Knocking on the Stars: The Philosophical Implications of the Search for Extraterrestrial Intelligence

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Abstract

As Carl Sagan puts it- "Two possibilities exist: either we are alone in the Universe or we are not. Both are equally terrifying." But what is more than this is the undeniable human desire to know which possibility is a reality. The search for intelligent extraterrestrial life has existed for thousands of years in thought, literature, and now reality, but we often fail to consider the question: *Should we be searching for intelligent extraterrestrial life?* This paper proposes several reasons why humanity is *not* prepared to encounter intelligent extraterrestrials and suggest that the conditions for preparedness are advanced technology and world cooperation. These two topics will be explored in the context of scientific assumptions used in the search for intelligent extraterrestrials, the distribution of resources and the priority of the search, First Contact protocol and its lack of current global administration, and overarching world peace. Once these conditions of preparedness are attained, the search for intelligence off-Earth becomes a matter which humanity is fit to face.

1 Introduction

Perhaps one of the greatest existential thoughts is that age old question- *Are we alone in the Universe?* The complexities and curiosities of human nature lead us to ponder this question and inevitably search for other life with a passionate need to know the answer. But at the same time, should we find that there is intelligent life beyond us, this matter alone will change the course of human philosophy, history, ethics, religion, astronomy, biology, chemistry, technology, and arguably every other aspect of our lives and how we understand ourselves (Dominik and Zarnecki, 2011).

So far, the search for life seems promising, even within our own Solar System. Scientists have determined that the best places for finding life in the near neighborhood (excluding extraterrestrial intelligence) are on Mars, Europa, Enceladus, and Titan (Dominik and Zarnecki, 2011). And although astronomers, physicists, and biochemists are optimistic about finding life beyond Earth, there are some, generally evolutionists, who assert that life is a "once in a Universe" kind of occurrence (Sri Kantha, 1996). Statistically, however, it would seem that life probably exists off-Earth. From current research around exoplanets, of which we have found 4,516 as of September 2021 (NASA Exoplanet Archive, 2021), it is probable that most stars have a planetary system. If there are billions of other galaxies, containing billions of stars each, containing several planets each, then it is unlikely, given the numbers, that Earth is the only place harboring life in the Universe (Bilder, 2020).

There are certain characteristics of exoplanets which we take to be supportive of the formation and sustainability of life. These characteristics include, but are not limited to, a relatively circular orbit, a stable star, long-term (several billions of years) stability in the stellar system, (Committee on Planetary Biology and Chemical Evolution, 1990), the presence of liquid water, at least a little starlight, and the presence of carbon (McKay, 2014). Circular orbits would allow for consistent temperatures on the exoplanet and a stable star would prevent evolving life from being wiped out by stellar activity such as excessively violent coronal mass ejections and flares. Long-term stability in the stellar system would ensure that the exoplanet is not kicked out of its system or undergoing drastic changes which could also destroy life on the planet. The presence of certain molecules like H_2O are important because water is a universal solvent which aids in life

processes on Earth, and elements like carbon have a large and strong structure which is also ideal for life. Between all of these conditions, the search for extraterrestrial life can be narrowed to stellar systems which have formed under these circumstances.

A study involving alien life would not be complete without mention of the two most famous concepts of this topic- the Fermi Paradox and the Drake Equation. Fermi's Paradox boils down to the question- *If there are so many alien life forms, then why do we not see them?* (Prantzos, 2015). To put it plainly, odds are that intelligent alien civilizations are millions, if not billions of years, more advanced than ourselves, who only showed up around 200,000 years ago (Bilder, 2020). So this poses a good point: where are they? Technology millions or billions of years more advanced should, theoretically, have given other civilizations the opportunity of finding and communicating with us. There are possible addresses to Fermi's Paradox that would explain why we have not yet uncovered the presence of extraterrestrial life, such as the consideration that advanced civilizations and technology are not necessarily synonymous concepts (Lamb, 2001), but this will be addressed in later sections of the paper.

