DRAMATURGICAL GUIDE

Jewel Theatre Company
January 24th - February 18th, 2018

The information in this guide was compiled by dramaturge Victoria Gardiner and director Susan Myer Silton.

Contents

Harvard Computers, circa 1918

PLOT SUMMARY

When Henrietta Leavitt begins work at the Harvard Observatory in the early 1900s, she isn't allowed to touch a telescope or express an original idea. Instead, she joins a group of women "computers," charting the stars for a renowned astronomer who calculates projects in "girl hours" and has no time for the women's probing theories. As Henrietta, in her free time, attempts to measure the light and distance of stars, she must also take measure of her life on Earth, trying to balance her dedication to science with family obligations and the possibility of love.

The true story of 19th-century astronomer Henrietta Leavitt explores a woman's place in society during a time of immense scientific discoveries, when women's ideas were dismissed until men claimed credit for them. Social progress, like scientific progress, can be hard to see when one is trapped among earthly complications; Henrietta Leavitt and her female peers believe in both, and their dedication changed the way we understand both the heavens and Earth.

SETTINGS

The play takes place between 1900-1920 at the following locations:
The Harvard Observatory 2nd-floor offices
Leavitt home, Wisconsin
Ocean Liner on the Atlantic
Henrietta's home, Cambridge, MA

CHARACTERS

(descriptions taken from playwright)

HENRIETTA LEAVITT	30s, brilliant, meticulous, excited - almost always wearing a period hearing-aid.
MARGARET LEAVITT	30s, homebody, creative, sweet, sister.
ANNIE CANNON	40s, the leader, terse and sure, grows into a firebrand.
WILLIAMINA FLEMING	50s, smart as a whip and fun. Scottish.
PETER SHAW	30s, the head astronomer's apprentice… and the man.

HENRIETTA LEAVITT

Historical Overview:
Born: July 4th 1868, Lancaster, Massachusetts
Died: December 12, 1921 (aged 53), Cambridge, Massachusetts
Cause of Death: Cancer
Family: George Roswell Leavitt and Henrietta Swan Leavitt, parents
Roswell Harvey Leavitt, Martha Almira Leavitt, and four other siblings

Henrietta Leavitt was born in Massachusetts to George Roswell Leavitt and Henrietta Swan Kendrick, from whom she takes the vast portion of her name. Henrietta was the oldest of seven, though two of her siblings died in infancy.

Though born in Massachusetts, Henrietta grew up in Ohio, where she attended Oberlin College, as well as Wisconsin, where a portion of the play takes place. She returned to Massachusetts to attend Radcliffe College, the all-women companion college to Harvard University, where she earned a Bachelor's degree in 1882. She made progress towards a graduate degree in Astronomy before going to work as a computer in the Harvard Observatory under Dr. Charles Pickering.

During the course of her work under Pickering (detailed below), Henrietta studied variable stars, which are stars that show different levels of brightness at different times. From there she went on to develop Leavitt's Laws, which state that there is a straight line relation between a Cepheid variable star's intrinsic luminosity (true brightness) and the log of its period. Although she went uncredited for several decades and was unable to contribute to follow-up research, her discoveries went on to influence the work of Edwin Hubble, precipitated space travel, and contributed to numerous other means of scientific discovery.

Henrietta was a fairly sickly individual, having never quite recovered from the childhood infirmity (likely scarlet fever) that damaged her hearing. She succumbed to cancer in 1921 at the age of 53 and was buried the the Leavitt family plot in Cambridge, Massachusetts. Her gravestone lacks any mention of her contribution the the field of Astronomy.

MARGARET LEAVITT

Historical Overview:
Margaret "Margie" Leavitt is not an individual who existed in real history. Rather, Margaret is an approximation of perhaps several people designed to serve as a foil or counter-note to Henrietta. In terms of composition, Margie could be drawn from a variety of people—most likely Martha Almira Leavitt (Henrietta's oldest sister and second of the Leavitt's siblings) and Martha Shapley, nee Betz.

In terms of symbolism, Margaret is a vehicle for two of the three primary concepts in this play: while Henrietta represents religion and science, Margaret represents religion and art. It is through direct exposure to Margie's compositions that Henrietta happens upon the epiphany which forms the cornerstone of her theory. This interaction is not supported by any historical evidence, but rather serves Gunderson's more abstract call for the mingling of arts and sciences in the play. Symbolically, Margaret also represents the obligations of family juxtaposed with the allure of discovery and a far less intrinsically questioning view of theology. It is shown later that as Henrietta sees the beauty of God in the stars, Margie sees it in music.

