

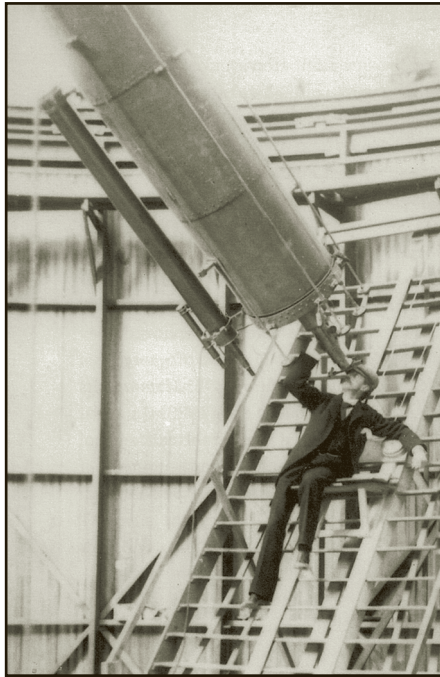
Read the passage that describes the history of observations and myths about the planet Mars. Answer the questions that follow.

## Observing Mars

from *Mars and the Search for Life* by Elaine Scott

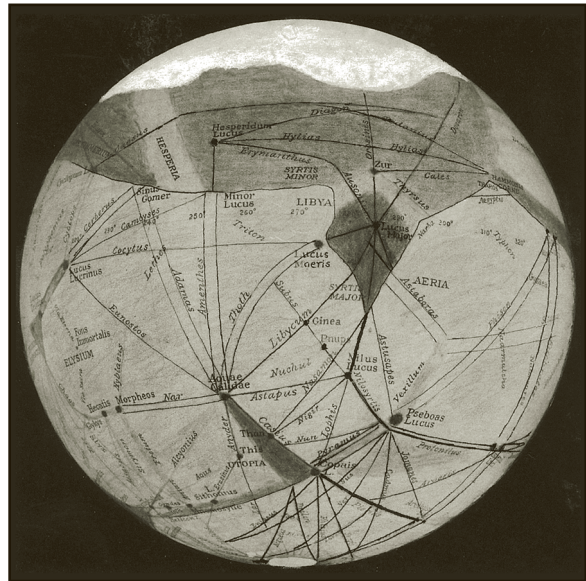
- F**rom the beginning of history, Mars, the small red planet that is fourth from the Sun, has always fascinated—even frightened—those who have watched it move from east to west across the night sky. Ages ago, people may have looked at Mars’s reddish color and thought of all the blood that is spilled during war. Perhaps that is why the ancient Assyrians called Mars the “Shedder of Blood,” and the Greeks, Romans, and, later, the Vikings named the planet after their gods of war. Mars was ancient Rome’s god of war, and that is the name that has endured.
- Our earliest ancestors used stories and myths to explain the mysteries of nature. They knew little about science, as we think of it today. Nevertheless, astronomy, the study of the universe beyond Earth, is one of the world’s oldest sciences. The earliest astronomers, like Ptolemy (TOLE-uh-me) (approximately A.D. 100–179), who lived in Roman Egypt, didn’t have telescopes or other instruments to help them study the moon and the stars. They had to rely on their own eyesight. Then, in 1608, the telescope was invented by a Dutch optician, Hans Lippershey (LIP-er-shy), who lived from 1570 to 1619. Lippershey’s invention had two lenses at either end of a tube. One, called a convex lens, curved outward. It made objects appear bigger than they were, but blurry. The smaller lens, called a concave lens, curved inward. It made objects look smaller, but clearer. When light passed through both lenses, objects appeared three to four times larger and closer than they were. Just a year later, in 1609, the Italian Galileo Galilei (ga-luh-LAY-oh ga-luh-LAY-ee) (1564–1642) made improvements to the instrument that enabled it to make objects appear 20 times larger than their true size.
- Telescopes continued to improve. Galileo’s was five to six feet in length, but by the middle of the 17th century, telescopes had grown. In 1656, a telescope made by Dutch mathematician Christiaan Huygens (HOY-gehns) (1629–1695) was 23 feet long and could magnify 100 times.
- The telescope changed astronomy forever. Knowledge of the universe grew, and ancient ideas gave way to new ones. The belief that Earth was at the center of our solar system gave way to the theory that the Sun was at the center.

