

WAS LIFE SEEDED ON EARTH FROM ELSEWHERE IN THE UNIVERSE?

By

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The idea that life springs on a continual basis from non-living matter (spontaneous generation) was widely believed for over 2,000 years, from the time of Aristotle, until it was finally disproved by Louis Pasteur in the nineteenth century. The theory of spontaneous generation was smoothly succeeded by the theory of panspermia, i.e. that pre-formed life was seeded on earth from elsewhere in the universe. The theory of panspermia was later replaced in mainstream science by the theory of chemical evolution. This is now the generally accepted scientific hypothesis to explain the mechanism whereby life spontaneously arose on Earth about three and a half billion years ago. Nevertheless, the theory of panspermia persists as a respectable minority scientific opinion.

When Pasteur conclusively showed that, under present conditions, life can only arise from pre-existing life, there was little point in pondering how life might have first arisen on Earth. At the time, far too little was known about the histories of life, biology, and the Earth. Nevertheless, Pasteur's dictum had such a powerful resonance that some scientists proposed the idea that life had no origin, but always existed, just like matter and energy. According to this idea, the origin of life on a planet, previously life-less, could only be effected by seeding pre-formed life onto the planet from elsewhere.

Several well known 19th century physicists approved of the idea of the seeding of life, e.g. William Thompson, who later became Lord Kelvin (1824-1907). The idea was more fully developed in 1908 by Svante Arrhenius (1859-1927), a Swedish chemist. He christened the theory with the name panspermia (from the Greek, meaning 'seeds-all'). Arrhenius proposed a mechanism whereby life could hop from planet to planet. He proposed that biological organisms, such as bacterial spores and viruses, are ejected from planets by electrical forces and propelled through space by the weak pressure of starlight. Such organisms become attached to dust particles in space, increasing their mass, and allowing them to fall under gravity towards the nearest star, perhaps to land on a planet of that star. A direct consequence of this theory is that all living things in the universe are biochemically related to each other.

One aspect of the theory can be ruled out straight away. Life is not as fundamental as matter and energy, and could not have existed from the birth of the universe. Cosmologists tell us that, in the beginning, only hydrogen and a small amount of helium existed. Hydrogen is still the most abundant element in the cosmos, making up over 60% of the mass of the visible universe. The various other elements that exist have been produced in stars, and continue to be produced, by nuclear fusion processes. Since living matter is composed of chemical combinations of many different elements, life cannot be as old as the cosmos.

There is also reason to doubt that spores of life can successfully journey long distances through space. Many scientists believe that any biological organism would be killed in space by lethal radiation - ultraviolet radiation, X-rays, and cosmic radiation. These radiations would have a long time to interact with the bacterial spores since interstellar distances, and therefore travel-times, are so immense.

On the other hand, experiments have been carried out in which bacterial spores were exposed to intense ultraviolet rays, extreme cold and vacuum conditions, in order to mimic the environment

of interstellar space. Some of these studies claim that, if the spores were carried within the molecular clouds which roam around space, a fraction of the spores could remain viable for many millions of years, perhaps long enough to travel from one solar system to another.

But, on the other hand again, there is evidence that biological spores neither leave our earth nor enter our vicinity from elsewhere. One would expect the moon to intercept many particles leaving the Earth, and also to intercept biological particles arriving from elsewhere. However, moon samples brought to Earth by the Apollo mission contained no micro-organisms. Also, tests carried out by the Viking mission to Mars found no detectable biological activity in Martian soil.

Many people will have heard of the proposition put forward by Fred Hoyle, the well known astrophysicist. He claimed that over 80% of all interstellar dust grains are bacterial and algal cells. This conclusion is based on the light-absorbing properties of the dust grains. It is estimated that the mass of these grains in our Milky Way Galaxy is equivalent to 5 million suns. In other words, space is teeming with life! But why is this life not falling onto the moon?

Another more recent version of the panspermia theory is called directed panspermia. This theory holds that life was not seeded on Earth by accident, but was sent in interstellar spacecraft by other intelligent beings. The best known directed panspermia hypothesis has been proposed by Francis Crick and Leslie Orgel. Crick and Orgel do not believe that sufficient time was available on the early earth to allow chemical evolution to produce life. However, they believe that enough time existed between the origin of the universe and 4 billion years ago (when life first appeared on Earth) for an advanced technological race to have developed elsewhere capable of effecting directed panspermia. Crick and Orgel believe that life originally began elsewhere in the universe in a spontaneous process similar to the conventional scientific explanation for the origin of life on Earth.

Hoyle, Crick and Orgel are all brilliant scientists. Their ideas on panspermia are based on serious considerations and deserve our serious attention.

One consideration that gives pause for doubt about the conventional scientific explanation for the origin and development of life on Earth is the absolute uniformity of the basic biochemical life-plan in all living organisms. Almost every conceivable environmental niche on Earth is inhabited by its own form of life - fissures in the deep ocean floor, dry rocks in the deep-freeze of Antarctica, scalding hot springs, etc. etc. The overall shapes and forms assumed by life are dramatically different - bacteria, jelly-fish, mouse, elephant, whale, oak tree, etc. etc. But the basic biochemical plan of the cells of every living organism is pretty much identical. DNA directs the manufacture of protein, and proteins carry out the work of the cell. The genetic code of bacteria is essentially identical to the genetic code of President Bill Clinton.

The conventional scientific explanation for this is that life arose in a unique event and in a particular biochemical configuration. All species of life that now inhabit the Earth are descended from that original ancestor and inherit the same basic biochemical life-plan. However, is it not somewhat surprising, in view of the spectacular variations shown by life at other levels, that there is essentially no variation in the basic biochemical plan of life? One possible explanation for this is that life never had any choice in its basic biochemical plan because the basic seed-stock was seeded here from elsewhere in the universe.

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