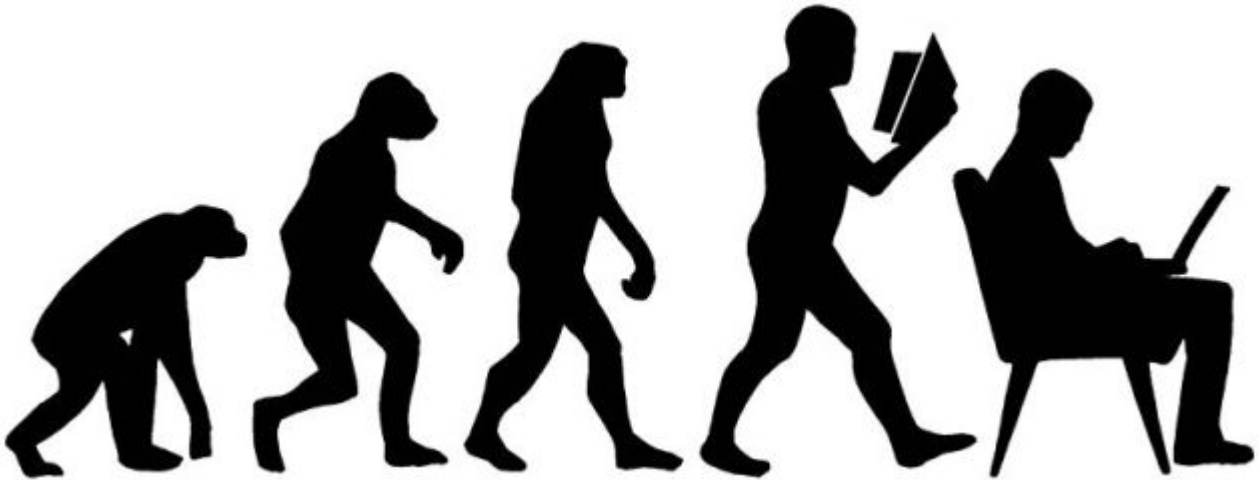


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The Evolution of Thinking Man
from [Wikimedia Commons](#)

“Through his Word and wisdom he created the universe, for by his Word the heavens were established, and by his Spirit all their array. His wisdom is supreme. God by wisdom founded the earth, by understanding he arranged the heavens, by his knowledge the depths broke forth and the clouds poured out the dew.”

—St. Theophilus of Antioch, [Letter to Autoylcus](#)

Evolution: *“The process by which different kinds of living organism are believed to have developed from earlier forms during the history of the earth.”*

—Oxford English Dictionary (OED)

Evolution: *“The gradual development of something.”*

—Oxford English Dictionary (OED)

SECTION 1: Evolution—Dogma and Doctrine

1.1 DEFINITIONS OF EVOLUTION, AND WHAT THE CATECHISM SAYS:

According to the Oxford Dictionary quotes above, there are two different definitions of “evolution.” The first applies to the development of living things; the second is more general and might be taken to apply to the development of the universe, cosmology after the Big Bang. I’ve discussed the second in Essay 3, “Creatio ex Nihilo” and will only say a few words here about that, arguing against geocentrists and the “Young Earth” Creationists who propose a universe only a few thousand years old, with everything (including the fossil record) instantly created as in Genesis 1, with the sun and stars revolving around the earth.

“The Catholic Catechism (CCC) and the Encyclical Letter, *Humani Generis*, outline the position the Catholic Church holds on evolution and the corresponding theological implications.

The Church has no position on evolution *per se*, other than evolution must ultimately be directed by God; it is not the result of random effects, blind chance, uncontrolled by God: *“Nothing exists that does not owe its existence to God.”*

—(CCC 338)

Evolution may be a “secondary cause”, i.e. a means whereby God directs change:

“God is the first cause who operates in and through secondary causes.”

—(CCC 308)

1.2 POPE PIUS XII AND POPE ST. JOHN PAUL II ON EVOLUTION

Pope Pius XII made a distinction between the body of man and his soul. The body might be a product of evolution, but the human soul is specially created. It did not evolve, and, unlike our bodies, it was not inherited from our parents.

*“...the teaching authority of the Church does not forbid that, in conformity with the present state of human sciences and sacred theology, research and discussions...take(s) place with regard to the doctrine of evolution, in as far as it inquires into the origin of the human body as coming from pre-existent [sic] and living matter [but] **the Catholic faith obliges us to hold that souls are immediately created by God.** [emphasis added]*

—Pius XII, *Humani Generis*)

Pope St. John Paul II made a strong effort to end the putative war between science and the Church (see Chapter 3). As part of this work, in 1996 he set forth the Church’s position on evolution before the Pontifical Academy of Sciences. In this address he expanded on the doctrine set forth by Pope Pius XII in his encyclical *Humani Generis*, and asserted, along with Pius XII, that the soul of man is endowed by God (the Holy Spirit) and not materially constructed:

*“It is by virtue of his eternal soul that the whole person, including his body, possesses such great dignity. Pius XII underlined the essential point: if the origin of the human body comes through living matter which existed previously, the spiritual soul is created directly by God (“animas enim a Deo immediate creari catholica fides non retimere iubet”—*Humani Generis*).”*

—[Address to the Pontifical Academy of Sciences, 1996.](#)

He also showed much insight on the scientific aspects of evolution, commenting that while evolution (the descent of species) is a fact, there is more than one theory-mechanism-proposed to explain evolution.

