

Evolution, Intelligent Design, and Faith

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Intro: As I mentioned this talk at the EJMA, Pastor Dan McMillan of San Juan Baptist asked if I was not going to begin with the bible. I answered that of course I was, but not by treating Genesis as a scientific treatise or a scientific historical account. I believe that the Bible is the Word of God, and that it inerrantly teaches us salvific truths, *if we read it as it was meant to be read*. As they were meant to be read, the creation accounts in Gen 1-2 teach clearly that 1) God is the creator of everything that exists; 2) God creates effortlessly a world that is good in all its manifestations; 3) God places humans at the center of creation as its kinsmen and caretakers; 4) Humans are created in the image and likeness of God, both male and female; 5) Humans are unavoidably social animals; 6) the emphasis on seven days is to ground the Sabbath observance. How God did this, is beyond the scope of the inspired writers or their writings.

I. Evolution:

A. MEANING OF THE WORD: The word evolution comes from the Latin *evolvere*, to turn out of. In some circles it is opposed to revolution, from the Latin *revolvere*, to turn back, to go back to a previous position. (In that etymological sense, neither the American, nor the French, nor the Russian revolutions were really revolutions, but more revolts, *turning against* what was the status quo.) At any rate, evolution means that some potentialities which were latent in a being have now so come to the fore that a new reality has come out of the old. In contemporary discourse, the word means the theory of the

evolution of species developed by Charles Darwin and his successors. To that we now turn.

B. BITS OF HISTORY:

In **1669** Niels Stensen, a Danish scientist and a Catholic priest, discovered in the mountains of Tuscany the fossil of a whale's tooth almost identical to that of a whale caught off of the coast of Livorno. He intuited that Tuscany must have been inundated in geological times by an ocean, and so wrote a book which founded the three geological sciences of paleontology, crystallography, and historical geology. In particular, he identified three different geological strata and proposed a long temporal sequence for the formation of the earth's crust.

In about **1740** the College de Sorbonne in Paris (a kind of semi-official French Holy Office) condemned the great French naturalist, Georges Buffon, for having proposed, from both the cooling rate of the earth and from the sequence of geological strata, that it took billions of years to form the crust of the earth.

About **1800** Georges Cuvier in Paris realized that the deeper fossils lay in the rock strata of the earth, the less they looked like living animals. Life's ascent, followed in the strata of the cliff face, broke an archaic belief that animals were the same now as on the day of their creation.

C. CHARLES ROBERT DARWIN (1809-1892) was born in Shrewsbury, England on Feb. 12, 1809, the same day as Abraham Lincoln. His father was a wealthy physician, with one of the largest medical practices outside of London. (His grandfather, Erasmus Darwin, had been a physician and a great scientist, poet, inventor, and general polymath.) His mother died when he was eight, and

he then attended a day school where he developed a passion for collecting shells and minerals. Charles, too, was expected to become a physician, but he couldn't stomach cadaver dissection nor surgery, and so he confessed to his father that he could never be a doctor. His father told him, "You care for nothing but shooting, dogs, and rat-catching, and you will be a disgrace to yourself and all your family."

Darwin went to Cambridge to study for a clerical career in the Church of England, but he was bored by the theology lectures. He found a mentor in a young professor of botany, the Rev. John Henslow, who encouraged him, after graduation from Cambridge in 1831, to take an extended sea voyage and exploration of the world outside of England. His role was largely to be a companion for Captain Robert FitzRoy, but gradually he edged the ship's senior surgeon out of the role as expedition naturalist on the HMS Beagle. Darwin always considered the Beagle voyage the defining experience of his life. The intended 3-year voyage stretched to 5 yrs, during which he circumnavigated the world, spending a good three years exploring the coastline, flora, and fauna of southern South America. On the Galapagos Islands, an archipelago 600 mi. west of Ecuador he carefully recorded how the finches there differed from island to island and from those on the South American mainland. He was puzzled also by differences in iguanas and turtles. He drew sketches of these and brought home specimens to England.

Upon returning to England in 1836 he arranged his notes and read voraciously in all fields of science. When he exhibited his drawings and specimens to naturalists, with their help he came to see that the differences were not variations within a single species, but indications of distinct species. He then began to question that God had specially created each species in the beginning. If God is an intelligent designer (1802, William Paley's

watchmaker God), why has there been so much tinkering with the original designs?