5 Astronomers continued to observe the planets and stars and make notes about what they saw. In 1877, an Italian astronomer, Giovanni Schiaparelli (joh-VON-ne skyah-puh-REL-lee) (1835–1910) trained his telescope on Mars and made a surprising discovery. He announced that the planet seemed to be crisscrossed by a series of channels—or, in Italian, *canali*. Unfortunately, when Schiaparelli’s work was translated into English, a mistake was made. The word *canali* was translated as the word “canals.” Though both are waterways, a canal is built by people, while a channel is created by nature. Debate raged among the astronomers of the day: Had the waterways on Mars been created by intelligent beings, or were they natural Martian formations? Throughout his life, Schiaparelli remained neutral



LEFT: Percival Lowell with his telescope at the Lowell Observatory. He was convinced that intelligent life existed on Mars.

BELOW: Lowell’s 1905 drawing of Mars, showing the “canals” he believed were there.



on the question. However, many of those who read Schiaparelli’s papers in English believed they were reading about constructed canals, and they drew the conclusion that these canals had been made by a civilization living on Mars. The American astronomer Percival Lowell (1855–1916) was among the biggest believers.

6 In 1894, Percival Lowell established the Lowell Observatory on top of Mars Hill in Flagstaff, Arizona. For 23 years, Lowell worked at his observatory, studying Mars and making drawings of the features he saw through his telescope. As he observed Schiaparelli’s “canals,” he became convinced they had been built by intelligent beings. Lowell promoted his views in three books: *Mars*, published in 1895, *Mars and Its Canals* (1906), and *Mars as the Abode of Life* (1908). In *Mars*, Lowell wrote, “Certainly what we see hints at the existence of beings who are in advance of, not behind us, in the journey of life.” Though we know now that he was incorrect, Percival Lowell was relying upon scientific “evidence” to formulate a hypothesis, or prediction, about what Martian life might be like.

- 7 At the same time, another man, the English writer H. G. Wells (1866–1946), was using his imagination to form a very different picture of life on Mars. In 1898, Wells’s science fiction novel *The War of the Worlds*—which was later used as the basis for the famous radio broadcast—was published. It was one of the first books to describe an alien invasion from another planet.
- 8 Thanks to the scientific efforts of Lowell and others, and the creative effort of H. G. Wells, the idea of a habitable world somewhere else in our solar system began to capture the world’s imagination.

### ***More About Mars***

- Mars is the fourth planet from the Sun.
- Mars orbits the Sun at an average distance of 141.5 million miles.
- Mars’s distance from Earth varies, according to the orbits of both planets. At its closest, Mars is 33.9 million miles away. At its farthest, it is 249 million miles away.
- Mars is about half the size of Earth, though its land area is about the same. This is because our planet is covered with oceans, and Mars is not.
- Because it is smaller than Earth, Mars’s gravity is only 38 percent as strong as Earth’s. A human weighing 160 pounds on Earth would weigh only about 60 pounds on Mars.
- Mars has two tiny moons—Phobos and Deimos. Phobos means “fear,” and Deimos means “panic.” In mythology, Phobos and Deimos were the offspring of Mars. The moons were discovered in 1877 by Asaph Hall, working at the U.S. Naval Observatory.
- The month of March takes its name from Mars.
- One Martian day, or “sol,” lasts 24 hours, 39 minutes, and 35 seconds.
- Traveling at an average speed of 53,979 mph, it takes Mars 687 Earth days to make one orbit around the Sun.
- Mars boasts both the largest volcano and the largest canyon system in the solar system.
- The average temperature on Mars is –64 degrees Fahrenheit, but at its poles the temperature can dip to –225°F and at the equator it can rise to 80°F.
- Martian wind can blow at hurricane force—more than 75 miles per hour.