Jonathan Preheim
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How Things Came to be this Way

Douglas Adams humorously revealed in his *Hitchhiker's Guide to the Galaxy* books that "the ultimate answer to life, the universe, and everything is 42". It might as well be. The answer to, or the origin of, everything is simply unfathomable to us. In this paper, I will describe how I believe things came to be the way that they are. Some sort of spirituality may explain what put the universe into being at all (this is the unfathomable part). Science then explains how the universe developed from that point. Specifically, it can be used to explain how a particular species on a particular planet progressed out of a primordial ooze into sentient beings on the verge of wiping out most of the life on their planet. Naturally, some speculation is needed to fill in the gaps, and I must acknowledge that I cannot strictly claim to have knowledge. I believe that a scientific explanation comes the closest to knowledge, so that is where I will begin.

The first event we know of is the Big Bang, 14 billion years ago. Everything in the universe was concentrated within an infinitesimally small volume, which exploded violently. The universe grew and cooled rapidly, and is still growing and cooling. Particle interactions governed by the four fundamental forces (weak nuclear force, strong nuclear force, gravitational force and electromagnetic force) and sheer probability let the universe become as it is today.

At first, it was too hot for even atoms to exist. As the universe cooled, quarks formed neutrons and protons. Neutrons and protons bound together to form hydrogen and then helium nuclei. Electrons bound to nuclei, completing atoms. Only lower elements on the periodic table existed at this point. Dust and gases drifted into clouds called nebulae.

Gravitational force caused some nebulae to spin and collapse inward. Dense collections of matter at the center of the nebulae grew hot, igniting nuclear fusion and forming stars. Through nuclear fusion, larger elements were created. The residual matter orbiting some stars collected into planets. Many stars grew so large that they could not be contained by their own gravity and went supernova, releasing enormous amounts of energy, creating the largest elements on the periodic table. Some of these became black holes at the centers of galaxies. Galaxies and solar systems, stars and planets, asteroids and comets formed and were destroyed, and matter was distributed across the universe.

In the most general sense, that is how things came to be this way. Somehow, matter and energy existed. Then, following a consistent set of rules that we have some understanding of, the universe, including humanity, carried on to its current state. This explanation has been developed through careful observation of everything from stars to single photons over thousands of years by millions of humans. We know very little about the way things are in most of the universe, but can go more in depth concerning ourselves.

We call one of the stars the Sun. It is not especially noteworthy or unique as stars go, but it is the center of what we call the Solar System. Eight planets orbit the Sun, and the third from the Sun we know as the Earth. Earth is about 4.5 billion years old, has one moon known as the Moon, and spins on an axis tilted at 23.5 degrees.

The core of the Earth is very hot and surrounded by a layer of molten rock. That liquid layer combined with the Earth's rotation maintains a magnetic field, which blocks much of the radiation from the Sun. The Earth was barren and rocky, with frequent seismic events like earthquakes and volcanos shaping the surface and releasing gases to create an atmosphere.

The atmosphere further protected the surface from radiation, and the Earth had lots of water, carbon and oxygen. These conditions allowed abiogenesis to occur billions of years ago. Organic compounds formed and grouped together in increasingly complex ways. Eventually these groups of molecules were complex enough to be considered alive. Cells developed, and natural selection took over. Multicellular organisms evolved. Various adaptations were propagated and species diverged. They swarmed the oceans, the land, and even the skies.

The Earth's barren surface gradually turned green as plant life evolved and spread. Animals, insects and bacteria lived and died, evolved and went extinct. The continents drifted apart, and unique species evolved on each. In life and death, all organisms provide what is needed for other organisms to survive, in a delicate but remarkably resilient balance. Life perfectly fits the conditions on Earth, and plays a role in maintaining those conditions while it spreads.

Some animals came to walk on two legs and possess two arms ending in hands with opposable thumbs. These highly adaptable omnivores evolved large brains. Hundreds of thousands of years ago, a bipedal species in Africa called homo sapiens began outcompeting the rest.

Humans spread out of Africa to all the other continents, except Antarctica. They made noises which developed into languages. Language encouraged group cohesiveness and helped give humans the capability for abstract thought. Like any other animals, humans were driven by survival instincts. They hunted and gathered for food and defended themselves against predators, though they had few. Some realized that they could control what plants grew where, and agriculture was born. They could even raise animals to eat. But this required appropriating land and resources that would have supported a great many other animals, and using it all for humans, as Daniel Quinn is keen to point out in *Ishmael*. Many groups of humans chose to maintain a hunter gatherer lifestyle, but the population of the groups that settled down exploded. Those humans tended to push out the hunter gatherers.

