The Evolution of Religion is a very recent phenomenon in the process of evolution. But evolutionary time frames are enormous compared to human existence.

From the Big Bang to Life on Earth took 10 – 12 billion years.

From the beginning of Life on Earth to Socialization took nearly 3 billion years.

Socialization has been an evolutionary effector for about 100 million years.

Bipedalism in mammals originated 4 – 5 million years ago. Birds, well that's another story.

Cognition followed closely by Religion has been around maybe 200,000 years;

Extensive tool use and primitive cultures about 40,000 years

Scientific Observation about 500 years;

In the last 500 years we have made considerable progress learning about our 15 billion year past.

Let me lay a little background from a scientific perspective. In the beginning, 13 - 15 billion years ago, an extremely dense black hole with crushing weight blew up creating tremendous energy and forming the simplest of elements, hydrogen. From the beginning hydrogen was fused into helium with the release of even more energy and as the stars and the planets were born, so too were the heavier elements. This process continued until all of the other elements necessary for life as we know it EVOLVED, carbon, nitrogen, oxygen, sulfur, calcium, magnesium, sodium, potassium, each in its own time.

Although they can't be quite sure, most cosmologists estimate that our sun originated about 4.5 billion years ago and our planet about 4 billion years ago.

During its first billion years Earth both grew (i.e., it attracted more debris from space) and cooled (from a liquid-gaseous sphere to a solid rock) at least externally. Water was formed in abundance.

As water accumulated and other elements dissolved in the water, the primordial soup became a good incubator for the formation of RNA and amino acids. These reactions have been shown to occur under conditions that likely existed on the early planet Earth.

Over the first billion years (wrap your mind around that time frame) RNA bases formed, amino acids formed, rudimentary proteins formed, rudimentary cells formed and the chemical reactions that occurred within these cells were protected from outside interference, creating an advantage for those reactions. Those developments might be considered the first step of life, a very primitive form of reproduction. Over an extended period of time the preferences led to increased concentrations of the molecules that protected each other, EVOLVING into the genetic code that is ubiquitous in the biological realm today.

From its chemical beginning life's evolutionary process appears to have been at work selecting the molecules that could work best in a cooperative arrangement to produce evermore complexity leading eventually to the process that today we call life. Remember that this process took about a billion years and the life it produced was simple.

The effectors of the evolutionary process are important. In addition to reproductive efficiency and survivability, they include environmental change, adaptability, death, and in the latter stages sex. Each has a role to play in driving the process.

Reproduction must be able to rebuild the model close to the standards that have brought success. Wholesale changes in the plans that have been successful would be counterproductive.

Capacity for survival insures that the individual with the best set of survival traits in the environmental milieu survives to reproduce. Survival traits might be more appropriately defined as the luck of the draw under the conditions prevalent at the time.

Death is important because the old models have to be removed from the system to improve the efficiency of the new and improved models. Competition from ancestors would create an evolutionary disadvantage. Besides the remains of the old models become resources for the new models.

Environmental change forces adaptation. There have been five mass extinctions, all caused by environmental disruption. All five mass extinctions reworked the species list considerably. The species list expanded slowly after each mass extinction as the remaining species proceeded to adapt to the new conditions forming other new species over time. The sixth mass extinction is in progress. This environmental disruption has a different source from the other five. This one is driven by one of the species rather than a cataclysm. Or, considering the time scales we are dealing with maybe we are a cataclysm. If we continue to drive the extinction, it may continue until the driver is gone or at least incapable of driving the process.

Adaptability appears to be at least partially genetic (i.e. DNA dependent), but given the similarities among the DNA compositions across the phyla, it appears that other factors, not yet understood, may be involved. For example, microorganisms tend to produce more of the genetic products, usually proteins, needed to adapt to changes in the environment when challenged by environmental stimuli. This mechanism does not change the DNA sequence, it simply creates more copies of a specific gene or genes. The organisms that do this create an advantage for their survival and therefore increase their relative populations. Presumably this mechanism has evolved into the higher organisms but with more complexity.

Sex is a late addition to the effectors. Sexual reproduction started with microorganisms because it led to a greater potential for adaptation, an increased capacity to adjust to environmental conditions. The more complex species today all reproduce sexually because it has an evolutionary advantage.

And biological complexity has led to an evolutionary advantage, the creation of community (socialization). Socialization has been a relatively recent addition to evolutionary progress. It has been around for a mere 100 million years. Insects and mammalian ancestors alike introduced the practice of socialization long before we humans existed. Socialization was already part of our inheritance before we evolved into Homo sapiens.

In our more complex world socialization, itself, provides an advantage for survival, more eyes and ears and noses to look for food, better defense, better capacity to carry forth successful methods of survival (group memory), increased specialization and efficiency, and the advantage of numbers in competitive situations. In these advantages evolution has found a bedfellow, a process that further enhances the survival of species.

However, the drivers for socialization are somewhat different from those for non-social species. While reproduction, capacity for survival and sex are still drivers, they are drivers only as they fit best into the social context. While aggressiveness may be awarded with evolutionary success in the non-social framework, it would have significant disadvantages in the social framework. Reproduction, or, in more complex systems, sexual activity, is rewarded in non-social evolution for frequency and in the sexual system for genetic variation (numbers of partners). And here we find, especially in humans, problems between social and non-social evolution. Non-social evolutionary drivers promote the survival of the individual so that he/she can reproduce. Social drivers promote the survival of the community necessarily suppressing some of the drivers that promote the survival of the individual.

