express make science possible. In this way, science presupposes them; it does not invent them, or create them in order to do science. These regularities in nature are already there and that is why we can do science at all. In a similar way, the theory of evolution logically cannot account for the origin of the universe. In order for evolution to occur, the universe—more specifically an environment operating according to scientific laws and existing material in the environment—must first of all exist! The questions "what must first be in place for evolution to occur?' and "what caused evolution?" should always give pause to those inclined to claim too much for the theory, to those who look at it as a kind of mystical explanation that somehow gives birth to the physical universe, and everything in it.

More generally, many theistic philosophers argue that because evolution cannot answer these crucial questions about the origin and nature of the universe, and so cannot answer ultimate questions about the origin of the species either, that it is no threat to religious belief. It is true that it would show that the biblical story of

[12] For further discussion, see St. Augustine, *On Genesis*, ed. by B. Ramsey (New York: New City Press, 2004); also Ernan McMullin, "Evolution and Special Creation," *Zygon*, 28.3 (Sept. 1993), pp.299-335; see also my "The Dispute between Plantinga and McMullin over Evolution," *American Catholic Philosophical Quarterly*, 86,2 (Spring 2012), pp.343-354.

Genesis was not literally true, but this point was accepted by many long before the theory of evolution came along, including by St. Augustine. This fact, however, does not affect the deeper philosophical points behind the creation story, that God created the universe and all life, for a purpose. Nor can evolution, advanced as an explanation for every fact about human beings, and so as an argument for naturalism, explain the origin of mind, or the nature of morality, or other key facets of human life. So, looking at the debate from the point of view of the best overall explanatory theory, the religious thinker holds that theism is the most rational option. Philosophers who argue this way hold that evolution was directed by God, or designed by God, and that human beings are, therefore, at the top of the evolutionary tree by design and not by accident.

*Evolution and Chance.* What about the supposed role of chance in the process of evolution? We must be very cautious about saying that the evolutionary process operates by chance for a number of reasons. First, (as I have argued elsewhere) it is far from clear that there is any element of chance in evolution, or biology, or more generally, in any domain of science.[13] This claim is not so controversial in physics, where we accept quite readily that causal processes are deterministic, and we allow no role for chance when we explain how things happen in the natural world, in technology, and in casual explanation more generally. We sometimes forget this point when we come to biology, and talk as if causal processes don't quite work the same way in biology as they do in physics. Indeed, some thinkers are inconsistent on this matter, arguing for determinism in physics and for indeterminism in biology![14] But my own view is that all of science is deterministic, and this means that when God created the universe and its ingredients, the end results of all the processes God set in place had to emerge because of the deterministic nature of these processes. This is true up until the appearance of human beings, who have free will and so are not subject to determinism. It is also possible, of course, that God could have intervened in the process and redirected or altered some of his planned causal chains (through miracles, for example), and claims for such intervention are best handled on a case by case basis. However, in the ordinary course of doing science, scientists operate with the assumption that there is no intervention by an agent or any chance involved whenever they present a causal explanation (for example, for why the Grand Canyon formed, or for why Mount Mayon erupted). All of this means that the species of *Homo*

[13] See my *Evolution, Chance and God*, *op. cit.*

[14] An example is the militant atheist, Jerry Coyne, who argues that biological processes involve a significant element of chance (i.e., for indeterminism) when discussing evolution, but for determinism when discussing free will; see his "You don't have free will," *The Chronicle of Higher Education*, March 18th, 2012.

*sapiens*, for instance, did not arise by chance, but by design. Second, some theologians disagree with me on this and hold that there may be room for an element of chance in the universe but that God still directs the overall outcomes. This view is more controversial but worth considering: it would mean, for instance, that perhaps God intended for an intelligent species with moral agency to evolve, but not necessarily in the biological form of *Homo sapiens*. A more extreme view regarding the role of chance in the universe (which I reject) would hold that God might not even know such things as whether a species like *Homo sapiens* would emerge, or even what the final outcome of the universe will turn out to be.[15]

Finally, it is also *quite remarkable* that the process of evolution has eventually given rise to conscious, intelligent observers who are moral agents, and who not only now *understand* the process of evolution, but who also have a significant measure of *control* over it, very strong arguments against the operation of chance in the universe (this argument is also part of the fine-tuning argument for the existence of an intelligent designer, God). It is significant that it is precisely the most conspicuous features of human beings—consciousness, intelligence, free will and moral agency—that have resisted scientific explanation, and that are extraordinary problems for naturalistic accounts of reality that rely on evolution. It does not seem reasonable to believe these remarkable features of human existence came about by chance. The significance of the fact that conscious, rational beings have evolved with free will that now have substantial control over the process of evolution should not be lost on us. It points to the fact that something remarkable is going on—to the existence of an overall intelligence behind the processes that operate in the universe.PS

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[15] We don't have space here to discuss this interesting view further, but for a fuller discussion see (from process theology) John Polkinghorne, *Science and Theology* (Minneapolis, MN: Fortress, 1998), and Arthur Peacocke, *God and the New Biology* (San Francisco, CA: Harper, 1986). From a Catholic perspective, see Cardinal C. Schoenborn, *Chance or Purpose?, op. cit.*; also Francisco Ayala, *Darwin's Gift to Science and Religion* (Washington, D.C.: Joseph Henry, 2007); also my *Evolution, Chance, and God*, *op. cit*, Ch.7.

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