

The Radium Girls' Eternal Glow: Politics, Gender, and Malpractice in the American Radium Industry

Claire Nam

Horace Greeley High School, USA

ABSTRACT

During the 1920s, radium permeated all aspects of American life from media to recreation to food due to pro-laissez faire laws that allowed the U.S. radium industry to adopt vertical integration business models and use illegal advertising methods. One of the largest radium corporations was the United States Radium Corporation which employed thousands of young girls in New Jersey and Illinois to paint radium watches for the U.S. military. While radium companies were aware of the lethal consequences of radium consumption, they continued to hire employees to handle the substance without proper protection and distributed their products on a mass scale, leading to hundreds of deaths and chronic illnesses. My paper builds on existing scholarship that has focused on the policy failures surrounding the Radium Girls while adding an overlooked unit of analysis: gender. This paper is a product of a year's worth of researching secondary and primary sources online, visiting museums and archival collections, analyzing previous American industrial health laws, and consultations with PhD students at Yale University specializing in American history. My paper concludes that the tragic tale of the Radium Girls is an account of gender-based violence on a massive scale. The USRC took advantage of the women's gender statuses to build a workforce considered expendable in society, and thus discounted by the media and law. As a result, the USRC and the U.S. government exploited the girls for decades, confident that the public would not demand justice in their names.

Introduction

Swen Kjaer rapped his knuckles on the gray, bleached door of the United States Radium Corporation (USRC). It was quiet on a warm, April afternoon of 1925. The leisurely, spacious landscape of Ottawa, Illinois was a rather sharp and refreshing contrast from the brisk hustle of Washington, D.C.

After minutes of no response, Kjaer adjusted the badge on his suit that identified him as an investigator from the U.S Bureau of Labor Statistics and knocked again. *It would serve them well to answer quickly*, he thought. Back at the USRC Orange Plant in New Jersey, workers were falling ill by the day and the company image was quickly deteriorating. Delaying a government investigation certainly wouldn't improve their situation.¹

Seconds later, the door burst open and a portly woman stood panting at the entranceway. She introduced herself as Miss Murray, the superintendent of the factory, and ushered him inside with overflowing enthusiasm. Kjaer briskly dismissed her apologies and interrogated straight away about the state of illnesses in the factory. "Why," Miss Murray replied, "[I] never heard of any illness which might in the slightest manner be caused by the work."² She continued brightly, "Instead of proving detrimental to the health of the girls, [I] know of several who had seemingly derived benefit from it and showed decidedly physical improvement."³

Kjaer then asked about lip-pointing, the company's infamous and eerie practice of licking paint brushes that put the USRC under scrutiny. Miss Murray responded brightly once more, saying that the girls "had been admonished not to tip the brushes in the mouths without washing them carefully first in the water provided for

such a purpose.”⁴ After a moment, however, she slyly admitted that “tipping in the mouth is constantly practiced.”⁵

Kjaer could see that for himself as he toured the studio that day. However, although every girl was lip-pointing, they all looked “healthy and vigorous.”⁶ He also noticed that there were water buckets on each desk which the girls used to clean the brushes. Later when Rufus Fordyce, the vice president of USRC, generously supplied him with photographs of the studio taken at an earlier time, however, Kjaer noticed that there was no water to be seen on any table.⁷

Later that afternoon, Kjaer interviewed the nearby dentists of Ottawa to see if they had come across any abnormalities in their patients’ mouths. Every dentist reported nothing but clean bills of health. “No evidence of malignant disorder,”⁸ said one dentist who examined a number of girls at the factory. “There seemed to be very little dental trouble among the workers,” another replied.⁹

As Kjaer left the dentist offices, he heard a faint, high-pitched chatter behind him. The workers were making their commute home. Against the dark backdrop of night, the girls glowed a brilliant, blazing green. Luminous dust drifted from the ruffles of their dresses, and when they laughed, their teeth sparkled and flashed underneath the moonlight.¹⁰

That night, Kjaer received a call from the U.S. Bureau of Labor Statistics that abruptly ordered him to cut the investigation short. Although this was strange protocol for a national investigation, Kjaer had no objections.¹¹ He could not help but admit that every individual’s account of the factory was consistent with one another, suggesting nothing other than a peaceful workspace.

Years later, it would be revealed that everything Kjaer witnessed was a lie—the superintendent’s reassurances, the workers’ smiles, the dentist’s positive accounts, and even the water on the table. The USRC had known that contact with radium in any form was lethal and that lip-pointing was a life-threatening practice. Yet, they sustained lip-pointing in their workplace by telling their employees that it was completely harmless, advertising radium as a health supplement, and denying any knowledge of its dangers. By the time the girls were middle-aged, they would become infamously known as the “Radium Girls”; Kjaer would read countless newspaper articles about their decade-long court trials against USRC, and the picturesque town he had visited being declared a non-habitable radioactive site.