As a matter of being a composite character, Margie occupies the place of Martha Almira Strong, nee Leavitt. Martha was the third of the Leavitt children and sadly not much historical record of her survives. She married William Henry James Strong, a Doctor of Divinity from Harvard University like her father, and had one child, William Leavitt Strong.

In addition, Margie may be inspired by, or at least inadvertently related to, Martha Betz Shapley. Martha was the wife of Harlow Shapley, Director of the Harvard Observatory immediately proceeding Edward Pickering. Though she is largely uncredited for her variety of contributions to the field of astronomy, Martha co-authored papers on Cepheid variable stars utilizing Henrietta's research with her husband. In addition Shapley was a classically trained, master pianist and is the only musician of note in any tangential proximity to Henrietta.

Martha Almira Leavitt
Born: August 1, 1876 Middlesex Massachusetts
Died: Unknown

Martha Betz Shapley
Born: 1890, Kansas City, Missouri
Died: 1981, Tucson, Arizona

ANNIE CANNON

Historical Overview:
Born: December 11, 1863. Dover, Delaware
Died: April 13, 1941. Cambridge, Massachusetts
Family: Never married, no children

Annie Jump Cannon was born in 1863, the eldest of three daughters of Delaware State Senator Wilson Cannon. She was completely deaf for most of her adulthood. Cannon was first taught about constellations as a child by her mother, who later encouraged her to pursue scientific studies. Cannon went on to study mathematics, physics and astronomy at Wellesley College where she graduated Valedictorian of her class. After graduating, she returned home to Delaware, took up photography and traveled throughout Europe. Shortly thereafter she contracted scarlet fever, which robbed her of her hearing.

Soon her mother died and Cannon sought to get out of her old home. She wrote to her former advisor about job openings at Wellesley where she was accepted as a physics teacher. From there she began taking graduate courses and started working towards a Master's degree. Cannon pursued part of her graduate degree in Astronomy at Radcliffe College, where she enrolled as a "special student" in order to gain access to the Harvard Observatory telescope. She received her degree in 1907.

In 1896, as part of her studies, Annie was hired by Dr. Charles Pickering, then the Director of the Harvard Observatory. She was 33. While working for Pickering, Cannon published several articles on Stellar Spectra in numerous journals, worked on the Henry Draper Catalogue, received the Draper Gold Medal, and was the recipient of numerous grants.

Cannon developed the system of spectral classification which organized stars by color. Later into her work, the O B A F G K M categories were discovered. They did not just relate to color, but also temperature and size, as these three characteristics of a star are intrinsically connected. To this day, the classification system she developed is one of the foundational concepts in astronomy education. And yes, they still use "Oh Be A Fine Girl, Kiss Me" to remember the star classification categories.

After publishing her first paper in 1901, Cannon was made Head of Photometry, the department responsible for analyzing star plates, at Harvard and became one of the first woman to receive an honorary doctorate from a European University. She still holds the record for most stars classified in a lifetime at over 500,000, at the peak of her career she could classify three stars a minute. Every year the American Astronomers' Society hands out the Annie Jump Cannon Award to that year's most prominent female astronomer. Though Cannon retired in 1940, she continued her work until a few weeks prior to her death in 1944.

WILLIAMINA FLEMING

Historical Overview:
Born: May 15, 1857. Dundee, Scotland
Died: May 21, 1911. Boston, Massachusetts
Family: James Orr Fleming (husband)

Williamina Fleming emigrated to America alongside her husband and her young child at the age of 21. She was shortly thereafter abandoned by her husband, James Orr Fleming, and forced to figure out how to make a living for herself and her child in America on her own. As a result, she found herself working in the house of Dr. Charles Pickering, Director of the Harvard Observatory. Allegedly, Dr. Pickering used to tell substandard employees that "his Scottish housekeeper could do a better job" and said it enough that eventually he gave her a job as a computer. However, this might be a highly over-reported office tall tale.

Over her time working for Pickering and later Harlow Shapley, Fleming classified 10,000 stars, discovered 59 nebule, and published several works on her discoveries. She discovered the Horsehead Nebula, through her work went uncredited. Despite having made massive contributions to the Draper Catalogue, Fleming's name along with all the names of her female peers were omitted in favor of a simple "Pickering" citation.

Fleming was placed in charge of the computing department after Annie Cannon's promotion to Head of Photometry. She was later made the curator of all spectra images at Harvard University. Fleming published numerous papers on her findings and received numerous awards. She was made an Honorary Fellow of Wellesley College in the early 1900's.