“As a result, the theories of evolution which, because of the philosophies which inspire

them, regard the spirit either as emerging from the forces of living matter, or as a simple epiphenomenon of that matter, are incompatible with the truth about man. They are therefore unable to serve as the basis for the dignity of the human person.”
—*op.cit.*

It is unfortunate that both scientists and lay persons do not share Pope St. John Paul II's understanding but equate the Darwinian model for evolution—"survival of the fittest"—with evolution, the descent of species. And as with his apology for the Galileo affair, the liberal media made much of his acknowledgement that evolution is a fact, as a reversal of the Church's position. However they neglected the historical and theological context which he brought to that statement.

1.3 CATHOLIC DOGMA ON MONOGENESIS AND ORIGINAL SIN

A lynchpin of Catholic Dogma is "Original Sin", the idea that the first man and woman (Adam and Eve) disobeyed God's edict and thus separated themselves from Him. According to the Catholic Catechism:

"The account of the fall in Genesis 3 uses figurative language, but affirms a primeval event, a deed that took place at the beginning of the history of man. Revelation gives us the certainty of faith that the whole of human history is marked by the original fault freely committed by our first parents."

—CCC 390

Monogenesis supposes that humans descend from one pair of ancestors, male and female, as opposed to polygenesis, that many humans were ancestors. That humans descended from only two is a cornerstone of Catholic dogma on original sin. As set forth by Pope Pius XII,

*“For the Christian faithful cannot maintain the thesis which holds that either after Adam there existed on this earth true men [emphasis added] who did not take their origin through natural generation from him as from the first parent of all, or that ‘Adam’ signifies a number of first parents. **Now it is in no way apparent how such an opinion can be reconciled with that which the sources of revealed truth and the documents of the magisterium of the Church propose with regard to original sin,** [emphasis added] which proceeds from a sin actually committed by an individual Adam and which, through generation, is passed on to all and is in everyone as his own.”*

—Pope Pius XII, *Humani Generis*

Now, there is a conflict between Pope Pius XII’s statement and what scientific findings about evolution, deduced from genetics tell us (see Sec.). That conflict can be resolved, however, following his and Pope St. John Paul II’s distinction between body and soul. I’ll repeat these:

*“...with regard to the doctrine of evolution, in as far as it inquires into the origin of the human body as coming from pre-existent and living matter [but] **the Catholic faith obliges us to hold that souls are immediately created by God.**” [emphasis added]*

—*op. cit.*

“...if the origin of the human body comes through living matter which existed previously, the spiritual soul is created directly by God.”

—Pope St. John Paul II, [“Address to the Pontifical Academy of Sciences.”](#)

1.4 KENNETH KEMP, TEILHARD DE CHARDIN, C.S. LEWIS ON MONOGENESIS AND ORIGINAL SIN

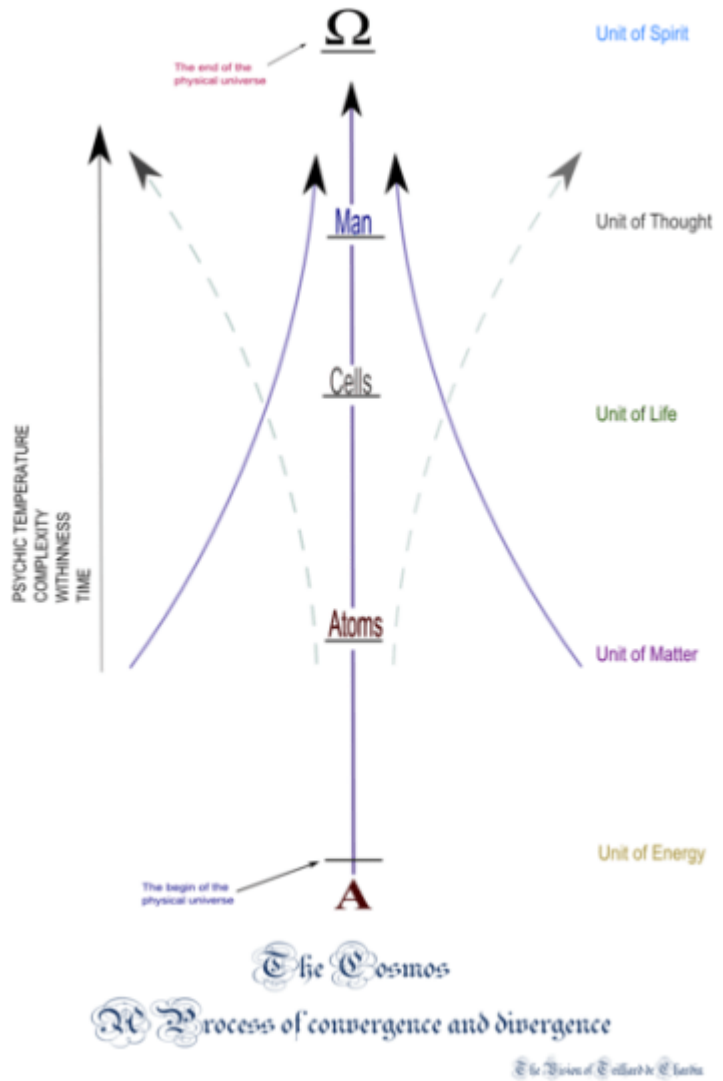
This distinction between material body and spiritual soul offers a way to reconcile biological polygenesis (many human ancestors) and spiritual monogenesis. Kenneth Kemp has explored this at length, in his article [“Science, Theology and Monogenesis.”](#) I’ve discussed his proposition in a blog post, [“Did Neanderthals have a soul?”](#)

Catholic dogma states that souls are not inherited but bestowed on each human at the moment of conception. So it is entirely possible that God bestowed souls on two humans who were similar physically to other humans who had not been given souls. And these were the humans who committed Original Sin.

Teilhard de Chardin, a Jesuit anthropologist, proposed another way to reconcile evolution with monogenesis and Original Sin. He gave a theological interpretation of evolution: it is directed toward an Omega Point, which is Christ. (See the illustration on the right.)

