Vesta, the third-largest known asteroid in our solar system, is the only asteroid that can be seen with the naked eye. Vesta is smaller than Ceres and Pallas, the first- and second-largest asteroids, respectively, but its reflective surface allows it to be seen occasionally, without the aid of a telescope, in the nighttime sky. The rest of the known asteroids can only be seen with a scope or as a smudge on a photographic plate—their mere size living up to their “minor planets” label.

Because of their smallness, no astronomer prior to the invention of the telescope ever discovered an asteroid with the naked eye. Certainly, a sharper-eyed sky watcher could have spotted Vesta. But the speck in the sky, similar in appearance to the surrounding stars, was interpreted as just that—another faint star.

Instead, planets and stars monopolized the early writings and records in astronomy, with the occasional comets weighing in as the smallest bodies in the solar system. Even after the invention of the telescope, the planets, moons, comets, and stars dominated the astronomical limelight. It took two more centuries after the invention of the telescope for astronomers to actively seek a missing planet between Jupiter and Mars. The “planet” turned out to be a belt of small bodies—the first asteroid found with the usual luck that accompanies many scientific discoveries.

Before the invention of the telescope, one of the major scientific ideas that profoundly changed the way scientists perceived
the solar system originated with Polish astronomer Nicholas Copernicus (1473–1543): The astronomer proposed a heliocentric view of the solar system, or that the Sun was the center of the solar system. (Actually, Aristarchus, in the third century B.C., first suggested that the Sun was at the center of the solar system, and movement of the heavens across the sky was caused by the Earth spinning on its axis. But Aristarchus’ contemporaries objected to his ideas, pointing out that if the Earth did indeed rotate, unattached objects would fly off.)

For some 2000 years before Copernicus, ideas about the solar system were dominated by a geometric representation of the system, developed by Claudius Ptolemy (100?–170? A.D.), in which the Earth was at the center. Each planet moved uniformly in a small circle called an epicycle, with the Sun and Moon exempt from the epicycle motions. In turn, the center of each epicycle revolved uniformly around the Earth in a large circle called a deferent.

Fortunately for us, Copernicus had other ideas and the intelligence to record and interpret his observations. His father died when he was 10 years old, and he was raised by his uncle, a bishop, who provided Copernicus with an excellent education. After extensive studies at places such as the University of Cracow, Copernicus returned to his uncle’s castle, working as a physician and diplomat, among other duties. With income from being elected a canon (because of his uncle’s influence), Copernicus was finally, and fortuitously, able to spend time with his favorite study, astronomy. His studies went against Ptolemy’s ideology, placing the Sun at the center of the solar system but still keeping the circular planetary orbits of the Ptolemaic system. The entire concept would soon catch on, leading astronomers to view the solar system in a very different way and to make discoveries that would reveal the system’s true nature.

At this time in astronomy, there was no reason to suspect that Mars and Jupiter had company in their dances around the Sun. One of the first indications that something resided between the orbits of Mars and Jupiter was drawn through the observational data of Tycho Brahe (1546–1601), the somewhat eccentric Dutch