While pondering what caused such modifications within species, in 1838 he read Thomas Malthus, An Essay on the Principle of Population and found his answer. Malthus noted that human population growth is always limited by the food supply available, so there will always be a struggle among numerous offspring for the limited amount of sustenance. In this contest nature will ruthlessly “select” the strong and eliminate the weak. This gave him his idea of “*natural selection*.” In any living species the struggle for existence will allow favorable variations to be preserved, while non-adaptive ones will be eliminated. Within a population of finches, these accidentally endowed with beaks shaped to crush the kinds of seeds available in their habitat are more likely to survive than those not so lucky. And being able to survive, they will reproduce and pass on the genes for better shaped beaks to subsequent generations.

In 1838, then, Darwin put together his theory of evolution by natural selection in a short paper. In 1839, he married his cousin Emma Wedgwood. They had a long and happy marriage without any trace of poverty or scandal, producing 10 children, 7 surviving into adulthood. After a few years in London, they moved to a country house at Downe in Kent, some 16 mi. from the outskirts of London, where Charles spent the rest of his days, always in poor health from his time on the Beagle.

In 1842 he expanded his ideas on the origin of species by a process of natural selection into a 35 page paper, and developed that into a 230 page book in 1844. In that year, however, Robert Chambers anonymously published Vestiges of the Natural History of Creation, a quasi-scientific book supporting evolution. The scientific reaction to it was fierce, and this caused Darwin to

put his own MS on hold to build a stronger scientific case for evolution. He read voluminously in comparative anatomy and other related disciplines and published a series of monographs on geological issues and on the biological sub class Cirripedia.

Suddenly in 1858 he received from Indonesia an essay written by the young English naturalist Alfred Russell Wallace, containing an outline of a theory nearly identical to his own. Darwin's friends tactfully arranged a compromise in which Wallace's paper and some of Darwin's earlier writings on natural selection were read at the same Linnean Society meeting. Darwin then rushed his own ideas into print in 1859 in On the Origin of Species, which became an instant best seller, and an instant source of controversy. The controversy was mostly in scientific circles, from which Darwin, shy and plagued by poor health absented himself. In the June 1860 public debate held at Oxford, with more than 700 persons crowded into a lecture room, Darwin was conspicuously absent, his ideas defended by friends and long time supporters like Thomas Huxley.

Curiously, Origin did not draw the conservative religious ire that Darwin feared, because the book speaks of pigeons, dogs, beetles, and other forms of life, but says nothing of man. Huxley's Man's Place in Nature (1863) discussed human ancestry from the apes, and drew the wrath of the religious caste. By 1871 when Darwin finally published The Descent of Man and Selection in Relation to Sex the poison had already been drawn and remained focused on Huxley.

Darwin continued to publish on various themes until his death. After 1859 he learned of others who described some form of natural selection in obscure publications earlier in the 19th century, and in later editions of the book he acknowledged more than 30 predecessors in evolutionary theory. His own

religious identity has been much discussed, but it seems that he gradually evolved from a fairly devout believer in the Creator God to a Deist. Nevertheless, he was buried in Westminster Abbey in 1882.

D. PRINCIPAL TENETS OF THE THEORY OF EVOLUTION

1. Darwin's theory is remarkably simple: first, all forms of life descend from a common ancestor through gradual modification over the course of time. Second, this gradual modification, including the emergence of new species, is explained by natural selection: those organisms most able to adapt to their environments will be "selected" by nature to survive and produce offspring; the non-adaptive organisms will perish. Over a long period of time small adaptive changes can accumulate and bring about not only changes within a given species (microevolution), but at times new and distinct species as well (macroevolution).

2. What was missing in Darwin's theory was a clear understanding of heredity. He erroneously supposed that the features of organisms are shaped by a "blending" of parental characteristics in the blood. In 1866 the Benedictine monk Gregor Mendel (1822-84) demonstrated that the various features of organisms, such as the color of sweet pea blossoms, had to be transmitted by way of discrete units (what we now call "genes"), rather than by a mysterious mixing of parental traits. What Darwin referred to as random variations are now called undirected genetic mutations. By the 1940s genetics had joined up with Darwin's evolution in what Julian Huxley called, the "Modern Synthesis," the theory known today as *neo Darwinism*. Genetics provided the

understanding of the evidence of mutation which has made evolution such a strong scientific theory today.