Cognition or intelligence has become a factor as well in the more complex species, especially Homo sapiens. It entered the realm of evolutionary effector much more recently than did socialization. It has been driving human population successes for about 200,000 years.

In humans, socialization combined with cognition has been so successful that we have not only spread our population throughout the planet, we have eliminated thousands of other species in the process. But the codes of behavior that support socialization are often

antithetical to the more primitive evolutionary drives. Fortunately in humans, cognitive abilities allow us to recognize the conflict, but that doesn't mean we are always able to prevent the conflict from arising. Regression into the more primitive behaviors driven by more primitive parts of our still evolving brain gives rise to antisocial behaviors, sometimes referred to as sin (individual values trumping community values).

This dichotomy of human behaviors has been recognized by religions for millennia, but I don't think that it was a factor in the evolution of religion. The dichotomy of human behaviors has been a topic of religious discussion for all of recorded history, but religion goes back much farther than that. As our cognitive abilities developed to the point where we could ask questions about cause and effect and later about mortality, we demanded answers to those questions. Of course we didn't have the scientific data to actually answer the questions at the time so we invented the answers. And of course those answers were anthropocentric. The human species or the "chosen peoples" were the center of the cosmos and all of the resource of the universe was at their disposal. But then the known universe at the time was pretty small. Moreover, I think that religious thought did not begin to address morality issues (community values vs individual values) until much later when the dominance of alpha males started to wane as interactions between clans began to increase.

Religion was likely a part of the human psyche as we moved out of Africa to populate other parts of the world. Over time the religion that moved from Africa with our ancient ancestors progressed independently by geographic region into the world religions we have today. Each of those religions attempts to explain the human condition in its own way. Each is more or less anthropocentric. Of course, why would we invent explanations for muskrats or amoeba?

Religion provided answers and hope where previously there had been only fear in the cognitive brain. It explained thunder and lightning. It explained night vs day. It explained rain and snow, storms and floods. It explained how we got here and it explained where we go when we die. Once we were capable of understanding personal mortality, religion helped by providing meaning. Our cognitive abilities recognized that life would be pretty meaningless without some kind of reward. Religion has provided that reward, even if

imaginary. Thus by providing explanations for natural phenomena and by providing meaning, religion has provided an evolutionary advantage over several tens of thousands of years. This evolutionary advantage of having answers vs not having answers allowed those individuals with active imaginations (religiously developed temporal lobes) an advantage in survival. The ability to ascribe meaning and cause whether real or not provides a comfort to the cognitive process that lends stability to the individual's interaction with the community. That stability provides an advantage in both survival and reproduction that will yield an evolutionary advantage to individuals presenting those characteristics. During the evolution of Homo sapiens, short though it has been, this advantage has likely produced a majority of individuals with a biological tendency toward religion. Unfortunately, the tendency to accept historical imaginary explanations because "the Bible or the Koran says so" does not facilitate understanding the real world.

Like the discordance between socialization and the success of the individual described above, so too is there a discordance between human cognition and the evolutionary advantage of religion. The success of socialization has produced a species that is capable of dominating all of the other species in spite of (or maybe because of) its capacity to create a system in which individual survival is second to community welfare. So too the evolution of human intelligence is producing a species capable of understanding its real role in the process so that it no longer needs to revert to imaginary explanations. If the species can accomplish that, it may be able to put itself back into equilibrium with the system that created it, and possibly survive.

To do that we must realize that life, the process we are obsessed with because it is OUR corner of the universe, seems to be just another development in the much bigger evolutionary process. Evolution may keep life or discard it depending on what happens in the experiment of life. This concept is in line with the sequence of discoveries that has provided us with perspective over the past 10,000 years during our developing capacity to understand:

- We really are not the only humans on the Earth. There are other civilizations.
- The Earth is round not flat.
- The sun does not revolve around us. Our planet is part of a bigger system.

- Our solar system is just a very small part of the Milky Way.
- Our galaxy is only a small part of the universe.
- Our species is only one of millions on this planet.
- All of the above are important in the evolutionary process.
- The evolutionary process formed the elements, the galaxies, the stars, the planets, the air, the rocks, the oceans, life, the species, socialization, cognition. What next?
- The bottom line on this sequence of realizations is that life is not particularly important in the sequence of evolution, and human life even less so, but in my mind all parts of the process are sacred, me and the rock.

This knowledge leads to the conclusion that we have considerably overstated our importance in the system for millennia. Now that we have the information and intelligence to recognize our place in the cosmos, are we willing to take our place and act accordingly, or will we continue to allow hubris to trap us into thinking we are special? Unfortunately, we are special, not because we have been ordained by God to dominate, but because of our evolved socialization and cognition, we have developed the capacity to destroy ourselves by our own success. We may be the first species capable of doing that. And if we continue to live beyond our resources, we may do just that.

May we learn to trust Science as the provider of truth and the Bible as the provider of ancient myths, a useful but not literal tool? And may we learn to live simply and sustainably so that the Earth can continue to support us?