

Design vs. Chance in the Primordial Soup of Life:

A look into the study of the
origins of life on Earth

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²⁰And God said, "Let the waters bring forth swarms of living creatures, and let birds fly above the earth across the firmament of the heavens." ²¹So God created the great sea monsters and every living creature that moves, with which the waters swarm, according to their kinds, and every winged bird according to its kind. And God saw that it was good. ²²And God blessed them, saying, "Be fruitful and multiply and fill the waters in the seas, and let birds multiply on the earth." ²³And there was evening and there was morning, a fifth day. ²⁴And God said, "Let the earth bring forth living creatures according to their kinds: cattle and creeping things and beasts of the earth according to their kinds." And it was so. (Genesis 1: 20-24)

Throughout most of recorded history, the account of the world's creation as told in the first Chapter of the bible was believed by Western societies. Other cultures have believed in some god or Supreme Being as the Creator of the universe and all that is in it. In the past 200 years, however, scientists have worked to find the true origin of life and, it seems, prove the belief in a Creator wrong.

“Francis Crick, recipient of the Nobel Prize for the discovery of the structure of DNA, states, “[T]he origin of life appears at the moment to be almost a miracle, so many are the conditions which would have had to have been satisfactory to get it going.” (Pitman, 148)

Despite this statement, many people have spent their life's work trying to prove that life is a product of accumulating random chance or natural selection. The truth is, no one has been able to prove or disprove the true origin of life. This has remained, and may always remain, a mystery in truth. The fossilized microbial cells found in the oldest-known rocks on the planet have found to be 3.5 billion years old, and they may not be the oldest. (Thompson, 90) How did this life begin? Did non-life beget life by random chance? Is it possible that the complex systems and physiological “miracles” that make up today's animals, especially humans, could have evolved from a simple strand of nucleotides?

There are three basic theories as to the origins of life on earth. The first, and most prominent, is that of a creator (the Christian God) who designed all life. The second is the theory

that says life on earth began in a primordial soup millions of years ago when the right conditions spontaneously generated life. The third theory branches off of the second saying that the means for life to erupt from the soup came from extraterrestrial particles. These theories have all been studied extensively, but none has been proved or disproved as of yet.

The first of these theories, the belief in design by God, is today based on the idea that life, from the simplest bacteria to the human race, is too complex to have risen out of chance and coincidence. This theory is often called creationism, and can take on many forms. Some say that life began and was carried on exactly as told in the Bible, while others believe in Darwin's natural selection and one common ancestor, but say that the ultimate beginning of life was the work of God, and He guided the process to come to the human race.

One such argument, the design theory, concludes that He took the billions of years before human life existed to create the perfect conditions for complex life. Humans were the goal from the beginning, and their existence came about by working backwards from the goal. Take, for example, the intake of oxygen and the byproduct carbon dioxide. Before humans could thrive, there had to be an environment with abundant oxygen and a way to create it from carbon dioxide. This role is fulfilled by photosynthesis by green plants. "Unless some other mechanism is shown to be capable of fulfilling the same role, a design perspective implies that organisms very much like green plants were a necessary part of the original plan." (Wells, 72)

Humans also require food and water. Essential nutrients are provided by a very complex self-sustaining ecosystem. This ecosystem has perfect balance of life and death, and every molecule plays a special role. "It is thus clear that planning of human beings requires planning for many organisms as well." (Wells, 72)

Darwinism fails to give purpose to the randomly formed life and subsequent forms that evolve from them. Under the design concept, every thing is created in its own time for a specific purpose by the Creator, whose ultimate goal was to create the human race.

If you compare the design theory to the account of creation in Genesis, and look at the days as a metaphor for millions of years, you can see a correlation. In the biblical account, God creates the heavens and the earths. He separates land and water. He makes plants and creatures that live in the water. He makes creatures that live on land. And then he creates man and woman. Each step in the biblical account corresponds with the Big Bang theory commonly believed by scientists today.

“Essentially, the theory of the big bang rests upon the notion that at first there was absolutely nothing...And then, inexplicably, this nothingness began to heat up and exploded, and out of nothing there was suddenly stuff. Or, another way of putting it: nothing happened. And, out of nothing flowed space, time, elementary particles, then protons, neutrons, electrons...the Universe and finally those molecules that would some day fall to earth.” (Joseph, 29-30)

After the big bang, “[t]he newborn earth remained inhospitable for at least a few hundred million years, It was, at first, simply too hot for life. The collisions of the planetesimals that formed earth released enough heat to melt the entire planet. Eventually, Earth’s out surface cooled and solidified to form the crust, and water vapor released from the planet’s interior cooled and condensed to form the oceans.” (Freeman, 616)

Following this cooling, the planet eventually became hospitable for life. Scientists have no physical evidence, yet, of the first forms of life on earth, how they came about, or even really when, though it is estimated that life first appeared about 4 billion years ago.

In an test disproving intelligent design of life, Poole et al. argue that, if life were created by design, organisms suited for a specific environment would be more similar in their structure and function and similar organisms in a different environment.

