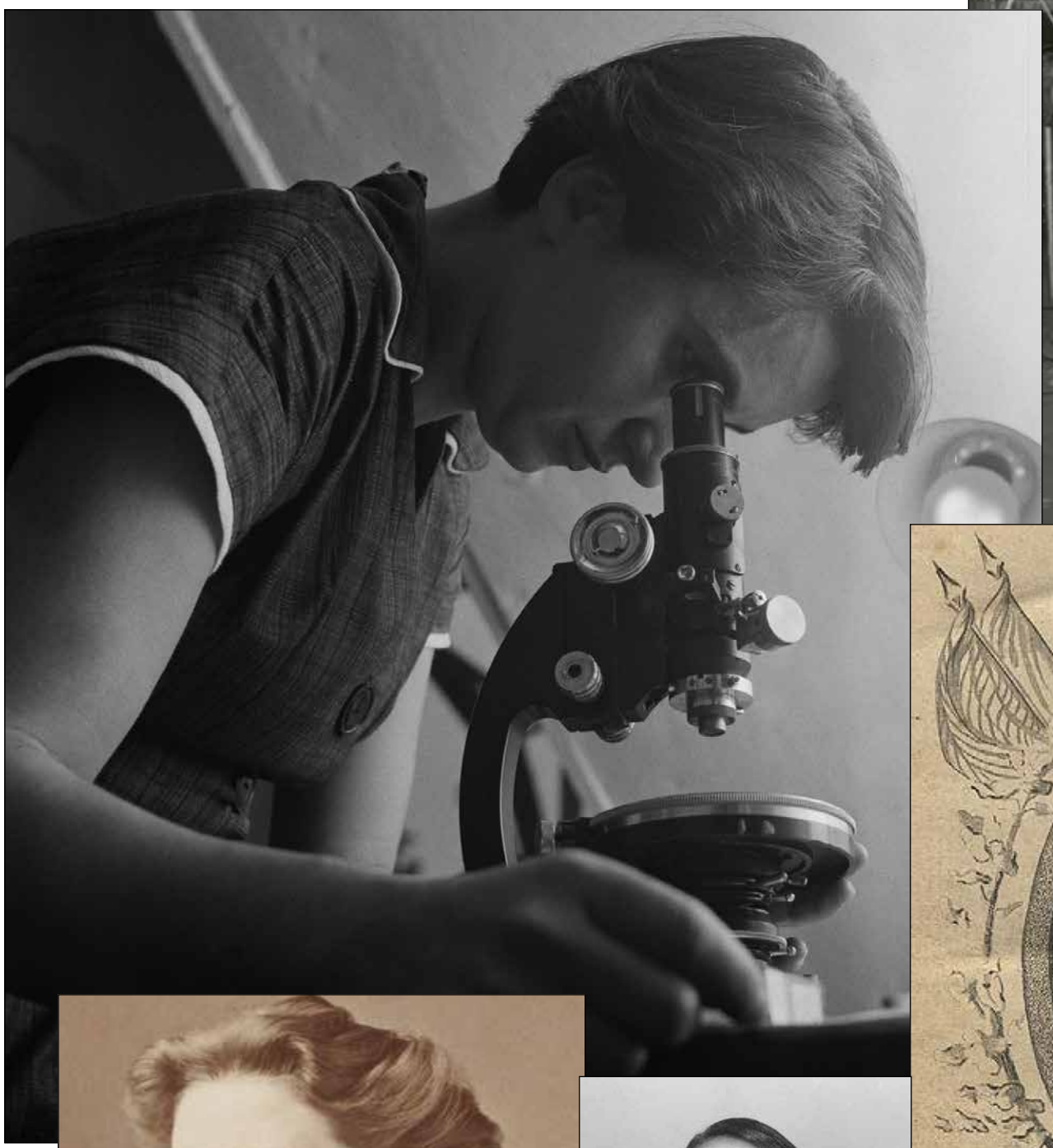

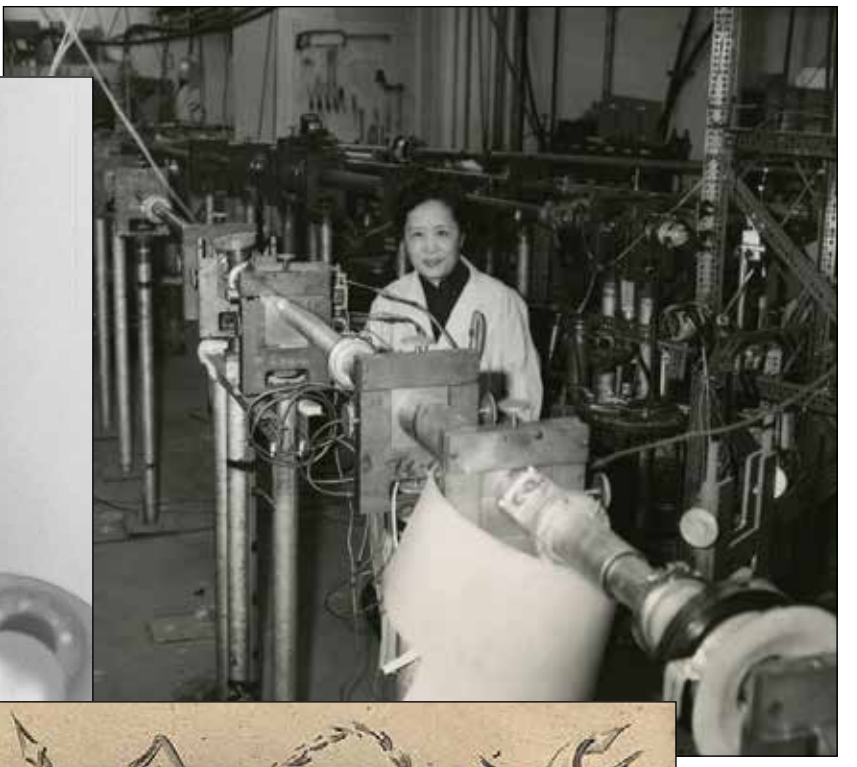

Women
in History

Secret Soldier Deborah Sampson

PUBLIC DOMAIN/WIKIMEDIA COMMONS

Marching with the Light Infantry Company of the 4th Massachusetts Regiment of the Continental Army in 1782 was a soldier whose identity was carefully hidden from fellow soldiers.

If discovered, the soldier known by comrades as "Robert Shurtleff" faced disgrace — or worse.

That's because the soldier's real name was Deborah Sampson, a woman who had assumed a man's identity in order to fight. After hiding her true identity for 17 months, she was finally discovered. She would become the only woman to earn an honorable discharge and a full military pension for participation in the Revolutionary army.

Born on Dec. 17, 1760 in Plympton, Mass., to descendants of Pilgrims, Sampson's family struggled financially after her father abandoned them, and she grew up in indentured servitude. She taught herself to read and became a school teacher before deciding to fight. She tried to enlist in the army but was discovered. The second time, she was able to pull off the deception.

Her role in the Light Infantry Company included direct combat with Tories. After being shot, she removed the bullet herself with a pen knife and sewing needle to avoid having her true identity discovered. After contracting a fever in 1783, Dr. Barnabas Binney discovered her secret. He arranged for her honorable discharge in October 1783, at which time she was commended for her bravery and good conduct as a soldier, according to the Sharon Public Library.

