

Women's History: Trail-blazing Women of our Time

Rocket scientist, inventor, cancer pioneer, human computer, bomber pilot, judo master. Why do we have to read their obituaries to know about them?

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Did you know that satellites stay in orbit because rocket scientist Yvonne Brill discovered how to keep them there? Or that environmental science was made possible by the research of one botanist, Ruth Patrick? Neither did this reporter, until she read their obituaries.

There are many such women whose life work inspires. Some have received important recognition in their fields. But they are not the national figures and the role models that they should be. Ironically, most can only learn about who these women were, what they did and how they did it after they die, by reading their obituaries.

Instead, the common images of women in the major media are “the glamorous sex kitten, the sainted mother, the devious witch, the hard-faced corporate and political climber,” according to a 2009 UNESCO report. At the current rate of progress on stereotyping women, the report continues, it will take another 75 years to achieve gender equality in the media.

Culled from New York Times obituaries that appeared in 2013, this article focuses on some of the women innovators who made their mark in the physical sciences and other non-traditional fields that are still mostly male bastions. For example, according to a 2011 report by the U.S. Department of Commerce, women had seen no employment growth in science, technology, engineering and math jobs since 2000.

The public view, created and reinforced by the establishment media, is that women in these fields have yet to make their mark. Yet all along, women — though few in numbers — were among the very top scientific achievers and visionaries. It is a telling comment on the undervaluing of women today that female innovators come to national attention not during their lives, but through the news of their deaths.

This raises the question: How many other women are making major contributions today to science, math, the social sciences, political and social life without their work and lives receiving much visibility in the national press? And what can be done to reverse this?

But let us return to the women. Their obituaries reveal their astounding contributions. But they also uncover the barriers they faced as women, the burdens they carried in their careers due to their gender, and the anti-woman bias that continues even into these write-ups.

This article aims to reclaim these women and tell of what they have done, so that they may take their rightful place on the pages of the people's history.

She began environmental science

Dr. Ruth Patrick, who died in 2013 at the age of 105, was a botanist who developed the science used today for pollution control and was a pioneer in environmental activism. She was also the foremost authority on U.S. river systems.

Patrick, who began her work in the 1940s, discovered that the number and kinds of species in a body of water — its biological diversity — reflected environmental stresses. That idea became known as the Patrick Principle; it can also be applied to an entire ecosystem and lies at the heart of environmental science.

“She was worried about and addressing water pollution before the rest of us even thought of focusing on it,” said James Gustave Speth, a former dean of the Yale School of Forestry and Environmental Studies.

Patrick became an adviser to presidents and was the recipient of distinguished science awards. Her work led Congress to pass the 1972 Clean Water Act, which she helped write. But it didn't start that way. One of the few women of her generation to enter the sciences, she was told in 1934 when she began working for the Academy of Natural Sciences that she would not be paid. Patrick worked there for eight years as a “volunteer” before earning a salary. She then went on to become the first woman chair of the Academy's board of trustees.

A rocket scientist — who ‘followed her husband from job to job’

Dr. Yvonne Brill was a rocket scientist who invented a propulsion system to help keep communications satellites from slipping out of orbit. Her work became the industry standard. She was likely the only woman rocket scientist in the country in the 1940s when satellite designs were developed. Brill was inducted into the National Inventors Hall of Fame in 2010.

Despite such amazing accomplishments, her Times obituary began, “She made a mean beef stroganoff, followed her husband from job to job and took eight years off from work to raise three children. ‘The world's best mom,’ her son Matthew said.”

The second paragraph started with, “But Yvonne Brill, who died on Wednesday at 88 in Princeton, N.J., was also a brilliant rocket scientist. ...”

Many Times readers objected. They pointed out that no male rocket scientist's obituary begins with his family role, and that describing Brill in this manner belittled her work. Additionally, she did not take eight years off to raise her children, as the Times said, but worked part-time as she raised them.