The Drake Equation (Drake, 1961) estimates the number of extraterrestrial civilizations N that may have the ability to communicate with us. In its original form, the equation is as follows:

$$N = R_* \ f_p \ n_e \ f_1 \ f_i \ f_c \ L$$

Where

R_* = The rate of formation of stars suitable to harboring life in the Galaxy
f_p = The fraction of R_* with planetary systems
n_e = The number of planets per such a system
f_l = The fraction of f_p where life could develop
f_i = The fraction of f_l where intelligent life could develop
f_c = The fraction of f_i where such intelligent life would develop communication technology
L = The time span over which such a communication signal would be sent

While the estimated values for each of these parameters varies, the formulation itself is not generally challenged. Scientists have realistic numbers, from observation, on the first few parameters, R_*, f_p, and n_e. Together, $R_* \cdot f_p \cdot n_e \approx 0.1$, (Tsumura, 2020), but the rest of the parameters can only be estimated. Many suggestions have been made to estimate N; Drake himself believes $N = 10,000$ (Haqq-Misra and Kopparapu, 2018), but the range varies by opinion. Attempts to estimate the remaining unknown parameters are difficult because the only reference that scientists have to calculate these is humanity, as Earth is the only location of confirmed life.

The Drake Equation accounts for f_c, or what fraction of intelligent lifeforms would be able to create the technology reserved for communication with other intelligent civilizations, but how to communicate is also up for debate. There are two general forms of possible communication in this case (Sri Kantha, 1996): (a) We send out a signal which other life intercepts, or (b) We send physical instruments and/or humans to initiate contact. It is much more likely that (a) happens before (b) ever does, and this is mainly due to our current technological limitations in terms of travel speed. We cannot yet travel at a significant enough fraction of the speed of light to make an interstellar mission with humans aboard plausible (Sri Kantha, 1996). So, generally, our only means of communication right now is the fastest means of travel in the Universe, light. However, options for channels of communication include the entire electromagnetic spectrum. So in the search for other life, we need to decide on a "Universal" communication frequency.

This topic has been subject to a fair amount of debate, but it has generally been concluded that the extraterrestrial search should be conducted in the 21 cm wavelength (Verschuur, 1973). This specific wavelength was chosen because it is not as easily scattered by interstellar material as shorter wavelengths and because it comes from the most abundant element in the Universe, hydrogen. Neutral hydrogen contains a proton and an electron which each have a certain spin (up or down), and when one of these changes their spin, it results in the release of a 21 cm wavelength photon (Liu, 2008). Due to the commonality of this particular wavelength in the Universe, it is assumed that other intelligent life will come to the same conclusions and also tune their instruments to 21 cm. Arguments have been made to broaden the search to include the H_2O resonance at 1.35 cm and most microwave signals in general. While these are good starting points in

searching for extraterrestrial signals, there is no guarantee that alien life would bother to send signals in a particular wavelength, if at all (Townes, 1983).

On a more open-ended side of this topic, the presence of Science Fiction in popular media is highly influential on our ideas surrounding advancements in technology and our overall drive for discovery (Bassett, 2013). Popular TV shows, movies, and books such as *Star Trek* (1966), *The Hitchhiker's Guide to the Galaxy* (1979), *Star Wars* (1977), *Contact* (1997), *War of the Worlds* (1897), and so many more have undoubtedly shaped human perceptions of extraterrestrial life. Speculations about how humanity will react to alien life and, further still, how alien life may be incorporated into our own lives have ranged from catastrophic to rather enlightening in these science fiction stories. Starting in the 20^{th} century, science fiction has become much more based on science truth which makes it a valuable resource for innovative ideas to come to life and for understanding how humanity will react to such a discovery as extraterrestrial life (Menadue and Cheer, 2017). It has even been suggested that science fiction bridges the gap between the sciences and the humanities (Schwartz, 1971). Writers of science fiction have allowed us to view the philosophical implications of scientific discoveries in benign thought experiments rather than actually living them out. Science fiction will occasionally be used for examples in this paper, leading to more relatable content.