She was honorably discharged at West Point, N.Y. She received a small pension for her service.

In April 1785, Deborah married Benjamin Gannett in Stoughton, Mass. She gave lectures across the Northeast about her military service, and the Gannetts raised four children.

She died in Sharon, Mass., in 1827 at the age of 66. Benjamin Gannett became the first man awarded pension benefits as a widower, though the decision to award him the funds was not made until after he died. The pension was then transferred to two of his children.

A statue of Deborah Sampson Gannett was unveiled on Veterans Day 1989 outside the Sharon Public Library. Her story reveals the physical and emotional costs of patriotism for women locked out of formal power.

Cryptanalyst Joan Clarke

Long before her story reached movie screens and history books, Joan Clarke was quietly helping to change the course of World War II from a cluster of wooden huts in the English countryside.

UK GOVERNMENT/WIKIMEDIA COMMONS

A brilliant mathematician and one of the few female cryptanalysts at Britain's secretive Bletchley Park, Clarke played a pivotal role in cracking Nazi Germany's Enigma codes — work that historians say shortened the war and saved countless lives.

Born in London in 1917, Clarke demonstrated an early aptitude for mathematics. She studied at Newnham College, Cambridge, where she excelled in geometry. Like many women of her era, she completed the same rigorous coursework as men but did not receive a full degree, as Cambridge did not grant degrees to women at the time.