3. Neo-Darwinian evolutionary theory, then, is comprised of 4 main points:

- a. All life on earth has a common origin: in the distant past an original life form gave rise to all subsequent life forms;
- b. All living things are related to one another in varying degrees through common descent (sharing common ancestors);
- c. All life forms (species) have developed from other species;
- d. Random heritable genetic mutations drive evolution of one species into another. Mutations that result in a survival advantage for organisms that have them are more likely to spread and persist than mutations that do not result in a survival advantage. The three main mechanisms of evolution are mutation, natural selection, and genetic drift.

1) A mutation is any change in the DNA base sequence (genetic information) of a gene, but only heritable mutations, those occurring in the gametes (reproductive cells) or the cell lineage contributing to the gametes, are involved in evolution. These germinal mutations can result from many factors, including natural background radiation, chemical mutagens, and viral infection. Because only a small portion of the genetic sequence of the DNA molecule is used to code for proteins, most mutations do not result in new traits. Of the mutations which do result in new traits, most are harmful: they interfere with an organism's physiology or otherwise reduce its adaptability to its environment. However, sometimes just by chance, a mutation will occur which produces a trait that enables an individual to adapt better to its environment, and so to produce more offspring.

2) Natural selection is the process by which traits that provide a reproductive advantage tend to increase in frequency in a given population over time. A reproductive advantage may arise from differences in survival, in fertility, in rate of development, in mating success or from some other aspect of the life cycle. Any trait that increases the chances than an individual will reproduce is providing a reproductive advantage, even if this comes at the expense of the survival of the individual. For example, possessing a certain coloring pattern might increase an individual's chance of attracting a mate, but might also increase this individual's visibility to predators.

3) Genetic drift = the genetic understanding of chance elements in evolution. One of two or more gene alternatives at a site on a chromosome (gene package) is known as an allele. Genetic drift occurs in all alleles, including those that result in an increase or decrease in reproductive fitness (natural selection). However its effects are greatest with alleles that are neutral with regard to reproductive fitness. Although such neutral alleles have an equal chance of being passed on to each subsequent generation, sampling error dictates that each allele will be passed on at a slightly different frequency than their alternatives. Over time this will lead to a change in the overall frequency of each allele. Eventually, all but one of the alleles will be eliminated from the gene pool. The smaller the population, the greater impact genetic drift will have on a population's genetic makeup. The easiest example to understand this effect is to visualize two kinds of accidental random events that influence allele frequency:

a) *Bottleneck effect*: Suppose a wildflower population which consists of only 25 plants. Assume that 16 of the plants have the genotype AA for flower color, 8 are Aa, and only 1 is aa. Now imagine that three of the plants are accidentally destroyed by a rock slide before they can reproduce. By chance,

all 3 plants lost from the population are AA individuals. This would alter the relative frequency of the two alleles for flower color in subsequent generations. This is a case of microevolution caused by genetic drift. Disasters like earthquakes, floods, or fires may reduce the size of a population drastically, killing victims unselectively. The result is that the small surviving population will not represent the original population in its genetic makeup---a situation known as the bottleneck effect. Genetic drift caused by bottlenecking may have been important in the early evolution of human populations when calamities decimated tribes. Or better: the northern elephant seal was hunted almost to extinction. By 1890 there were fewer than 20 animals, but the population now numbers more than 30,000. As predicted by bottleneck genetic drift, there is very little genetic variation in the elephant seal population, and it is likely that the 20 animals that survived the slaughter were more “lucky” by chance than “fit.”

b) *The founder effect* is a genetic way of describing the effect of small initial populations and inbreeding. It is probably responsible for the virtually complete lack of blood group B in American Indians, whose ancestors arrived in very small numbers across the Bering Strait during the end of the last Ice Age (about 10,000 years ago). More recent examples can be found in religious isolates like the Dunkers and Old Order Amish, sects founded by small numbers of migrants from their much larger congregations in central Europe, and who have since remained closed to immigration from the surrounding American population. Another example: all the cattle on Iceland are descended from a small group brought to the island more than 1000 years ago. The genetic makeup of Icelandic cattle is now different from that of their cousins in Norway.