In retrospect, the findings of Kjaer’s investigation reveal a more sinister reality of the early days of the US Radium industry. The USRC’s willingness to sacrifice worker’s lives for profit led to severe health consequences amongst the radium girls—young factory women who were unaware that the amounts of radium they were consuming were deadly. The same girls who were considered “healthy and vigorous” would be featured in the morning newspaper just a few years later, rotting alive in their hospital beds.

At a glance, the death of the Radium Girls appears to be a paradigmatic case of corporate crime and cover-up. However, deeper analysis shows that the U.S. government, its legal system, and a sensationalist media were all complicit in their murder. Laissez-faire policies, pro-business laws, and an apathetic press collectively set the stage for the USRC to build a booming business based on poisoning American citizens. Accountability only arrived later—too little, too late for the Radium Girls.

This paper builds on existing scholarship that has focused on the policy failures surrounding the Radium Girls, while adding an often overlooked unit of analysis: gender. The tragic tale of the Radium Girls is an account of gender-based violence on a massive scale. The USRC took advantage of the women’s gender and immigrant statuses to build a workforce considered expendable in society, and thus discounted by the public and law. As a result, the USRC and the U.S. government exploited the girls for decades, confident that the public would not demand justice in their names.

The Rise of the Radium Industry

As the heart of one of the largest American industries in the 1920s, radium permeated almost every aspect of American society, from medicine to cosmetics to cartoons. Although radium was perceived as a magical substance, the industry behind it was based on a scheme of misinformation and false advertising.

Radium was first discovered in Europe in 1898 by Marie Curie, a Polish-French physicist and chemist, and was the world's most rare, expensive, and mysterious mineral at the time.¹² Curie had devised a method called "fractional crystallization," a long and painstaking process that yielded minute amounts of radium that were worth thousands of dollars. As soon as fractional crystallization became standardized, the first radium-manufacturing factories emerged in Europe and began to distribute radium to local scientists researching radioactive materials.¹³ In Austria, after the Austrian government's embargo of 1903 on uranium exports, the Austrian Academy of Sciences, which had overall control of radium mines, provided radium strictly for experimental purposes to the Institute for Radium Research in Vienna.¹⁴ In Germany, the Braunschweig Quinine factory, the largest German supplier of radium, only sent radium to distinguished scientists such as Ernest Rutherford, the Curies, and Dmitrii Mendeleev.¹⁵ Using radium solely for research was a consistent practice across Europe.¹⁶

U.S. radium manufacturing companies emerged shortly after the first European radium factories. However, the radium industries in the two continents were vastly different. In Europe, governments controlled radium ores, scientists oversaw industrial production, and philanthropic groups formed institutes to ensure that radium use was devoted to scientific and medical purposes. On the other hand, in the United States, there was a lack of a strong radioactive community and the government was much less concerned with its scientific research. This lack of regulations would later allow for radium to be used to manufacture a plethora of unsafe products, including cosmetic appliances and food condiments.

When the demand for radium first rose in the U.S. in the early 20th century, there was a short-lived public-private partnership where the U.S. government was partially involved in radium production.¹⁷ In 1914, the Bureau of Mines introduced a bill that would have put U.S. radium ores fully under federal control, with the goals of ensuring affordable radium for medical uses, preventing a radium monopoly, and, according to House of Representative member Judge James Byrnes, stopping radium from falling "into the hands of quacks" selling "toenail cures" and other remedies.¹⁸ Joseph Flannery, the president of Standard Chemical Company (SCC), the leading U.S. radium company, fiercely opposed the legislation with a slippery-slope argument. Since almost every mineral in the ground is somewhat radioactive, "if the Government wants to get all the radium in the country, when will it stop?"¹⁹ Eventually, Congress succumbed to the demands of SCC and other private companies, granting radium corporations access to every stage of radium distribution, from extraction to production to marketing.²⁰ This was a grave error. As stated in the Organic Law of 1913, the U.S. Bureau of Mine's scope of responsibility included conducting investigations concerning the "utilization of mineral substances with a view to improving health conditions" and "prevention of waste in... metallurgical and other mining industries."²¹ However, the Bureau gave radium companies complete control over the radium industry without waiting for more research to be conducted on the material, including its effects on human health. As profit-seeking institutions, radium companies took advantage of the power granted to them, and developed a variety of radium products for public use, despite its potential dangers.

