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ENG 101

The Possibility of Life in Space

As humans began to grow and mature as a species the question of whether Earth was alone as the sole island of life in the universe has nagged at humanity's consciousness. Numerous stories and ideologies sprang forth from this question, inciting tales of fiction, urban myths and science to probe at the possibility of alien life. Despite all of this speculation the general public still remains in disbelief at the mere concept of extraterrestrial life. Yet, if one looks passed the preconception of alien life as something humanoid they would realize how significantly greater the chances of finding alien life are. The most basic definition of life is essentially a simple single cell organism, such as bacterium. To restrict the concept of finding alien life solely on the complex characteristics of Eukaryotic cells would be to ignore a fundamental concept of Earth and the evolutionary biology found on the planet. Advanced studies concerning the elements found in space and the increase likelihood of finding Earth-sized planets help to contribute to the idea that perhaps the conditions for life can be met elsewhere. Another aspect that should be taken into consideration when discussing the possibility of finding alien life is also the age of the universe as well as the Earth itself. The universe is almost 14 billion years old, while the Earth is considerably younger. Both universe and planet have spent considerable time barren of life. Thus, it is not unreasonable to think that the reason extraterrestrial life has not been found is because time is still needed for evolution to work its magic. Technology is also another factor that can impact the search for alien life. Not only can humanity's own technology work against finding any evidence of interstellar life, but also the

time it takes for light and radio waves to travel the vast empty void of space is mind boggling. Thus due to the diverse factors of life, the lifespan of the universe and Earth, and other vital factors the likelihood of humans finding alien life in the future is a distinct possibility.

When thinking of alien life, the preconception for most humans is to imagine something humanoid or at least something similar in regards to the fauna and flora found on the planet Earth. However, this general conception of life is extremely limiting. The search for alien life is not, nor should it be, solely confined to multi-cellular organisms. In the, *The Microbiological Challenge in Space* Bejuki states, “we tend to think in anthromorphic terms. But microbes came before man.” (Bejuki 50.) In other words, it is important to remember that while larger organisms are impressive, tiny bacterium are just as important to an ecosystem and are just as animate as any other living creature. Of course, this brings up the question of whether or not such organisms can live in an alien environment that is not as idyllic as Earth. This is especially true when considering how every detail must be just right to meet the requirements of life. While for most forms of life it is vital to maintain a delicate balance within the environment, it is imperative to realize that just because the majority of life requires such intricate stability, not all do. Some lifeforms actually thrive in typically hostile habitats. On Earth, creatures known as extremophiles make their homes in some of the most inhospitable environments. They are able to survive in near volcanic vents underwater, in ice, even in battery acid. (Tarter) While these organisms demonstrate the flexibility and perseverance of life found on Earth, they also shine a light to how lifeforms can exist elsewhere in the universe. In Jill Tarter’s *Why the search for alien intelligence matters* Tarter states, “these extremophiles tell us that life may exist in many other environments.” Thus, it is not such a farfetched thought that despite the inhospitality of an

alien planet, single-celled organisms can thrive and perhaps one day evolved into multi-cellular creatures.

With further studies into space, scientists have learned a great many things about the elements and nature of the planets. For example, water, one of the basic necessities for sustaining and the development of life is not that uncommon. In fact water can often be found in its solid state on many meteors or on other planets in the universe. Ice has even been discovered on Mars and recently salt water has been found in geysers on Enceladus, one of Saturn's moons. (Porco) The water found on Earth may very well have come from meteors that collided onto the planet. Thus, if Earth's surface can be populated with water in such a way it only makes sense that other planets or moons can be naturally terraformed to support life. The commonality of water and elements, such as hydrogen, in space show that life may not only be restricted to Earth but may crop up anywhere where the conditions are right.