To conclude: It is now wrong to consider natural selection as the ONLY mechanism of evolution and probably wrong to think of natural selection as the predominant mechanism. Population geneticists have been arguing about the relevant influence of these two mechanisms for over 50 years. It is probably safe to say that the relative importance of genetic drift or natural selection depends largely on estimated population sizes.

E. PROBLEMS THAT EVOLUTION HAS RAISED FOR TRADITIONAL (CHRISTIAN) THEOLOGY:

If you are as old as I, you probably remember the evolution/faith debate as centering on the question of whether humans were descended from apes. Actually, evolutionary theory raises many more problems for those of Christian faith:

1. It offers a whole *new story of creation*, one that seems to conflict with the biblical accounts;
2. It appears to diminish, if not eliminate *the role of God* in creating the diverse forms of life;
3. Human descent from “lower” forms of life appears to question age-old beliefs in *human uniqueness and ethical distinctiveness*;
4. The prominent role of chance seems to destroy the notion of *divine providence*;
5. Evolution seems to rob the universe *of purpose*, and human life of any permanent significance;
6. Its account of human origins seems to conflict with the notion of *original sin*, the Fall, and so to remove any need for a savior.

Because Western civilization has been built on Christian culture, Darwin’s ideas came into the Western world, says Andrew Dickson White, “Like a

plough into an anthill.” It is not surprising that over the past century, there have been numerous attempts to refute Darwin’s explanation of the origins and descent of the living world.

II. American Religious Responses to Evolutionary Theory:

American religious responses to evolutionary theory have fallen into two groups: creationism and intelligent design.

A. CREATIONISM: All theists accept the doctrine of creation, but “creationism” refers to the beliefs of biblical literalists who reject evolutionary biology. In general creationists fall into three classes:

1. “Young earth” creationists hold that about 6000 years ago God created the world in six calendar days (as in Gen 1:1-2:3). Genesis is historically accurate, including the Fall. The story of the Flood helps to explain the catastrophes described in the fossil record. Thus evolutionary theory must be false, & even blasphemous.

2. “Old earth” creationists accept current scientific findings that the earth is 4.5 billion years old but they hold that the various kinds of life could not have been created by natural processes from inanimate stuff, but only by God’s “special creation.” Every distinct species of life was effected by God’s direct creative intervention some time in the remote past, and more or less in its present form. New species cannot arise from older ones; clearly human beings with immortal souls could not have evolved from nonhuman species. Rather Adam & Eve were created perfect from the beginning, and the imperfections of our world derive from original sin, which is why humans and the world need a savior.

3. “Scientific” creationists go further into fundamentalism, insisting that Genesis creation stories give us more reliable *scientific* information about the world than does evolutionary theory. They reason that if the Bible is divinely

inspired, it must be literally (factually, historically, scientifically) inerrant. Further, they argue that since no one has ever observed (“measured”) the evolution of one species into another, it is no more scientific than the Bible. Further, they argue that evolution is only a “theory,” not an established “fact.” Thus we have to choose between two scientific theories, that of evolution and that of the Bible. No contest! Consequently, they argue for a balanced treatment in high school biology classes between two scientific theories of origin.

B. INTELLIGENT DESIGN reached maturity in the 1990s through the work of Michael Behe, a Catholic biochemist, William Dembski, a Protestant mathematician and philosopher, and Jonathan Wells, a molecular and cell biologist. Their program is supported by the conservative think tank in Seattle, The Discovery Institute. They hold that various aspects of the biological world point to the direct design of God and so dispute evolution’s emphasis on blind chance in the evolutionary process. Some illustrations of their work:

1. Darwin himself acknowledged, “If it could be demonstrated that any complex organ existed which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down.” Behe claims that some systems are *irreducibly complex*: they are composed of multiple complex systems that must all be functioning at one point in time for the system to exist. They cannot have evolved from prior “selected” simpler processes. If any one of the complex systems is removed, the whole system ceases to function. Behe names as examples of such irreducibly complex entities, cell organelles, the flagella of bacteria, and the more than 20 distinct and intricately related biochemical sequences needed to initiate and stop blood clotting. In short, some biological processes appear to

look intelligently designed because they really are designed by external intervention (of God).

