

Sun, water is vaporized. On Mars, located farther out, water is mostly frozen. The Earth's distance is such that the heat from the Sun generates exactly the right temperature range for water to exist as a stable liquid. Thus, a slightly different distance from the Sun would have resulted in water's existing either as steam or ice.

Also, the Earth's mass is not large enough to retain the light element of hydrogen through gravitational attraction. It must therefore keep most of its hydrogen locked in heavier molecules of water. However, the Earth's mass is sufficient to retain oxygen, an obviously critical component for the later development of animal life.

LET THERE BE LIGHT

This chapter has covered the initial creation of the Universe from its instantaneous beginning in a blaze of light to the formation of the Solar System which includes the planet Earth. These events took a minimum of ten billion years. The importance of Earth's special location in the Solar System and its unique material composition has been outlined. The concepts contained in the initial creation are so important to the understanding of subsequent events that a review is in order.

The Universe was created at the sharply defined beginning of time in a fiery explosion of dazzling brilliance. Robert Jastrow writes: "Picture the radiant splendor of the moment of creation. Suddenly a world of pure energy flashes into being; light of unimaginable brilliance fills the Universe."¹

In the beginning, the Universe was filled with energy in the form of light. This radiant energy was largely transformed into matter as the Universe expanded and cooled. All the energy, forces, and particles that subsequently filled the immensities of space with gases, elements, stars, and planets were created in the initial Big Bang explosion.

It would be difficult to find a scientist who disagrees with the statement: The Universe began with light. Interestingly, however, there are rarely direct statements about the presence of light at the beginning of the Universe in textbooks. Instead, textbooks refer to the enormous temperatures of the gigantic initial explosion using such terms as "cataclysmic explosion that hurled matter and radiant energy outward,"² or "...exploded violently to initiate the expansion that is still in progress today."³