Another aspect that can be helpful in the support and growth of life, is how big the planet in question is. Though, at first thought it might seem beneficial for a planet to be larger in order to support a diverse population of life, this in fact proves to be incorrect. In Dimitar Sasselov's *How we found hundreds of potential Earth-like planets*, he states, "life as a chemical system really needs a smaller planet with water and rocks and a lot of complex chemistry to emerge and survive." In other words life, in terms of chemical reactions, is more likely to occur on a planet similar in mass to Earth than on a planet the size of one of the gas giants. Sasselov goes further on to note that Earth-sized planets actually outnumber other sized planets by a considerable number. Currently scientists have noted that there are 100 million planets that are Earth size and possess the potential to support life. (Sasselov) These findings help to increase the statistical

chances of not only finding a habitable planet for humans, but also the chances of finding alien life.

While the concept of finding alien life in the future may seem daunting, especially in comparison to all time humanity has devoted to studying the cosmos, in reality the growth and development of life takes time. For a considerable portion of its existence the Earth was barren of life. Only after about billion years following its creation did life begin to spring forth from the waters. As Jill Tarter states in *Why the search for alien intelligence matters*, “..our planet has spent the vast majority of its 4.56 billion year history developing life, not anticipating its emergence. Life happened very quickly, and that bodes well for the potential of life elsewhere in the cosmos.” Relative to the timescale of Earth and the evolution of life on the planet, it is only recently that humans can make the claim of being the dominate species on the planet. Jill Tarter in her discussion goes on to say how humans are a very young both in terms of technology and as a species. She states in her discussion that, “It’s only the last few hundred thousand years that modern humans have been pursuing technology and civilization.” (Tarter) Human technology is obviously much younger than the species itself, and as such, humans have only begun to scratch at the bare minimum of mysteries that inhabit space. Other planets may only be at the beginning stages of life, which would explain why there have been no space invaders or aliens trying to communicate with Earth. Or perhaps, given the fragile state of life, some organisms did sprout up on alien planets but due to the various reasons were unable to survive. In which case, if their fossils managed to remain intact they can provide vital information concerning the state of life on different planets and perhaps better insight into the history of the universe.

Regardless of how much time it takes for life to evolve, there will always be one constant that inhibits the progress of finding alien life. This road bump is none other than the vast distance

of space. As humans look up into the cosmos, the lights from distant stars and galaxies light up the night sky. However, this light is nothing more than the ancient fossils of the universe's past. If it takes light thousands of years to reach Earth, than the radio signals and technology that humans use will obviously take longer; and that is considering if the waves do not dissipate before encountering anything of merit. However, this same curse can also be viewed as a positive trait, as it shows that there is still so much to explore and discover about space and the possibility of alien life. At the moment, the technology of humans is rather young and the search for extraterrestrial life has only begun. As Jill Tarter further states in her discussion,

“...it's impossible to overstate the magnitude of the search that remains. All of the concerted SETI efforts, over the last 40-some years, are equivalent to scooping a single glass of water from the oceans. And no-one would decide that the ocean was without fish on the basis of one glass of water.”

The universe stretches beyond imagination and even to this day, its reach continues to spread. It is easy to become disheartened or bitter at the lack of evidence of alien life. Yet, it is also important to remember the amount of time it takes for radio waves or light to traverse the vast empty leagues of space. As such, it will take time for any sign of alien life to be found but it is not impossible.

Humans will encounter alien life one day. It is only a matter of time of when it happens. However, until that day comes it is important to realize that though urban myth and science fiction depict aliens as humanoid figures that is not the only form life comes in. Life, even on the planet Earth comes in a variety of shapes and sizes. As Sasselvow notes in his discussion, “If there is life on other planets do we expect it to be like life on earth...life as a chemical

phenomena.....is that chemical phenomena universal or is something that depends on the planet?" (Sasselov) The possibility of finding life amongst the stars is great. The building blocks of life from the Earth have their sources in extraterrestrial origins; demonstrating the likelihood and possibility of other Earth-shaped planets being naturally terraformed. And though the vastness of space and time make it seem hopeless, the opposite is actually true. There is so much space to explore and time for organisms to evolve that just because humans have not found any evidence for alien life, does not mean it does not exist.

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