Biographies Handout
Struggle for Employment: Anti-Nepotism Laws in the Academy

Maria Goeppert Mayer: The employment struggle that led to a Nobel Prize[1]

Maria Goeppert grew up in Gottingen, Germany. Her father was a pediatrician and a university professor while her mother was a faculty wife. Men within the Goeppert family had been professors for six generations and Maria's father expected her to continue on the tradition since she was an only child. Maria remembers that, "There was never any question of my being able to go on to the university and study whatever interested me." However, this proved difficult because many schools in the area were not preparing women to continue on with a college education. Maria moved around to many schools and finally her parents sent her to a suffragist-run private school, called *Frauenstudium*. When this school closed, Maria decided to take the university entrance exams a year early. Four girls from her school took the entrance exam along with thirty boys from other schools; all the girls passed the exam but only one of the boys did.

Maria formally started her education at the University of Gottingen in 1924. She started studying math, but eventually became more interested and focused her studies on physics. Even though women studying physics was very rare, Maria got along extremely well with all of her male classmates. Maria continued on into graduate school getting along well with her mentors by winning their affection and respect. Max Born, a future Nobel Prize winner, guided Maria through her studies of quantum physics. However, in 1927 Maria met Joseph Mayer, an American who had come to Germany to study quantum mechanics. He had come to the Goeppert home in 1927 to ask about renting a room and Maria had answered the door. They got along well and soon they were "out dancing almost every night." Joseph Mayer asked Maria to marry him in 1929. He made it clear that he loved the fact that she needed the stimulation of science and promised that he would never make Maria give up physics. He was always encouraging of her and helped her finish her thesis by taking her to the Netherlands in order to talk her thesis through with Paul Ehrenfast, a famous physicist.

In 1930 Maria and Joseph were married and Maria received her PhD two months later. She was now twenty-four years old and could not obtain a job in the academy that trained her. This was a common problem for women of this time period. Eventually Maria and her husband immigrated to Baltimore and her husband obtained a tenure-track position at Johns Hopkins. Maria Mayer had more expertise in quantum mechanics than anyone else at the university. However, she could not obtain employment because the university would not hire both a husband and wife. This was no different than nearly all other coeducational colleges in the United States. Particularly during the years of the Depression, colleges would not hire both husband and wife for full faculty positions. These rules, called anti-nepotism policies, were meant to prevent colleges from hiring unqualified spouses into positions that could easily be filled by someone more qualified. However, the reality of the situation was that anti-nepotism often put a severe strain on the careers of qualified women who were married to similarly or less qualified men. Faculty wives would unfortunately often end up in unpaid assistantships or "volunteer" positions that allowed them to have access to research facilities in exchange for teaching many courses.

Maria Mayer was grateful to get a workspace in the attic of the physics building. This was where she took on graduate students and did research. During this time, Maria Mayer got along well with all of

[1] All information presented in this study is from: Jardins, Julie Des. *The Madame Curie Complex: The hidden history of women in science.* New York: Feminist Press. 2010.

the graduate students with whom she worked. She became someone that was approachable and students felt comfortable asking her for letters of recommendation. She was also unofficially paid a few hundred dollars a year to help the faculty with German correspondence. She eventually gave graduate lectures on a "voluntary" basis with her courses listed in the catalog under "G" for her maiden name. Maria Mayer teamed up with experimentalists and men in the math department for research. Her presence at Johns Hopkins annoyed the dean, however, who disliked women in academic positions. He fired Joseph Mayer, and the couple began to look for new positions.

During Maria Mayer's pregnancy with her second child, her husband worked with her to write a textbook, *Statistical Mechanics*. This textbook became a hit and propelled Joseph Mayer's career forward. He was offered a position as an assistant professor at Columbia in 1939. He hoped that this position would be good for him and his wife because the salary associated with this position was double what he had been making at John Hopkins. The chair of the new department created a title for Maria, "lecturer in chemistry", which was unpaid. Due to anti-nepotism laws this was the only position that she could get within the first two years. Then she applied for a full-time position in the physics department. The chair of the department refused her and she had to settle for office space and unpaid teaching assignments.

In 1941 Maria Mayer was given the honor of being elected into the American Physical Society. Unfortunately, this did not change anything at Columbia. She then accepted a position at Sarah Lawrence College to teach math and physics. This was only a part-time salary. Soon she taught double the load of introductory courses and became the department chair. However, this never led to a permanent position or a full salary. This was all put on hold when the United States became a part of WWII and physicists were needed for defense work. This work did not have gender restrictions and Maria Mayer was soon working in Columbia's Substitute Alloy Materials (SAM) Laboratory. This was the best pay that she had ever received and she had an entire team of researchers working below her. But while working, she was also raising a family. She eventually asked for less work to be home with her children at night and on the weekends.

After the war ended, Mayer returned to teaching physics at Sarah Lawrence. Around this time. her husband found out that he had been elected into the National Academy of Science and offered a position at the University of Chicago. This was when everyone else, including all of their neighbors who were also in the physics community, was moving to Chicago for atomic physics research. In Chicago, Maria Mayer was given a position on the faculty but still was not paid even though she was in a different department from her husband. Her title was "volunteer associate" and she handled committee work, teaching, and advising duties. Then Robert Sachs offered her a part-time position as a senior physicist at Argonne. She was very pleased with this job because she no longer felt as though she was being taken advantage of within a department.