In 1940, her mathematical ability brought her to Bletchley Park, the secret headquarters of the British Government Code and Cypher School. She was first assigned clerical duties but was quickly recruited to Hut 8, the section led by Alan Turing that focused on breaking the German navy's complex Enigma cipher.

The Enigma machine scrambled messages through constantly changing settings, forcing codebreakers to solve a new puzzle each day. Clarke became a leading expert in "Banburismus," a statistical method that reduced the number of possible machine settings and sped up the decoding process. The intelligence produced in Hut 8 proved vital during the Battle of the Atlantic, when German U-boats threatened to cut off Britain's supply routes.

Despite her expertise, Clarke faced persistent gender discrimination. She was initially paid less than male colleagues and was formally classified as a linguist rather than a mathematician so she could be promoted. Even so, she became the most senior woman working as a cryptanalyst at Bletchley Park and one of Hut 8's longest-serving members.

Clarke developed a close friendship with Turing, and the two were briefly engaged, but later separated. Bound by their shared wartime experience, they remained lifelong friends.

Like many codebreakers, Clarke was unable to discuss her achievements for decades because of Britain's secrecy laws. She was appointed a Member of the Order of the British Empire in 1946, but broader recognition came much later as historians revealed the scale of the Bletchley Park operation and the central role women played there.

After the war, Clarke built a second career as a respected numismatist, publishing research on historic coins and earning the British Numismatic Society's Sanford Saltus Gold Medal.

Clarke died in 1996 at age 79. Today, she is remembered not only for her intellectual skill but also for her perseverance in a field that offered women little recognition.

BLETCHLEY PARK/WIKIMEDIA COMMONS

DNA Pioneer Rosalind Franklin

In 1953, James Watson first saw the famous X-ray image of DNA — later known as Photo 51 —and immediately grasped its significance. The image was taken by a scientist whose name was missing when the Nobel Prize was awarded.

LONDON MUSEUM/CREATIVE COMMONS

In post-war America, scientific competition to determine DNA's structure was fierce. History would come to remember James Watson, Francis Crick and Maurice Wilkins for their characterizations of DNA. But the work of Rosalind Franklin, an X-ray crystallography expert at King's College London, was critical to the landmark discovery.

Franklin's specialty was producing precise measurements of the molecule, which made the double-helix model possible. Photo 51, taken by Franklin along with her student, Raymond Gosling, provided the critical structural parameters used by Watson and Crick.

Watson saw the image when it was shown by Wilkins while Franklin was at King's College. There is an ongoing historical debate about whether this reflected normal data-sharing rules of the lab or a breach of scientific ethics. What's not debated: the model relied on Franklin's measurements, and her work was used without her knowledge or permission.

In 1962, the Nobel Prize went to Watson, Crick and Wilkins. Franklin had died of cancer in 1958 at age 37, and Nobel Prizes are not awarded posthumously. Her contribution went largely unrecognized for years, even as Photo 51 became one of the most famous images in science. Her work also led to major advances in the areas of virus structure and materials science.

Franklin's experience came to symbolize the challenges women faced in scientific spaces at the time. Women working in elite labs frequently received limited recognition. Franklin reported a hostile work environment during her time at King's College, and many women faced similar circumstances.

Watson himself famously denigrated Franklin's contributions to the discovery of the structure of DNA. In his 1968 memoir "The Double Helix," Watson characterized her in demeaning and dismissive terms, often referring to her as "Rosy," a nickname she disliked. He portrayed her as an abrasive, uncooperative and unattractive "bluestocking" whose inability to interpret her own X-ray data stemmed from a lack of scientific intuition. Years later, in the epilogue of the book, Watson finally acknowledged her vital contribution.

Franklin is now widely recognized as a co-discoverer. She's also celebrated as a crucial figure for women in STEM. Rosalind Franklin University of Medicine and Science in Chicago is named after her, and the European Space Agency named its Mars rover "Rosalind Franklin" in her honor.

Scientific breakthroughs are rarely the work of a single, visible genius. Franklin's story reminds us to celebrate the significant contributions that women continue to make in science.

Eye Health Pioneer Patricia Bath

Patricia Bath was the first Black woman to receive a medical patent. Her impact on medical, academic and public health spheres, however, is much larger.

NATIONAL LIBRARY OF MEDICINE/WIKIMEDIA COMMONS

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Bath was born in 1942 in Manhattan. She developed an interest in biology at a young age.