Humans discovered things like fire and electricity. They developed tools, like mallets and weapons and science. They invented things like the wheel and politics and Wikipedia. They built sprawling cities and flying machines. They fought wars with each other over the resources they needed to maintain their increasingly safe lifestyles. They fought wars over the ideas of their prophets. And they fought a war against the status quo of the Earth itself.

It is only natural that humans took as much as they could from their environment to make their lives more comfortable. A desire for comfort and safety keeps an organism from dying, and allows it to reproduce more, so of course that desire has been passed on. In a mind capable of abstract thought, that desire begs a sense of purpose. Humans developed religions to justify their sense of purpose, and technology to keep themselves safe and comfortable. They expanded beyond what most species could and clashed with each other and their environment, to the point where it is changing faster than it ever did in the billions of years before human existence. Most species are limited by competitors or their food supply and have limited ability to spread. Humans gained nearly complete control over their food supply, can exterminate any competitors

and can move anywhere on Earth in mere hours. They surpassed their “natural” population, destabilizing terrestrial life as a whole.

Humans are only now beginning to realize this. Life on Earth has been so resilient because it is so diverse. With that diversity threatened, humans are threatened as well (or, “with gorilla gone, will there be hope for man?”). There is a movement away from religion to more objective knowledge. They are questioning whether or not it is allowable to keep affecting their environment in this way. They want answers but are conflicted because it really is impossible to know anything for certain, and therefore it is impossible to agree on a course of action.

If knowledge is a true and justified belief, it is impossible to claim knowledge about anything. To claim a justified belief is knowledge is to claim that it is true. But then how does one know the belief is true, other than by citing another true and justified belief, and so on? It is certainly possible to have knowledge by this definition, one just can never know whether they have knowledge. Science is the closest we can get to “knowing” if a justified belief is true. Perfect certainty is impossible, but by compiling a consistent set of many testable justified beliefs that interrelate and support each other, science is approximating knowledge. So practically speaking, knowledge can be claimed if a belief is justified and scientifically proven.

On the other hand, there is no way to be confident that we are not deluding ourselves. Things that make sense in our dreams often are wholly ridiculous in our waking worlds. We cannot say with absolute certainty that dreamlike logical jumps are not happening to scientists or humanity as a whole. After all, as Descartes points out, we cannot even be sure when we are awake or when we are dreaming. We evolved to survive and procreate; we did not necessarily evolve to see everything as it really is. The scientific method was created and applied by humans. We perceive that it works, and I believe that it does, but there is no way to be absolutely certain.

Of course, science does not explain how that infinitesimally small volume got there in the first place. At best this explanation is incomplete. I originally researched what science says about how things became the way they are in order to prove the Genesis account of creation that my parents and church taught me to believe. I ended up rejecting the Genesis myth in favor of mainstream science, and my specific beliefs about God slowly fell away as well. One thing spiritual creation myths like the one in Genesis do have going for them is an explanation of how the universe itself came to exist: the gods did it. Science is limited to the confines of the universe, while spirituality speculates on what is beyond it. We have discovered that time is inherently linked with other properties of the universe, like mass and space. What is to say that time or space, or even energy, must exist outside of the universe, where God presumably is? Then, whatever is out there is utterly incomprehensible to us and bound by an entirely different set of laws that we have no hope of understanding. But *something* is *probably* there, and that is why we are here and things are how they are.

We have nothing to go off of but what we sense. I never sensed the presence of anything that I felt to be God-like (or god-like), but I can see stars and the world around me, and I perceive that everyone else senses the same things, and science explains those things in a compelling way. There may be a god in the sense that something, unbound by time and space, exists outside of this universe and influenced its being. But since I have no hope of understanding that, I am reasonably satisfied with the limited scientific explanation, and the admission that some unknown entity unbound by the laws of this universe is the ultimate creator.

Life, the universe, and everything is absurd. We have no definitive way of distinguishing dream from reality. The only thing we can know with certainty is that we exist in some form. We have prophets that tell us how things came to be this way, from supernatural beginnings to how we should behave. We have science which seems to do an excellent job of explaining our universe. While we cannot know truth for certain, I believe that science provides us with true knowledge for all practical purposes. And what it tells is amazing. As far as we can tell, the universe literally exploded from nothing into everything. Particle interactions led to everything that is, and somehow developed self-awareness in the form of humans and some other animals. Now, humanity is poised to wipe itself, but things will go on. Just as a supernova is the death of a star, but the birth of other matter, and the death of an organism provides food for others, who knows what will come after us? Perhaps that is a natural quality of intelligence; it spreads to a point and then it cannot sustain itself and dies, just like everything else has a beginning and an end. Or maybe that is avoidable, and another intelligent species could go on without repeating the mistakes of man, as long as man is around long enough for those mistakes to be seen – “with man gone, will there be hope for gorilla?”