

the water vapor and other gases trapped in the pores of the Earth's rocks.

Initially, water in liquid form could not exist since the extremely hot molten surface of the Earth prevented water vapor from condensing. It is generally thought that this vapor, together with smog-like gases (primarily carbon dioxide) formed a hot, dense, continuous cloud surrounding the Earth.

In the gradual but continued cooling of the Earth's crust, the air temperature finally lowered to the point (100°C) where the condensation from water vapor to liquid water took place. At first, rain began to fall only to be reheated to new clouds of steam by the hot crust. Further crust cooling took place and sheets of rain fell from the sky to accumulate on the cooling surface. Volcanic action continued to outgas water vapor to the atmosphere and gigantic cloud bursts sent the water back to Earth. The water accumulated into shallow seas.

By 3.5 billion years ago, the Earth is thought to have been covered by a shallow sea. At this point, water formation was essentially complete. In his college textbook, *Essentials of Earth History*, W. L. Stokes comments: "There is good evidence that sea water accumulated rather rapidly during the early stages of the earth's history and has remained almost constant in quantity for the past 3.5 billion years."¹ Since this time, the waters of the Earth have basically been recycled through the atmosphere and fresh water systems. Minor additions may occur from time to time from new volcanic eruptions, but this also may represent recycling as will be seen in the subsequent chapter.



FIGURE 4.13

The eruption of Halemaumau in the Kilauea quadrangle, Hawaii, in May 1924. (Courtesy U.S. Geological Survey.)

A LOOK BACK AT GENESIS

Genesis 1:6-7 says, "Then God said, 'Let there be an expanse in the midst of the waters, and let it separate the waters from the waters.' And God made the expanse, and separated the waters which were below the expanse from the waters which were above the expanse; and it was so."

In the biblical account, God has turned His attention from the Universe as a whole to the planet Earth. These verses and those following are therefore descriptive of events on Earth.

Ronald Youngblood, an Old Testament scholar specializing in Semitic languages, describes the *expanse* as "the visible atmosphere