2. Dembski argues that some events manifest *specified complexity*. An event exhibits specified complexity if it is contingent and therefore not necessary; if it is complex and therefore not easily repeatable by chance, and if it is specified by an independently given pattern. Such specified complexity manifests design by an intelligent agent.

3. Jonathan Wells grants that natural selection can modify existing features, but only within established species. He asks, “Where is the evidence that selection produces new features in new species?”

C. EVALUATION OF THESE REJECTIONS OF EVOLUTIONARY THEORY

The debate between evolutionists, creationists and intelligent designers is hopelessly confused without

1. The Distinction between the methods of science, philosophy, and theology

a. the method of *natural science* is confined to *measuring matter*, or at least the movements of matter which can be tested in space and time. Thus evolutionary biology cannot determine that there is an infinite (i.e. spiritual) Creator, nor can it find an encompassing purpose in the universe. Nor can it deny that there is a transcendent intelligence at work in the universe.

Whenever scientists claim that science has done away with God, they have exceeded the limits of their science and have slipped into a materialist philosophy, without the philosophical tools to argue their case. (A classic recent example of this error is Richard Dawkins’ The God Delusion (Houghton Mifflin). Dawkins is very bright, one of the leading theoreticians of evolutionary biology, but he is a philosophical simpleton, and so is unaware

that his book makes him a laughing stock among serious philosophers.) Much of the Church's protest against evolutionary biology is a protest against this materialist philosophy. In this, ID is right on target.

b. *philosophy* too deals with experience of the material world in which humans live, often as it has been explained by science, but it also deals with the spiritual world which is manifested in the process of human thought and love. It is philosophy, specifically metaphysics, which deals with the transcendent dimensions of life, where one's methodology properly deals with all-encompassing purpose and design. Philosophy asks questions like, "Why is there something rather than nothing?" "How can contingent reality imply a necessary origin or foundation?" "How can there be order without an Orderer?" A materialistic philosophy would deny that there is a Creator of the universe. In my philosophy, that simply means the philosopher has not attended to all the data of his experience, or has not the tools to explain what he has experienced. A philosopher with an adequate starting point and method will conclude that the data of biology, raised to a transcendent view of life, reveals an infinite intelligence at work in the design of the cosmos, and a transcendent source of its being.

c. When faith enters the method, one begins to do *theology*, which, in the Christian view, means that the Infinite Being who designed and created the universe is also the all-loving God who not only became flesh in Jesus of Nazareth, but revealed a God who is not a distant Deity, but the servant of his creation for which he laid down his life out of love.

Once we have accepted these distinctions, we can proceed to an analysis and critique of creationism and intelligent design. The first thing we note is that neither creationism nor intelligent design is science, but theology and philosophy.

2. Creationism.

a. “Young earth” creationism, of course, has to deny all the data of science, especially the patent fossil record of transitional forms, and even the geological and cosmological data of the long evolution of the cosmos. Young Earth Creationists are members of the Flat Earth Society. They are willing to do this because they take the Bible not for what it was meant to be, religious literature, but literally as a historical record, and so turn its data into science. In short, you are left with what my tradition calls *sacrificium intellectus*, denial of human intelligence and rationality.

b. “Old earth” creationism at least can deal with the 4.5 billion year age of the earth, and it can accept microevolution. But God must be the direct cause of every evolution of a new species, and it can accept only the devolution of the human species from the perfect Adam and Eve of the garden, to the wretched creatures who need a savior from their sins. But in the end, they too must deny parts of the fossil record, and they do so because of their theology, which must require a devolution in order to require a savior.

c. But “scientific creationism” is the most explicit of all about turning religious literature into science. Whether they take the “days” of Genesis 1 as chronological days or geological periods, they do violence to the literary character of the text, and are false to both the Bible and to science. To think that creationism is scientific is to misunderstand both science and the Bible. In the Catholic view the Bible has no intention of giving scientific information, and so the idea that creationism ought to be taught in high school biology is absurd.

d. The ultimate problem of all creationists, is a faulty understanding of how the Bible is Word of God in human words. They cannot accept that God reveals Himself and His world according to the ability of humans to understand at a

given space and time. Their anachronism disrespects both man and God. They create God in their own image and likeness, according to their own superimposed understanding of days and times, and so fall short of the majesty of God who exceeds our understanding in mysterious ways.