PETER SHAW

Historical Overview:
Peter Shaw, much like Margie Leavitt, did not exist in real life. Unlike Margie he seems to not have any discernible real life counterparts. Rather, he symbolically represents the "old guard" of the study of astronomy, though he has an inherent capacity for change. The rigid, sexist man seen in the opening scene is transformed over the course of the play.

It is possible that some inspiration for Peter is drawn from Harlow Shapley, Dr. Pickering's successor. Shapley was known to be far more progressive in his view of the women computers, ensuring that they received due credit for their work, and facilitating Annie Cannon's and Williamina's rise to positions of authority in the Observatory. Shapley also helped Henrietta Leavitt receive credit for her work.

CHRONOLOGY - THE WORLD OF *SILENT SKY*

1882: Both the U.S. House and Senate appoint committees on women's suffrage; each report favorably.

1884: The U.S. House of Representatives debates women's suffrage.

1886: The suffrage amendment is defeated two to one in the U.S. Senate.

1890: The National Woman Suffrage Association and the American Woman Suffrage Association merge to form the National American Woman Suffrage Association. Its first president is Elizabeth Cady Stanton. The focus turns to working at the state level. Wyoming renews general woman suffrage.

1893: Henrietta begins work at Harvard Observatory

1894: Despite 600,000 signatures, a petition for woman suffrage is ignored in New York.

1895: The New York State Association Opposed to Woman Suffrage is founded.

1906: Elizabeth Cady Stanton's daughter, Harriot Stanton Blatch, returns from England and forms the Equality League of Self Supporting Women with a membership based on professional and industrial working women. It initiates the practice of holding suffrage parades.

1908: Henrietta first publishes her data, noting a pattern in variable stars (cepheids).

1910: Emulating the grassroots tactics of labor activists, the Women's Political Union organizes America's first large-scale suffrage parade, which is held in New York City.

1911: In New York City, 3,000 people march for women suffrage.

1912: Henrietta publishes a full paper documenting her Period-Luminosity relationship.

1913: Ejnar Hertzsprung uses Henrietta's finding to measure distance to cepheids within the Milky Way.

1913: The Senate votes on a women's suffrage amendment, but it does not pass.

1914: Montana grants suffrage to women.

1916: Woodrow Wilson promises that the Democratic Party Platform will endorse women's suffrage.

1916: Montana elects suffragist Jeannette Rankin to the House of Representatives. She is the first woman elected to the U.S. Congress.

1917: Beginning in January, the National Woman's Party posts silent "Sentinels of Liberty," also known as the Silent Sentinels, at the White House. The National Woman's Party is the first group to picket the White House. In June, the arrests begin. Nearly 500 women are arrested, and 168 women serve jail time.

1917: The New York state constitution grants suffrage to women. New York is the first Eastern state to fully enfranchise women.

1917: The United States government declares war against Germany, entering WWI.

1918: The jailed suffragists are released from prison. An appellate court rules all the arrests were illegal.

1918: The Nineteenth Amendment to the U.S. Constitution, which eventually granted women suffrage, passes the U.S. House with exactly a two-thirds vote but loses by two votes in the Senate.

1918: WWI ends.

1920: Henrietta is made head of Stellar Photometry at Harvard Observatory.

1920: The Nineteenth Amendment to the U.S. Constitution is ratified, stating, "The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex".

1921: Henrietta dies of ovarian cancer.

1923-24: Edwin Hubble measures Cepheids in the Andromeda Galaxy, proving that the universe is far bigger than the Milky Way.

1926: Unaware of her death four years prior, the Swedish mathematician Gosta Mittag-Leffler considered nominating Henrietta for the 1926 Nobel Prize in Physics.

Henrietta Leavitt

Henrietta's breakthrough star plate

Harvard Observatory, Circa 1888

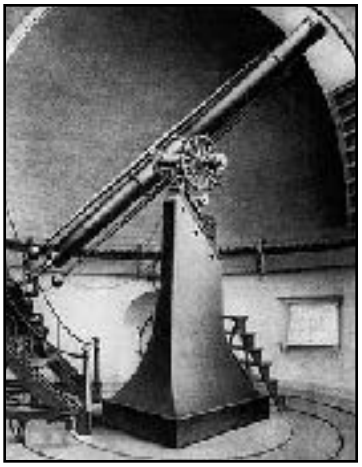
ASTRONOMY 101

(a glossary)

Computer: Person tasked with undertaking computation. Because this was considered to be rote and uninspired work, most computers during this time period (and then leading up to the creation of the electronic computer) were women.


