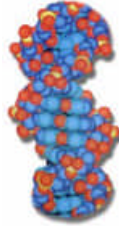

CENTER FOR SOCINIAN STUDIES

BIO PHILOSOPHY HUMANISM SOCINIAN



CREATIONISM AND EVOLUTION MISCONCEPTIONS ABOUT SCIENCE AND RELIGION AND THE SOCINIAN SOLUTION

(Based on the paper presented at the Atlanta Theological Conference, Atlanta Bible College, Morrow, GA February 11-13, 2000)

Marian Hillar

Introduction

From the moment the human animal became self-aware and acquired the ability to conceptualize, he asked the same questions we ask today concerning the three domains of human perception: 1. Our surrounding nature and reality; 2. The meaning of human existence; 3. The conduct of human activity in a social and personal setting.

Primitive man was overwhelmed and horrified by nature and natural phenomena just as animals are when they face an unknown situation. He could not give a naturalistic explanation so he looked for explanations in his imagination filling the world with imaginary forces, then to creatures hypostasizing these forces. At the same time, however, man was making real observations of the world and natural phenomena and attempting to give primitive scientific answers.

With time these answers became quite elaborate producing stories and myths recited over and over again. They led eventually to the development of various theosophical and philosophical systems and organized religion.

Records of these products of their mental activity survived to our time in the form of written documents, either philosophical or mythical, some of which were elevated to the dignity of so-called holy and revealed scriptures. And this happened for political reasons as well. Rulers hid behind the authority of God and the scripture and elevated it to the status of sacred writings which became the codes of rule and the encyclopedias of all knowledge. The whole system became institutionalized and an inherent part of the culture.

The Meaning of the Traditional Religion

Thus at the center of most cultures there is what is traditionally called Religion. It performs several functions. At the psychological and epistemological level it gave an explanation of the ultimate meaning of life and the world, and instructions on how to live accordingly. At the social level most religions serve the rulers of societies as a tool for its organization. This was succinctly stated by the Greek philosopher, Isocrates (436-338 B.C.E.): “Men who show piety will be equally submissive to all other injunctions.” Traditional religions thus contain the following components^[1]:

1. **Creed.** It is everything that goes into the “story” of the explanation as the ultimate meaning of life and of natural reality (world view) – including religious myth and religious ideology.
2. **Code.** This is a system of behavioral rules and customs of action that somehow follow from one aspect or another of the Creed.
3. **Cult.** This comprises all the ritual activities relating the follower to one aspect or another of the Transcendent. Prayer is one example of this and one’s behavior toward cult leaders such as priests is another.
4. **Community-structure.** This is the organizational and social relationship among the followers, e.g., egalitarian as among Quakers, republican as among Presbyterians, or monarchical as among the Jewish Hassidim or among Catholics.
5. **The Transcendent.** This refers to the point of reference, something beyond the every-day life and activity which serves as an organizing point for our behavior. In traditional theistic religion it is a personal or tribal God.

Thus, originally the inquiry into nature, which today is a subject of scientific investigation, was combined together with the sphere of religion and morality. Only through the historical process of the evolution of culture, were science and morality finally emancipated from religion and able to acquire independence. Religion underwent an evolution as well and most religions including most Christianities accept science and scientific evolution.

The main problem with those religions that still reject the scientific world view is psychological rather than based on the merits of science or religion, because they accept science in many other respects. For example, when we turn on the electricity, when we drive cars, when we fly airplanes or space rockets, when we use computers, when we eat new or modified agricultural products, when we submit to medical treatment or to surgery, etc., etc., we automatically subscribe to all the scientific theories behind them. These achievements are at the same time the best verification of the truthfulness of these theories.

So when some religionists, generally characterized as creationists, cling to the literal text of the Genesis or interpret natural phenomena as the result of a miraculous intervention of the deity, they are not consistent. Moreover, they also reject the literal reading of the Bible without realizing it – they no longer subscribe to the biblical world view (e.g., flat earth, a geocentric system), and on a moral level they reject slavery which is accepted and approved even in the Decalogue.

The major factor which drives creationists is fear of losing their faith and belief in the deity. But all this is a big misconception perpetuated by the religious leaders who try to maintain their status quo. **There is no real conflict between science, its rules and modus operandi, and theistic religion.** Usually creationists erroneously associate atheism with evolution. **Atheism has nothing to do with being a scientist or evolutionist.**

I am going to suggest a solution for the religionists to reconcile their religious views with the naturalistic

theory of evolution. And this solution, I believe, is in agreement with the spirit of the Socinian thought. Socinians adhered strictly to the rules of reason^[2] and today they certainly would have accepted the scientific theory of evolution as describing a real process in the world.

Religions may have a positive effect on the individual and society but most often their influence was repressive. Once religious opinions are indoctrinated in young individuals, they become almost as strong as biological instincts and that is one of the reasons why it is so hard for the creationists to accept the tenets of science. The situation was very aptly described by Darwin: **“It is worthy of remark that a belief constantly inculcated during the early years of life, whilst the brain is impressible, appears to acquire almost the nature of an instinct; and the very essence of an instinct is that it is followed independently of reason.”**^[3]

Religions undergo evolution too in modern societies. The traditional religious world view is replaced by the scientific theories. If the personal or tribal God at the same time becomes replaced by **secular concepts and ideals**, then the Creed is replaced by a **secular ideology**. It performs, however, a similar function to the Creed in traditional religions.

The Evidence for Evolution

The most universal observation we can make about the evidence for evolution is that everything around us and in the entire world undergoes a continuous process of evolutionary transformations including societies, religions, doctrines, etc. The evolutionary theory especially permeates all branches of the biological sciences and is the ultimate explanation of life. Peter Medawar, Nobel Laureate in biology, said:

It is naïve to suppose that the acceptance of evolution theory depends upon the evidence of a number of so-called “proofs”; it depends rather upon the fact that the evolutionary theory permeates and supports every branch of biological science, much as the notion of the roundness of the earth underlies all geodesy and all cosmological theories on which the shape of the earth has a bearing. Thus antievolutionism is of the same stature as flat-earthism.^[4]

Evolutionary theory is one of the best if not the best documented scientific theory.^[5] It is the best explanation of a broad range of phenomena and has been tested and proven vis-à-vis biological data. There is this famous dictum by geneticist Theodosius Dobzhansky that “Nothing in biology makes sense without evolution.”^[6]

Evolutionary theory extends also to human evolution and the evolution of the human psyche and language. Much work was done in this area such that we can trace today the whole lineage of human ancestors going back to the first hominids about 4 million years ago.^[7] At the same time, we can trace the origin of the so-called moral sense, a biological basis for morality, which was so elegantly sketched by Darwin:

The difference in mind between man and the higher animals, great as it is, certainly is one of degree not of kind. We have seen that the senses and intuition, the various emotions and faculties, such as love, memory, attention, curiosity, imitation, reason, etc., of which man boasts, may be found in an incipient, or even sometimes in a well-developed condition, in the lower animals.... The moral sense perhaps affords the best and highest distinction between man and the lower animals; but I need say nothing on this head, as I have so lately endeavoured to shew that the social instincts,—the prime principle of man’s moral constitution—with the aid of the active intellectual powers and the effects of habit, naturally lead to the golden rule, ‘As ye would that men should do to you, do ye to them likewise;’ and this lies at the foundation of morality.^[8]

Through reasoning man was able to formulate this golden rule in variety of ways, but it is found in all cultures and societies.^[9] The best formulation, I think, is that given by Suffi tradition, because it has a direct relation to the Kantian concepts of ethics (Table 1)^[10]:

A good man is one who treats others as he would like to be treated.