His notion of Original Sin, which was condemned by some Church authorities, is one that begins with the beginning of the Universe, as a struggle to become united with Christ. The article, [“Evolution and the Problem of Original Sin”](#), gives a more detailed exegesis.

I think C.S. Lewis had a better analysis in the first of his Space Trilogy, [“Out of the Silent Planet.”](#) The three intelligent species on Mars knew God, were not separated from Him. They knew when they were to die, but were not afraid of death, since they knew they would be in an afterworld. Here is, I think, an insight into how the Fall brought about death: to not know that we would be with God after we die, to be uncertain



Teilhard de Chardin's Vision of Evolution toward an Omega Point, Union with Christ from [Wikimedia Commons](#)

about what would happen to us when we die—that is the true enormity and sadness of mortality.

1.5 THE “LITERALISTS” INTERPRET SCRIPTURE: NO EVOLUTION

“The plain and obvious sense of these verses [Gen 1:14-19] is that God created the celestial bodies immediately and instantly, solely by His own omnipotent power and without support from natural processes over long ages of time as the idea of cosmic evolution suggests. That this is indeed the way the Lord created the universe is confirmed by the commentaries of the church fathers like St. Ephrem the Syrian...”

—Dr. Thomas Seiler, [Cosmology, Thermodynamics and the Christian Doctrine of Creation \(KolbeCenter.org\)](#)

In the quote above, Dr. Seiler speaks for many Christians (Catholics and Protestants)—let’s call them “literalists”— who believe that Scripture must be taken as literally true. I’ve discussed this issue in several blog posts, [“God’s Periodic Table and Evolution,”](#) [“...Is Belief in Cosmology and Evolution Heretical,”](#) [“You Lie Said the Geocentrist to the Catholic Scientist.”](#) I’ll summarize the arguments of the literalists and my rebuttals below.

The first argument of the literalists, primarily used by fundamentalist Protestants, is that since Scripture is Divine Revelation, the word of God, the cornerstone of Christian faith (“*Sola Scriptura*”) it must be taken as literally true. And this applies not only to the evolution of living things (definition 1, above), but also to the evolution of the universe from the Big Bang. As Martin Luther put it:

“People give ear to an upstart astrologer [Copernicus] who strove to show that the earth revolves, not the heavens or the firmament, the sun and the moon. Whoever

wishes to appear clever must devise some new system, which of all systems is of course the very best. This fool wishes to reverse the entire science of astronomy; but the **sacred scripture tells us that Joshua commanded the sun to stand still, not the earth.**”[emphasis added]

—Martin Luther, “[Table Talk of Martin Luther](#)”

The second type of argument, used by Catholics (some of them geocentrists), is that Papal Encyclicals, Proceedings of Ecumenical Councils, and Commissions established by Papal authority have decreed that the biblical story of creation in Genesis is literally true. Since these decrees have the full force of the Magisterium, we as faithful Catholics are obliged to believe them. I’ll list them below.

“God...creator of all visible and invisible things, of the spiritual and of the corporal; who by His own omnipotent power at once from the beginning of time created **each creature from nothing**, spiritual and corporal, namely, angelic and mundane, and finally the human, constituted as it were, alike of the spirit and the body.” [emphasis added]

—Lateran IV (1215, D.428)

“If anyone does not confess that the world **and all things** which are contained in it, both spiritual and material, **were produced, according to their whole substance, out of nothing by God**; or holds that God did not create by his will free from all necessity, but as necessarily as he necessarily loves himself; or denies that the world was created for the glory of God: let him be anathema.” [emphasis added]

Vatican I (1870, Article 5).

“I: Do the various exegetical systems excogitated and defended under the guise of science to exclude the literal historical sense of the first three chapters of Genesis rest

on a solid foundation?

Answer: In the negative. ”

—[1909 Pontifical Biblical Commission on Genesis](#) (instituted by Pope Leo X)

I answer these arguments below.

1.6 REBUTTAL TO THE LITERALISTS

Let’s turn to the argument that belief that the account of Creation given in Genesis 1 must be taken literally as true.

Question: Was the Universe and all within it as it exists presently created at once, instantaneously, as Dr. Seiler asserts?

Answer: There are two ways of getting at the meaning, parsing, “at once.” First, if we believe the universe evolved from an instant of creation, The Big Bang, *Creatio ex Nihilo*, as described in Essay 3, then we can believe, along with St. Thomas Aquinas and the Catholic Catechism ([CC 308](#)), that God is a First Cause, and that He can operate through both primary and secondary causes. As St. Augustine posited

“...each one [type of creature] fulfills its proper function, comes to creatures from those causal reasons implanted in them, which God scattered as seeds at the moment of creation [emphasis added] ... Time brings about the development of these creatures according to the laws of their numbers, but there was no passage of time when they received these laws at creation. [emphasis added]

—St. Augustine of Hippo, [de Genesi ad Litteram](#) (the Literal Meaning of Genesis.)

Second, God is eternal, timeless—like a photon of light, time does not exist for God. He sees

our future and our past and our present simultaneously, so the term “at once” to imply a single moment in past time is a limitation on this Godly timelessness.

Question: Do the Popes of modern times say that evolution contradicts Catholic teaching?

Answer: Modern Popes, St. John Paul II and Benedict XVI, have argued that evolution, as a scientific thesis, is to be considered a legitimate object of investigation. However interpretations of evolution that contradict Catholic teaching are to be rejected. Granted that these opinions do not have the full force of Encyclicals or Council Decrees, nevertheless, they are part of the Magisterium and to be taken seriously by Catholics.