2 Framing the Question & Defining Terms

With the possibility of encountering extraterrestrial life at any moment, we are left with the choice of actively seeking it out or not. This poses the question- *Should we be searching for extraterrestrial life?* It is generally understood that finding extraterrestrial life would have a profound impact on humanity as we know it, therefore it is quite the important question to ask. And more importantly, is it even possible for humanity to agree on an answer? This paper will argue the point that we are not scientifically or philosophically prepared to encounter intelligent extraterrestrial life, and therefore we should postpone our search until certain conditions of preparedness are met.

Before I can formulate an argument on the subject, it is vital that we come to a consensus on certain key definitions of "life", "intelligence", "non-intelligence", and "First Contact". Please note that these definitions serve two purposes: (1) to present a common understanding of each term so that they can be used within the same context later, and (2) to lay the groundwork for demonstrating that the assumptions present when defining these terms result in prominent scientific limitations.

Though the topic of life is undeniably complex, and I have not been able to find an all-encompassing definition, for the purposes of this paper, we will consider life in the more common Darwinian sense. Life is that which evolves through the process of amplification, mutation, and selection. Amplification involves the genetic replication of a prototype, mutation involves a variation in amplification, and selection involves choosing among these genetic replications for a new prototype (Joyce, 1995). In layman terms, an organism has a genetic mutation which perhaps increases its survivability, and natural selection takes place until this mutation is adopted by the whole species. As Joyce explains, this definition seems to run into some issues when considering the complex biology involved in the evolution of early life, however, it does pose the most straightforward and widely accepted description. It is noted, and later discussed, that by limiting life to this definition, we are creating assumptions about what extraterrestrial life might be. Perhaps extraterrestrial life does not experience Darwinian evolution as we do. But, it is important to understand that science, as we generally understand it, has a rather determined view on what it means to be "alive".

A definition of "intelligence" is also quite difficult. The only beings that we can surely count in this category are us, humans. But the question of intelligence becomes more convoluted when we consider octopi, apes, dolphins, and other rather smart animals. Do they fall under the definition of intelligence? We will consider an Aristotelian-inspired definition of intelligence: the ability to comprehend one's own mortality. According to some, death cannot be taught (Yun, 2011), therefore, it is a development which arises from self-awareness and therefore can be taken as a mark of intelligence. But, how do we explain this self-awareness and reasoning? Aristotle explains in his *De Anima* that there are three parts to the soul, the nutritive (plant) soul, the sensible (animal) soul, and the rational (human) soul. Nutritive souls include the basics of life such as reproduction, growth, and metabolism. Sensible souls begin to involve emotions, senses, and desires. Finally rational souls involve the abilities of thought and reason- the highest of the three (Aristotle, 2016). But instead of spending too much time on the concept of the soul, we will just use it to

limit the definition of intelligence to this ability of "rational thought", and therefore allow for comprehension of one's own mortality. Humans, we shall then say, are the only creatures on Earth under this category of intelligence. Although this cannot be proven, for the purposes of this paper it provides a reasonable understanding of what we consider as intelligence. Additionally, from here we can suss out a definition of non-intelligence being any life which does not fall under the category of intelligence.

The term "First Contact", was initially made popular in the context of extraterrestrials by Murray Leinster's 1945 Science Fiction book, *First Contact* (Brown, 2018). It is used to refer to the initial communication between humanity and extraterrestrial life. However, for the purposes of this paper, "First Contact" will specifically refer to initial communication from *intelligent* extraterrestrial life to humanity. This might include radio messages, physical presence on Earth, or physical presence on other Earth-explored bodies. This would *not* include the physical discovery of evidence of an extinct alien civilization (with the exception of electromagnetic messages from a civilization which may have gone extinct since sending), Earth messages intercepted by alien civilizations, or discovery of non-intelligent extraterrestrial life. Essentially, if intelligent extraterrestrial life is made known to us somehow, then this is "First Contact".

