

Chapter 16

The Quest for Extraterrestrial Intelligence

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ABSTRACT

The constant depictions of contact with extraterrestrial life and their constant basic presence in science fiction shows the deep human desire for connection and transcendence with other life forms. In reality, continuous efforts on the search for aliens are being made by renown not-for-profit research organization such as the Search for Extraterrestrial Intelligence (SETI) since 1984. Over the years, plenty of detected signals were dismissed as noise from transmitters on Earth or orbiting satellites but one – the “Wow!” signal. However, artificial signals from extraterrestrial sources could be the key to detecting extraterrestrial intelligence. Apart from passively searching, some are doing active SETI, or known as METI (Messaging Extraterrestrial Intelligence), where humans create and transmit interstellar messages to aliens instead of waiting for theirs. Substantial effort in many areas – awareness, time, technological advancement, techniques – would be necessary to increase the probability of locating outer space intelligence.

For centuries, we have always been fascinated by the existence of other intelligent beings out in the unknown, or most commonly known as aliens. Judging by the number of science fiction books and movies based on alien contact, alien invasion or alien abduction, our imagination has never run dry on what would happen when we finally meet them. We are curious to know who they are, where do they come from, what would they look like, why would they contact us, if they are friend or foe, or will they conquer and enslave us?

There are even some among us who believe that aliens have actually visited us, abducted us, or that we have found them, captured them, and experimented on them. There is a place in Nevada located in the western region of the United States called Area 51, a highly classified United States Air Force facil-

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ity, which has long been the center of a conspiracy that the government keeps captured alien spaceships and studies the captured aliens.

But are aliens only in the realm of imagination? Is it possible that we are not alone, and the universe is actually teeming with intelligent beings, waiting to be discovered?

If the universe is actually teeming with intelligent beings, then where is everybody? This is the famous question asked by Enrico Fermi during a lunch session with his fellow physicists in the summer of 1950, now known as the Fermi Paradox. This paradox is a contradiction between the high estimates of probability that favor extraterrestrial civilizations being common in the universe, and the missing evidence that they existed elsewhere other than Earth. Fermi realized that if extraterrestrial civilizations are common in the universe, given the age of our galaxy, aliens should have more than enough time to colonize the Milky Way galaxy. Their presence should be obvious all around us. But we see none of them.

An approach was conceived by Frank Donald Drake in 1961 to estimate the number of communicative extraterrestrial civilizations that may exist in our Milky Way galaxy – the Drake equation. The equation includes seven factors that are considered to be important for the advancement of such civilizations. Firstly, it considers the rate of formation of stars that are suitable for the development of intelligent life, and secondly it considers that among these stars, that percentage of them that have planetary systems. The third factor is the number of planets in a planetary system that have an environment suitable for life, and fourthly, out of these life bearing planets, the fraction of them that life actually appears. The fifth factor represents the fraction on which not only just life, but intelligent life, emerges. The sixth factor is the fraction of civilization with intelligent life that develops a technology that releases detectable signs of their existence into space, and finally, the last factor considers how long such civilizations can release detectable signals into space.

If we really wanted to be certain that we have found convincing signs of alien existence, then we should do it in an organized and systematic way – the scientific way – to ensure that we eliminate all false alarms, and find what we are really looking for.

SETI AND METI

Human's curiosity never stops us from trying anything. We are not just interested in hearing from aliens, but also trying to talk to them. This is the main distinction between the two modes of alien communication that we are currently conducting – the Search for Extraterrestrial Intelligence (SETI) and Messaging Extraterrestrial Intelligence (METI). SETI's main focus is searching for messages from aliens, and to answer the question “are we alone?”. METI, on the other hand, is about creating messages to aliens and let everyone knows that “you are not alone!”.

A systematic search for life beyond Earth started with an article (“Searching for Interstellar Communications”) dated back to 1959, which was published in *Nature* by two nuclear physicists named Giuseppe Cocconi (cosmic ray specialist) and Philip Morrison. Cocconi and Morrison suggested that a systematic search for life forms from outer space was worth the effort – using electromagnetic waves, specifically the radio region at the proposed frequencies (hydrogen frequency). The duo wrote that “we shall assume that long ago they established a channel of communication that would one day become known to us, and that they look forward patiently to the answering signals from the Sun which would make known to them that a new society has entered the community of intelligence”. Before this, not many reliable theories were available to estimate the probabilities of extraterrestrial intelligence. Radio

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