Computers at work, circa 1891

Radcliffe: Harvard-affiliated all-female collegiate institution. Harvard did not admit female students until 1977.

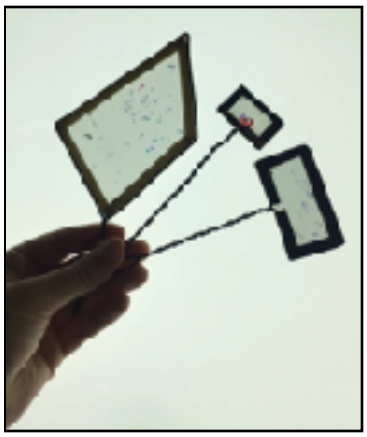


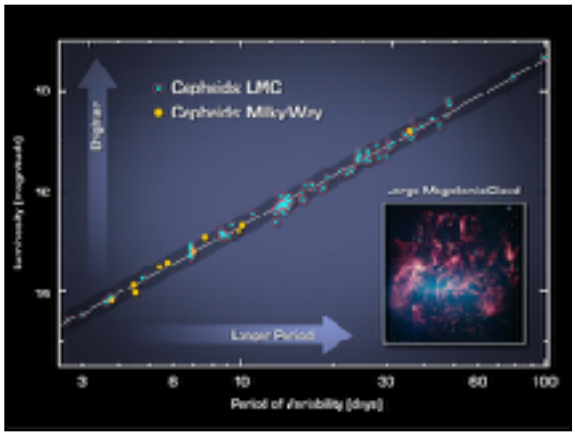
The Great Refractor: 15" telescope installed in 1847, crucial in such discoveries as the eighth satellite of Saturn in 1848 and was used to take one of the earliest photographs of a double star in 1857. Once Pickering took over the Observatory, it was used almost exclusively for photometry.

Photometry: In astronomy, the measurement of the brightness of stars, nebulae, galaxies, planets, etc. Primarily achieved by gathering light into a telescope and then capturing and recording the light on photosensitive plates, the basic calculations of photometry included visual comparison between these images.

Draper Catalogue: An astronomical star catalogue which lists spectroscopic (light wavelength) measurements for stars. Called *The Draper Catalogue of Stellar Spectra*, the first of these works was published in 1890, and included classifications for over 10,000 stars. Most of the classification work was done by Williamina Fleming.

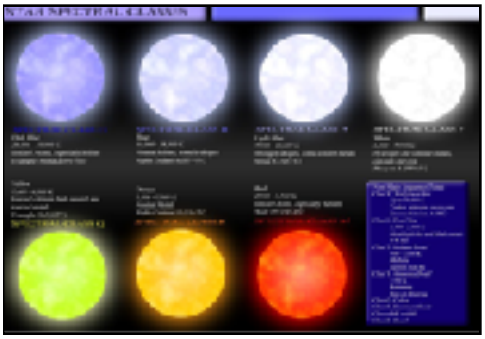
Star Spanking/Fly Spanker: A tool used to help standardize brightness measurements and in real life actually invented by Henrietta Leavitt. Previously, brightness had been measured by observers ranking it by eye, which was too subjective for an accurate measurement. The "fly spanker"—so named because it resembled a fly swatter but was "too small to do a fly much damage"—was a piece of photographic plate with a wire handle attached which had stars of well-established brightnesses on it. This tool could be moved around in front of a glass plate with stars of unknown brightness to help standardize the measurements and to determine if the brightness of a star had changed.





Cepheid Stars: Stars that have entered a stage of their life cycle that involves a repetitive 'pulsing' cycle of lighter and darker appearance. These cycles can last anywhere from 1-40 days, with the brightest Cepheid stars taking longer than the faintest. This relationship between the rate at which the stars 'pulse' and how bright they appear to us gives a very handy way to measure how far away they are. This is the "measuring stick" for the universe that is the source of such excitement for Henrietta.

Small Magellanic Cloud: A dwarf galaxy near the Milky Way. Classified as a Dwarf Irregular Galaxy, it is about 7,000 light years across. Between 1893 and 1906, the 24-inch telescope installed in Peru and run by the Harvard College Observatory collected plates observing both the large and small Magellanic clouds. These plates were used by Henrietta Leavitt to study the Cepheid phenomenon.