3 The Argument

Now that these important terms have been defined, we come to the topic of "preparedness". Though I will be arguing that humanity is not prepared for First Contact, it is vital that we consider the conditions for preparedness. What *would* make us ready for First Contact? As the following sections will show, the two primary conditions of preparedness are advanced technology and world cooperation. Advanced technology is a condition because of our current limited resources and knowledge. By searching for intelligent extraterrestrial life before we have precise means of doing so, we are limiting humanity through the focus of resources on non-essential projects. In addition, world cooperation would allow us to create a plan for First Contact and ethically enter into a new age of civilization where interactions with intelligent extraterrestrials becomes a matter of pure intent instead of being influenced by power and control. The following sections will address the shortcomings of humanity in the areas of technology and peace.

3.1 Assumptions About Extraterrestrial Life

The Drake Equation, while helpful for estimating the number of intelligent, social alien civilizations in our Galaxy, is full of assumptions when actually calculating the value of N. The Search for Extra-Terrestrial Intelligence (SETI) initiative and other organizations with the focus of searching for extraterrestrial life also make plenty of assumptions which affect their search. These include, but are not limited to topics of intelligence, communication, extraterrestrial travel, and life itself.

SETI, in particular, tends to narrow their definition of intelligence. For a large portion of their research, intelligent life seems to be any being with the ability to communicate via electromagnetic waves (Dunér, 2017). They do not necessarily account for the possibility of non-social or non-technological intelligent civilizations. They are looking for intelligence as it is synonymous with technological advancements in communication. Perhaps the pinnacle of enlightenment and philosophical knowledge of advanced intelligent civilizations has been found by renouncing technology. With the current understanding and curiosity which drives advancing technology for humanity, it may be difficult to imagine that a civilization, perhaps millions of years older than us, has found meaning in life through the abandonment of technology. But this does not make it impossible. Just because we, as humanity, value certain traits like curiosity and exploration and colonization, which require technological advancements, does not mean that other civilizations necessarily do.

On the other hand, perhaps these alien civilizations are so advanced that while we are at the age where using light as communication seems like the best possible method, they may have developed technology which allows them other means of communication. There is no reason to believe that light is the best way of sending messages for other civilizations. In fact, there is no reason to believe that other intelligent civilizations are sending signals at all! Generally, we have adopted a listening strategy when it comes to the search for extraterrestrial life; we listen for extraterrestrials trying to contact us. While there have been some instances where we have sent radio messages into space in an attempt to contact extraterrestrials, this is by far the less practiced of the two. Who is to say that intelligent extraterrestrials are not doing the same?

Perhaps they are purposely staying silent and listening for everyone else. Any of these instances would have an impact on the f_c variable of the Drake Equation. Perhaps these civilizations *are* technologically advanced enough to have communications technology but do not use it to announce their presence to the rest of the Universe. While this may seem unlikely due to the natural progression of things here on Earth, we cannot eliminate this possibility entirely, and therefore, it must be addressed.

Also regarding communication, we have learned that most of these extraterrestrial searches are conducted in the 21 cm wavelength. But, how can we know intelligent extraterrestrials will come to the same conclusions that we have and also use 21 cm? Suppose that these extraterrestrials did use light to communicate, even then, it would not be realistic to search everywhere in the Universe at every single wavelength in order to find them. Perhaps we will create technology in the future which is capable of doing so, but until this technology has been developed, the range of possibilities for means of communication is just too large for us to cover. One could argue that creating technology for this purpose may stem from the search for intelligent life, however, this would involve the use of time and money developing technology which is specific to this purpose. In the next section, we will discuss the idea that this is not a reasonable use of our resources.

Another assumption made when calculating N from the Drake Equation is the assumption that intelligent life is staying in one place- the same place where it originated. Travel to other planets, moons, and even stellar systems would have a large impact on the f_l variable. Intelligent life could be rare but easily spread and multiply much farther than its point of creation. And if this is the case, planets and moons which we didn't think would be able to hold life actually would (SETI Institute, 2021). On the same note, we also assume that intelligent life is limited to planets in stellar systems. This is based on our own ideas of the necessities of life, namely water and energy, like Earth life needs. But this, by no means, indicates that extraterrestrial life works the same way.

