The Evidence for the Existence of Extraterrestrial Life and the Conditions Which Might Sustain Life

In the cosmos, is Earth supposed to be the unique planet which fertilizes

life? In the vast universe, are we human beings alone? People have been obsessed with

such doubts for thousands of centuries. As a result of our endless curiousness, numerous

amazing videos as well as photos relating to aliens and UFOs have somehow been found

and investigated.

Even though it seems impossible to confirm the authenticity of that so-called evidence,

they still have attracted numerous curious minds of the society, especially the scientists.

Also, it is worthwhile to investigate the existence of life outside the earth.

For a long period of time, the perspective that we are along in the universe has long been

held by large numbers of astronomers. However, with the

dramatic development of science and technology, modern scientific study

indicates that the earth is not alone in the universe. There are hundreds of billions of

planets like Earth and stars like the Sun in space. The possibilities of the existence of

life beyond Earth,

therefore, have been accepted by increasing numbers of people. The majority consider

there are basically three reasons why extraterrestrial life may arise: first of all, since

space is huge, many galaxies there are likely to support life; secondly, the basic elements

that constitute life are discovered in both the earth and the solar system, such as

Carbon, Hydrogen, Nitrogen & Oxygen, may exist across the immense universe; finally,

Organic reactions are able to proceed under several conditions. (Cooper)

Astronomers have begun the study on interstellar molecules. As the years go by, even

though there is still no accurate proof for the existence of extraterrestrial

life, scientists have gained a volume of valuable data from analyzing meteorites,

conducting experiments, observations, etc. To determine the potential for habitable

planets beyond the Solar System, it seems more practicable to start from studying our

nearby planets. Therefore, on the purpose of searching for the track of extraterrestrial

life ,human beings have respectively explored Mercury, Venus, and Mars by using space

probes. Astronauts have even landed on the Moon. Unfortunately, so far we still

have not obtained any clue of existence of life beyond Earth.

Mercury is unable to sustain life, since this planet has no water at all and

bears huge temperature differences. Likewise, Venus retains little water vapor in its

atmosphere.

The Moon is the closest neighbor to the earth. We human beings have dreamed of

reaching the Moon for thousands of years. In 1969, our dream came true when

NASA’s

Apollo Program successfully landed on the moon. Scientists eventually realized that the

Moon, which is splendid and spherical from its outer appearance, is actually a desolate

land. In other

words, there is no point to support the existence of organisms in such a land due to its

huge temperature difference between day and night, no water and no atmospheric

layer.

Mars was once regarded to be the most likely to harbor life. Amid the past

explorations,

Viking No.1 and No.2 explorers are well-known for their main objective, which is to

detect

life.“Two robotic Viking explorers landed on Mars in 1976 carrying TV cameras,

weather stations, and life-detection experiments. Their transmitted data followed the

seasons throughout the Martian year (669 24-hour, 40-minute days), including great

planet-wide dust storms. Pictures they took of a frosty morning on Mars shows the

abundance of extractable water in the atmosphere. The soils sampled revealed no organic

materials or evidence of life. Although these results were negative, life may exist

elsewhere on Mars. The era of liquid water on Mars lasted longer than the time required

for the first terrestrial life to appear in Earth's oceans, so fossils may record earlier life.

We have much yet to learn about the possibility of life beyond Earth, and Mars is a

superb laboratory. ”(Paine,12). In 1988, Wesley Huntress, NASA administrator,

claimed

that the pictures received from the explores visibly displayed the definitive evidence for

an ancient riverbed on Mars. Yet the formation of this canyon was supposed to have

occurred over

one million years or more. This remarkable discovery to some degree convinced people

that a vast ocean emerged on Mars and the air there was as

humid as the Earth at some point. In accordance with so many evidences, some scientists

made a bold

speculation that on ancient Mars, intelligent life once existed with a considerate degree of

civilization. (“Rational Knowledge ”)

Even though the failure of detecting life beyond might have disappointed us a bit, the

possibility of the existence of life beyond the planet Earth still stands a chance. There was

a significant discovery which to some degree would excite us; not only can other planets

sustain life, but also other planetoids are able to do so. “A series of complex biological

communities, both in the deep-sea and inside caves isolated from the external biosphere,

were discovered. These communities were found to depend entirely on geothermal

energy instead of light energy for their survival. This discovery gave us new evidence

and hope that life might exist not only on other planets, but perhaps even in other

planetoids of the solar system. This might be possible since life can exist on other areas

than the surface of a planet, and these areas would be extremely difficult to identify.”