In 1959, she received a grant from the National Science Foundation to attend the Summer Institute in Biomedical Science at Yeshiva University in New York. There she invented a way to mathematically predict cancer cell growth. Her work was published in 1960.

In 1961, she was recognized as one of "Mademoiselle" magazine's Ten Young Women of the Year for 1960.

After receiving a bachelor's degree in chemistry and physics from Hunter College in New York, she studied medicine at Howard University, earning a medical degree in 1968. She worked on corneal transplantation and artificial cornea replacement surgery.

From 1970 to 1973, Bath was the first Black resident in ophthalmology at New York University's School of Medicine. She pioneered community ophthalmology after noticing that Black patients were twice as likely as white patients to develop glaucoma and had higher rates of blindness, linking the disparity to access to eye care. Community ophthalmology combines aspects of public health, community medicine and clinical ophthalmology to offer primary care to underserved populations, according to the National Institutes of Health. In 1976, Bath helped found the American Institute for the Prevention of Blindness.

While working with cataract patients, she developed the Laserphaco Probe and technique, and received the patent for her invention in 1988. The device performs all steps of cataract removal, including making the incision, destroying the lens and vacuuming out the fractured pieces, according to the National Inventors Hall of Fame. Today, millions of patients worldwide have benefitted from this technology. She would go on to be awarded four more patents over the course of her career.

Bath was the first female faculty member at the University of California at Los Angeles School of Medicine Jules Stein Eye Institute. Despite the university's claims of valuing equality and condemning discrimination, Bath reported experiencing numerous instances of sexism and racism. Bath found that her work was valued on its merits in Europe and saw great success in advancing her work there.

Bath died in 2019.

Leading Women in Science

For centuries, women have helped drive humanity's pursuit of knowledge, despite being formally excluded from scientific research.

These are the stories of two women who produced paradigm-shifting research that reshaped their disciplines, despite facing enormous barriers.

In addition to leading the way in their own fields, these women also led the way for other women to thrive in scientific spaces.

TAGES ANZEIGER-MAGAZIN/WIKIMEDIA COMMONS

SCIENCE SERVICE (SMITHSONIAN INSTITUTION)/WIKIMEDIA COMMONS

ADA LOVELACE
The Scholar Who Imagined Modern Computing

The daughter of noted poet Lord Byron and his wife, Annabella Milbanke, a mathematician, Ada Lovelace was born in 1815 in London. She published a description of a "stepwise sequence of operations for solving certain mathematical problems," according to the Computer History Museum. In fact, she is often referred to as "the first programmer."

She wrote that an "analytical engine" might "act upon other things besides numbers. ... The Engine might compose elaborate and scientific pieces of music of any degree of complexity or extent." According to the Museum: "This idea of a machine that could manipulate symbols in accordance with rules and that numbers could represent entities other than quantity mark the fundamental transition from calculation to computation."

Every year on the second Tuesday of October, Ada Lovelace Day is celebrated. It's a day to honor women's contributions to science, technology, engineering and mathematics.

CHIEN-SHIUNG WU
The Physicist Who Changed the Laws of Nature

In 1956, an experiment in a laboratory in Washington, D.C., provided the first experimental proof that the principle of parity conservation does not hold in weak subatomic interactions.

It became known as the Wu Experiment, after Chien-Shiun Wu, a female academic whose meticulous experimental design helped shape a revolutionary theory in particle physics. Her experiment tested the law known as "conservation of parity," which held that there was a fundamental symmetry in the behavior of everything in nature, including atomic particles, according to Time magazine.

Her work would play a major role in the Manhattan Project and led Wu to become known as the "First Lady of Physics" for her teaching, mentorship and laboratory leadership.

Wu was born in 1912 in Liuhe, Jiangsu province, China. She came to the U.S. in 1934 to study physics at the University of California at Berkeley, and then became a physics professor at Columbia University. Wu would be left out of Nobel Prize recognition after her groundbreaking 1956 discovery, while the award went to the male theorists whose work she proved. Wu would go on to have a career marked by further groundbreaking discoveries.

She also blazed trails that other women would follow in science. She campaigned for gender equality, correcting anyone who called her by her husband's name and insisting on being paid the same as her male colleagues at Columbia, according to Time.

Candidate Victoria Woodhull

Before women even had the right to vote, Victoria Woodhull became the first woman to run for president in the United States.

