

CHAPTER 3

THE BEGINNING

Then God said, "Let there be light"; and there was light. And God saw that the light was good; and God separated the light from the darkness.

Genesis 1:3-4

Light is the key to all life in this world. It is the form of energy that is necessary for all life on Earth. It is an imperfectly understood gift that behaves as both a wave and a particle to provide the energy upon which all life ultimately depends.

In classical physical theory, energy radiates or travels as electromagnetic waves. Scientists have also discovered that light consists of high energy particles known as photons. Photons are discrete particles without mass (matter). According to quantum theory, light is composed of photons. The filament in an ordinary light bulb emits or radiates enormous quantities of photons which we perceive as visible light.

The Universe began at a sharply defined instant in time in a fiery explosion of intense brilliance. In the beginning, pure energy was transforming itself into matter. One of the greatest contributions of nineteenth-century physics was the statement of the law of *conservation of energy*. In essence this law says that energy can change form, but it is never destroyed. Thus in the Big Bang, pure energy would alter itself into forms of matter about which we can only theorize. The first particles to emerge were photons (particles of light) and neutrinos (subatomic particles that travel through solid bodies at the speed of light). These were almost instantaneously followed by electrons, positrons, protons, and neutrons. Initial temperatures were beyond comprehension, such as one hundred thousand million degrees. The Universe was filled with light.

It is difficult to describe the details of the initial fireball radiation and its more immediate aftermath without dealing with the principles