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## At the Birth of Modern Physics

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MARIE CURIE: A Life

By Susan Quinn

Simon & Schuster. 509 pp. \$30

AS A YOUNG Polish-American girl growing up in the 1950s, a telescope and chemistry set my most prized possessions, there was no greater figure in the pantheon of scientific gods than Polish-born Marie Curie, the first woman awarded a Nobel Prize. It still seems almost blasphemous to exclude the "madame" before her surname. Hollywood firmly cemented this saintly image with its movie of her life, reverently showing how Curie laboriously purified her glowing radioactive elements in cast-iron pots. Curie was the paragon of scientific virtue, noble and self-sacrificing.

With this new and long-awaited biography of Marie Curie, Susan Quinn strives to peel back these layers of myth and idealization that have grown up around the physicist, stories that have flourished ever since Eve Curie wrote the celebrated book about her mother's life nearly 60 years ago. She succeeds beautifully. Quinn has written a worthy successor to her previous work, the award-winning biography of American psychiatrist Karen Horney.

Quinn's portrait of Curie is rich and captivating. She doesn't demolish the myth (Curie's industry and intelligence remain indisputable); rather, Quinn engagingly fleshes out the saga, allowing us to see both the physicist and the woman. Though largely sympathetic, it is still a view of Curie's life that didn't make it to the silver screen: As a young girl, Curie writes winsome poems and sets up practical jokes; in her later years, racked by illness and worn down by professional battles, she turns aloof and dictatorial. Even Einstein, a valued friend, once complained that she was a grumbler with "the soul of a herring . . . poor when it comes to the art of joy and pain." But while adopting a cool, smileless exterior, her inner emotions ran deep. Four years after the tragic death of her devoted husband and collaborator Pierre, Curie cast off her bereavement by engaging in a scandalous affair with a married man, a liaison that almost lost her a second Nobel Prize. Hollywood may angle for a remake.

Quinn's story is made more vivid by new evidence, in particular a personal journal that Curie started to keep shortly after her husband's death and which was first made available to researchers only five years ago. With it, along with the remembrances of friends during Curie's biggest crises, Quinn allows us to see science as a very human enterprise, an endeavor that is an integral part of society and can share in its many foibles. It is a story that deals with jealousy, misogyny, love, bitterness, revenge and determination, as well as scientific insight at the cutting edge.

Born in 1867 in Poland, Curie was the fifth and last child of Wladyslaw and Bronislawa Sklodowski, struggling educators whose ancestors had been members of Poland's landed gentry. A polymath, Curie's father immersed his children in an atmosphere of learning, both serious and playful. Little Maria Sklodowska was a precocious child, though volatile and emotional, traits likely exacerbated by the death of her mother from tuberculosis when Curie was only 10.

Quinn presents a splendid overview of Poland's history and culture and shows how Curie's accomplishments as a lone woman in the masculine world of physics are firmly rooted in this Polish heritage. Railing against the Russian occupation of Poland through the 19th century, the Polish intelligentsia had forged its own brand of positivism, a philosophy embraced by the Sklodowskis. The movement encouraged hard work, stressed the importance of science, and supported women's rights.

Curie decided to study physics and mathematics while working as a governess to help pay for her older sister's medical education. That she was ambitious was clear; marooned in Poland's hinterlands, she once despaired in a letter of "ever becoming anybody." But a doomed relationship with her employer's son, her first love, spurred her on to Paris at the age of 23 to join her sister.

Here begins the tale so familiar to Curie admirers: the 100 steps upward to her tiny garret on the sixth floor; the water freezing in her washbowl during winter nights so cold that she was forced to sleep under all her clothes. Yet, despite these obstacles, she finished first in her licence es sciences exam at the Sorbonne, and second in mathematics. Teaching in Poland would have been her likely career, if not for her fateful meeting with Pierre Curie in the spring of 1894 to seek advice on a project. Shy and awkward, Pierre was an insightful researcher (the discoverer of piezoelectricity), but one who worked outside normal academic circles.

Their union seemed almost destined; each had experienced a lost love, and both thought of work as their main source of happiness. They complemented one another as well: Marie's overseriousness and fastidious zeal (she kept records on every aspect of her life) balanced by Pierre's childlike delight in his research. Quinn poignantly describes how the very smitten Pierre spent an anxious year wooing the more reluctant Marie, who yearned for Poland.

