



28.2 Henrietta Leavitt

Leavitt, although deaf, had a keen eye for observing the stars. Her ability to identify the magnitude of stars set the standard for determining a star's distance—hundreds or even millions of light years away.

Star struck



Photo courtesy of the American Association of Variable Star Observers

Henrietta Swan Leavitt was born on July 4, 1868 in Lancaster, Massachusetts. Henrietta's family lived in Cambridge, Massachusetts and later moved to Cleveland, Ohio. In Ohio, Leavitt attended Oberlin College for two years and was enrolled in the school's conservatory of music. She then moved back to

Cambridge and attended Radcliffe College, which was then known as the Society for the Collegiate Instruction of Women.

In her last year of college, Henrietta took an astronomy course—then began her fascination with and love for the stars. She graduated in 1892 and later became a volunteer research assistant working at the Harvard College Observatory.

Computing the stars

In the 1880s, Harvard College established a goal to catalog the stars. Edward Pickering, a former professor at the Massachusetts Institute of Technology, became director of the Harvard Observatory. Pickering was an authority in photographic photometry—determining a star's magnitude from a photograph. He wanted to gather information about the brightness and color of stars.

In order to complete this work, Pickering needed people to perform the tedious task of examining photographs of stars. Men typically did not perform this type of work, but women were hired and known as “computers.” Leavitt was hired at a rate of \$.30 per hour to complete this painstakingly detailed work.

Leavitt was not a healthy woman, struggling with complete hearing loss and other illnesses during college and throughout her career. Despite these setbacks, she became a super computer, devoting her life to studying the stars. She eventually became the head of the photographic stellar photometry department.

Leavitt catalogued variable stars that altered in brightness over the course of a few days, weeks, or even months. She studied Cepheid variable stars in the Magellanic Clouds, two galaxies near the Milky Way. Leavitt examined photographic plates, comparing the same regions on several plates taken at different times. Stars that had changed in brightness would look different in size. Leavitt continued to examine plates, discovering nearly 2,000 new variable stars in the Magellanic Clouds.

Leavitt found an inverse relationship between a star's brightness cycle and its magnitude. A stronger star took longer to cycle between brightness and dimness. Therefore, brighter Cepheid stars took longer to rotate between brightness and dimness. In 1912, Leavitt had established the Period-Luminosity relation.

These stars, all located within the Magellanic Clouds, were roughly the same distance from the Earth. This rule provided astronomers with the ability to measure distances within and beyond our galaxy.

Astronomical findings

Leavitt's discovery had a tremendous impact on future research in the field of astronomy. Astronomers could now determine distances to galaxies and within the universe overall. Ejnar Hertzsprung was able to plot the distance of Cepheid stars. Harlow Shapley, using Leavitt's findings, was able to map the Milky Way and determine its size. Edwin Hubble applied her rule to establish the age of the Universe.

An unsung heroine

In 1925, the Swedish Academy of Sciences wished to nominate Leavitt for a Nobel Prize. However, she had died of cancer nearly four years earlier at the age of 53. The Nobel Prize must be given during a recipient's lifetime.

In addition to her discovery of numerous variable stars, Leavitt discovered four novas and developed the standard method for determining the magnitude of stars. An asteroid and crater on the moon are named in her honor.



Reading reflection

1. How did Henrietta Leavitt discover new variable stars?
2. What were Leavitt's two significant contributions to the field of astronomy?
3. **Research:** What is the name of the asteroid named in Leavitt's honor?
4. **Research:** When was the Harvard Observatory established and what does it do now?
5. **Research:** State three facts about each of these astronomers: Ejnar Hertzsprung, Harlow Shapley, and Edwin Hubble.
6. **Research:** What is the Nobel Prize?