The Times changed the obituary's opening, but not by much, still emphasizing the family role. The final version, which many saw as grating and still containing gender bias, was staunchly defended by the Times obituary editor.

A review of some of her work shows why the Times felt that Brill merited a substantial obituary in the first place. She contributed to the propulsion systems of the first weather satellite; a series of rocket designs that were used in American moon missions; the first upper-atmosphere satellite; and the Mars Observer, which almost entered a Mars orbit in 1992 before losing communication with Earth.

Brill's innovative concepts for satellite propulsion systems and her breakthrough engineering solutions earned her an international reputation as a pioneer in space exploration.

She wanted recognition for her work

Dr. Candace Pert, while a lab assistant in the 1970s, helped discover the brain receptor for opiates. This was one of the most sought-after goals of brain research at that time, as it explained how drugs like morphine worked.

The discovery merited the prestigious Albert Lasker Award in 1978, often a precursor to the Nobel Prize. However, neither Pert nor any of the other lab assistants on the Johns Hopkins University School of Medicine team who made the discovery were mentioned in the awarding of the prize. It went solely to Solomon H. Snyder, who headed the lab.

Such omissions were common at the time. However, Pert did not let this go. She sent a letter to the head of the foundation that awards the prize, explaining that she had “played a key role in initiating the research and following it up” and was “angry and upset to be excluded.” Her exclusion was seen as an example of the bias against women in science careers.

Pert spent her career pioneering work on receptors and the neuropeptides that fit into them. Her best-known book, “Molecules of Emotion: The Science Behind Mind-Body Medicine,” was described by author Deepak Chopra as a “landmark in our understanding of the mind-body connection.” (New York: Scribner, 1997)

She invented permanent press

Dr. Ruth Benerito, who died at 97, was the chemist who invented permanent press cotton, considered one of the major contributions to the textile industry in the 20th century. She also invented stain- and flame-resistant fabrics.

It was very unusual for a woman of her time to earn a Ph.D. degree in the hard sciences, and even more unusual to make such an important contribution in textile science, known for its swaggering men. Benerito, however, held more than 50 patents for her inventions, many of them in textiles, and was inducted into the National Inventors Hall of Fame in 2008.

While Benerito is usually described as the sole inventor of permanent press, she described the breakthrough as a group effort. She credited the team she worked with in the 1950s and the incremental work of other 20th century scientists, and even traced the roots of wrinkle-free cotton to an 18th century Shaker community in Maine, which made, wove and traded the fabric.

Nothing comes from a vacuum. Benerito’s view of how permanent press came to be is a more accurate description of how scientific inventions really work. Her acknowledgment that breakthroughs are built on the work of many others, often over generations, including artisans and workers, stands in marked contrast to the exclusionary conventions of that time, as seen by how Pert was treated.

Benerito’s protests that she was not the sole inventor of permanent press were seen then as modesty. Her ego did not get in the way of her recognizing that breakthroughs are always built on the work and assistance of others. In this, as well as in her inventions, she was ahead of her time.

She changed medicine

Dr. Jane Wright was a pioneering oncologist whose work elevated chemotherapy from a last resort for cancer patients to a major treatment option. She did this by analyzing a wide range of anti-

cancer agents, exploring the relationship between patient and tissue culture response, and developing new techniques for administering cancer chemotherapy.

In 1967, Wright became head of the cancer chemotherapy department and associate dean at New York Medical College, the first African-American woman to hold so high a post at an American medical school. She was the first woman president of the New York Cancer Society and a founder of the American Society of Clinical Oncology.

Dr. Sandra Swain, current president of ASCO, said that Wright's work was not only scientific "but it was visionary for the whole science of oncology." Referring to the racism and gender bias Wright faced, she added, "It's amazing to me that a Black woman, in her day and age, was able to do what she did."

She out-computed computers

Shakuntala Devi was known as "the human computer" for her ability to make amazingly quick mathematical calculations. Devi demonstrated her mathematical gifts around the world, at colleges, in theaters and on radio and television.