It was two years after her marriage that Curie thrust herself into the forefront of modern physics by perceptively choosing to study a new phenomenon that surprisingly few were following up on: the astounding rays emitted by uranium compounds. Henri Becquerel first discovered the effect; the Curies would name it -- radioactivity.

Marie originally set out to describe the phenomenon with more precision for her doctoral thesis, but she soon recognized that a compound's radioactivity could be used in identifying new elements. It was this brilliant insight that led to her discoveries of polonium and radium. More important, she was one of the first to suspect that the rays were an atomic property of matter, not merely a chemical one. Pierre, the superb instrumentalist, joined her effort early on as a full-time and equal partner.

When Curie received the Nobel Prize for physics in 1903, along with Becquerel and her husband, she confronted many prejudices. While feminists mistakenly saw Pierre as riding on his wife's coattails, reactionary thinkers spuriously cast Marie as mere helpmate to Pierre's great genius (indeed there had been a campaign by some to award the prize to the two men alone). Nevertheless, it was at this moment that Marie (and the Nobel Prize) took on their legendary status.

Quinn contends that the Curies were not really "prophets without honor" -- celebrated abroad but not at home -- as popularly assumed. In fact, the French scientific establishment had been decently funding their work before the Nobel award. What they lacked was access to a well-equipped laboratory. A special institute would eventually be built, with Marie serving as director, but only after Pierre's fatal accident on the streets of Paris in 1906. It is in this section of the book that Curie is most fully revealed through the pain so evident in her journal entries.

Curie's overwhelming grief did not abate until a consoling friendship with physicist Paul Langevin, a former student of Pierre's, turned into deep passion. This chapter of Curie's life is now hardly remembered, although the incident then elicited as much press coverage as the O.J. Simpson trial does today. "The fires of radium which beam so mysteriously . . . have just lit a fire in the heart of one of the scientists who studies their action so devotedly," reported one Parisian newspaper. France's tabloid press had a heyday, and for good reason. The story involved a love nest, stolen love letters, murderous threats against Marie by Langevin's insanely jealous wife, and a duel between Langevin and the scurrilous journalist who first exposed their affair. Curie's halo gets a bit tarnished at this point; though terribly shaken by the exposure, she seems unusually detached from the pain she generated within Langevin's family.

UNFORTUNATELY, Curie's exact feelings during this tumultuous time are unknown (or can only be guessed). Vital evidence, such as letters and journal entries from this period, was destroyed. Some papers were expunged by either Curie or her family; others were lost in the Nazi bombing of Warsaw. For that reason, Curie remains a somewhat enigmatic figure. I wish Quinn had stepped in to fill these gaps with her own suppositions. She has chosen, instead, to tell the story chiefly through the recorded words of the participants. Moreover, while Quinn mixes these personal accounts with the science well, I was hoping for a deeper discussion of the physics of radioactivity and how it is linked to the development of one of physics' greatest revolutions -- quantum mechanics.

After the scandal, Curie essentially took on the role of elder scientist, her most original work behind her. Despite Curie's international acclaim, the prestigious French Academy of Sciences, determined to remain a male domain, never made her a member. Until her death in 1934, she devoted her life to directing the Institute of Radium, going on tours to raise funding, extending the science of

radiochemistry, raising her two children (daughter Irene went on to win her own Nobel Prize), and establishing medical uses for radioactive elements.

Her very appearance during these years was the greatest mythmaker of all. "The first contact with Madame Curie left a strange impression," wrote chemist Marcel Guillot, "because the appearance of this frail woman, all dressed in black, . . . made you feel pity." The deep sadness in her eyes, captured in nearly every photograph of her, is haunting.

Quinn replaces this icon with a fully dimensional person, a woman who can now serve to inspire future chemists and physicists even more. Curie never completely entered the new realm of quantum physics, but Quinn ably demonstrates how this resourceful woman, like a modern-day Moses, took bold strides in leading her colleagues to the very threshold.

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PHOTO

CAPTION: Marie Sklodowska Curie with her husband Pierre in their laboratory.

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