OBAFGKM: A system of classifying stars based on the observed color of that star. Specifically, Annie Cannon (who invented this method) looked at the Balmer Absorption Lines (a measure of what colors of light are absorbed by a star and which are reflected, from which we can infer color) and classified the different stars based on that. It was later discovered that the color of a star was also related to heat and size, thus these qualities have been retroactively correlated with this classification system.

WHAT IS A CEPHEID?

A Cepheid variable star is one that pulsates, meaning the layers of gases that make up the star expand and contract in a cycle, causing the size of the star to change. This in turn makes the star seem brighter or dimmer because the larger the surface area of the star, i.e., the more space emitting light, the brighter the star appears to be.

Luminosity is the measure of how bright a star is, though it comes in two varieties: observed and true luminosity. Observed luminosity is how bright we perceive a star to be; true Luminosity is how bright a star actually is. If one can quantify the distance to a star, they can tell how bright it actually is by mathematically accounting for the dimming of the light as it travels, (Note: not quite how light works, but that is a whole other physics lecture.) If you happen to know its size, you can use the same equation to determine how far away something is by measuring how bright it is. If you know luminosity and distance you can determine size, and so on.

The trouble with a Cepheid is that if you don't know how far away it is, brightness is also not a reliable measure to determine distance because that brightness appears to change. What Henrietta discovered is the relationship between the pulsation period (the time it takes for the star to expand and contract in a single cycle) and the star's perceived luminosity. Thus, by observing the pulsation period of the star, you can use that value to calculate true luminosity and thus calculate an accurate distance to that star. Thus, Cepheids provide benchmarks that help us determine the distance between us and various celestial bodies. If a faraway galaxy contains an observable Cepheid, the approximate distance to that galaxy can be calculated utilizing data from that Cepheid. In this way, Henrietta literally gave us the ability to map the Universe.

KEY FIGURES OF THE HARVARD OBSERVATORY AND MORE

Dr. Edward Charles Pickering

Dr. Edward Charles Pickering was the director of the Harvard Observatory from 1877-1919, the year he died. Pickering was a physicist and astronomer, having received his physics degree from Harvard in 1865. He taught at MIT, as well as co-authoring a paper on the discovery of binary star systems in 1873. A binary star system is two stars which from afar appear to be a singular body, but are actually two stars orbiting one another, leading to the appearance of several odd behaviors. They are usually mistaken for cepheids due to appearing to pulsate. Over the course of his tenure as director, Pickering hired close to one hundred women computers—allegedly referred to as Pickering's Harem—to assist in his work on Stellar Photometry. These women were often paid meager wages, and their work often went uncredited as was the case for Williamina Fleming and her contributions to the Draper Catalogue, as well as Henrietta Leavitt's discovery of period variable luminosity.

Harlow Shapley

Pickering's successor, Shapley was known to be far more progressive in his view of the women computers, ensuring that they received due credit for their work, and facilitating Annie Cannon's and Williamina's rise to positions of authority in the Observatory. Shapley also helped Henrietta Leavitt receive credit for her work. He was a member of the Progressive Citizens of America, one of the first science and social groups in the country concerned with environmentalism and social justice.

His claim to fame is using RR Lyrae stars (a specific collection of Cepheids) to approximate the size of the Milky Way Galaxy. He also utilized these stars to measure the distance needed by a planetary body orbiting a star to

support the formation of water on that planet's surface. This is a concept we now refer to as the "habitable zone" as carbon based life forms require water to survive.

Edwin Hubble

Hubble, born in 1889, was an American astronomer who pioneered and contributed greatly to the field of extragalactic (outside our galaxy) astronomy. He was the astronomer to discover that many of the objects thought to be clouds of dust and gas that had been lumped into "nebulae" were, in fact, galaxies beyond the Milky Way. He used the Cepheid variable discovered by Henrietta Leavitt to measure distance both inside and outside our galaxy, and was on the forefront of research to show that the universe is expanding. Most famously, however, the Hubble Space Telescope was named in his honor. He died in 1953.

Ejnar Hertzsprung

Hertzsprung, born in 1873, was a Danish chemist and astronomer. In 1913 he determined the distances to several Cepheid variable stars by statistical parallax, and was thus able to calibrate the relationship discovered by Henrietta Leavitt between Cepheid period and luminosity. He used this relationship to estimate the distance to the Small Magellanic Cloud. Perhaps his greatest contribution to astronomy was the development of a classification system for stars to divide them by spectral type, stage in their development, and luminosity. The so-called "Hertzsprung-Russell Diagram" has been used ever since as a classification system to explain stellar types and stellar evolution.