Worse, creationists bring into disrespect the notion of belief and the idea of God. The chief Darwinian opponents of religion reject the Bible because it does not deliver science. They share with creationists the assumption that the Bible can be evaluated purely in terms of scientific criteria. When Creationists reduce the Bible to the status of a scientific source it cannot be respected by scientists for what it really is, a religious truth about the relationship of God and this world.

3. Intelligent Design is deficient in two realms---as science, and in its mixing up of science and philosophy.

a. as science: Behe's theory of irreducible complexity has been refuted by a Catholic biologist, Kenneth Miller, who shows that the components of Behe's examples did function in an earlier stage of evolution before they were gradually assembled into the complex whole to which Behe points. Further, neither Behe nor any of the other intelligent designers have actually done research to test their hypotheses, much less produced data that challenges the massive evidence accumulated by biologists, geologists, and other evolutionary scientists. Thus they do not make their appeal to the scientific community, but to the general public and to politicians.

b. My main difficulty with ID is that these scientists confuse philosophy, theology, and science. Their attack, according to Dembski is not on science but on the philosophy of naturalism. The founder of the movement, Phillip E. Johnson (Darwin on Trial, 1991) declared in 1996, "This isn't really, and never has been, a debate about science. It's about religion and philosophy."

Dembski puts it, ID "...is just the Logos of John's Gospel restated in the idiom of information theory." But its proponents insist that what they are doing be taught in science classes! Since they do not show the distinctions between the two in their works, they leave the reader with the impression that the honest biologist, as biologist, would conclude to the existence of a supreme intelligent Designer.

III. Faith Responses: falls into two categories:

A. SEPARATISM: The separatist keeps his religious life and theology uncontaminated by his evolutionary theory. Separatism insists that science itself has nothing to say about larger meaning, values, or God. The problem with this approach is that it separates the idea of God from God's creation, where God reveals himself. This runs contrary to the incarnational thrust of Christian faith.

B. ENGAGEMENT means that the faithful person wants his science to speak to his theology and his theology to his science. This leaves her or him with the task of assembling a religious view, a theology which can see its God as the Creator of an evolutionary process. This is not as novel as one might think!

1. Predecessors:

a. In 414 AD St. Augustine, bishop of Hippo advanced an evolutionary theory for the creation of the world. According to his neo-Platonist philosophy, God first created the world in *rationes seminales* (derived ultimately from the Stoic λογoi σπερματικοι), seeds of things which would eventually evolve into the creations of the vegetation, animals, and humans.

b. Cardinal Newman commented on Darwin in 1868, "The theory of Darwin, true or not, is not necessarily atheistic; on the contrary, it may simply be suggesting a larger idea of divine providence and skill."

c. Pope Leo XII in his encyclical *Providentissimus Deus* (1893, i.e. 11 years after Darwin's death) pointed out that the Bible does not teach science, but rather the things that pertain to human salvation.

c. Pope Pius XII, *Humani Generis* (1950) stated there was no opposition between evolution and Catholic faith about man and his vocation. He conceded that the human body may well have evolved over a great period of time, but he insisted that that God creates each human soul directly.

d. In 1981 speaking to the Pontifical Academy of Sciences, Pope John Paul II rejected creationist literalism, and in a significant address to that same body in 1996, he asserted that the evidence for biological evolution is convincing, making evolutionary theory no longer a hypothesis but a scientific theory. (He maintained, however, Pius XII's immediate creation of each human soul.)