A generous man is one who treats others better than he expects to be treated.

A wise man is one who knows how he and others should be treated: in what ways and to what extent.

The first man is a civilizing influence.

The second man is a refining and spreading influence.

The third man is a higher-development influence.

Everyone should go through the three phases typified by these three men.

To believe that goodness or generosity are ends in themselves may be good or it may be generous.

It is, however, not an informed attitude – and that is the most good and the most generous we can be about it.

If someone said: “Is it better to be good, generous or wise”? One would have to reply:

“If you are wise, you do not have to be obsessed by being ‘good’ or ‘generous’. You are obliged to do what is necessary.”^[11]

Problems with Creationism

From the IVth century a crude creationism and a literal reading of the Bible was the religion of the Western World. Only recently under the influence of developing philosophy, religious studies, biblical studies, and science most Christian churches abandoned this biblical world view. They do not see any conflict between their faith and the findings of evolutionary biology. One of the last in recognizing evolution and accepting the theory of evolution of the world and living organisms was the Roman Catholic Church. Many mainstream theologians oppose creationism on theological grounds:

1. Creationists claim that their view is the only true Christian view.
2. Creationists limit God in his power or dictate to God what he should do or not do.
3. Creationists treat the Bible as a scientific textbook which it is not.
4. Creationists conveniently forget the earlier conflict based on the Bible about the movement of the earth, sun and the heavens.
5. According to Langdon Gilkey, a theologian, creationists come “very close, yes, very close indeed to the first and worst, Christian heresy!”
6. Creationism is a potentially dangerous movement because it imposes absolute dichotomies: the Bible is either inerrant or worthless; Christianity or atheism; certainty or skepticism; absolute morality or subjectivism (relativism).

Evolution is overwhelmingly demonstrated, yet there are religious denominations that actively oppose any thought of evolution and adamantly stick to the letter of the Bible. In the entire creationist literature there is not a single argument which would disconfirm the evolutionary theory! The problem is driven by human psychology and seems to be connected to insufficient knowledge about the science of evolution, misconceptions about faith and rationality, and to the blind indoctrination conducted from childhood which is habituating and conditioning human behavior and intellectual attitudes. The illustrative example of this situation is the case of Frank Marsh. Marsh was a creationist and paleontologist who corresponded with Theodosius Dobzhansky in the 1940s about evolution and broke with his fellow creationists by accepting small evolutionary changes; but he was not able to break with his emotional baggage and accept the inference to a larger-scale evolution. Dobzhansky commented on the situation: “No evidence is powerful enough to force acceptance of a conclusion that is emotionally distasteful.”^[12]

Creationists are a small group of extremists who attempt at any cost to reintroduce the biblical world view. The creationist movement was initiated by formation in the 60's of the Institute for Creation Research. The movement assumed the name "Creation-Science." It regrouped and today appears under a variety of names like "abrupt appearance theory," "initial complexity theory," "theistic science," or "intelligent design theory." All these terms are misleading and big words used as a cover-up for a big mystification – the revival of biblical creation myth which inspired them in the first place. There is not a single bit of positive evidence or argument for creationism. At best creationists refer to the Bible and biblical world view. Among the negative arguments the most common is simple negation just like the Russian diplomatic "Nyet" during the cold war. Other negative arguments may point to the fact that we may not know every detail of the mechanism, but then creationists commit the logical fallacy. If something is not fully explained by science (for practical and technical reasons -- after all, biochemistry is only 100 years old and molecular biology not even 50 years old), it does not mean that it is not explainable at all by science. Still less, should we defer to some supernatural powers. In still other negative arguments, creationists invent intricate terminology to cover-up old arguments or convolute and twist scientific arguments to adapt them to their wishful thinking. Of course, the whole procedure has nothing to do with science or theory, it is an attempt to save old religious doctrines. Their real issues are not evolution and science, but erroneous and misguided fear that by accepting scientific discoveries and their world view they would lose their primitive faith.

The best illustrations of this attitude are the paranoid pronouncements exposed in the museum of the so-called Institute for Creation Research in California under the name of "evil fruits of evolutionism" and contrast these with the "fruits of creationism"[13] or the publication of the so-called Tree of Evil. This "tree of evil,"[14] published by the Pittsburgh Creation Society lists 22 "evils" having their roots in evolution. Among them are: science in general, astronomy, geology, biology, medicine, socialism, atheism, communism, society, abortion, euthanasia, perversion of churches (it means all churches and religions except Christian fundamentalists).

Creationists fear that evolution, and science by extension, undermines morality, the basis of the purpose of life, their religious tenets, etc. In their eagerness to adhere literally to the Bible text they want to destroy religious freedom, introduce theistic speculations to scientific inquiry, introduce biblical law, and destroy education.[15] Often creationists involve themselves in a discussion of the scientific evidence for evolution but this is not their issue. It obscures the main theme, namely their concern about how we got here and all that has to do with the theological and philosophical consequences of thinking one way or the other. Perhaps the most outspoken creationist expressing these general worries is Phillip Johnson when he says:

Naturalism is a metaphysical doctrine, which means simply that it states a particular view of what is ultimately real and unreal. According to naturalism, what is ultimately real is nature, which consists of the fundamental particles that make up what we call matter and energy, together with the natural laws that govern how those particles behave. Nature itself is ultimately all there is, at least as far as we are concerned. To put it in another way, nature is a permanently closed system of material causes and effects that can never be influenced by anything outside of itself by God, for example. To speak of something as "supernatural" is therefore to imply that it is imaginary, and belief in powerful imaginary entities is know as superstition.[16]

Of course, Johnson is right when he describes the philosophical point of a naturalistic metaphysics. But he is badly confused when he mixes philosophical naturalism with science and puts the sign of equality between them. Science is neutral when it comes to a philosophical or religious world view of its practitioner and where the metaphysical underpinnings are concerned. It is, however, **methodologically naturalistic, that is, it explains the world in terms of natural phenomena and events and does not seek answers in supernaturalism.** It uses a set of methods as a reliable way to find out about the world, its conclusions are defeasible on the basis of new evidence, and it is committed to a mode of investigation. **The moment science abandons this methodological naturalism, it ceases to be science and becomes religion. Then any scientific inquiry becomes redundant. And what was science becomes now a useless, unproductive verbal exercise, subject to imaginary fiction and the mystical experience of**

the practitioner because nothing definite can be said about any process connected to the will of the supernatural agent, and any supernatural hypothesis will remain immune from disconfirmation.[\[17\]](#)

Table 1

Essential Characteristics of Science[\[18\]](#)

1. It is guided by natural law;
2. It has to be explanatory by references to natural law;
3. It is testable against the empirical world;
4. Its conclusions are tentative, i.e., are not necessarily the final word; and It is falsifiable.