Pope Bendedict XVI:

“My predecessors Pope Pius XII and Pope John Paul II noted that there is no opposition between faith’s understanding of creation and the evidence of the empirical sciences.”

—[Address to 2008 Pontifical Academy of Sciences](#)

“Creation should be thought of, not according to the model of the craftsman who makes all sorts of objects, but rather in the manner that thought is creative. And at the same time it becomes evident that being-in-movement as a whole (and not just the beginning) is creation...”

—[Creation and Evolution: A Conference with Pope Benedict XVI in Castel Gandolfo](#)

*“It says that **the Bible is not a natural science textbook, nor does it intend to be such. It is a religious book, and consequently one cannot obtain information about the natural sciences from it.** [emphasis added] One cannot get from it a scientific explanation of how the world arose; one can only glean religious experience from it. Anything else is an image and a way of describing things whose aim is to make profound realities graspable to human beings. One must distinguish*

between the form of portrayal and the content that is portrayed. The form would have been chosen from what was understandable at the time.”

—(writing as Cardinal Ratzinger) [“In the Beginning”](#), a compilation of homilies and addresses.

Pope St. John Paul II

“Dans son encyclique « Humani Generis » (1950), mon prédécesseur Pie XII avait déjà affirmé qu’il n’y avait pas opposition entre l’évolution et la doctrine de la foi sur l’homme et sur sa vocation, à condition de ne pas perdre de vue quelques points fermes.”

“My predecessor, Pius XII, has already affirmed in his Encyclical, “Humani Generis” (1950) that there is not opposition between evolution and the doctrine of the fall of man and his vocation provided that certain fixed points are kept in mind.” my translation

.—[Address to the Pontifical Academy of Sciences, 1996](#) (I’ve included the original French because some comments have objected that the English translation does not give the spirit of the original.)

Other statements of Pope St. John Paul II about evolution and Catholic teaching are given in Section 1.2

I have one final comment on the objections of the literalists, taken from my favorite saint, Augustine of Hippo:

“Often a non-Christian knows something about the earth, the heavens, and the other parts of the world, about the motions and orbits of the stars and even their sizes and distances,... and this knowledge he holds with certainty from reason and experience. It is thus offensive and disgraceful for an unbeliever to hear a Christian talk nonsense about such things, claiming that what he is saying is based in Scripture. We should do all that we can to avoid such an embarrassing situation, lest the unbeliever see only

ignorance in the Christian and laugh to scorn.”

—*De Genesi ad litteram*; the Literal Meaning of Genesis.

And now, let’s see what the science of evolution, that is the evolution of living things, is all about. We’ll not discuss how life began; that’s still a mystery, as I’ve argued in a [blog post on this subject](#).

SECTION : Evolution, the Science

“If evolution really works, how come mothers only have two hands?”

—Milton Berle

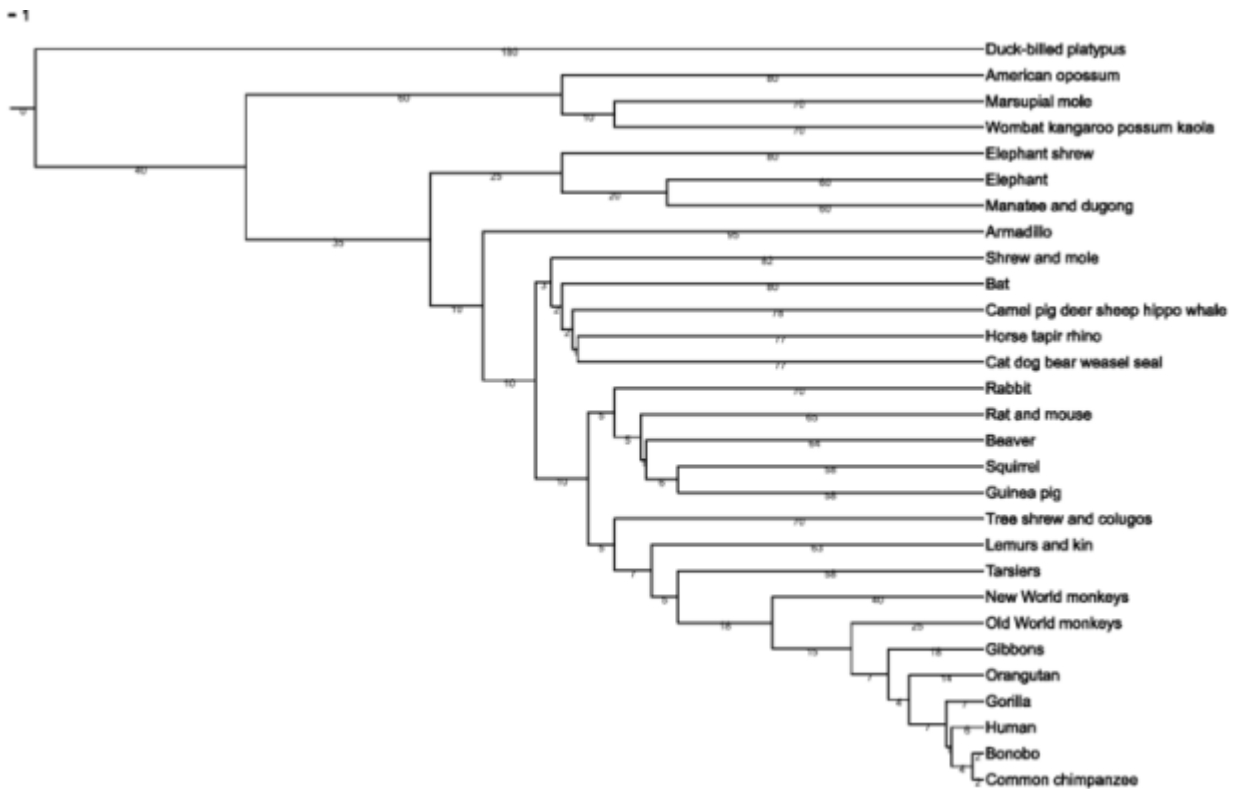
“What evolution tells us is that we are part of a grand, dynamic, and ever-changing fabric of life that covers our planet. Even to a person of faith, in fact especially to a person of faith, an understanding of the evolutionary process should only deepen their appreciation of the scope and wisdom of the creator’s work.”