“The logic is identical for comparing protein sequences in the hairs of polar bears and snow rabbits with, say, those of a rabbit in a warm environment. Under intelligent design, the proteins in the two species living under Arctic conditions could be created to give maximum insulation under freezing conditions. Thus, hair proteins from species living in the Arctic would be similar for functional reasons...It is possible for Intelligent Design to fudge predictions to make them identical to the theory of descent, but this is unsatisfactory. It provides no mechanism that leads to the observed data.” (Poole et al., 380)

This test does not entirely disprove the theory of Intelligent Design because it presumes to know the logic behind the Design of the Creator, a presumption that goes against the premises of the theory to begin with. For those who believe in a creator, humans will not know the purpose or the process of life while they are here on earth. The Creator is more intelligent than humans could ever be, so we cannot understand His logic.

The general scientific belief is that life arose from non-living substances on the surface of the earth. “The typical textbook scenario suggests that lightning, ultraviolet rays from the sun, or heat from volcanoes affected gases in the primitive earth’s atmosphere and changed them into more complicated organic compounds.” (Camp, 31)

Stanley Miller and Harold Urey attempted to recreate the environment of the early earth and continuously exposed a mixture of methane, ammonia, water vapor and hydrogen gases to electrical charges and ultraviolet light for a week. The experiment was a success in that it created organic compounds and 12 different amino acids such as alanine and glycine. The compounds

created by this experiment and many similar ones are considered the building blocks of living matter. However, no scientist yet has been able to produce life, or even a fragment of DNA, the substance at the core of all living organisms. (Joseph, 112)

An RNA World, however, is quite possible. James Ferris and colleagues have been able to synthesize nucleotides on clay and other minerals that would have been present in the early earth. Their initial findings published in 1993 showed activated nucleotides would form polynucleotide chains of 8-10 on clay in the lab. Further studies, published in 1996, showed the formation of chains 40-50 nucleotides long by exposing the clay to a new nucleotide mixture every day, to simulate a continuous bathing (like a tide) or a splashing. And most recently, chains of up to 55 nucleotides in a row have been formed on the minerals illite and hydroxylapatite. (Freeman, 634)

These polynucleotide chains may have been the precursors to early self-replicating RNA. Conditions on Earth at the time probably included high UV radiation, something that has deterred many from believing RNA could have formed. It has been found, however, that the bases making up RNA absorb UV light, protecting the sugar and phosphate holding it together. UV light may have even excited the bases into a reactive state, promoting the formation of RNA. (Bhattacharya, 22)

It has also been proven that this RNA could have mutated to evolve into DNA based life. RNA, itself, was proven to mutate by Sol Spiegelman and colleagues in 1967. Their experiments with RNA in test tubes proved that RNA can evolve both its genotype and phenotype. The evolution of the RNA favored faster, more efficient reproduction and had a shorter strand. These evolutions did not help it become the basis for DNA or living organisms, but that has been further studied. These studies have shown that the introduction of environmental factors can cause RNA to mutate towards protein synthesis and on its way to DNA. (Freeman, 619-22)

Still others believe that the building blocks of life, or even life itself, arrived by extraterrestrial means. The theory is that life was formed on other planets (most likely Mars) and transferred to Earth through meteorites and other debris. It has been shown that some organisms and their spores can withstand the extreme conditions found inside comets like the ones that bombarded the Earth until very shortly before life appeared. Other studies have shown that it was not very likely. "In contrast, the possible transport of extraterrestrial organic material via infalling comets and asteroids is a serious possibility. The very narrow window between the end of the heavy bombardment phase and the evidence for primitive organisms favors the idea that impacting prebiotic matter could have been the first step to life." (Horneck, 18)

Studies have predicted that the atmosphere of the early Earth was not favorable for the formation of prebiotic molecules like the ones created in the Miller-Urey experiments. Thus, the possibility of organic matter reaching Earth from space is much more conducive to the formation of life. Extraterrestrial organic material still reaches Earth via small particles called micrometeorites every year. The amount reaching Earth today is nothing compared to that which hit at the end of the Cretaceous period and the beginning of the Tertiary. The C/T boundary sediments show huge deposits of extraterrestrial materials and large asteroid impacts. (Horneck, 19)

Early Earth did not contain many of the essential ingredients to form early life, including oxygen, necessary in the formation of DNA. The idea of these ingredients falling to Earth and accumulating in the seas to form an organic sludge seems very plausible.

But where did the life found in the Universe come from? What caused the big bang? Was there anything before this event, perhaps another universe with another blue planet full of complex living organisms?

Studies are being done every day testing one hypothesis after another, but we may never know. Some people seem to be happy believing that their God created it all, and when this life is done they will know for sure how and why it was. Others are not so easily convinced. Some feel that the human mind is not the result of a creating God, but that God is a result of the human mind.

“Humans exhibit one feature that is very odd by animal standards, namely our extraordinary willingness to accept the will of the community and even to die for it. This level of altruism is the key to our success, allowing us to exploit cooperative solutions to the problems of individual survival and reproduction. For these to work, however, the individual has to be prepared to trade immediate personal interests for long-term gains.” (Russell, et al.)

Religion creates a system of punishment and reward. Our minds allow us to recognize that others have thoughts and we can therefore use religion to inspire individuals and groups to behave with decency because of a common belief in what is good. Religion also provides an answer to the unanswerable. (Russell, et al.) Today’s technology and science seems to be out to disprove the existence of a Creator, rather than to prove our true beginnings.

But the majority of the human race seems to be in some sort of limbo between all of the theories, each person with their own ideas and beliefs. The truth is, we may never know how we all came about on this planet.

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