Additional Characteristics of Scientific Method:[\[19\]](#)

1. Uses several steps in arriving at the conclusions.
2. Induction – increases information
 - a. enumerative induction
 - b. method of hypothesis or hypothetico-deductive method.

It is inference to the best explanation.

3. Deductions and theory building.

Einstein described science in these terms: “Science is nothing more than a refinement of everyday thinking.”[\[20\]](#)

Creationists often express the contention that belief in scientific or religious propositions is “a matter of faith” and that there is no question as to which beliefs one should accept. Well, that is not so, because, though one can have both scientific and religious beliefs, all beliefs are not equal. Beliefs that are not based on evidence are not equal to those based on evidence. Having faith in theological propositions means sustaining belief in them despite the lack of evidence, or even against the evidence. We believe in a

scientific proposition because it survived the attempts to disconfirm it. Creationists consistently attack biology, geology, astronomy, medicine, etc., and even now the scientific method itself:

As Christians we believe that only God knows the universe as it really is. We are limited by our senses and by our minds, and we know the universe only as it appears to us.... Truth as God sees it has been revealed in the pages of Scripture, and that revelation is therefore more certainly true than any mere human rationalism. For the Creationist, revealed truth controls his view of the universe to at least as great a degree as anything that has been advanced using scientific method.[21]

To be a member of the creationists organizations such as The Bible-Science Association, The Creative Science Fellowship, or the Creation Research Society, one has to sign a statement of belief in biblical inerrancy, in the special creation by God of all biological kinds, and in a historical global flood.

Creationism is not a uniform movement and has diversified into several groups with quite different programs and views and which not only contradict each other but even openly fight each other.

Various Types of Creationism

We shall briefly review now the major tenets of various types of creationism and compare them with the so-called theistic evolution and scientific evolution. For all creationists **“The Bible is the ultimate scientific approach.”**[22] [23]

Young-Earth Creationism

1. Belief in the literal biblical sudden creation of the universe, energy, and life from nothing.
2. Claim in an insufficiency of mutations and natural selection in bringing about the development of all living kind from a single organism.
3. Conceding in changes only within fixed limits of originally created kinds of plants and animals.
4. Asserting separate ancestry for humans and apes.
5. Explaining earth’s geology by catastrophism, including the occurrence of a world wide flood.
6. Belief in a relatively recent inception of earth and living kind:

Bishop of Armagh James Usher in 17th century, later John Lightfoot, calculated that the Earth was created on October 18, 4004 B.C.E.; Adam was created on October 23, at 9 am. Such a view was maintained by Martin Luther, John Calvin, the Catholic church, all of Judaism and Christianities in the past. Currently Young-Earth creationists assume earth to be up to 10,000 years old.

Old-Earth Creationism

1. Such creationists support the scientific Big Bang theory and the universe to be about 15 billion years old.
2. Factions within the movement in trying to reconcile science with the Bible, maintain: 1. the “day-

age” interpretation. This specific view comes from Augustine who claimed that the biblical days could not be days because the sun was not created until the fourth “day;” 2. the “ruin and restoration” interpretation; 3. the “appearance of old age” interpretation.

Progressive Creationism

1. A variety of Old-Earth Creationism. For the most part they accept evolution according to natural law, but that in the formation of life, God intervened not in days but in millions of years.

Theistic Evolution

1. Basically, theistic evolutionists accept the scientific Darwinian evolution, but one based on theology. For them, “nature” was created by God *ex nihilo* in some form (e.g., the Big Bang as the moment of creation.)
2. A variety of the above is “**evolutionary creationism.**” These creationists believe that God guided the process directly.

Howard van Hill is the representative proponent of this type of evolution and a quote from him summarizes this view: *“I see no reason, either scientific or theological, to preclude the possibility that the temporal development of life-forms follows from the properties and behavior of matter.... I believe that the phenomenon of biological evolution, like any other material process, is the legitimate object of scientific investigation.... I would be terribly surprised to discover that we live in a universe that is only partially coherent, a universe in which the temporal development of numerous material systems proceeds in a causally continuous manner while the history of other systems is punctuated by arbitrary, discontinuous acts unrelated to the ordinary patterned behavior of matter.”*^[24]

Intelligent Design Creationism:

1. Belief in a personal creator.
2. The creator is supernatural.
3. The creator initiated the process and continues to control the process of creation. The creator furthers some end or purpose (reinventing the teleological claim).
4. Rejection of theistic evolution. This is best illustrated by a quote from the leader of the movement William Dembski: *“Design theorists are no friends to theistic evolution. As far as design theorists are concerned, theistic evolution is American evangelicalism’s ill-conceived accommodation to Darwinism.”* ^[25] They have no positive argument for any theory. Their “theory” begins and ends with the assumption of God’s continuous creative power. It relies on negative argumentation, a form of “God of the gap” argument. They are basically anti-science and represent traditional creationism based on a literal reading of the Bible under a new disguise.
5. Their main theme is that there is purpose or end in God’s design and that it can be found in: a.) revelation through mystical experience or scripture and b.) the will of God as when Johnson concludes that the elaborate tailed-peacocks are “just the kind of creatures a whimsical Creator might favor, but that an ‘uncaring mechanical process’ like natural selection would never permit to develop.” ^[26]

Extraterrestrial Intelligent Design

There is an alternative to the intelligent design creationism in the form of a religious movement spreading in about 85 countries and counting about 35,000 followers. It was founded in France in 1970s by a French journalist Claude Vorilhon, who changed his name to Raël, and claims to being twice contacted by aliens in a flying saucer who revealed to him the true story of the creation of life on earth. Raël describes the story of creation as an experiment in genetic engineering done by the aliens, called Elohim, from a distant planet, who reached a technological and scientific level which allowed them to produce in the laboratory various forms of life. All these experiments they performed on a planet without life (Earth). Eventually they were able to produce beings like themselves, and after a few prototypes (the skulls and bones of them have been found) they produced *Homo sapiens* in different races. Raélians deny evolution and claim that the biological world is a product of the intentional design of Elohim scientists and artists. According to Raélians the biblical story of creation is a corrupt version of the true story. Thus, according to them, evolution is a myth but so is creationism. The Elohim are thought of not as supernatural beings, i.e., as gods (as also the plural form of the word might indicate), but the term is supposed to mean “those who came from the sky.” Raélians have also explanations for many other biblical statements, e.g., claiming the biblical “sons of God” who married the “daughters of men” were the aliens who had been exiled to earth. Raélians maintain many other Christian beliefs as well and appeal to the revelation as all other Christians do:

Now you have read this book ... in which I have tried to reproduce as clearly as possible all that was said to me [by extraterrestrials], if you will think perhaps that I have a great imagination and that these writings were simply to amuse you, I shall be profoundly disappointed. Perhaps these revelations will give you confidence in the future and allow you to understand the mystery of the creation and of the destiny of humanity, thus answering the many questions that ever since childhood we pose during the night, asking why we exist and what is our purpose on this earth.[\[27\]](#)

Scientific Evolution

- 1 Assumes methodological naturalism, i.e., it denies divine intervention on methodological grounds.
2. A “creationism debate” for science is nonsense. All working biologists resent having to take the time from their research to rebut anew each revised creationist argument against well-established facts.

Chance and Design

One argument used by the creationists is the impossibility of evolutionary development of life because, they argue, chance cannot produce anything organized. Moreover, it needs a designer to put things together. And they quote as an example the low chance to assemble, e.g., all atoms forming a bacterium into a functional organism at once. Or the assembly of a small enzyme having, e.g., ten amino acids or a genetic code in DNA.[\[28\]](#) Yes, it is true that the probability of doing it at once is practically zero. **But then this is not what evolution does. These creationists are 200 years late—they negate the process of the so-called spontaneous generation which is not believed by any evolutionist.** Such types of argument miss completely the most basic point about Darwinian cumulative selection. Evolution proceeds not only by random chance, but by random chance combined together with cumulative nonrandom selection.

The function and biological information that develop through evolution is **not something that is specified in advance**, but it is a constant, causal interacting. When biologists speak of a function, e.g., of an organ, they use the term as a shorthand for longer causal explanation which depends on the evolutionary history. Only because some properties have been “selected for” by natural process that is it legitimate to speak metaphorically of its having a function. Such a specification of function depends necessarily upon the evolutionary process, therefore the biological notion of function is not a specification that would require a design inference. Quite the contrary, genetic information is natural, not indicative of intelligence.[29]

This randomness as a creative power was studied by scientists and found application in finding solutions for practical engineering, e.g., in designing the wing of the first human-powered airplane, the Gossamer Condor.[30] Engineers designing this craft used the same approach evolution does, they were not looking for anything, but they were just “wandering aimlessly with a blank mind until something just popped out.” By the assembly of results of random runs through alternative variations they were able to **select the best fitting variations** and develop the aircraft. Nature works in exactly the same way **through selection by adaptation either at the molecular or organismic level**. Scientists who study the process of creativity and the relationship between chaos and creativity find exact parallels with the processes occurring in nature, e.g., random recombinations, permutations, reversals, multiplications, transpositions, substitutions.[31] Darwin pointed out the mechanism when he indicated that in human practice nature provided random heritable variations and human power provided the accumulation of selection: “We cannot suppose that all were suddenly produced as perfect and as useful as we know them. ... The key is man’s power of accumulative selection: nature gives successive variations; man adds them up in certain direction useful to him.”[32] **In natural situations it is natural selection that functions as a creative force or designer**. But it is the unconscious force coming from constraints imposed by the unintelligent environment that makes the improbable more probable. Thus it is chance inheritable variations together with natural selection that drive evolutionary changes and shape the species both at the molecular and morphological levels. This can be studied in the lab and in the field, e.g., the studies of the famous Darwin finches on the Galapagos Islands.[33] Of course, other mechanisms may operate as well such as, self-organization in non-equilibrium systems. Darwinian mechanism found full implementation in practical design application, e.g., in designing space craft or wings of airplanes.[34] Even a computer imitation of the evolution of a digital self-replicating organism with a limited number of instructions imitating chance mutations, replicating errors, selection, etc., was designed. The program was able to generate a whole menagerie of digital organisms with new properties.[35] Such evolutionary computations of artificial life systems offer a new source of evidence about the evolutionary process. Though these are models, they are real evolutionary systems which attest to the generality of the Darwinian mechanism.

Origin of Life

This is the favorite topic of creationists because little is known about it. But the assumption given by them is only an assumption.

The origin of life was not the topic for research in Darwin’s time and it is not part of his theory, though he predicted that a chemical evolution had to take place as well. The mechanisms involved here may not be necessarily Darwinian.

History:

1650 G. Leméry divided substances into organic and inorganic. The organic were supposed to be associated only with life, therefore their generation depended on the existence of some supernatural force.

1828 F. Wöhler. The view of a vital force as necessary for maintaining life and responsible for the organic molecules was questioned by the synthesis in a test tube of the organic molecule urea by heating

potassium cyanate with ammonia.

1920 A.I. Oparin and J.B.S. Haldane suggested a generation of an “organic soup” or a “pond” in the primordial ocean as the prebiotic source of life.

1953 Stanley Miller and Harold Urey (and later others) performed a famous experiment in which they synthesized all the basic organic molecules of the cell from a mixture of inorganic gases and water thus imitating the conditions on earth several billion years ago.

1972 The organization of the International Society for the Study of the Origin of Life. Some 400 scientists work in the field.

Creationists dismiss such studies (unjustly) and claim:

We accept by faith the revealed fact that God created living things. We believe God simultaneously created those crucial substances (nucleic acids, proteins, etc.) that are so intricately interdependent in all of life’s processes, and that He created them already functioning in living cells.[36]

We have several solid established facts and they are the basis for the next investigations. The process of the origin of life from non-living molecules was never disproved on any ground. Even Charles Thaxton is not able to disconfirm chemical evolution, though for psychological reasons, he prefers miraculous intervention to scientific explanation.[37]

The Case of Confused Michael Behe.

Michael Behe,[38] a biochemist, purportedly admits acceptance of the age of earth as billions of years old. He really is confused because on the one hand he accepts the evolutionary theory, yet on the other hand he rejects it. He accepts the Darwinian descent with modification as he agrees in principle with the natural selection. “I find the idea of common descent (that all the organisms share a common ancestor) fairly convincing, and I have no particular reason to doubt it.”[39] But he uses several metaphors to convince the reader that the Darwinian evolutionary theory does not have the power to explain the gaps that purportedly exist at molecular level. It is obvious that the large morphological evolution has its basis at molecular level evolution. Strangely enough, he just contradicts himself.