—Kenneth Miller, author of [“Finding Darwin’s God”](#)

2.1 INTRODUCTION

The evolution of living things is a development from simple one-celled organisms to mammals. If one compares different species within a family, they have similar characteristics in form and in their genetic makeup, as for example with a lion and tiger (species *Leo* and *Tigris*, respectively; family *Panthera*). If one compares across phyla, for example *Homo Sapiens* (human) and *Asteria Rubens* (starfish) there are vast differences.

However these difference can still be traced to a common origin genetically. A phylogenetic tree can be constructed with branches whose distance apart are related to the similarity of their genetic material. For example, for mammals a similar branching diagram can be constructed, a “cladogram” to show evolutionary divergence from a common ancestor, as shown for the class *Mammalia* in the illustration below.



Cladogram, diagram of evolutionary branching for mammals
 from [Wikimedia Commons](#)

In the following, I'll focus on three models proposed to account for evolution, the descent of species. It will not be a comprehensive account, but will survey the most important and significant features relative to Catholic teaching. Let me emphasize that these are interpretations; evolution is the common descent—how that occurs, the mechanism—is explained by many different models.

2.2 EVOLUTION MODELS: NEO-DARWINIAN PRINCIPLES

One problem in discussing evolution is that, both laymen and scientists, confuse evolution—the descent of species from common ancestors—with the Darwinian model

for evolution, natural selection. They take them to be the same. This is not so. As we'll see below, many scientists and philosophers offer alternative models. As Pope St. John Paul II said:

*“And to tell the truth, rather than speaking about the theory of evolution, **it is more accurate to speak of the theories of evolution.** [emphasis added] The use of the plural is required here—in part because of the diversity of explanations regarding the mechanism of evolution, and in part because of the diversity of philosophies involved.*

—Pope St. John Paul II, “[Address to Pontifical Academy of Sciences, 1996](#)”

Darwin's original model has been modified to include genetics as a mechanism for heredity and mutations as a source of variation, or as it is termed a “neo-Darwinian” model. We can partition this model into the following parts:

Evolution in form and function is gradual—major changes by which different species, groups, families and classes are formed originate by small variations carried through a long period. Variation in form and function is carried by heredity (genetics).

The genetic variation is due to mutation (random changes in the genetic code), genetic mixing between subpopulations, isolation of groups;

Natural selection will lead to change in genetic constitution of the population, for even a small—3 or 4%—advantage in survival and reproduction, as we see below in the development of the Lactase Persistent gene.

2.3 EVOLUTION MODELS: NEO-DARWINIAN EVIDENCE

Evidence for species variation and change:

[Fossil records](#) from early times to recent shows change and development of species;

Similarities and differences in protein structures parallel similarities and differences in anatomical form

Similarities and differences in gene sequences for coding proteins (relative to human—see Table below):

SPECIES	PROTEIN ENCODING GENE SIMILARITY TO HUMAN	RANDOM DNA BETWEEN GENE SIMILARITY TO HUMAN
Chimpanzee	100%	98.0%
Dog	99	52
Mouse	99	40
Chicken	75	4
Fruit Fly	60	ABOUT 0
Round Worm	35	ABOUT 0

Notice the difference in similarities between functional DNA sequence (coding for protein) and nonfunctional (DNA between genes). The latter can be subject to mutation without damaging the function of the organism.

It's relatively easy to see how small changes (an example is given below) in function and/or form can arise by mutation and natural selection. It's harder to see how major differences can occur—for example, the difference between fruit fly and round worm.

2.4 AN EXAMPLE: THE LACTASE PERSISTENCE GENE

Here is an example of a quantitative demonstration of the Neo-Darwinian thesis. Mammalian babies drink milk. Almost all non-human adult mammals do not drink milk. Some human adult mammals drink milk (northern Europeans, East Africans, West Africans), while many adult human mammals (East Asian, Bantu, Basque) cannot drink milk without suffering lactose intolerance symptoms (lactose, a milk sugar, cannot be metabolized).

The explanation: mammalian infants have an enzyme, lactase that enables lactose to be metabolized. This enzyme is normally lost after infants are weaned. However in certain groups where dairy farming has been carried out, a gene, "*lactase persistence gene*", enables the enzyme to continue to be present. **This gene was not present in these groups (Northern Europeans/East Africans) 8000 to 10,000 years ago, but is now (77% or higher in Northern Europeans).** Therefore it must have appeared as a mutation and by enhancing survivability, spread.

The best science according to Fr. Stanley Jaki is quantitative, so that predictions or retrodictions can be assessed quantitatively. Such a test was reported in an article by Todd Bersaglieri and many others, "[Genetic Signatures of Strong Recent Positive Selection at the Lactase Gene.](#)"

Dancing on a tightrope of very involved statistical and Markov chain calculations, the authors find that this mutated gene, which allowed persistence of the lactase enzyme action, enhanced survivability by between .09 and 0.19 for the Scandinavian population and between 0.014 and 0.15 for the East African. I take this "coefficient of selection" to mean that those Scandinavians carrying this dominant gene produced between 1.09 to 1.19 more children per generation than those who did not have the gene.