Finally, there are also assumptions in terms of life itself. What does life look like? What signs indicate life? What is life made of? Early on, we stipulated that life is Darwinian in nature. But this is the ultimate assumption when it comes to extraterrestrial life! We cannot even create a good definition of life based on "living" organisms on Earth, so how can we expect to define life in terms of extraterrestrial organisms? What counts as living? Right now, those who are searching for extraterrestrial life are searching for "signs of life". We've also discussed the different exoplanet conditions which are considered "potentially habitable" for intelligent extraterrestrials. These include things like a strong magnetic field, a relatively old star, the presence of water, etc... Because we consider these to be indications of the possibility of life, these conditions are what we search for when we search for extraterrestrial life. Needless to say, while there is reason to believe that life requires these conditions because we require these conditions, (and they are a reasonable place to begin the search), Earth alone is hardly a full set of data in this matter. With seemingly limitless possibilities on what life may be like, it is presumptuous to assume that we are standard forms of life.

So, it seems evident that the search for extraterrestrial intelligence is based upon a plethora of presuppositions. For example, the assumption that intelligent aliens communicate in the 21 cm wavelength. If technology were developed which would allow us to search for life in *all* wavelengths, then we wouldn't need to limit the search to 21 cm anymore. Perhaps this would increase our probability of finding life in the first place, and as we will see in the next section, the existence of this advanced technology would limit the need for spending the time, money, and resources of the world developing for a non-essential task.

3.2 SETI & The Distribution of Resources

SETI has been at the forefront of extraterrestrial research since its beginning in 1984, and it is currently entirely funded by millions of dollars in donations (Clery, 2020). But is this really the best investment for our money at the moment? Compare this to recent donations made to Notre Dame. According to some sources, between $835 million and $1 billion US dollars have been donated to the repair of Notre Dame after the infamous fire in 2019, and there has been some major backlash on the subject (Noack, 2019). Also according to Noack, the actual cost of restoring Notre Dame would only be around $330 million to $670 million US dollars, leaving hundreds of millions of dollars in excess which could have been donated to feed the hungry children of the world or clean up trash in the oceans or helping war refugees find safety. The question of morality becomes prominent as all this money instead goes toward restoring a building. In the same way, many millions of dollars go to SETI research programs (SETI Institute, 2021) to search for extraterrestrial life when there are still such prominent world issues which could be addressed with this money. Just from a practical perspective, would this money not have a more tangible return for the human race if it were put

into more pressing issues than the search for alien life?

If the answer to this question is "yes", then the question now becomes- *Why do we spend so much time, money, and resources on projects like SETI?* For one thing, the idea is appealing. Led by our perceptions of intelligent alien life by sources like science fiction, it is probable that many believe a topic so mysterious and fascinating as space travel and communication is far more intriguing to put money into than something as mundane as cleaning plastic from our oceans. In addition to this, actually finding intelligent extraterrestrials might allow for the possibility of learning more, traveling more, and solving many problems which face us now. In this way, SETI is a beam of hope for humanity and therefore attracts the attention of donors. It is easy to put money into something which proposes endless possibilities rather than current problems that face the Earth and seem difficult to fix. The promise of off-Earth travel and habitation has had a great influence on opinions surrounding sustainability (Adams, 2010). Colonizing places other than Earth could be an end-all solution to our problems, making efforts in the name of sustainability seem rather futile. But the reality is that Earth is all we have right now, and instead of turning to the uncertainties that come with searching for intelligent extraterrestrials, we may find ourselves needing the certainties of projects like cleaning the ocean to survive.

This is not to say that we should never invest in searching for intelligent alien life, but let us consider the fact that our current technology is nowhere near advanced enough to search for every kind of life, in every kind of way, and in every direction of the Universe. SETI bases their search on many assumptions, meaning it is possible that they are spending all this donated money searching in the wrong places because the technology does not yet exist for us to address our assumptions. It would be appropriate to ask why we do not simply develop the technology needed for the search now, and instead we wait for advanced technology to develop. The difference here is between invention and innovation. It much easier to adapt and build upon current technologies to fit current issues (innovation) than it is to come up with entirely new ideas and technologies (invention). By allowing invention and advanced technology to develop in response to non-extraterrestrial life issues, we can then adopt this new technology to the issue of extraterrestrial life without spending excessive resources on it in the first place. This seems to be a reasonable solution to the problem- we spend money on more pressing issues which results in the development of advanced technology which can then be modified to the needs of searching for intelligent extraterrestrials.