Behe not only dismisses a gradual evolution in his metaphors, but also he does not understand what Darwinian evolution is. He is counting on the reader who is unfamiliar with the scientific issues involved to be fooled. **He is not only misinformed, but also simply lies** in order to get attention and drive his point on the unsuspecting reader. For example, he claims that “There has never been a meeting, or a book, or a paper on the details of the evolution of complex biochemical systems.” I am enclosing in the Appendix a list of hundreds out of thousands of papers dealing with detailed studies of evolution of complex biochemical systems.[40] **He tells his “stories” which are false, misleading, and betray a fundamental ignorance of the molecular and Darwinian mechanism of evolution. They are Behe’s blunder.**[41]

The approach selected by Behe in order to disprove the evolutionary theory is exactly the same as that used a century ago by W. Paley for complex organ structures and earlier by creationists pointing to the gaps in the fossil record. He introduces a new bogus term, “irreducibly complex system,” which is another and cunning way to say that such systems supposedly had to be created at once because they “cannot be produced directly (that is, by continuously improving the initial function, which continues to work by the same mechanism) by slight, successive modifications of a precursor system, because any precursor to an irreducibly complex system that is missing a part is by definition nonfunctional.”[42] There are several

fallacies associated with this contention. Behe states that for the determination of an irreducible system one has to specify the function of the system and all the components of such a system and determine if all the components are required for the function. Behe has not done so for any of his examples. As he admits himself, we do not know most of the components and their function. Moreover, even if such systems exist it is obvious that the simpler the system, the more irreducible it could be. His example of the mousetrap as a model for such system does not warrant his empirical conclusion from the “by definition” conceptual argument that it cannot be produced by a Darwinian process. Even if a system is irreducibly complex with respect to one defined basic function, it does not follow that the system might not be functional for a related function. Behe makes the system fit his idea of the way things ought to be. Also the Darwinian mechanism could gradually produce an irreducible complex system for the same function by adding parts which, while initially are just advantageous, they become for later changes essential:

An irreducibly complex system can be built gradually by adding parts that, while initially just advantageous, become—because of later changes—essential. The logic is very simple. Some part (A) initially does some job (and not very well perhaps). Another part (B) later gets added because it helps A. This new part is not essential, it merely improves things. But later on, A (or something else) may change in such a way that B now becomes indispensable. This process continues as further parts get folded into the system. And at the end of the day, many parts may all be required.[\[43\]](#)

As an example we might quote the transformation of the air bladder into lungs that allowed animals to breathe atmospheric oxygen and that was initially just advantageous—such animals could explore open niches of dry land. But as evolution through adaptation modified limbs for walking, these animals became terrestrial and lungs became essential.[\[44\]](#) Such a scenario at the molecular level was already elaborated by geneticist and Nobel Laureate, H.J. Muller, in 1918 and in 1939. He postulated that genes that at first would improve function would routinely become essential parts of the pathway.[\[45\]](#) Thus the gradual evolution of irreducibly complex systems is not only plausible, but it is expected. This is how Allen Orr, an MIT evolutionary biologist, summarizes this situation:

Although Muller’s essay is not as well known as it should be, the gist of his idea is common wisdom in evolutionary biology. Here is an important application. Molecular evolutionists have shown that some genes are duplications of others. In other words, at some point in time, an extra copy of a gene got made. The copy was not essential—the organism obviously got along fine without it. But through time this copy changed, picking up a new, and often related, function. After further evolution, this duplicate gene will have become essential. (We are loaded with duplicate genes that are required: myoglobin, for instance, which carries oxygen in muscle, is related to hemoglobin, which carries oxygen in blood. Both are now necessary). The story of gene duplication—which can be found in every evolution text—is just a special case of Muller’s theory. But it is an immensely important case: it explains how new genes arise and, thus, ultimately, how biochemical pathways get built.

We know hundreds of such situations (see some examples in the Appendix 6). Behe ignores duplicate genes in order to avoid a necessary conclusion. Lastly, Behe’s speculations border on the bizarre. For example, he speculates that the designer equipped the primal cell with all the genes modern organisms might need, that is the first bacterium carried all the genes for the human being, e.g., for speech center, etc.) Poor Behe, he got caught in his own mousetrap.

Hebrew Cosmology and World View

Since creationists insist that **“the Bible is the ultimate scientific approach,”** let us analyze for a moment what it is exactly that the Bible says about the world and the origin of life and what is the origin of

the biblical story.

Hebrew cosmology derived from some form of Chaldean and Babylonian cosmology and is known from the *Pentateuch* and Old Testament writings^[46]. Its center of the world is flat “land” surrounded by a primordial ocean and limited by a heavenly firmament spread like a “canopy” or “tent” or “gauze” where God resides, *Isaiah* 40:21-22:

The land is spread on primordial waters and is supported by foundations or pillars, *Psalms* 24:1-2; *Psalms* 104:5-6; *Job* 38:4-6.

From these primordial waters derive the seas, *Proverbs* 8:28-29; *Job* 38:16; and other sources of earthly water, *Deuteronomy* 33:13.

In the center of the land there are dwellings of the dead, *Job* 11:7-8; *Psalms* 139:7-8; *Numbers* 16:32-33.

Heaven stretches above the land as a hemisphere, *Proverbs* 8:27; *Job* 26:10. It is a “tent,” *Psalms* 104:2; *Isaiah* 40:22; a translucent crystal, *Ezekiel* 1:22; or a sapphire, *Exodus* 24:10. Heaven is similar to a concave mirror, *Job* 37:17-18; and has gates (doors), *Genesis* 28:16-17; *Psalms* 78:23-24; and floodgates, *Genesis* 7:11; *Isaiah* 24:18.

The primordial heaven was located beneath a portion of the primordial waters located above the visible firmament, *Genesis* 1:6-8; *Psalms* 148:4.

The Hebrews did not have a concept of the universe. All existing reality was described in terms of “heaven and land.” What was this primordial principle from which emerged the world? It seems that the *Pentateuch* indicates two such principles: one is God, Creator, (Elohim), autonomous and active, existing beyond reality; and the other is the coexisting chaos, the passive principle, which is the primordial ocean. It is something very elementary which is unformed, fluid, submerged in darkness.

There are two different stories of creation in the *Pentateuch*; *Genesis* 1:1-2:3 and *Genesis* 2:4-3:24. The first story begins with an introduction (*Genesis* 1:1-2) which probably summarizes the creation of the universe. God creates “heaven and earth” within the primordial ocean called “tehom.” The Hebrew word “ha’aretz” is translated as “earth.” In our present mentality the creationists present this to mean Earth as a globe. The Hebrews did not have the concept of Earth as a globe, on the contrary, the world was flat in a semicircular shape. Additionally, it is clear that this term designated land because it is equated later (*Genesis* 1:10) with the dry land (“yabashah”).

The land was formed from or in the primordial ocean (“tehom”) floating in it still covered by waters. That the term “tehom” means a body of water is clear from the statement that God, in the form of his substance, “ruach,” the Greek equivalent of which is “pneuma,” was “hovering above the waters.” Such a watery chaos is found in most other cultures as well.