(Santini,7)

Is the emergence of life accidental or inevitable? What factors led such a

normal planet Earth to be so unusual? Embracing these fascinating questions, scientists

believe the study of how life originated on earth is essential. To find out the conditions in

which life will probably arise, one of the crucial means is to begin from the evolution

of life on Earth. The research and data may provide scientists with helpful clues in

search of extraterrestrial life. “Life, defined as a chemical system capable of

transferring its molecular information via self-replication and also capable of evolving,

must develop within a liquid to take advantage of the diffusion of complex molecules.

On Earth, life probably originated from the evolution of reduced organic molecules in

liquid water. Organic matter might have been formed in the primitive Earth's

atmosphere or near hydrothermal vents. A large fraction of prebiotic organic molecules

might have been brought by extraterrestrial-meteoritic and cometary dust grains

decelerated by the atmosphere. Any celestial body harboring permanent liquid water

may therefore accumulate the ingredients that generated life on the primitive Earth.

The possibility that life might have evolved on early Mars when water existed on the

surface marks it as a prime candidate in a search for bacterial life beyond the Earth.”

(Brack, 417).

In some way, different studies have revealed that bacteria are not able to exist

in any harsh environment unless there is water. Accordingly, scientists are convinced

that appropriate chemical elements, including carbon, hydrogen, oxygen, nitrogen,

sulfur and phosphorus, among which carbon is the primary component, plus water

and energy, comprising solar energy as well as the energy from chemical reactions, will

probably generate the start of life. Yet organisms are expected to survive and

reproduce if there is also a stable environment.(Morrison)

Obviously, there are

important reasons for scientists to explore extraterrestrial life. Some scientists even

declare that seeking extraterrestrial life is to a certain extent seeking for the planets

which possess water. Besides, a scientist from NASA even claimed that, “Without

organic molecules, the building blocks of life, life cannot exist.”(Dick) In short,

through the long-term study of the origin of life, scientists have drawn a conclusion.

Life on earth comes from waters that include ordinary chemical substances. As a result of

solar radiation and lightning, energy, which is conductive to life’s origins, is

gradually accumulated in the waters. Afterwards, simple molecules evolve to

complex organic compounds, and finally turn transforms into the simplest organisms, due

to the cosmic forces and the forces of nature. Through the observation,

scientists also indicated that dust grains at extremely high temperature will give rays

only if there is no interference from other celestial bodies, and thus deduced that

organic materials brought by comets, may become one of the prerequisites to harbor

life.

Human beings invest a huge number of dollars into astronomical research and

technology every year. Many argue whether it is worthwhile to waste a large

amount of taxpayer’s money in the study of extraterrestrial life since the possibility of

finding evidence of intelligent life beyond Earth is really small. In my perspective, the

answer is

positive. Even though to date, we have turned up no scientific evidence for the existence

of life beyond Earth, abundant valuable data have been collected, bringing on a salient

progress on science and technology. Via those detections, we are able to have progressive

knowledge about the long-term evolution of life, and the consequences of the interaction

among rocks, air and water. If we find out life in other places beyond the Earth, it means

we are no longer alone any more in the universe; such a discovery will have tremendous

impact on human civilization.

Bibliography

Paine, Thomas O., “Biospheres and Solar System Exploration”, NASA Conference Publication #3094 (1990): 12-13.Print.

Cooper, P.D, and Cooper, J.F. “Water, Water Everywhere…and Oxidants too!”, American Geophysical Union, Fall Meeting 2007 ,Dec.2007, 32B-01. Print.

Brack, A. “Life in the Solar System”, Advances in Space Research, Volume 24, Issue 4, p. 417-433.Print.

Santini, Francesco,and Galleni, Lodovico. “The Significance of Light-Independent Ecosystems in the Search for Life in the Universe”, 213, Bioastronomy 99: A New Era in the Search for Life 2000, 7, Print.

Dick, Steven J. “Why We Explore”, Science.Nasa.Gov, 27 June 2005.Web. 12 October 2009.

Morrison, David. NASA.NASA, 21 Feb. 2008. Web.30 Oct. 2009.

“Rational Knowledge About the Existence of Extraterrestrial Life”. UFOcn, 16 Jan. 2008. Web. 31 Oct. 2009.