Also important to consider is the fact that by finding intelligent extraterrestrial life, we may further limit our resources by creating a higher demand and distribution of them. This is very similar to the plot of Dune (Herbert, 1965), an extremely popular science fiction novel by Frank Herbert. In this book, advanced civilizations require the resource of "spice", naturally occurring on the planet Arrakis, and oppress the lives of natives to this planet in their attempt to control this resource. Suppose that intelligent alien life contacts us and we learn that they also require fresh water. If they, themselves, do not have any at their disposal, now, instead of a few billion people fighting over clean water sources, it is 10s of billions, 100s of billions, or even trillions of individuals who need this limited resource. Depending on the circumstances, the human race could end up like the natives of Arrakis, oppressed and much worse off than if these extraterrestrials had never come at all. Perhaps advanced technology will allow not only for increasing our current set of accessible resources, but also for a more ethical distribution of the resources we have. Sticking to our example of clean water, maybe we should make sure that all of humanity is getting the clean water they need before opening Earth's resources up to other potentially water-loving alien civilizations.

It is possible that by discovering and initiating contact with intelligent extraterrestrials, we may *gain* access to additional resources. Perhaps these water-loving aliens have a whole planet of clean, fresh water which they are willing to give us access to. While this would be excessively helpful to humanity, it is only a best-case scenario. Between the two extreme possibilities, it is preferable to avoid causing harm to humanity altogether (by postponing First Contact insomuch as we can) than it is to take the chance that resources (with no caveats) would be gained through extraterrestrial interactions.

3.3 First Contact Protocol

There have been a few attempts at creating a series of steps for First Contact, such as the SETI post-detection protocol, approved by the International Academy of Astronautics (IAA) in 1989. However, no protocol is legally enforceable to the nations of the world, making First Contact a big question mark in terms of what would happen (Dominik and Zarnecki, 2011). If no protocol is binding for the whole world,

then First Contact becomes a situation where things could go horribly wrong. Say, for example, that an individual tries to convince intelligent extraterrestrials to wage war on the rest of the world. This is a rather outlandish tale but still in the realm of possibility. There seem to be no laws against this person doing so, but it could potentially cause great havoc to the rest of the world. When it comes to the unknown of extraterrestrial life, anything we can imagine is possible, even to the far reaches of Science Fiction. It is understandable that these limitless possibilities make coming up with a plan immensely difficult, however it will prove incredibly useful for if/when First Contact happens. Searching for intelligent extraterrestrial life without a plan is like poking a sleeping bear without knowing what you'll do if the bear wakes up. Sure, it might not wake up, it might shrug off your poking, or it might get very angry. In any case, you would need to know what to do or face a potentially disastrous situation. Without a First Contact protocol which we've all agreed to, we could end up being the person standing in front of a very angry extraterrestrial, not knowing what to do.

Laws surrounding international space have generally been debated and poorly regulated since the space age began in the mid 1900s. In recent news, Russia tested an anti-satellite, or ASAT, missile on November 15, 2021. By destroying one of their own satellites, they created 1,500+ pieces of debris in Low Earth Orbit (LEO), which is heavily utilized internationally by both commercial and private sectors (U.S. Space Command, 2021). Despite their detailed laws, it is still difficult to enforce rules and regulations about international space in a global fashion. Russia's ASAT test is just one example of how difficult it is to get the world to agree upon space protocol, and the topic of extraterrestrials would likely become just as chaotic.