Thus, with enhanced survivability and migration of people the lactase gene mutation would spread, as shown in the neat movie from the article ([Wikimedia Commons file](#)):

<http://catholicscientist.com/wp-content/uploads/2018/07/The-Origins-of-Lactase-Persistence-in-Europe-pcbi.1000491.s015.ogv.480p.webm>

which shows the spread of the mutation from Ireland, England, Denmark and southern Sweden 8000 years ago throughout Europe. The calculated retrodictive frequencies are in accord with the relative frequencies of the gene: orange to red, high; blue to indigo, low; the map goes from completely blue in the beginning to a large orange-red central region at

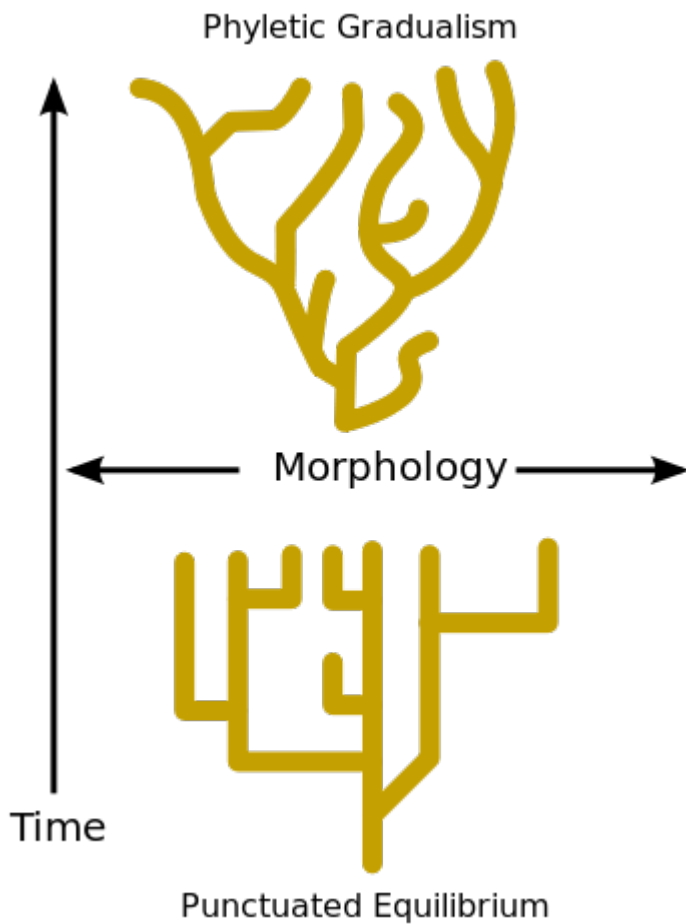
Denmark and Sweden after 360 generations (about 7500 years); southern Europe remains blue.

If one looks at the [map showing high proportions of lactose tolerance](#), it appears in multiple regions—Northern Europe, East Africa and the Arabian peninsula, West Africa, Pakistan—such that migration of peoples with the gene would not have been a likely mechanism for its spread. There are various suggestion about where the mutation originated—Hungary, Iranian plateau—but a single geographic origin doesn't seem to be compatible with the present distribution.

Here's a question to puzzle over: which came first, dairy farming and then mutation, or the mutation first and then dairy farming? Is it possible that God might direct such a mutation (or more) to occur where dairy farming could be prevalent? There's no way to answer that question, other than a faith that God might direct mutations for His purposes.

2.5 EVOLUTION MODELS: PUNCTUATED EQUILIBRIUM

In 1972 Niles Eldridge and Stephen Gould proposed that evolutionary change occurred by discontinuous steps rather than by the gradual increments suggested in the standard neo-Darwinian model, "Phyletic Gradualism". The difference between their model, which they termed "Punctuated Equilibrium" and the standard Neo-Darwinian is shown in the diagram below:



From [Wikimedia Commons](#)

In the diagram above, the horizontal direction, "Morphology", represents shape, color, etc. The long vertical lines mean that morphology is unchanged, in "equilibrium" over a long period of time. When environmental stress or sudden isolation of a sub-population occurs, then a discontinuous variation can occur, as depicted by the horizontal lines.

Punctuated Equilibrium was introduced as an alternative mechanism to Gradualism to account for the fact that discontinuous changes in morphology were usually found in the paleontological record, rather than continuous small changes. Nevertheless, this might be

due not to discontinuities in events, but to inadequate survey of the paleontological record. It should be emphasized that Punctuated Equilibrium is a supplement, not a replacement for the neo-Darwinian model.

2.6 EVOLUTION MODELS: INTELLIGENT DESIGN/ IRREDUCIBLE COMPLEXITY

There is a cadre of scientists—mathematicians, biologists, physicists—who do not believe that natural selection can account for evolution. They argue that it is too improbable that the complicated molecules and assemblies for life came together and evolved into a variety of living things purely by chance. They propose instead that there is an inherent design—Intelligent Design (ID)—manifested in the complexity of biochemistry and genetics, the complex and intricate arrangement of components that points to an intelligent, purposeful designer.

The ID viewpoint is much like that of William Paley (1743-1805), the English clergyman who made the analogy of finding a watch upon the heath (moorland) and deducing from its intricate construction that it had to be designed by some intelligence. This argument by analogy has been criticized by many opponents of ID, most notably by Richard Dawkins in his book *The Blind Watchmaker*.

Nevertheless, this argument is basic to the ID thesis, that the conjunction of complicated biomolecules to perform specific functions is not one that could be achieved by small, gradual increments. Michael Behe has termed this argument, “irreducible complexity”. There would be no survival value in the incremental change—only until the full complicated structure was achieved would there be a natural selection advantage. Michael Behe, a biochemist advocating ID, in his book *Darwin’s Black Box*, has set forth a number of these biochemical “watches”, systems too complicated to come about by gradual changes. The most striking of these is that for bacterial flagella.