MATHEW BENJAMIN BRADY/WIKIMEDIA COMMONS

Born in 1838 in Homer, Ohio, Victoria became a traveling clairvoyant in her family's traveling medicine show and married Canning Woodhull at age 15. After getting a divorce in 1865, she met railroad magnate Cornelius Vanderbuilt, who was interested in spiritualism, and he helped her and her sister, Tennessee, set up a stock brokerage firm.

She became an adherent of the free love movement, which advocated against marriage in favor of less restrictive romantic relationships, and sought to destigmatize divorce and make it easier for women to leave abusive husbands, according to WomensHistory.org.

The stock venture was a success, and using their profits, the sisters founded Woodhull and Claflin's Weekly, a magazine that advocated for women's rights and suffrage, legalized prostitution and dress reform. In 1871, they published the first English-language account of Karl Marx's "The Communist Manifesto."

Woodhull became a public speaker for women's suffrage and in 1871, was the first woman to testify before a committee of the U.S. House of Representatives. She argued that under the 14th and 15th amendments, women already had the right to vote, and implored the lawmakers to vote on a 16th Amendment to clarify that fact. The committee took no action on the matter, but Woodhull impressed suffrage leaders such as Susan B. Anthony and Elizabeth Cady Stanton.

In 1872, the Equal Rights Party, which Woodhull had helped found, nominated her for the presidency, and abolitionist Frederick Douglass for the vice-presidency. Her opponents were incumbent Ulysses S. Grant (Republican) and Horace Greely (Liberal Republican) according to the National Parks Service.

In a letter to the New York Herald, she wrote: "While others argued the equality of woman with man, I proved it by successfully engaging in business; while others sought to show that there was no valid reason why woman should be treated socially and politically as a being inferior to man, I boldly entered the arena of politics and business and exercised the rights I already possessed."

Douglass never acknowledged the nomination, and Woodhull was not yet 35 years old, the minimum age to assume the presidency, according to WomeninHistory.org. Her campaign was not taken seriously by many, and her views on free love, communism and spiritualism led even members of the women's suffrage movement to distance themselves from her.

Grant won the election. She and her sister were arrested for publishing accusations that Rev. Henry Ward Beecher was having an affair. They were charged with publishing obscenity and she was imprisoned during the election for which she was a candidate. The scandal led the sisters to relocate to England, where they both married into wealthy families and became patrons of the arts. She died in 1927 at the age of 88.

She is still remembered, however, for having the political audacity to run for the nation's highest office when the law didn't even recognize her as a full citizen.

Agent 355: Mystery and Myth

In 1779 British-occupied New York, coded letters crisscrossed Long Island and Connecticut as patriots worked secretly to outsmart British forces.

Among those working to deliver those messages was Agent 355. This enigmatic woman's name appears only once in surviving intelligence correspondence, but her symbolic role represents women's hidden work in the Revolution.

In the wake of the British loss at the Battle of Saratoga in 1777, the tide of the American Revolution turned toward the Patriots. In 1778, Maj. Benjamin Tallmadge organized the Culper Spy Ring for the Continental Army. The network communicated encrypted messages to Continental Army leadership, including descriptions of fortifications, observations about troop numbers and movements, and other intel. They delivered their messages through coded letters, invisible ink, courier networks, aliases and signaling.

On Aug. 15, 1779, chief spy Abraham Woodhull wrote in a coded letter to George Washington: "I intend to visit 727 [Culper code for New York] before long and think by the assistance of a 355 [code for lady] of my acquaintance, shall be able to outwit them all," according to the Smithsonian.

Agent 355, whose real name would never become widely known, was believed to be the paramour of one of the members of the spy ring, Robert Townsend. Evidence of her existence is scant, with only the single reference in the historical record, and her role in the spy ring has likely been embellished over time, according to the Smithsonian.

The name Agent 355 began to appear in the literature in the 1930s, after historian Morton Pennypacker wrote two books identifying some members of the Culper Spy Ring. The legend endures today, and the story of Agent 355 was told in the 2022 movie "The 355," starring Jessica Chastain. The Smithsonian, however, calls the tale of Agent 355 "speculation and myth" that has become "almost impossible to eradicate."

What we know for sure is that women's roles in the Revolution — such as gathering information casually in homes, workplaces or social circles — were rarely recorded but contributed significantly to the Patriots' strategic edge.

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