



## History and Discovery of Asteroids

## The Lost is Found

### FLASHBACK—EARLY ASTEROID DISCOVERIES

Giuseppe **Piazzi**<sup>1</sup> observed a moving point of light during January and February of 1801. It was thought to be the “missing planet,”<sup>2</sup> which he named **Ceres**. However he did not collect enough data to determine the object’s orbit before it disappeared. This was necessary so that other astronomers could find the object when they wished to investigate it more thoroughly. Was Ceres lost? Most of Piazzi’s colleagues feared that it was.

But **Carl Friedrich Gauss**, a young German mathematician, came to the rescue! In October 1801, he applied his new method of “determining the path of a celestial body” to Ceres’ orbit. With surprising speed and accuracy, Gauss used Piazzi’s observations to predict where the new “planet” should be found. Imagine Gauss’s excitement when **Baron von Zach** found Ceres on the night of December 7, just where Gauss said it would be!



Actually, von Zach found four stars at that location, but when the weather cleared again on December 18, one of the stars was gone. Von Zach finally confirmed that he had recovered the missing object on January 1, 1802, exactly one year after Piazzi’s first sighting. Using Gauss’ results, **Wilhelm Olbers**, an amateur astronomer in Bremen, also found Ceres with his telescope.

Piazzi received a letter sent by the secretary of state on behalf of the king of Sicily commending him on the discovery of Ceres. Instead of giving Piazzi a medal, the king agreed to buy the Palermo Observatory a new telescope.

Von Zach had two roles in this exciting event. He not only found the missing Ceres, but also, his publication, *Monthly Correspondence*, played a vital communication role in the recovery.

By 1809, Gauss had refined the mathematical procedure he used to determine Ceres’ orbit, and it became the standard procedure for orbital calculations.

In order to find Ceres again, astronomers used

- new mathematics
- communication
- observation

The “missing planet” was found, lost, and found again. All’s well that ends well...except this was not the end! This was only the beginning! Many more asteroids had yet to be discovered. The NASA Dawn mission will travel to Ceres but first will study another asteroid named Vesta.

<sup>1</sup> see “Dark and Starry Night” flashback

<sup>2</sup> see “Celestial Police” activity

## Additional Resources

<http://www-gap.dcs.st-and.ac.uk/~history/Mathematicians/Gauss.html>

This biography of Carl Friedrich Gauss contains information about the relationship of Gauss and Baron von Zach as well as details about the rediscovery of Ceres.

### [A Texas-Sized Space Rock](#)

A NASA feature story about a “Texas-Sized Space Rock” known as Ceres.

## Questions relating to The Lost is Found

1. How much time lapsed between Ceres’ first discovery and its rediscovery? Who was involved in the rediscovery?
2. Why couldn’t Herschel and other astronomers find Ceres during the early months of 1801?
3. What two important roles did Baron von Zach play in the rediscovery of Ceres? Explain why each was important.
4. Why was Gauss’s new method of determining planetary orbits so important to the re-discovery of Ceres?
5. Did Piazzi rediscover Ceres?
6. Why was communication between astronomers and mathematicians so important in the re-discovery of Ceres?