Some scholars deny, however, that the primordial water was not created. According to Heidel^[47] we cannot deduce the creation of the primordial water from the term “bara,” because it does not mean create from nothing, but rather from the use of the expressions “in the beginning” and “heaven and earth.” Though the last term designates the cosmos, the term “earth” clearly refers to the land and not primordial water with which it is contrasted. There is no statement about the creation of the “tehom.”^[48] Moreover, other biblical texts make this primordial water the source of various types of water on earth.

Next follows a well known series of creative acts by God presented as performed in six days.

The *Pentateuch* story described in this text is modeled on the Babylonian creation stories from which it derived. The parallel text to the *Genesis* is the epic known as *Enuma elish* (*On the High*) dated from the dynasty of Hammurabi (ca 1792–ca 1750 B.C.E.), i.e., from the time when Marduk became the main god of Babylonia. The purpose of the text is to narrate the elevation of Marduk to the dignity of the king of gods and express devotion to him in order to gain his favors. Both texts have similarities but also some

differences. A comparison of both texts is presented in Table 2. The vast range of Babylonian and Sumerian/Akkadian literature explains many theological concepts and the strange or mysterious occurrences in the Hebrew Bible; e.g., blood considered as the location of the principle of life, occurrence of monsters used as metaphorical descriptions of the enemies of God (that is the people and countries which were considered the enemies of Israel), Jewish eschatology, the flood, the fall of man, etc.[49] It was suggested that both texts have the same source in the Babylonian literature.[50]

The second story of the creation (*Genesis* 2:5-24) is shorter and places less emphasis on the creation of the world and more on the formation of mankind. God created man now described by the Hebrew term “Adam” from the “dust” (“adamah”) of the land and placed him in the garden of Eden, a place of bliss, and for companionship God creates from Adam’s rib the first woman who will be named by man Eve, (Chawwah). And the story ends with a description of how the first man and the first woman disobeyed God’s command of not eating the fruit from a certain tree in the garden and how they were punished.

It is clear that the Hebrew biblical stories are not original and unique. They belong to the mythical stories which man was creating since the dawn of mankind to explain human existence on earth and his fate. They are basically identical in their world view with the Babylonian accounts. The major difference in theological speculations is the evolution from a crude polytheism to a more refined, purified, and strict monotheism of the Hebrews, though still anthropomorphic. The world view described in them corresponds to the world view typical of the level of knowledge available at that time to the ancient man.

Their world view is geocentric with a flat earth covered by a vault of heaven where the celestial bodies are located and where God abides. The earth is floating on an ocean supported by some foundations. Inside the center of the earth there is a place for the dead.

Table 2

Parallels between *Genesis* and *Enuma elish*

<i>Enuma elish</i>	<i>Genesis</i>
The divine principle and cosmic matter (Ti’amat, Apsu, Mummu) are coeternal and mixed (combined).	The divine principle is independent of the primordial ocean (tehom). God created cosmos (land and heaven) within or from the primordial ocean.
Primordial chaos is a personification of the primordial waters enveloped in darkness.	The land (earth) is shapeless and void with darkness covering the primordial waters (tehom).
Light is emanation from the gods (but alluded to later in the account).	The work of creation is distributed over six days: God created light independent of the celestial bodies.

God Marduk's work of creation: The creation of heaven (firmament) from the one half of the body of Ti'amat (primordial ocean) (upper waters).		The creation of heaven (firmament).
The creation of dry land (earth) from the other half of the body of Ti'amat (lower waters).		The creation of dry land emerging from the primordial ocean.
The creation of the luminaries in the sky.		The creation of the luminaries in the sky.
The creation of mankind from the blood of the slain god Kingu. Man is created for the purpose of serving the gods by building sanctuaries and cultivating the earth for the benefit of the gods. In other stories man must have divine understanding because he was formed from divine blood – hence also blood is the seat of life.		The creation of a man and a woman in the image of God. (In the second account – the creation of a man from “dust” by breathing life into his body, and of a woman from a rib of man). Man is created for the purpose of dominating the earth and for cultivating it.
The gods rest and celebrate.		God rests and sanctifies the seventh day.

The living organism is defined only as a “breathing life” which is in accordance with the ancient view that breath was connected to inhaling the divine substance sustaining life. Moreover, classification of the living organisms is utterly rudimentary and naïve. There is no mention of invisible life, e.g., bacteria, viruses, protista, and fungi.

The creation stories are poetical renditions of the popular mythical beliefs at that time. They are cultural products of the Babylonian priests which were modified by the Jewish priests and as such a witness to the cultural evolution, i.e., evolution of ideas and of religion. It is obvious that such accounts have no scientific value though they may be used in religion as an illustration of certain philosophical and religious assertions. Thus when creationists make reference to these accounts in their scientific elaborations, they simply convert science into religion or religion into science.

This religious world view was imposed on mankind in the Western world from the fourth century under the sanction of law. The results of it were a stifling development of science, an intellectual marasmus and regression compared to ancient Greece, the imposition of intolerant and repressive government systems, the repression of religious freedom, and persecutions.

Modern Christianities should abandon the literal reading of the Bible in matters of their world view, the origin of life, and biological evolution.

Following the advice of the Socinians, "*Scriptura supra rationem sed not contra rationem*,"^[51] in the modern world, one has to reject the authority of the scripture in matters of science and the scientific world view. Thus today Christianities should abandon the outdated concept of the direct creation of living organisms and accept the tenets of modern science. And most Christian denominations have already done so. One of the last to accept the scientific theory of evolution is the Roman Catholic Church.

The biblical world view concerning the physical world was tacitly rejected over a few centuries due to the work of Copernicus, Galileo, Kepler, and Newton. Symbolism of the process was emphasized in the case of Galileo when the Church accepted the Copernican world view. Just as a reminder, I will quote the verdict of the Catholic Holy Inquisition against Galileo in 1630:

Whereas you, Galileo, ... Following the hypothesis of Copernicus, you include [in your writing] **several propositions contrary to the true sense and authority of the Holy Scriptures**; therefore (this Holy Tribunal ...) by the desire of his Holiness and the Most Eminent Lords, Cardinals of this supreme and universal Inquisition, the two propositions of the stability of the sun, and the motion of the earth, were qualified by the Theological Qualifiers as follows: 1. The proposition that the sun is in the center of the world and immovable from its place is absurd, philosophically false, and formally heretical; because it is **expressly contrary to the Holy Scriptures**. 2. The proposition that the earth is not the center of the world, not immovable, but that it moves, and also with a diurnal action, is also absurd, **philosophically false, and, theologically considered, at least erroneous in faith**.^[52]

It took the Church 362 years to get used to the idea and to realize the extent of the error it committed against science and Galileo by adhering closely to the letter of the text written several thousand years ago. Galileo was officially rehabilitated by the Church and the verdict of Inquisition recanted on October 31, 1992.^[53] The official declaration stated that **the theologians who attacked Galileo failed to understand that the scripture was not literal when it came to a description of the physical world**. The Church's errors must be frankly recognized as Galileo was more perceptive in his interpretation of the scripture than the theologians in spite of the fact that reading and interpretation of the Bible by lay persons was prohibited at the Trent Council. But as usual, the Church did not apologize for the immoral deed done in the name of God and faith. Nevertheless, by its recantation the church officially renounced the literal adherence to the scriptures and recognized their invalidity for a scientific world view.

