

The Rise of Life on Earth

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It is estimated that the earth was created about 4.5 billion years ago. How long life has inhabited it, no one knows, although it is assumed that the simplest form of life came into being more than 3.8 billion years ago. For a long time researches and studies have been carried out to determine what the first forms of life were, their nature and behaviour and during which time period they came into existence. Scientists came up with many different theories regarding the first forms of life but still today they are not sure of the very first species of life on Earth.

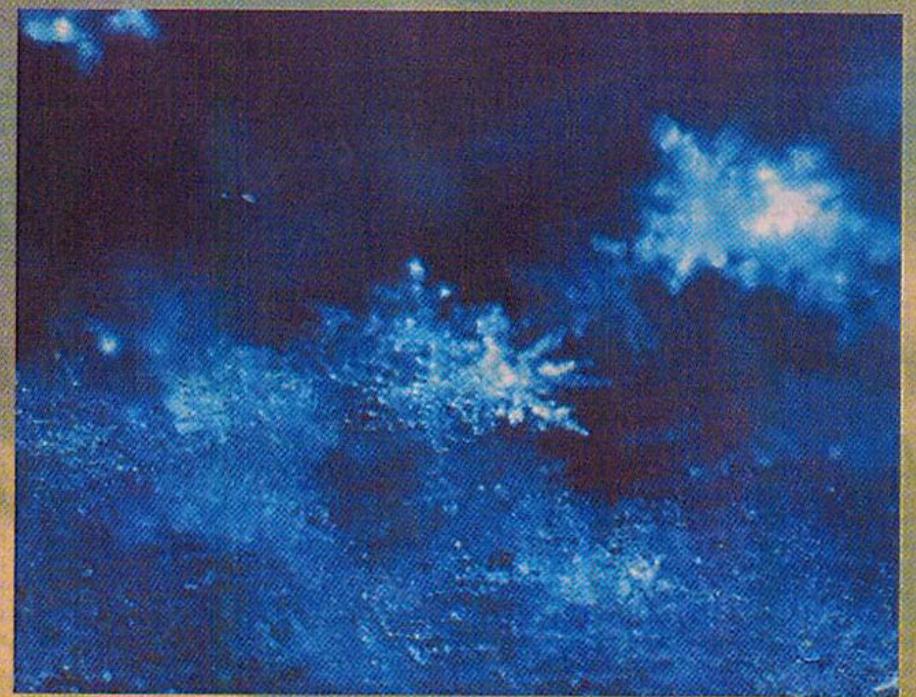
Some scientists think that the first form of life originated during the primordial era. The question is, what kind of place was the primordial Earth actually like? Was it fiery or was it moderate? Could it even have been chilly? One school of thought suggests that the Earth was covered with ice when life started to emerge. Due to such temperature and atmospheric conditions, compounds like formaldehyde, cyanide and ammonia were formed and these reacted with water to form glycine (a type of amino acid). These were one of the basic molecules in a living cell. Others accept the theory that the Earth was a temperate region when life originated. Molecules of aldehyde phosphate, which were found in ponds and lakes and other water bodies, united to give rise to the progenitors of RNA (another very important constituent of a living cell). According to some scientists, since the Earth was a very hot place at the time of its birth, it could have been a blazing orb of hot magma when life was born and the first life forms must have been heat-loving organisms called "thermophiles". These were able to adjust themselves to the scalding atmospheric conditions. Gases released from this magma could react to form such important compounds as acetic acid and others, which are vital components required in the synthesis of specific organic compounds.

The "thermophiles" were said to have existed during a time period known as the Precambrian. This period started from the time of the creation of the Earth and lasted

for about three and a half billion years. The organisms said to be existing in this time period were all minuscule and microscopic. These were the ones, which facilitated and aided the birth and development of the later organisms. They developed the DNA, the proteins and all those basic molecules essential for making the first living cells. They were even said to have devised and invented the methods of photosynthesis, respiration and reproduction. A certain rock, found in an island near Greenland, bears some evidence of life about 3.86 billion years ago. This rock, though having lost nearly all of its anatomical features, had had biological features similar to those of all the forms of life that have risen ever since.

A certain scientist named Stanley Miller argues that the most credible and accepted theory about the evolution of life on Earth was that, the first type of living beings was born when the climate of the Earth was very hot. He assumed that the first forms of life were actually the end products of some reactants in the atmosphere during the primordial time, which had undergone a series of reactions at that time under those atmospheric conditions. He supposed that if he could create an atmosphere similar to that of the primordial age, and carry out some similar reactions, he would be able to show if these reactions really did cause any forms of life or any basic component to evolve. He demonstrated an experiment to prove this hypothesis. A glass flask was filled with methane, hydrogen and ammonia, made to resemble the primordial atmosphere. Another flask positioned below the first one was filled with water representing the ocean. The electric current acted as the lightning sparks. By passing the electricity through the gases in his so-called "atmosphere" Miller wanted to generate chemicals which would fall into the pool of water just like rain. This resulted in a thick yellow mixture which, when tested, turned out to be a rich brew of amino acids.

Miller's conception of the primordial atmosphere was contradicted by other



scientists who claimed that the atmosphere rather consisted of carbon dioxide and nitrogen, instead of hydrogen, methane and ammonia. In an attempt to react carbon dioxide and nitrogen however, they obtained a trivial amount of organic material which, when mixed with water, formed a dilute solution. Scientists found it hard to conceive how such complex an aspect as life could have evolved from such a feeble, dilute solution. So they came to the conclusion that some other objects had aided the reaction and thus made the conditions feasible for life to start developing. They guessed that asteroids, meteorites, comets and even interplanetary dust particles, brought with them the ingredients required to produce amino acids, which along with some vital chemicals, reacted to form living cells.

It is suggested that three branches of organisms, the bacteria, archaea and eukaryotes, arose from the main branch of

thermophiles. The oldest manifestation of the eukaryotes was about 2 billion years ago. These eukaryotes had a nucleus a complete cell structure. Then, approximately 1 billion years after that, mixing of genes among the eukaryotes led to eruption of life among them. Before long sponges, worms, multi-celled organisms and aquatic invertebrates like clams and trilobites began to emerge. This was during the late Precambrian and the Cambrian era. Around 0.2 billion years ago, dinosaurs came into existence but they became extinct within 65 million years of their reign. Human beings have been living on this Earth for about 4 million years now. It is amazing how life began on this Earth through microscopic unicellular creatures. Still today scientists are trying to find the exact source from which such a marvelous phenomenon as life has emerged.