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Pioneering Engineers

Today, women can choose to train for any career in which they are interested. This was not always the case, as many of us know. Gender discrimination in most fields was real and in countless cases, officially sanctioned. Engineering is one of those fields that is still male-dominated, with women representing significantly less than half of the practitioners in the field. In fact, the percentage of women receiving B.S. degrees in the sciences didn't even reach one percent until 1972. In this month's newsletter, we profile two pioneering women engineers: Edith Clarke and Mabel MacFerran Rockwell.



Edith Clarke had always wanted to be an engineer. In 1908, when she graduated from Vassar, engineering was not a curricular option, nor was it encouraged for women. After studying civil engineering at the University of Wisconsin, she worked for AT&T, where she supervised women who did computations for research engineers. She then enrolled at MIT and received her master's degree in electrical engineering in 1919. Clarke was the first woman awarded such a degree from MIT.



Hoover Dam

After graduation, Clarke had a very difficult time securing employment as an electrical engineer. She wanted to work at either Westinghouse Electric or General Electric; neither company had an opening for a woman engineer. Then in 1920, General Electric offered Clarke a job directing calculations in the turbine engine department; this position was very similar to the one she had had at AT&T. Since she wasn't allowed to do electrical engineering work, she left GE to be an instructor at the Constantinople Women's College in Turkey.

When she returned from Turkey in 1922, GE offered her a job as an electrical engineer in the central station engineering department. At GE, she became interested in the system of symmetrical components. This is a mathematical means for engineers to study and solve problems of power system losses and the performance of electrical equipment. Clarke adopted this system to three-phase components (the basis of our electricity in the United States). Her two-volume textbook on this topic was used to educate all power system engineers for many years. Based on these significant contributions, Clarke was one of the first three women fellows of the American Institute of Electrical Engineers. After her work at GE, Clarke became the first woman professor of electrical engineering in the U.S., when she taught at the University of Texas.

Another electrical engineer, Mabel MacFerran Rockwell, was the only woman actively involved in designing and installing the power-generating machinery at the Hoover Dam in 1935. Also a graduate of MIT, in 1925, she earned her B.S. degree in electrical engineering, and graduated first in her class. Rockwell worked for Southern California Edison, the Metropolitan Water District, and the US Bureau of Reclamation. She also helped design the power system for the Colorado River Aqueduct project. In addition, she was involved with the military during World War II where she conducted research in underwater propulsion systems and submarine guidance.

These women helped lay the foundation, particularly for those of us in science who came afterwards; we are grateful for their ground-breaking efforts.

Her Story: A Timeline of the Women Who Changed America
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