The point here is that before searching for intelligent extraterrestrials, it would be helpful to have an idea about what to do once First Contact occurs. It would be ideal if the nations of the world were to work together to create a plan of action which everyone will agree to and follow. This protocol would prevent unnecessary misunderstandings and provocations like the Russian ASAT test. But before we can even get to agreeing upon a First Contact protocol, we have to figure out our own space laws and regulations! U.S. Army General James Dickinson commented that this was "a deliberate disregard for the security, safety, stability, and long-term sustainability of the space domain for all nations," (U.S. Space Command, 2021). Clearly, this is the case for this specific instance, but *many* nations are guilty of the same kinds of space-related misdemeanors for the sake of expressing power such as China [38], the US (Marshall, 1985), India (Akhmetov, 2019), etc... If we, as humanity, are not able to come to an agreement on use of our own local space, how will we handle First Contact? Poorly, I would argue. So, is there really benefit right now to pushing the search for intelligent extraterrestrial life? We have not even handled issues and discrepancies amongst ourselves.

Once we have figured out these issues with ourselves, we can consider our options for First Contact. Cooperation amongst the world is ideal for handling this extraterrestrial situation. If we are able to agree on a First Contact protocol and enforce this to the nations of the world, then the whole process would likely go much smoother. By precluding First Contact with a list of agreed-upon actions, we limit the possibility of misunderstandings and provocations amongst ourselves and with the intelligent extraterrestrials.

3.4 World Peace

World peace also naturally becomes a reasonable solution for attaining cooperation among humanity. If world peace had been attained already, then Russia probably would not have felt the need to demonstrate their anti-satellite technology, and the world would not be in this conundrum about all of the extra debris polluting LEO. Maybe if world peace were the case, we could get on with discussing options for First Contact protocol. One could make a plethora of arguments about what world peace means, but for the purposes of this argument, we are projecting large-scale; peace simply means cooperation and collaboration between nations and internal to nations without animosity and with the intent of benefiting humanity instead of gaining power and control. This is a very lofty goal for us, and there is no avoiding the question: *could* we even attain world peace in this way? If we take the ambitious answer, "yes", it follows that humanity would, after attaining this state, be in an acceptable position to encounter intelligent extraterrestrial life. If the answer is "no", then perhaps a simpler version of world peace would be attainable and still lead to worldly collaboration, indicative of our preparedness.

Consider the Space Race. This crucial moment in the development of human history was brought about by warring nations. The U.S. and the USSR found themselves in a competition for who could get to space first

(the USSR) and then who could get to the Moon first (the U.S.) (Donovan, 2020). One might easily argue that the conflict between these adversaries actually *inspired* scientific and technological advancements, but how often do we look at the costs of the Space Race, the risks that we took, and the unethical corners cut in order to "win"? James Donovan, author of the book *Shoot for the Moon: The Space Race and the Extraordinary Voyage of Apollo 11* summed the consequences best- "Rockets exploded. Systems malfunctioned. Men died," (Donovan, 2020). At the cost of *lives*, the USSR and the U.S. continued to push for beating the other to space and to the Moon. And what was this for? It was not with the primary intent of technological advancements and growth of humanity but for political power and expressions of superiority (Siddiqi, 2000). This being said, it is not just warring nations who cause chaos and tragedy- it is also toxic competition between nations which leads to humanity's detriment.

But, say we argue the other side a moment. Perhaps we think that the technological advancements and lives *saved* as a result of the Space Race were worth the catastrophes involved. Even then, this argument is less about the trade-in of disastrous consequences for technological advancements and more about the intent behind the Space Race and the trade-ins that we allowed at the time. The two countries continued to move forward in their competition without understanding the significance of the impacts this new technology would make in the future. Therefore, their intent was polluted by their greed. And knowing this intent, I would argue that it was not worth the lives lost. If we knew that by proceeding with the Space Race we would create technology that would benefit society, then perhaps it was worth it, but we could not know this.

When turning this argument to address intelligent extraterrestrial life, it is rather simple: we should be held morally responsible for what values we put out into the Universe and pass on to alien civilizations. If we are not held responsible, then what is to stop us from destroying, even accidentally, other intelligent extraterrestrial civilizations? For example, suppose we happen upon a slightly less advanced alien civilization and teach them how to make nuclear weapons, and they then proceed to destroy themselves because they gained this means of mass destruction from us. Would we not, then, need to take responsibility for the war and death we have caused?