2. Elements of a Christian Theology of Evolution

a. The Bible is to be interpreted not as scientific history, nor as natural science. Both of these views are anachronistic and do violence to God's willingness to reveal to humans in terms that their culture enables them to understand. The Bible is religious literature which conveys through myth, legend, story, parable, metaphor, and, indeed, contemporary notions of history, the proper relationships of humans with God and the universe. In short, Gen 1-3 is not history or science; it is a myth that is truer than history. Thus Catholics adhere to the truths Genesis teaches through the literary forms of its own day, but do not press it to answer questions which only contemporary science can answer. No contradiction. (cf. II, E. 1)

b. There is no conflict between Gen 1-3 placing humans at the top of creation and evolution from lower to higher species. Teilhard de Chardin, the Jesuit paleontologist who was a devout exponent of evolutionary theory, places

humans at the pivotal point in the evolution of the noosphere, and the eventual evolution of the cosmos into the Omega point which is Christ. (cf. II. E. 3, 5)

c. Nor does evolution achieved through random processes rob the universe of divine providence or divine purpose (II, E. 4, 5). In an article in the recent *Theological Studies*, Patrick Byrne discusses design and randomness:

1) Design: of course scientists discover intelligible patterns in data. That is of the essence of scientific method. But for a scientist as scientist to affirm a designer of such a design, he would have to observe the designer at work (e.g. the designer of new pharmaceuticals). Absent that observation, the scientist does not conclude to the designer. That is why Behe tries to show that evolution by chance mutations cannot produce a given result, and so the baffled scientist must try another avenue. But the other avenue is not by way of introducing an interventionist designer, but by finding a way in which the Designer can operate through evolutionary processes.

2) Randomness: a notoriously difficult word to define. (A random event). Randomness means that a whole series of events does not conform to some intelligible pattern or rule. Thus randomness is a relational concept: relative to some pattern (say the curve on a graph), actual events deviate from it. But what appears random in relation to one intelligible pattern, may be explained as conformity to a more complex pattern. And so Karl Popper has argued it is impossible to establish by empirical means alone, that a given series of events is absolutely random and conforms to no conceivable intelligible pattern. Now the kind of randomness that evolutionary theory requires is that biology cannot find any pattern to the various events of development of life. They might explain a mutation or two, but the whole process by which environment, genetic drift, gene mutation, random accidents occur over time in the development of a species cannot be plotted or

demonstrated. But empirical science (biology) cannot say that there is no pattern at all.

d. Therefore, if you can conceive of God as the Infinitely perfect Being who is capable of the unrestricted act of understanding, the way is open to a God who conceives of a design for everything which is set in place when he creates a world full of potential to evolve randomly into that design. Theology a la Lonergan, then, places the design not in an intervention at various points in the evolutionary flow, but in the potentialities structured into the cosmos at the moment of creation and in the ongoing process of that randomly unfolding creation. Thus the hand of God is not seen directly in evolutionary process, but in the way in which God stacked the cards at the beginning of the game and set the rules by which the cards are dealt. Cosmology's 17 constants which ground the anthropic principle can serve as an example of God's creative providence in evolution.

3. Some Gains for Christian Faith in Such an Evolutionary God

a. The World becomes not the quarry to be mined, but the womb, indeed the very stuff of our human being. Our human history begins with the big bang (quarry to be mined), the formation of carbon atoms in space, the cooling of the earth's crust, the emergence of life out of the primeval waters, the evolution of animals, mammals, and primates. Since we share DNA with all life forms--- the world is our kin. Further, it is the place where God is still present, actively creating ever new forms where His goodness and beauty can be found (*creation continua*). The world's own unfolding of its potentials is our cosmic creation story, to the end of evolution which lies ahead of us (*creatio nova*).

b. Humanity is still the linchpin of creation, where the material world becomes conscious and loving. Further, as conscious and loving, it is the

place where God's grace becomes manifest and progressive in the building of the reign of God on earth. With conscious cooperation with the love of God, evolution continues in a bright new way, although it still lurches down cul-de-sacs in the way that pre-Christian evolution progressed.

c. God's image is the one most changed by evolutionary theory. God is no longer the designer of a stable and fixed design in the past, but the source of novelty and surprise. Now no longer the God who created each separate species at the beginning of time; God is the unrestricted act of understanding and loving who creates a much larger canvas in which the world's potentials evolve randomly into what He had intended from the beginning. This is the God "who makes all things new" (Is 43:19; Rev 21:5). This is an image of the creator far more expansive and exciting than the old image. How it all works out we do not know, because the future will be the revelation of what has been going on in our past and our present. God is now no longer the past of creation and redemption, nor even the God acting by grace in our present, but the God of the future. He is not just "up above" but "up ahead," graciously pulling the world and us into his future.

d. Christ is the linchpin who unites past, present, and future. He is the Word through which the big bang's potentials were created, the God who is the summit of earth's potentials in the body of Jesus of Nazareth, the goal to which all creation strives (the omega point of full socialization and loving).