Devi became a performer instead of a scientist because she had no educational opportunities. Many such women exist worldwide with special gifts but little opportunity to develop their full potential.

Devi was born in 1929 into a poor family in Bangalore, India. Her father, a circus trapeze artist and lion tamer, realized his daughter was a mathematical prodigy when she was three years old. He encouraged her to practice her skills so that she could perform mathematical feats to help the family survive.

"I had become the sole breadwinner of my family, and the responsibility was a huge one for a young child. At the age of 6," remarked Devi. "I gave my first major show at the University of Mysore, and this was the beginning of my marathon of public performances."

In 1977, at Southern Methodist University in Dallas, Devi extracted the 23rd root of a 201-digit number in 50 seconds, beating a Univac computer, which took 62 seconds. In 1980, she multiplied two 13-digit numbers in only 28 seconds at London's Imperial College. The 28 seconds even included the time to recite the 26-digit solution. This feat earned her a place in the 1982 Guinness Book of World Records.

Devi toured Europe in 1950. When she appeared on the BBC, her answer to a difficult calculation was different from the interviewer's, but she was right. At the University of Rome, experts thought one of her answers to a problem was wrong, until they reexamined their own calculations and found she was right.

Devi traveled the world for the better part of six decades. Clad in beautiful saris, she was a warm stage presence. She would rattle off the dates of, say, every Friday in a given year. She asked for the birth years and dates of people in the audience. In one second or so, she came up with the day of the week on which they were born.

They called her 'the night witch'

As a bomber pilot, Nadezhda Popova flew 852 missions against Nazi occupation forces during

World II and survived being shot down several times. She was highly decorated after the war by the Soviet Union. After that government's collapse, her achievements and those of other women pilots were forgotten.

One of the first volunteers for an all-women regiment of pilots, Popova became the deputy commander of the 588th Night Bomber Regiment, which the Nazis named the "night witches." The women took the name as a compliment and kept it.

Mostly in their late teens and early twenties, the women were all volunteers. They dropped their bombs at night from crop duster planes made of plywood with open cockpits. Their uniforms were hand-me-downs from male pilots.

They flew only at night and concentrated on harassment bombing of German encampments, rear-area bases and supply depots. Their faces froze in the open cockpits. If their planes were hit, they often burst into flames like paper. They had no parachutes, guns, radios or radar, only maps and compasses, yet the three regiments of women pilots flew 30,000 missions over four years, dropping 23,000 tons of bombs on the Nazi invaders of the Soviet Union.

One German source said they were "precise, merciless and came from nowhere." The women's skill led the Nazis to spread a rumor that the Soviet women were given special injections and pills to give them catlike night vision. "This, of course, was nonsense," Popova said.

A trailblazer in judo

Keiko Fukuda was the highest-ranking woman judo expert in history, and the first woman to hold the highest-level black belt in that discipline. She taught martial arts until she was 98 years old.

Born in Japan, Fukuda was a student of the founder of Judo, Kano- Jigoro-. She grew to love the sport. When she learned she would have to give it up as part of an arranged marriage, she refused to be married. By 1930, she had become an instructor and developed an expertise in ju-no-kata, a gentler form of judo.

Fukuda demonstrated women's judo at the 1964 Summer Olympics. She returned to the United States in 1966 at the invitation of a judo club in California and stayed. The highest-ranked female judoka in history, she held the rank of 9th dan from the Kodokan, and 10th dan from USA Judo. She stood 4 feet 10 inches tall, and weighed less than 100 pounds.

These women's obituaries appeared in the New York Times on the following dates in 2013: Ruth Patrick, Sept. 23; Yvonne Brill, March 30; Candace Pert, Sept. 19; Ruth Benerito, Oct. 7; Jane Wright, March 2, Shakuntala Devi, April 23; Nadezhda Popova, July 14; and Keiko Fukuda, Feb. 16.

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