LEADERS OF THE SUFFRAGE MOVEMENT

Susan B. Anthony

Susan B Anthony was born in 1820 to a Quaker family living in Massachusetts. Raised with strong principles of equality on many social fronts, Anthony was active in the New York chapter of the American Anti-Slavery Society, collecting anti-slavery petitions when she was still only 17. In 1852, she and Elizabeth Cady Stanton founded the New York State Temperance Society after Anthony was prevented from speaking at a temperance conference on account of her sex. Together, they organized and conducted the largest petition drive in United States history up to that point, collecting almost 400,000 signatures in support of abolishing slavery. She traveled extensively in support of women's suffrage, giving between 75 and 100 speeches each year and working on multiple state campaigns.

In 1872, Anthony was arrested for voting in Rochester, New York. In the widely-publicized trial, she was convicted and despite her refusal to pay the fine, remained a free woman. In 1878, she and Stanton arranged for Congress to be presented with an amendment giving women the right to vote, known colloquially as the Susan B. Anthony Amendment and ratified in 1920 as the Nineteenth Amendment. When she began her work, Anthony was horridly ridiculed for her beliefs, even to the point of being accused of trying to destroy the institution of marriage. Thankfully, however, public opinion changed during her lifetime and she spent her 80th birthday as a guest of then-President William McKinley, six years before her death.

Elizabeth Cady Stanton

Elizabeth Cady Stanton, born in 1815 in New York, was a powerful force in the American movement for women's suffrage as well as women's rights movements worldwide. She married Henry Stanton (a co-founder of the Republican Party) in 1840 and spent the early years of their marriage working alongside him on other issues of social equality and specifically for the cause of abolition. Her Declaration of Sentiments, presented at the Seneca Falls Convention in 1848, is credited with kicking off the first serious, organized women's rights and suffrage movement in America.

Unlike many of her contemporaries, Stanton was concerned with more than *just* women's right to vote. She brought attention to women's parental and custody rights, property rights, income rights, employment rights, divorce rights, the economic health of the family unit and birth control. When the issue of women's suffrage rose again after the American Civil War, Stanton caused a schism in the movement when she and lifelong friend Susan B. Anthony refused to support passage of the Fourteenth and Fifteenth Amendments to the United States Constitution, arguing against giving more legal protections and voting rights to African American men while denying those same rights and protections to both black and white women. Twenty years after the division, the two halves of the movement reconciled, with Stanton as the unified organization's president. She published *The Woman's Bible* in 1895, challenging the traditional Christian theological position that women should be subservient to men. In addition, she wrote her own autobiography as well as numerous articles and pamphlets in support of women's rights and continued to be active in her support until her death in 1902.

Lucy Stone

Lucy Stone was the founder of the American Woman Suffrage Association (AWSA), a political organization in competition with Susan B. Anthony and Elizabeth Cady Stanton's National Woman Suffrage Association (NWSA).

Stone was a seasoned activist, having worked as an abolitionist before moving on to the issue of Women's Suffrage. She wrote and spoke extensively about her beliefs regarding Women's Rights. From the time she was sixteen, she worked as a teacher in local schools and eventually led a strike for equal pay for female staff at Oberlin College. She also advocated for women to have the right to divorce their husbands.

Interestingly, Stone was also part of something called the Dress Reform around 1851. The Dress Reform came about as a reaction to the prevalence of Parisian fashion for American women. Parisian dress involved tight laced corsets, long skirts which dragged on the floor, and layer upon layer of undergarments—ll in all, impractical, unsafe and unhealthy. Stone and other women's rights activists began wearing a style of dress called "The Turkish Costume" or "Bloomer Dress" a pair of bloomers under a shorter skirt with a jacket. While these were originally meant for private wear around the home, women started advocating for wearing them in public as a safer, more comfortable mode of dress than corseted dresses. Stone began delivering lectures in a Bloomer Dress in the fall of 1851 for which she was derided. However, she abandoned short dresses in 1855, seemingly apropos of nothing. She drew much criticism from her peers over this decision.

Despite such criticisms, Lucy Stone is still considered the heart and soul of the American Women's Movement. It is said that, although her own organization was a rival to Susan B. Anthony's until they merged in 1890, she is the one who inspired B. Anthony to advocate for the rights of women.