Behe pictures the flagellum as a biological machine, as shown in the video below:

Behe contends that none of the parts, proteins and other bimolecular constituents separately would convey any survival advantage and therefore would not be propagated by natural selection. He uses the analogy of a mousetrap—it won't work unless all the parts are assembled properly. Kenneth Miller, author of *Finding Darwin's God*, [countered Behe's example](#) with the use of parts of a mousetrap as a tie clip and a key chain.

The debate has been heated—I'll not give a judgment here but refer you to [this web site](#) that gives the arguments and rebuttals.

2.7 EVOLUTION MODELS—INTELLIGENT DESIGN; SPECIFIED INFORMATION

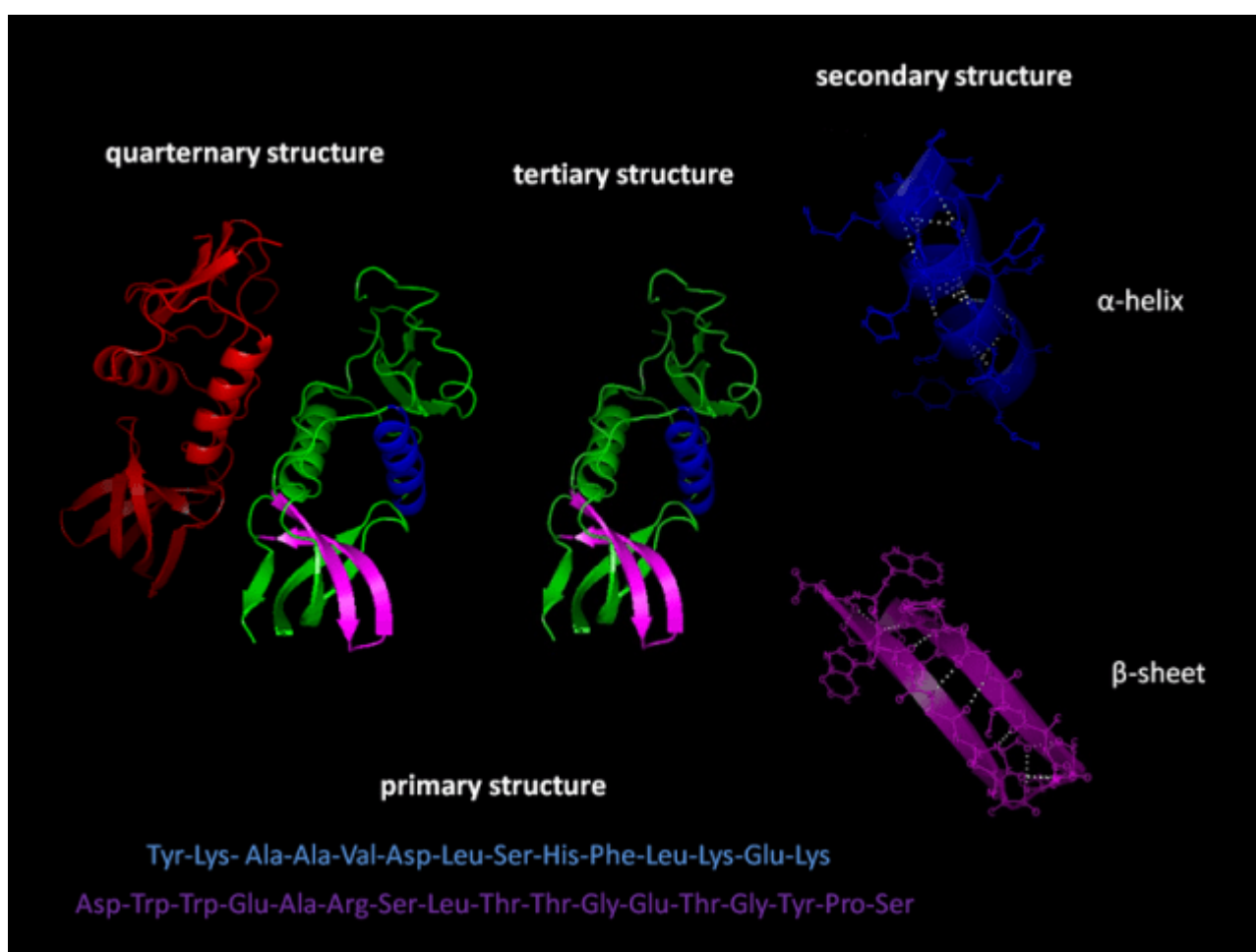
Besides Behe's "irreducible complexity" complexity arguments for Intelligent Design, Stephen Meyer, in his book, [Signature in the Cell](#), has argued that biomolecules—DNA, RNA, proteins—contain information that could not be there other than by design; to use his term, they manifest "specified information". To understand how life began, we must take into account this "specified information", which specified information can be brought about only by an intelligence, a designer; it cannot occur by chance or by the working of physical and chemical laws (e.g. chemical affinities).

As an example of "specified information", consider the phrase "cat in the hat." This conveys information (for Dr. Seuss fans—a book title and an image). If one was to draw characters out of a large bag containing the appropriate proportion of spaces, t's, c's, etc., the probability of getting them in the order "cat in the hat" would infinitesimally small...for all practical purposes, zero. Thus the probability of getting "cat in the hat" by randomly drawing letters from a large bag filled with the appropriate proportion of characters will be very small. Accordingly, if you saw that phrase on a table next to a large bag of characters, you'd assume that a Dr. Seuss fan had arranged them.

