

*The Lady of Luminosity*

*American Astronomer of the First Magnitude*

---

# Henrietta Swan Leavitt

By: Saia Patel

May 2016

Science

---

(1868—1921)





Henrietta Swan Leavitt



---

# Early Life

---

- ❖ born on July 4, 1868 in Lancaster, MA
- ❖ attended Oberlin College, graduated from the Society for the Collegiate Instruction for Women (Radcliffe College) in 1892
- ❖ traveled in America and Europe where she lost her hearing
- ❖ became volunteer research assistant at Harvard College Observatory
- ❖ interest in astronomy began during senior year of college: took astronomy class
- ❖ given position of chief of the photographic photometry department, responsible for the care of telescopes





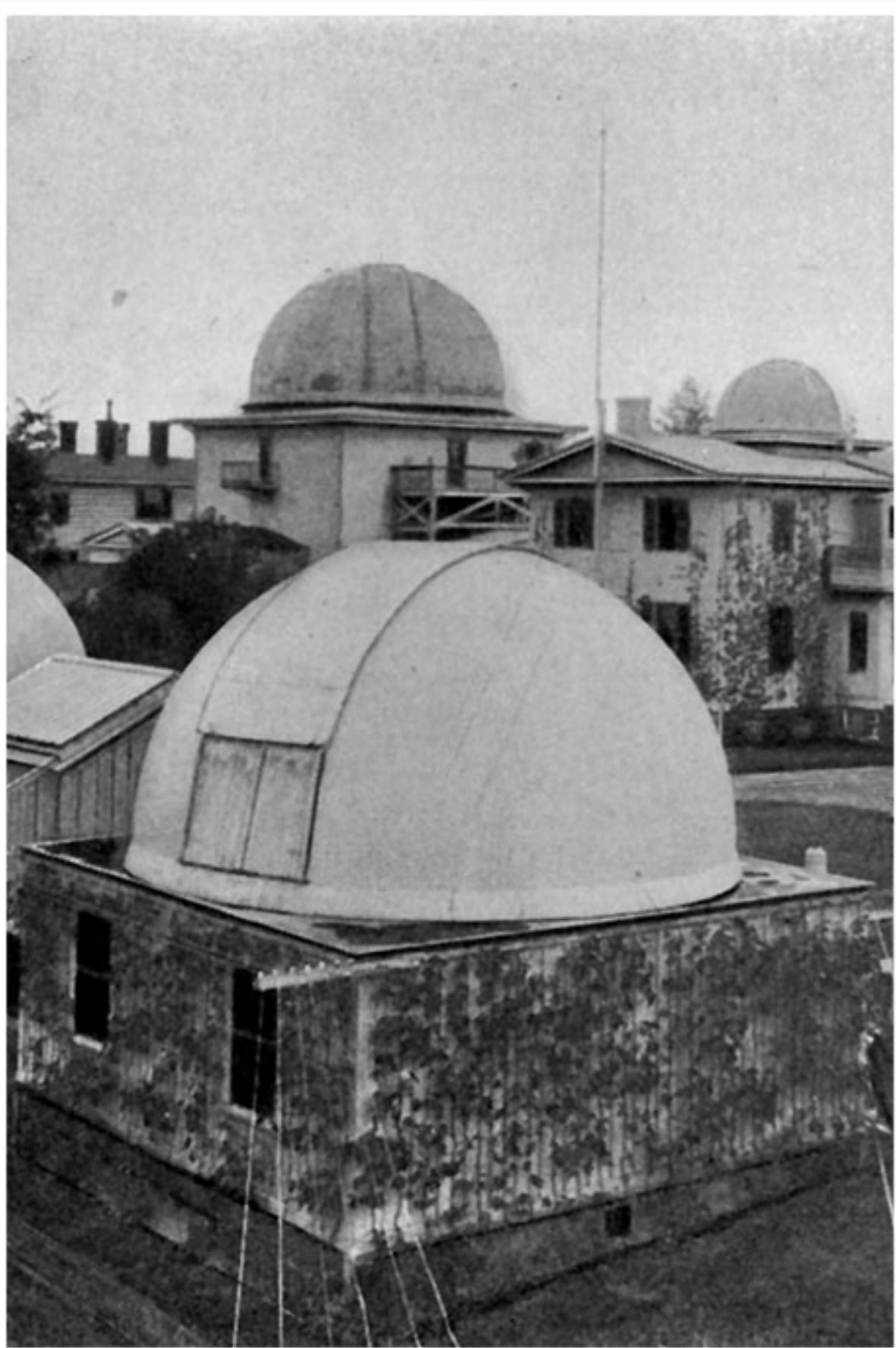














---

# Some Important Terms to Know...

---

- ❖ Variable Stars—a star whose brightness as seen from Earth (its apparent magnitude) fluctuates
- ❖ Cepheid Variable—intrinsic variable stars which pulsate in a predictable way
- ❖ Fluctuation—to rise and fall irregularly in number or amount
- ❖ Intrinsic Brightness—how bright the stars would be at a common distance
- ❖ Magellanic Cloud—two irregular dwarf galaxies orbiting the Milky Way Galaxy











---

# Harvard College Observatory

---

- ❖ liked astronomy so much that she became a volunteer at the Harvard College Observatory as a "computer"
- ❖ "the Harvard computers"—the name used for women who examined tiny dots on time-exposed photographs of night sky and then measured, calculated, and recorded their observations in ledger books
- ❖ in 1902, she was hired at 30¢ per hour and worked there for 19 years until her death





Some of the women who worked at Harvard College Observatory. From left to right: Ida Woods, Evelyn Leland, Florence Cushman, Grace Brooks, Mary Van, Henrietta Leavitt, Mollie O'Reilly, Mabel Gill, Alta Carpenter, Annie Jump Cannon, Dorothy Black, Arville Walker, Frank Hinkely, and Professor Edward King.