Obstacles

Community support for suffrage movements varied through different phases of the movement's various campaigns. Initially, the endorsement of women's temperance unions (Protestant religious organizations, concerned with Christian morality in America) was considered a great boon. However, as the Temperance Movement began to wane in the late 1920s, the suffragettes started to turn to women's literature clubs and other social clubs to garner their support. These groups were dwarfed by the former size and organization of the Temperance Movement, leading to a bit of a decline in the Movement as a whole.

Opponents of suffrage were largely corporate. This mainly included large factory-based companies that feared women voters would move to create child labor laws, thus eliminating their cheap source of labor. Additionally, distilleries feared that due to their strong ties with the temperance movement, women voters would favor Prohibition. What's more, distilleries were largely composed of German and Irish immigrants, who held more conservative cultural and religious backgrounds.

Additionally for the first few decades of the suffrage movement suffered from divisiveness. Though B. Anthony and Stanton's National Woman Suffrage Association worked for the same purpose as Lucy Stone's American Woman Suffrage Association, they did not work together. The NWSA attempted to campaign for women's rights on a federal level through the Supreme Court and acts of civil protest while the AWSA focused on campaigning at a state level and attempting to win over the hearts of communities. These two organizations competed for

platform space and resources until they merged into the American National Woman Suffrage Association (ANWSA) in 1890.

RELIGION IN THE 1920s

Conscience

In order to better understand the social conscience of the Calvinist church, it is important first to understand its primary differences with main-branch Lutheranism. The most prominent of these is in the interpretation of the uses for God's laws. In both Calvinism and Lutheranism, it is understood that there is a conflict between God's Law (written in the Old Testament as a covenant with the Jews) and God's Grace (the redemption, forgiveness and freedom promised to his followers by Christ in the New Testament). In both denominations, it is also generally accepted that the Law has three primary uses for the followers of Christ: first, to use the fear of punishment to maintain civil order by restraining from sinful action those who would otherwise have no compunction against the sinful act; second, a mirror to remind each individual of how far they are from the perfection God asks of them and to make them acquainted with their own sinful natures; and finally, to use as a guide and helper to live their lives as close to a godly way as they are able.

It is in the importance of this third use of Law where Lutherans and Calvinists disagree. Calvinists believe that the third use of Law is of paramount importance, because those sinners who are redeemed by God's grace are expected to bear the fruit of this redemption and do good works—to shine a light out into the darkness of the world. Lutherans, on the other hand, were wary of this use being stressed, as many feared that it would lead to a theology of earning grace by good works, which for them was a direct contradiction to Ephesians 2:8-9, which reads, "For it is by grace you have been saved, through faith—and this is not from yourselves, it is a gift of God—not by works, so that no one can boast."

It is this emphasis on good works which—aside from being at the core of the split between the two denominations of faith—forms the backbone of the Calvinist social conscience. It is important to note, however, that Calvinist beliefs vary from region to region (and even parish to parish) and many within the movement prefer to refer to themselves simply as Reformed instead. Good works, predestination and election are the three most prominent elements of Calvinist/Reformed belief, though the five points of Calvinism often represented by the acronym TULIP (Total Depravity, Unconditional Election, Limited Atonement, Irresistible Grace, and Perseverance of the Saints) gained notoriety toward the middle of the 20th century. For our purposes, however, the focus on those who have been redeemed doing good works as evidence of their salvation is a key factor in shaping the religious conscience of these communities.

Temperance

The Temperance Movement was a social movement against the evils of—and therefore inherently the consumption of—alcohol. This kind of social movement is not unique to this period in history; temperance movements have occurred at multiple points in both American and European history on local and more systemic levels. The American Temperance Movement of the late 19th and early 20th centuries had been building slowly but surely since the 1830's. While some local success had been achieved in legislating bans and restrictions on the sale of alcohol, progress was stymied during the Civil War as both the Union and the Confederacy depended on the taxes from the sale of alcohol to fund their efforts.

While it is easy to characterize the Temperance Movement as being ridiculous and a form of religious extremism, it would not have been as successful as it was had there not been real problems that proponents were trying to address. That there were flaws in their method of addressing these problems is without a doubt, but when one becomes more familiar with the socio-economic climates of this period, it becomes evident that there were real evils strongly associated with the production and consumption of

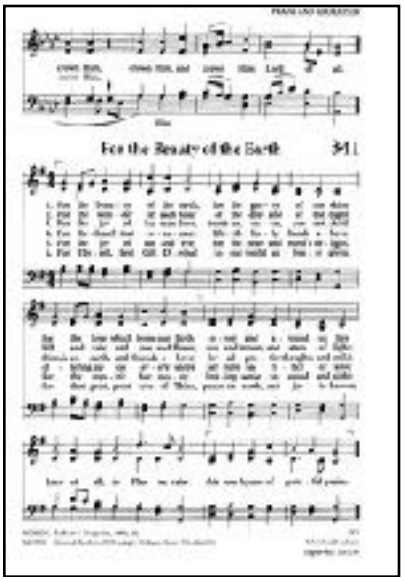
alcohol—evils which proponents of the Temperance Movement were trying to address.