Another big step in the evolution of Christian doctrines took place on October 22, 1996 when the Pope in an address to the Pontifical Academy of Sciences under a remarkably Socinian title *Truth Cannot Contradict Truth*,^[54] officially recognized the theory of evolution as a true scientific theory. He explains that this decision was a direct result of the previous considerations connected with the case of Galileo:

For my part, when I received those taking part in your academy's plenary assembly on October 31, 1992, I had the opportunity with regard to Galileo to draw attention to the need of a rigorous hermeneutic for the correct interpretation of the inspired word. It is necessary to determine the proper sense of Scripture, while avoiding any unwarranted interpretations that make it say what it does not intend to say. In order to delineate the field of their own study, the exegete and the theologian must keep informed about the results achieved by the natural sciences.

And then the Pope declares:

Today, almost half a century after the publication of the encyclical [*Humani Generis* of

Pope Pius XII], **new knowledge has led to the recognition of the theory of evolution as more than a hypothesis. It is indeed remarkable that this theory has been progressively accepted by researchers, following a series of discoveries in various fields of knowledge. The convergence, neither sought nor fabricated, of the results of work that was conducted independently is in itself a significant argument in favor of this theory.**

However, in accordance with Catholic theological doctrine, the Pope made a *caveat* that:

If the human body takes its origin from pre-existent living matter, the spiritual soul is immediately created by God. Consequently, theories of evolution which, in accordance with the philosophies inspiring them, consider the spirit as emerging from the forces of living matter or as a mere *epiphenomenon* of this matter, are incompatible with the truth about man.

Both these events, one the rehabilitation of Galileo's views, and the second, the recognition of the theory of evolution as a true theory, are a remarkable development in the evolution of a religion. The doctrine maintained for fifteen centuries and purportedly supported by an infallible scripture and the infallible teaching of the church was overturned by one stroke of the pen. Thus the Church repudiated the literal reading of the Bible at least in matters concerning its world view, the origin of life, and the biological evolution including man.

Previously, in 1983, the Catholic church already accepted the Big Bang theory as an explanation for the origin of the universe.

Thus, in conclusion, all Christianities should abandon their literal reading of the Bible with respect to the world view, the origin of life, the origin of man, and other natural phenomena and consider the biblical text as a metaphorical representation only of metaphysical views. They should accept the tenets of modern evolutionary theory and of modern science as a valid and factual explanation of the physical world. By doing this these Christianities do not lose anything, on the contrary, they enrich themselves with a broader and better understanding of the human condition, they break with their self-imposed "marginalization" and isolation, and enter into the mainstream of social, cultural and intellectual life of the global society. They might face new challenges better equipped in means to solve them for the advancement of humanity. The revelation cannot contradict the principles of reason in full agreement with the doctrine of the Socinians:

Though the Holy Scripture is authoritative, its authority can be assessed exclusively by the judgment of our reason. Because of this the Holy Scripture cannot contradict reason, just as faith should not contradict reason. Indeed, faith follows the judgment of reason and believes that which reason judges worthy of belief.[55]

The author wishes to express his thanks and gratitude to Ms. Claire S. Allen for reading the manuscript manuscript and her comments.

Bibliography

[1] Leonard Swidler, "Toward a Universal Declaration of a Global Ethic," in *Dialogue and Humanism*, Vol. IV, No. 4, pp. 51-64, 1994.

[2] M. Hillar: *The Philosophical Legacy of the Socinians*, paper presented at the XXth World Congress of Philosophy, Boston, August 10-16, 1998. Abstract Book, p. 93.

M. Hillar, "The Philosophical Legacy of the XVIth and XVIIth Century Socinians: Their Rationality," in *"The Philosophy of Humanism and the Issues of Today,"* eds. M. Hillar and F. Prahl, pp.117-126, American Humanist Association, Houston, 1995.

[3] Charles Darwin, *The Descent of Man*, (New York: Random House, first published in 1871) chap. IV, p. 491. [This and all subsequent bold face type is mine.]

[4] Robert T. Pennock, *The Tower of Babel* (Cambridge, MA, London: The MIT Press, 1999), p. 43.

[5] *Science and Creationism. A View from the National Academy of Sciences* (Washington: National Academy Press, 1999).

[6] Theodosius Dobzansky, Quoted by Pennock, *op. cit.*, p. 340.

[7] *The Cambridge Encyclopedia of Human Evolution*, Steve Jones, Robert Martin, David Pilbeam, eds., (Cambridge: Cambridge University Press, 1999).

Robert Wright, *The Moral Animal. Evolutionary Psychology and Everyday Life* (New York: Vintage Books, 1995).

Peter Singer, ed., *A Companion to Ethics* (Oxford: Blackwell, 1993). Pennock, *op. cit.*, pp. 117-179.

[8] Darwin, *The Descent of Man*, *op. cit.*, p. 495.

[9] Leonard Swidler, *op. cit.*, pp. 55-58.

[10] Immanuel Kant, *Foundations of the Metaphysics of Morals*. Translated by Lewis White Beck (New York: Macmillan Publishing Company, 1988). Originally published in 1785.

[11] Idries Shah, *Seeker After Truth*, (London: The Octagon Press, 1992), p. 134.

[12] Pennock, *op. cit.*, p. 146.

[13] Quotes from Pennock, *op. cit.*, p. 315.

[14] Reproduced from Monroe W. Stickberger, *Evolution*. Third Edition (Sudbury, MA, Jones and Bartlett Publishers), p. 64.

[15] Pennock, *op. cit.*, pp. 309-310; 49; 312; 326.

[16] Pennock, *op. cit.*, p 314.

[17] John Losee *A Historical Introduction to the Philosophy of Science*. Third edition (Oxford: Oxford University Press).

