

Two Women Who Engineered Change

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IN LAST ISSUE of Montclair Neighbors, we highlighted two female trailblazers who have called Montclair home—Althea Gibson and Lillian Moller Gilbreth. Although she is most known as the mom in Cheaper by the Dozen, Gilbreth demonstrated women could have successful careers in science and engineering. She was the first woman elected to the National Academy of Science in 1965.

But Gilbreth was not the only woman who lived in Montclair who broke barriers in science and engineering. The two women profiled today—Carleen Maley Hutchins and Beatrice Alice Hicks—are not as well known as Gibson and Gilbreth, but both succeeded in fields traditionally dominated by men.

CARLEEN MALEY HUTCHINS: MASTER LUTHIER

Born in 1911, Carleen Maley moved with her parents to 112 Essex Avenue when she two years old. She was a quintessential tomboy and loved woodworking, sports, and the outdoors. She learned to play the bugle, an instrument usually reserved for boys, when she was eight years old. With her parents support, she bucked tradition at Montclair High School, playing first trumpet in the band and taking shop rather than home economics.

Carleen earned her Bachelor of Arts in Biology with a concentration in entomology (the study of insects) from Cornell University in 1933. She considered going to medical school but with money tight in the Depression era, she began teaching science at Brearly, a private school in Manhattan. During this period, she met and married Morton Hutchins in 1945.

At Brearly, she decided to join a faculty chamber music group. Her trumpet, however, didn't fit in. She bought herself a used viola for \$75 and began to teach herself how to play a stringed instrument. In her estimation, the instrument she had purchased was sub-par. She knew she could make a better one.

She started her quest poring over books and blueprints, then began studying with renowned violin makers (or "luthiers") and a Harvard physicist who studied violin Acoustics.

She and her husband moved back to Montclair in 1949, returning to her home on Essex Avenue with their children. She created

violins in the basement of the home experimenting with vibrations, air movement, and placement of the ribs and f-holes. While master luthiers relied on "art" to create the perfect instrument, Hutchins looked to science.

She discovered a method called "free plate tuning." Free plates refer to the top and bottom of the instrument before they are attached. Hutchins sprinkled the free plates with Christmas glitter or aluminum flakes, and then used a device that created a tone that caused the glitter to vibrate. The patterns they formed showed her where to shave the wood, resulting in a superior sound. Hutchins was becoming known as an excellent luthier, a field dominated by men.

In 1957, American composer Henry Brant asked Hutchins to create a violin "family" of eight stringed instruments, each a half-octave from its "siblings." This new octet, built in her home and workshop on Essex Avenue, created a richer, more complex sound than the traditional stringed ensemble. After one of the earliest performances using the complete octet, a New York Times review noted that "a major step toward renovating the string family for the first time in 200 years has been taken--and bravo!"

Hutchins work gained even more attention. She published two scholarly articles in Scientific American, was profiled in Time

magazine in November 1962 and Life magazine in November 1963 (although the article was shortened due to the Kennedy assassination), and her work was featured in a documentary produced by the California Academy of Sciences in 1964. Despite the accolades, the publicity often had a subtle demeaning tone and even referred to her as the "housewife making fiddles in the kitchen."

Hutchins' legacy lives on in her violin octet, in the legacy of her scientific work on violin acoustics and free-plate tuning techniques, and the many luthiers she taught in her Montclair home. As one luthier said after her death in 2007 at age 95, "Most famous artists come to life after they pass away. Let's hope for Carleen, that is the case."

BEATRICE HICKS: INVENTOR

Beatrice Hicks was born eight years later than Hutchins in 1919 in East Orange. In the depth of the Depression, her father lost his job as a chemical engineer at Westinghouse and they moved into a tent in Livingston. He borrowed money to market a safety control device for steam heating systems and founded the Newark Controls Company. The family moved back to Orange where Hicks attended the public high school and excelled in math, physics, and mechanical drawing. Her parents, however, encouraged her to study stenography. She graduated in 1935.

Hicks went against her parents' wishes and enrolled in the Newark College of Engineering, one of two women in a class of 900 students. She graduated in 1939 with a Bachelor of Science in Chemical Engineering, just like her father. She spent her first three years post graduation as a research assistant, studying the history of inventions.

As the men head off to fight in World War II, opportunities broadened for working women, even in fields not traditionally open to women. In 1942, Western Electric hired Hicks as a "technician," even though she performed the same work as the "engineers."

She soon proved that her work was comparable to the men left in the department, and earned the title of engineer. At Western Electric, Hicks designed telephone equipment for a long-distance dial system and oscillators used to control

radio frequencies in aircraft communications.

When her father died in 1946, Hicks became Vice President and Engineering Director at Newark Controls Company, supervising 22 men who designed and developed electromechanical heat controls. She also began to pursue a Masters degree in physics from Stevens Institute of Technology, graduating in 1949. One year later, she became the first president of the Society of Women Engineers.

In 1948, she married Rodney Duane Chipp, director of engineering for DuMont Television in Montclair. The newly-married couple moved to 212 Lorraine Avenue in Montclair. They lived in Montclair until 1963, when they moved to Bloomfield.

By 1955, Hicks had risen to President of Newark Controls. Her name is on the patent for a gas density switch that monitors the density of a sealed environment and signals when that density had changed, indicating a possible leak. The gas density switch has been used in Boeing 707s, in Saturn V rockets that launched Apollo moon missions, and in securing nuclear weapons in storage. When her husband passed away, she took over his consulting business and sold Newark Controls.

Throughout her career, Hicks worked to encourage women to become engineers and to be recognized for their achievements. As she said, "Women think that an engineer is a man in hip boots building a dam. They don't

realize that 95 percent of engineering is done in a nice air-conditioned office."

Hicks died in 1979. She has posthumously been elected to the National Women's Hall of Fame (2001) and the New Jersey Inventors Hall of Fame with the Advancement of Invention Award (2013).

On November 2, 1920, 8 million women voted in the presidential election. It was the first time they could vote in New Jersey in over 100 years. Despite this major step towards equality, to this day women are often paid less than men for the same work, fewer women are heads of Fortune 500 companies, and women are underrepresented in the science fields. According to the National Science Foundation, although women make up about half of the all college-educated workers in the United States, only 28% are in the science and engineering fields. ■

Montclair has its share of famous people. This year, in honor of the centennial anniversary celebrating women's right to vote, we pay tribute to women who called Montclair home at some point in their lives and who broke through barriers in their respective fields.



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