At the time, drinking was a way of life—at all hours and for all reasons. Men drank in pubs and bars, but also in their offices, in the fields, at the houses of friends and family. Wealthy women rarely drank in public, but many had alcohol-based medicines which were part of their day-to-day lives. Because milk was only available from April until November and because milk and its products were important commodity items for families looking to make ends meet, children also drank cider, wine, gin and whiskey. Immigrants flooded into the country for whom constant consumption of alcohol was a way of life. Such high levels of daily intoxication resulted in injuries from negligence or confrontation, were detrimental to children's health and came along with huge increases in the levels of spousal and child abuse within the home, especially for the lower and working classes.

Initial proponents of the Temperance Movement sought exactly what it says on the tin—temperance. Advocacy of complete abstinence came later and coincided with a shift in movement leadership from conservative clergy to Evangelical ministers. Political momentum was gained in England with the passage of the 1910 "People's Tax" which imposed stiff duties on pubs, but it wasn't until the First World War that legislative temperance became more widespread, as countries instituted restrictions and outright bans in order to preserve resources for wartime use. The Eighteenth Amendment, introduced after the close of the war, imposed prohibition on the entire country. This would lead to a series of issues, including the creation of vast criminal enterprises, and the movement declined in the 1930's until the repeal of Prohibition in 1933.

While ultimately unsuccessful, the temperance movements were associated with many important reform movements of the 19th century. From its origins as a way to show that English working class people could be responsible enough to have the vote, to the strong ties between it and Women's Suffrage (both in America and abroad), the Temperance Movement was a driving force in many lives and a part of the social consciousness in this time period.

Religion and Science



In a modern context, we think about science and religion as being rather at odds with one another. Creationism vs. Darwinian Evolution, radical anti-choice proponents vs. stem cell research; these are the kinds of conflicts that typically come to mind when we consider the coexistence of science and faith. However, at the turn of the 20th century—and in fields like astronomy especially—this was not the case. The study of the natural sciences was believed to be a form of exultation in the marvelous work of the Creator - the idea that one could better glorify God's creation when one better *understood* God's creation. In fact, many of America's early institutes of learning were affiliated with their local church - from a prairie one-room schoolhouse to Harvard University, learning and religious institutions went hand in hand.

While science and religion have butted heads across nearly all of history, for America, it really wasn't until the Fundamentalist-Modernist Controversy of the 1920's and the 1930's that we started to see the makings of the way that conflict looks to us today. Events

like the Scopes Monkey Trial in 1925, the 1929 reorganizing of the Princeton Theological Seminary along modernist lines, and the split of the Presbyterian Church of America and the Orthodox Presbyterian Church in 1939 ratcheted up the rhetoric on both sides leading to the American entry into World War II. During the decades we're concerned with, most people in institutions like the Harvard Observatory really saw no conflict between their passion for scientific knowledge and their faith.

Religion and Community

Obviously the place of the church in a community is going to vary drastically based upon the denomination of Christianity one is dealing with. While Catholicism had something of a foothold in the American 1920s, it was largely maintained by immigrants from places such as Italy and Ireland. For a family such as the Leavitts, who can trace their lineage back to early colonists, and would appear to be tried and true East Coast residents, that denomination is most likely Reform Protestantism, more specifically Calvinism.

The vast majority of historical mainstream society Christian practice around the East Coast and Midwest is Congregational Ministry.

The Congregational Church is a largely American and English phenomenon. An artifact of Protestantism under the Reform tradition, it is otherwise known as Calvinism. "Congregational" refers to the Church's practice of self-governance as a community by its church congregation or individual attendees. Other denominations, by contrast, are broken up into dioceses and overseen by bishops. This creates many degrees of variation between different Congregational churches and endows the pastor with a significant amount of spiritual and community authority. Furthermore, Congregational churches in America, like those in colonial times that served as the centers of their settlements, are often tied deeply to the charitable, political and educational establishments of their respective communities. Harvard University, for example, was once tied to local Congregational churches.