- [18] Pennock, p. 5.
- [19] John Losee, *A Historical Introduction to the Philosophy of Science*, third edition (Oxford: Oxford University Press, 1993).
- [20] Albert Einstein, *Out of My Later Years*, quoted by Pennock, *op. cit.*, p. 376.
- [21] Davis and Frair, quoted in Pennock, *op. cit.*, p. 179.
- [22] Nancy Tatom Annerman, *Bible Believers: Fundamentalists in the Modern World* (New Brunswick, N.J. and London: Rutgers University Press, 1987). Quoted by Pennock, *op. cit.*, p. 39.
- [23] Walter L. Bradley and Roger Nelson, *The Trustworthiness of Scripture in Areas Relating to Natural Science*. <http://www.origins.org/> 1/30/2000
- [24] Pennock, *op. cit.*, p. 28.
- [25] Pennock, *op. cit.*, p. 31.
- [26] Pennock, *op. cit.*, p. 200.
- [27] Raël, Claude Vorillon, *The Book Which Tells the Truth*. In *The Message Given to Me By Extra-Terrestrials* (Tokyo: AOM Corporation, 1986). pp. 134-135.
- [28] Fred Hoyle and Chandra Wickramasinghe, *Evolution from Space* (London: J.M.Dent and Sons, 1981). Charles B. Thaxton, Walter L. Bradley, Roger L. Nelson, *The Mystery of Life's Origin. Reassessing Current Theories* (Dallas: Lewis and Stanley, 1992).
- [29] Pennock, *op. cit.*, pp. 242-263.
- [30] Edward de Bono, *Lateral Thinking: Creativity Step by Step* (New York: Harper & Row, 1970).
- [31] Alex Osborn, *Applied Imagination* (New York: Charles Scribner's Sons, 1953).
- [32] Darwin, *op. cit.*, (1972) p. 29.
- [33] Jonathan Weiner, *The Beak of the Finch: A Story of Evolution in Our Time* (New York: W.A. Knopf, 1994).
- [34] James Adams, *Conceptual Blockbusting: A Guide to Better Ideas* (San Francisco, CA: W. H. Freeman and Company, 1974). Don Koberg and Jim Bagnall, *The Universal Traveler: A Soft-Systems Guidebook to : Creativity, Problem-Solving, and the Process of Design* (Los Altos, CA: William Kaufman, Inc.). Pennock, *op. cit.*, pp. 104-106.
- Faye Flam, *Co-opting a Blind Watchmaker*. *Science*, 265, 1032-1033, 1994.
- [35] Faye Flam, *Ecologist Plans to Let Cyberlife Run Wild in Internet Reserve*. *Science*, 265 1085, 1994.

[36] Davis and Frair, in Pennock, *op. cit.*, p. 162.

[37] Charles B. Thaxton, Walter L. Bradley, Roger L. Nelson, *op. cit.*

[38] Michael J. Behe, *Darwin's Black Box* (New York: Touchstone, 1996).

[39] Behe, *op. cit.*, p. 5.

[40] John Catalano, ed. "Publish or Perish. Some Published Works on Biochemical Evolution". *The Talk Origins Archive*. <http://www.talkorigins.org/> 10/29/99.

Keith Robison, "Darwin's Black Box. Irreducible Complexity or Irreproducible Irreducibility?" *The Talk Origins Archive*. <http://www.talkorigins.org/>10/29/99.

[41] Pennock, *op. cit.*, pp. 166-172.

Jerry A. Coyne, "More Crank Science." *Michigan State University Press On Line*, <http://www-polisci.mit.edu/> 10/29/99.

Michael Ruse, "Enough Speculation," *Boston Review*, <http://www-polisci.mit.edu/> 10/29/99.

George Acton, "Behe and the Blood Clotting Cascade." In *The Talk Origins Archive*. <http://www.talkorigins.org/>10/29/99.

Robert Dorit, "Review of M. Behe's Darwin's Black Box." *American Scientist*, September-October 1997.

Niall Shanks, Karl H. Joplin, "Redundant Complexity: A Critical Analysis of Intelligent Design in Biochemistry." In *Philosophy of Science*, Vol. 66, pp. 268-298, 1999.

Douglas J. Futuyma, "Miracles and Molecules." In *Boston Review*, http://www-polisci.mit.edu 10/29/99.

Russell F. Doolittle, "A Delicate Balance." In *Boston Review*, http://www-polisci.mit.edu /10/29/99.

"H. Allen Orr Responds." In *Boston Review*, http://www-polisci.mit.edu 10/29/99.

Terry M. Gray, "Complexity—Yes! Irreducible—Maybe! Unexplainable—No! A Creationist Criticism of Irreducible Complexity." *A Response to Michael Behe—Darwin's Black Box—Irreducible Complex*. <http://mcgraytx.calcin.edu/> 1/30/00.

[42] M. Behe, *op. cit.*, p. 39.

[43] H. Allen Orr, "Darwin v. Intelligent Design. The Latest Attack on Evolution is Cleverly Argued, Biologically Informed and Wrong." In *Boston Review*, http://www-polisci.mit.edu /10/29/99.

[44] H. Allen Orr, *ibidem*.

[45] H.J. Muller, "Reversibility in Evolution Considered from the Standpoint of Genetics." In *Biological Reviews*, 14, pp. 261-280, 1939.

[46] All biblical quotes are from *NIV Bible* in Bible Works 4.0. (Big Fork, MT: Hermeneutika 1999).

[47] Alexander Heidel, *The Babylonian Genesis. The Story of Creation* (Chicago and London: The University of Chicago Press, 1942, 1963). pp. 91-96.

[48] Socinians too believed that the biblical text indicated the eternity of the primordial ocean. Hieronim Moskorzowski, *Refutatio libri de Baptismo Martini Smiglecki Jesuitae*. In Zbigniew Ogonowski, ed., *Mysl arianska w Polsce XVII wieku. Antologia tekstów. (Arian Thought in Poland of the XVIIth Century. An Anthology of Texts)*. (Wroclaw, Warszawa, Kraków: Zakład Narodowy imienia Ossolinskich, 1991) pp. 501-503. Jan Völkell *De vera religione libri quinque*. In *ibidem*, pp. 504-507.

[49] Heidel, *op. cit.*, pp. 130-139.

Lloyd M. Graham, *Deceptions and Myths of the Bible* (New York: Bell Publishing Company, 1975).

John Gardner and John Maier with the assistance of Richard A. Henshaw, *Gilgamesh*. Translated from the Sîn-leqi-unninni version. (New York: Random House, 1985).

Donald A. Mackenzie, *Mythology of the Babylonian People* (London: Bracken Books, 1915, 1996.)

[50] Heidel, *op. cit.*, pp. 130-139.

[51] M. Hillar, "From the Polish Socinians to the American Constitution," *A Journal from the Radical Reformation. A Testimony to Biblical Unitarianism*, Vol. 3, No.2, pp. 22-57, 1994.

[52] Quoted by Joseph Campbell, *The Masks of God: Creative Mythology* (New York, Penguin Books, 1968, 1976). Pp. 573-574

[53] James Reston, Jr., *Galileo. A Life* (New York: Harper Collins Publishers, 1994). Pp. 283-286.

[54] John Paul II, *Truth Cannot Contradict Truth*, address to the Pontifical Academy of Sciences, October 22, 1996.

[55] Joachim Stegmann, Sr., *De iudice et norma controversiarum fidei*. In Zbigniew Ogonowski, ed., *op. cit.*, pp. 293-294.