Meyers argues that specified information is conserved. Although this seems reasonable at first glance, there is no proof of such that I can find. If [an inverse relation between Shannon](#)

[information and entropy](#) is made (the greater the information content, the lower the entropy), there is no application of the Second Law that would apply to conservation of information. So we'll have to accept the second principle as possible, but not proven—a hypothesis.

Meyers discusses how proteins, DNA and RNA are biomolecules encoding specified information. He argues convincingly that this encoding cannot proceed from chance or by natural law.



Possible Protein Folding Structures; see also Essay 4, Section 5.5
from [Wikimedia Commons](#)

The probabilities of the sequences occurring by chance are too small, and this view agrees with that of a number of other scientists, not all of whom support intelligent design.

According to Meyers, specified information does not proceed from chemical or physical principals—chemical affinities and attraction, for example, yielding protein folding shapes or sequence order of bases in DNA or RNA. Were such operative, they might yield order (as, for example, gravity and coriolis forces yield whirlpool shapes in water going down a drain). However, such order could not provide for the variety of base sequences needed to encode for the synthesis of many different proteins, nor for the different conformations involved in folding of proteins that yields enzymatic activity.

An important criterion for a theory to be “scientific” is that it can make testable predictions, predictions that can be falsified. Meyers makes 12 such predictions. The problem with many of the predictions is that they propose results that may be found with sufficient research, but if they aren’t, it won’t signify falsification of the prediction. For example:

“Investigation of the logic of regulatory and information-processing systems in cells will reveal the use of design strategies and logic that mirrors...those used in systems designed by engineers. Cell biologists will find regulatory systems that function in accord with a logic that can be expressed as algorithms.”

—Stephen Meyer, *The Signature in the Cell*, Appendix A.

If such results are obtained, it will strengthen the Intelligent Design hypothesis, but it will not necessarily confirm it.

Several predictions propose that positive results from origins of life computer simulations or laboratory work to show spontaneous self-organization require information input. For example:

“Informational accounting will reveal that any improvements in replicase function in ribozymes are the result of active information supplied by ribozyme engineers.”

—*op.cit.*

I’m not sure how one would show the above, but the fact that it couldn’t be shown does not amount to an adequate test of the prediction. And again, finding such results would strengthen ID, but not confirm it. The only prediction amongst those listed that might be falsified—and even here, if the contrary isn’t shown, it won’t necessarily show the prediction to be true—is the following:

“ No undirected process will demonstrate the capacity to generate 500 bits of new information starting from a nonbiological source.”

—*op.cit.*

2.8 EVOLUTION MODELS—CRITICISMS OF INTELLIGENT DESIGN

“Intelligent Design is a remarkably uncreative theory that abandons the search for understanding at the very point where it is most needed. If Intelligent Design is really a science, then the burden is on its scientists to discover the mechanisms used by the Intelligent Designer.”

—Michael Shermer, [Why Darwin Matters: The Case Against Intelligent Design](#)

The first criticism is given above in the quote by Michael Shermer. Although proponents of Intelligent Design argue that information is put into cell components, they suggest no mechanism as to how this might occur.

Another opponent of the neo-Darwinian thesis, the philosopher Thomas Nagel, has proposed in his book, [Mind and Cosmos](#), that teleology should be considered as a general operating principle in nature. Although this requirement—purpose as a part of nature—just names, rather than explains the issue, it is a starting point. Teleology might be the fundamental principle that would justify Intelligent Design.

The esthetic requirement for an intelligent designer who effects his design from a blueprint, is expressed very well by Paul Davies:

*“...the hypothesis of an intelligent designer applied to the laws of nature is far superior than the designer ...who violates the laws of nature from time to time by working miracles in evolutionary history. **Design-by-laws is incomparably more intelligent than design-by-miracles.**”* [emphasis added]

—Paul Davies, [The Cosmic Jackpot: Why our universe is just right for life.](#)” p.200)

The second criticism is that the fundamental assumption of conservation of specified information or specified complexity is assumed. Although this seems at first like a reasonable assumption, it is necessary that it be justified from first principles, outside of the realm of biology, if Intelligent Design is to be considered science.

SECTION 3: Final Thoughts—A Summary

I want to stress again that evolution, applied to living things, means “common descent” from one ancestral unicellular organism. There are various models—theories, if you will—for how evolution occurs, including the neo-Darwinian one: survival of the fittest, aided by natural variation due to random genetic mutations. Many scientists and philosophers, some of whom are atheists, do not believe the neo-Darwinian model gives a satisfactory explanation for the mechanism of evolution.

Intelligent Design, which explains the variety of living things and their wonderful biochemistry as due to design by some intelligence, is an interesting explanation for evolution, but in my opinion is not science: it does not offer falsifiable predictions and it does not give a scheme whereby the designing intelligence produced each individual biochemical mechanism.

In any case, the fact of evolution, common descent, does not conflict with Catholic teaching. As Popes Pius XII, St. John Paul II and Benedict XVI have said: although the physical body of man may originate from pre-existing matter (other living forms) via an evolutionary process, the individual soul is created and implanted in each of us by God. Therefore interpretations of evolution—theories or models—that deny the existence of such a soul do conflict with Catholic teaching, but evolutionary models which do not deny the soul, do not.

Although some Christians deny evolution because it does not agree with a literal interpretation of the Creation account given in Genesis I, there is no reason to deny that Creation “at once” can refer to God as a primary cause who instilled secondary causes in His Creation, as St. Augustine argued. Moreover, God is eternal, timeless, so to say that He must have created the universe at a single instant in time is to put a limitation on His timelessness. Also, as Pope Benedict XVI argued, we cannot regard Scripture as a science text book; the Old Testament leads us to the New and is the road to Christ.