---

# Leavitt's Law

---

- ❖ discovered a direct correlation between the time that it takes for Cepheid variable to go from bright to dim and back, and the brightness of the star
- ❖ the longer the period of fluctuation, the brighter the star
- ❖ that means that even though that a star might seem dim, if it had a long period, it must be large
- ❖ calculated how bright the star appeared from Earth, and compared it to its intrinsic brightness
- ❖ could estimate how much of the star's brightness had faded away while reaching Earth, and the distance of the star



**“A straight line can readily be drawn among each of the two series of points corresponding to maxima and minima, thus showing that there is a simple relation between the brightness of the variables and their periods.”**

*–Henrietta Swan Leavitt*  
Commenting on her discovery



---

# The End of her Life

---

- ❖ worked irregularly at Harvard due to health problems and family obligations
- ❖ made head of stellar photometry in 1921 by new director, Harlow Shapley
- ❖ passed away from cancer in 1921
- ❖ unaware of death, Gosta Mittag-Leffler, a Swedish Mathematician considered nominating her for the 1926 Nobel Prize in Physics and wrote to Shapley for more information
- ❖ Shapley responded and said Leavitt was dead, but he should consider nominating her because he "correctly interpreted" Leavitt's discovery
- ❖ Nobel Prize not awarded posthumously
- ❖ asteroid 5383 Leavitt and lunar crater Leavitt named in her honor





**Leavitt  
Crater**



---

# Effects of her Work

---

- ❖ Ejnar Hertzsprung, Danish astronomer and chemist, used her discoveries to plot the distance of stars
- ❖ Harlow Shapley, American astronomer, used her discovery to measure the size of the Milky Way
- ❖ Edwin Hubble, American astronomer and the creator of Hubble Telescope, used her discovery to discover the age of Universe



---

# Accomplishments

---

- ❖ American astronomer of the first magnitude
- ❖ her research resulted in advances within the field of astronomy
- ❖ discovered how to rank stars's magnitudes using photographic plates
- ❖ discovered a way to accurately measure extra galactic distances (period-luminosity relation)
- ❖ discovered more variable stars than any other astronomer in her time
- ❖ asteroid 5383 Leavitt and lunar crater Leavitt named after her and deaf astronomers and scientists
- ❖ member of Phi Beta Kappa, the American Association of University Women, the American Astronomical and Astrophysical Society, the American Association for the Advancement of Science, and an honorary member of the American Association of Variable Star Observers



---

# Biographic Books and Plays

---

- ❖ *Silent Sky*, a play written by Lauren Gunderson follows Henrietta's journey in life
- ❖ *Miss Leavitt's Stars*, a biography written by George Johnson tells the triumphs of women's progress in science through Henrietta Leavitt's life

**And Many More...**







HENRIETTA SWAN LEAVITT

BORN JULY 4, 1868,

DIED DEC. 12, 1921.

CHILDREN OF GEORGE  
AND HENRIETTA



# Other Events During Leavitt's Life

1869–Mendeleev makes periodic table

1882–Charles Darwin dies

1876–Telephone patented

1889–Van Gogh paints Starry Night

1898–Curie discovers radium and polonium

1914–World War I begins

1916–Einstein publishes General Theory of Relativity

1920–Women given right to vote in U.S.

1870

1880

1890

1900

1910

1920

1885–1888–Attends Oberlin College

1893–1902–Volunteer Work at Harvard College Observatory

1908–Publishes theory

1888–1892–Attends Radcliffe College

1902–1921–Paid work at Observatory, loses hearing

1921–Dies of cancer

1868–Born on July 4 in Lancaster, MA

1902–1908–Discovers Cepheid variable stars and develops period–luminosity theory

# Leavitt's Life



---

# Sources

---

- ❖ [https://en.m.wikipedia.org/wiki/Henrietta\\_Swan\\_Leavitt](https://en.m.wikipedia.org/wiki/Henrietta_Swan_Leavitt)
- ❖ <http://www.pbs.org/wgbh/asodatabank/entries/baleav.html>
- ❖ <http://www.sheisanastronomer.org/index.php/history/henrietta-leavitt>
- ❖ <https://www.slideshare.net/mobile/BigHistory/u2-bioleavitt>
- ❖ <https://prezi.com/m/-ilsk4su79z6/henrietta-swan-leavitt/>
- ❖ [https://prezi.com/m/znf\\_fuqydi8\\_/henrietta-leavitt/](https://prezi.com/m/znf_fuqydi8_/henrietta-leavitt/)



The End