If this is still unconvincing, suppose it is we who are the war-ignorant civilization and nuclear weaponry is only the tip of the iceberg for a newly contacted alien civilization which has not attained world peace. Not only is there a chance that we gain knowledge of their weapons technology and end up destroying ourselves, but it is also possible that relations with the alien civilization become unstable. Instead of inspiring curiosity and making efforts to advance science and understand ourselves better, we might get caught in an alien civil war. Being a neutral party is one thing, but when they have unimaginably advanced weapons technology, we may need to choose a side or become an unwilling enemy. This seems like a horrible situation for us to be in. Aliens who have not attained peace for themselves may bring about destruction, death, and morally complex situations from which we have no escape. Would anyone want this from First Contact with intelligent extraterrestrials? I would think it difficult to argue for such a situation. Therefore, is it not morally irresponsible for us to, even inadvertently, create this situation for other civilizations?

Overall, we struggle with taking responsibility for the pain and destruction we have caused each other, so introducing another intelligent species into the mix would just complicate things further. It is imperative then, that we learn how to propagate peace throughout the world before making efforts toward First Contact. Peace, though likely far from our reach at the moment, is our only means of going into First Contact with a clear conscious and pure intent. The search for extraterrestrial life is fueled right now by human curiosity, and it would be a terrible thing to destroy that intent with so petty a thing as war.

4 Conclusion

Now, we can finally put everything together and ask the question: *Should we be searching for intelligent extraterrestrial life?* We have addressed several topics in this paper which would indicate that the answer is "no". The following questions offer a reexamination of these concepts:

- *Is the search for extraterrestrial intelligence important enough to prioritize along with other pressing needs of humanity?*
- *Are we willing and prepared to share our resources with extraterrestrials, should the need arise?*

- *Have we taken the time to address our assumptions about extraterrestrial life?*
- *Do we have the universal right to define what it means to be alive?*
- *Is it reasonable to believe that extraterrestrial life would be similar to us?*
- *Would humanity be able to agree upon a response to First Contact?*
- *Is our intent with initiating First Contact completely isolated from a desire for power and control?*
- *Are we prepared to take responsibility for our impact on less-advanced alien civilizations?*
- *Are we willing to deny advanced weapons systems from alien civilizations in the interest of world peace?*

If the answer to most of these questions is "no", then perhaps it is worth rethinking our relentless search for intelligent extraterrestrials because we may not be prepared for them. By advancing technologically and acquiring world cooperation, I believe that several of the answers to these questions would slowly and surely turn to "yes". And once they do, the world will be in a much more prepared state to address the search for intelligent extraterrestrial life.

In this paper we have covered several topics which all lead to the same conclusion- humanity is woefully unprepared to encounter intelligent extraterrestrial life. By making assumptions about what extraterrestrial life is like, we are constricting our search to the point where we are able use our current technology to continue with the search. By allowing technology to advance, we will be able to gradually release these assumptions and search for life which may be even stranger and foreign than we once assumed. Also, by allowing technology to advance without pouring money and resources into specific technology for the extraterrestrial search, we will be able to focus these saved assets on other more pressing issues presented by society. On another end of things, we discussed the benefits of world cooperation and its overarching benefit for once we do find intelligent life. Not only do we struggle as humanity with creating an enforceable plan for First Contact, but we simply have not addressed our local issues with international space protocol. And finally, world cooperation seems to go hand-in-hand with world peace. By altering our intent in interacting with one another, we promote peace and collaboration. World peace will allow us to go into First Contact with good intent and maintain our curiosity through the end of our greed. So, before we go knocking on the stars, perhaps we get a few affairs in order here on Earth.

The unknowns of intelligent extraterrestrial life are more than enticing, but they also pose major threats to us, should we be unprepared for this encounter. The achievements of world collaboration and advanced technology are not only indications of growth as humanity, but they also allow us to patiently, slowly, and safely move forward in our exploration of the Universe. It would seem that on the topic of searching for intelligent extraterrestrial life, scientists have been rather dismissive of the surrounding philosophy and ethics. But, science needs philosophy for guidance and philosophy needs science to enact on the brilliance of the human mind.

> *Science without philosophy is blind, and philosophy without science is empty.*
> -Unknown

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