Conclusion: from 1 Cor 3:21-23: "So let no one boast about human beings, for everything belongs to you---Paul or Apollos, or Kephass, or the world or life or death, or the present or the future: all belong to you, and you to Christ, and Christ to God."

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“Evolution is ‘only a theory’” mistakes what *theory* means in the sciences. Common speech often uses theory for an unproven or even untested guess. (Unfortunately, sometimes even scientists make this blunder: the much heralded string theory in physics is only a hypothesis; not only has it never been tested by experiment, but its proponents cannot even think of a possible test for it!) In science, one begins with a hypothesis which might explain the data, and then experiments are devised to test the hypothesis. If the hypothesis does predict and explain the resulting test data, it eventually becomes a theory. Science has no greater certitude than such theories. On the other hand, all scientific theories are revisable. A better expression for theory might be “Today’s best scientific explanation of the data available today.” (George V. Coyne, S. J.)

Since its alliance with genetics, evolution is a theory which has been tested and verified by experimental science.

“No one has ever observed evolution taking place.” Wrong: evolutionary changes have been observed in bacteria, finches’ beaks, fruit flies, and peppered moths. Further, look at the tremendous variation in *canis familiaris*, the domestic dog. But this is only microevolution. The problem is that not only no human, but perhaps historical mankind, has not lived long enough to perceive the evolution of one species to another. No one observed the Hawaiian islands being formed by volcanic activity, but today we accept that they were so formed.

“Gaps in the fossil record point to God’s special creation of new species.” Evolutionary theory implies that some transitional forms would point to the process under way. But in many supposed evolutions of species, such transitional forms do not exist. This non existence is called a gap. Scientists respond by saying that we do have examples of many transitional forms. In anthropology we see the descent from primates of Australopithecus and Homo Erectus, quite certainly transitional forms in the evolution of humans. That we do not possess all transitional forms can easily be explained by two factors: 1) Only a very small number of bones become fossilized, and only a very small fraction of those fossilized bones get discovered by paleontologists; 2) TdC pointed out that the beginning of any new species will be so fragile that records of its appearance will easily be erased. We should not expect to find many transitional forms.

Still proponents of evolutionary theology like Teilhard and John Haught seem to me to mistake an important element which the Popes have consistently made. Spirit does not evolve from matter; spirit is not the inwardness of all matter; there is no spiritual inwardness in matter, not even in dogs. Humans had to be created by a direct intervention of God.

The Anthropic Principle: “The seemingly arbitrary and unrelated constants in physics have one strange thing in common---these are precisely the values you need if you want to have a universe capable of producing life” (Patrick Glynn, God, the Evidence). There are at least 17 constants of modern physics which had to be perfectly calibrated just as they are in order to produce a universe with a planet just like ours, capable of producing not only life, but intelligent life.

For example:

- If the ratio of the mass of the proton to the electron were only slightly different, the sun would have burned up its thermonuclear fuel before earth or any planets could form.
- Likewise, if the constant of gravity were slightly different, stars would be born and die so rapidly that there would not be any possibility of forming planetary systems.

- The nuclear weak force is 10²⁸ times the strength of gravity. Had the weak force been slightly weaker, all the hydrogen in the universe would have been turned into helium (making water impossible).
- Unique among the molecules, water is lighter in its solid than in its liquid form—it floats. If it did not, the oceans would freeze from the bottom up and earth would now be covered with solid ice. (This property in turn is traceable to the unique properties of the hydrogen atom.)

Thus our universe is “fine tuned” to produce intelligent life.

Besides these constants, there meteorological factors necessary to produce life: if our planet did not have a moon to balance its spin, ... if our planet did not have Jupiter, with its gasses, to sweep away the asteroids and comets, life would be crushed by these explosions on earth.