During this time, Maria Mayer worked on and completed the shell orbit theory that would win her the Nobel Prize. She would later go on to secure a full-professorship position for both her and her husband at the University of California-San Diego in 1959. In 1963, Maria Mayer received word that she had won the Nobel Prize in physics.

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Cecilia Payne-Gaposchkin:[2]

Cecilia Payne was born in 1900 in Wendover, England to Emma Helena and Edward Payne, a London lawyer and historian. Her father died when she was four years old, and her mother had to raise Cecilia and her sister and brother on a limited budget. Despite this, Cecilia's mother found ways to allow her to travel around Europe and continue her education.

In 1919, she won a scholarship to attend Newnham College in Cambridge University. The subjects she studied at Newnham included botany, physics, and chemistry. While an undergraduate, Cecilia heard a lecture by Arthur Eddington, a famous astronomer, about his 1919 expedition to the island of Principe to observe a solar eclipse. It was these eclipse observations which was the first test of Albert Einstein's general theory of relativity, and Eddington convinced the world Einstein was correct. Cecilia's interest was sparked in astronomy, and Eddington became her academic mentor.

After finishing her undergraduate studies, Cecilia tried to find a job in astronomical research, but neither she nor Eddington could find anyone in England who would hire her. Nevertheless, she did find a job in the United States, at Harvard Observatory. Payne also enrolled in Radcliffe College (the female-only college which is now a part of Harvard) as a graduate student in astronomy. In 1925, she became the first PhD in astronomy from Radcliffe, and her thesis was one of the first pieces of scientific research to argue that stars are mostly made of hydrogen, which became accepted a few years later.

After receiving her doctorate, Cecilia continued to work at the observatory, but was forced to work in the director's area of research rather than her own. Although she found this work tedious, she stayed in her position because there was no place in England which would hire a female astronomer. She was also isolated socially from the intellectual life of Harvard, because faculty and their wives didn't associate with the female employees of the Harvard Observatory. Nevertheless, Cecilia did find companionship with the other members of the observatory. Several female graduate students followed Cecilia, and with the director, his wife, and the other staff, they formed a close-knit "observatory family."

In 1933, Cecilia decided to travel to Europe to continue her research. She went to Russia to work on a book with a famed Russian astronomer interested in similar research problems. After visiting Russia and being appalled at the conditions people had to live in, she went to Germany to give an astronomical lecture. She met Sergei Gaposchkin, a Russian astronomer who was politically exiled from Russia for supporting the losing side in the Russian Revolution. Although he was working in Berlin, the Nazi party had just come to power in Germany, and he feared he would soon be fired for his Russian heritage. Cecilia was moved by his story and his dedication to astronomy, and appealed to the Harvard Observatory director to get him a job in the U.S. Although it was very difficult because of the Great Depression, the observatory was able to find Gaposchkin a limited term and low-paying position, which he accepted to get out of Germany.

Cecilia was very happy to have Sergei in America, and was impressed enough with his ability that they worked on some projects together. After a few months in America, Cecilia and Sergei surprised their friends and family by marrying. Although most female astronomers who got married left the

[2] All information presented in this study is from the following: Kidwell, Peggy. "Cecelia Payne-Gaposchkin: Astronomy in the Family." In *Uneasy Careers and Intimate Lives: Women in Science, 1787-1979*, edited by Pnina Abir Am and Dorinda Outram, 216-238. New Brunswick, NJ: Rutgers University Press, 1987.

profession, Cecilia knew she actually had the better position, and so Sergei was dependent on her continuing to work in research. Over several years, she impressed other astronomers with her dedication and results, and was one of the first women to be elected to the American Academy of Arts and Science when it admitted female members in 1943. She also began teaching undergraduate and graduate courses at Harvard in the late 1930s, impressing the graduate students she advised with her intellect and hard work.

After she married, Cecilia changed her last name to Payne-Gaposchkin, so that astronomers would still be able to find her old research papers and she wouldn't suffer an academic "split personality." She and Sergei also had three children. Since she and Sergei couldn't afford a caretaker for several years, they actually took the children to the Observatory, where they became a part of the observatory family. Although she was dedicated to both her family and astronomical research, the combination of the two made it difficult for her to find positions suited to her level of accomplishment. Although several people nominated her for professorships and secretary of the American Astronomical Society, she was passed over for these positions because of her "domestic situation."

Payne-Gaposchkin worked on observations of variable stars throughout her career. These are stars whose brightness changes as they are observed. In total, she and her assistants made over three million of these observations, which laid the foundation for figuring out how stars change over time. In the 1950s, Cecilia started to get more official recognition for her work, being "promoted" to professor at Harvard and becoming the first woman to head a department (Astronomy). She published over 150 scientific papers and several books, a few of which became the standard textbooks in astronomical subjects.

During her career, she was interviewed several times about how she balanced her career with raising a family. At first, she was happy to do these interviews, and promote the idea that women can and should have the same opportunities for families and productive work that men had. However, after a few of these interviews focused completely on her doing housework without mentioning her astronomical research, she decided to turn down any publicity which would center on her personal life. She loved and was intensely loyal to her family, but she always wanted to be remembered and known for her science. In 1977, as she received the prestigious Henry Norris Russell Prize from the American Astronomical Society, she said "nothing compares to the emotional thrill of being the first person in the history of the world to see something and understand something."