Given the lack of knowledge surrounding radioactive materials, companies first had to research the mineral intensively so they could advertise that radium was safe. However, much of this research would be distorted or completely faked, instigated by the SCC. In 1913, Flannery opened a non-accredited medical clinic associated with SCC, advertised as the Free Radium Clinic of Pittsburgh. The clinic claimed to have pioneered "internal therapy," in which patients suffering from various chronic illnesses spent hours consuming radium substances for treatment.²² One of the clinic's doctors estimated that over the course of four years, he had injected radium into 1,500 to 2,000 patients.²³ From the treatments, SCC's doctors claimed internal therapy

could cure a staggering number of ailments such as arthritis, diabetes, all forms of anemia, correct “faulty elimination,” insanity, and “the body ferments.”²⁴ They also claimed that “One of the effects of the intravenous solution is to make patients sleep comfortably.”²⁵ A “safe dose” for such a treatment was 50 to 100 micrograms of radium salts, repeated every ten days.²⁶ These findings were published in *Radium*, SCC’s in-house journal, and became the first published experimental data to support the company’s products.²⁷ While the claims were clearly bogus, Flannery denied the journal was an advertisement and instead said it was sent to doctors to “enlighten” them on the fact that radium “will cure 25 times more people of different diseases more important than cancer.”²⁸

At this time, the Bureau of Chemistry was in charge of regulating the safe circulation of food and drug products under the 1906 Food and Drugs Act, otherwise known as the Wiley Act. The basis of the Wiley Act rested on the regulation of product labeling rather than pre-market approval, allowing the SCC to sell whichever products they wanted as long as they clearly stated that they contained radium.²⁹ In 1911, the Supreme Court ruled that the law did not apply to false therapeutic claims, meaning a defendant (sued for faulty products) only had to show that they personally believed in their remedy to escape prosecution.³⁰ This put the Bureau at a significant disadvantage when proving in court that manufacturers of drugs labeled with false claims intended to defraud customers. More importantly, the SCC could produce false research under the guise of authentic science without breaking any laws.

With no counterevidence or laws in the way, the SCC continued to churn out research and medical publications to establish scientific credibility. Copies of *Radium* were distributed to physicians across America. In 1916, Charles H. Viol and William Cameron, two researchers from SCC, represented the company at the American Medical Association (AMA), a highly influential board of more than 120,000 representatives from medical organizations across the United States. Using their self-validated research, they presented themselves as authorities in the field and proposed the creation of the American Radium Society. Viol and Cameron became associate and charter members of the board, despite not being physicians.³¹ By founding a society with highly-regarded doctors of the AMA, Viol and Cameron further consolidated the supposed scientific credentials of the SCC.

Desperate to create a reputation for their products as quickly as possible, the SCC ordered their physicians to abuse their titles to sell misinformation. In 1914, Flannery hired physician Everett Field, who had connections to Albany Medical School and the Royal Medical Society in Montreal, to promote radium products to the medical communities in those areas. Field had little to no expertise in radium and only received a few weeks of training regarding the product. When he expressed concern over his unfamiliarity with radium, Flannery simply replied, “Doctor, you have been trained more than anyone in America... answer them any way you choose. Nobody knows enough to refute you.”³² Unfortunately, Flannery was right. In the 1920s, no one had sufficient knowledge of radium to refute SCC’s optimistic claims.³³ Through *Radium*, the founding of the American Radium Society, the Free Radium Clinic of Pittsburgh, and fictitious public lectures and papers to medical societies, the SCC had created a dense network of physicians supporting them and willing to adopt their methods. In turn, the physicians used SCC’s research to commercialize radium products. Meanwhile, the Wiley Act protected them from prosecution since they could always claim that they genuinely believed in radium’s health benefits.

Before long, the news about radium’s extraordinary powers spread and more radium companies emerged to supply the demand of increasing consumers. Many of the newly formed companies followed SCC’s marketing approach. One such company was United States Radium Corporation (USRC). The USRC was founded in 1913 in Newark, New Jersey by Sabin Von Sochocky and George Willis, two certified physicians.³⁴ Sochocky had studied with Marie and Pierre Curie, the Nobel Prize-winning scientists who had discovered radium, and knew extensively about its dangers. Sochocky even experienced its harmful qualities, having had to amputate his own finger due to radium poisoning when he first experimented with the substance.³⁵ Nonetheless, he invented a luminous paint made of radium that could make jewelry, watch dials, and other everyday

objects glow brilliantly in the dark. Like Flannery, Sochocky advertised radium in a highly exaggerated and vague manner. In an article for *American magazine*, a magazine with a widespread circulation of 1.8 million, he wrote, “Locked up in radium is the greatest force the world knows. Through a microscope, you can see whirling, powerful, invisible forces.”³⁶ With no reason to challenge established researchers like Sochocky, the public pounced on the supposed magic mineral.

By the 1920s, a radium craze had erupted in America. The element was dubbed “liquid sunshine” and could be found at hospitals, libraries, and even theaters.³⁷ Some companies falsely advertised their products as if they contained radium when they didn’t, to appeal to the public. For instance, the butter company *Creamery Butter* printed the words “Radium Brand” on all their packaging but only sold pure butter.³⁸ Other companies injected radium into their products and advertised them as all-curing substances. Radithor, a tonic that was merely distilled water with a drop of radium, advertised itself as a “Fountain of Youth.”³⁹ The tonic, which earned the title “a cure for the living dead,” became so popular that it was consumed by America’s highest elites. Eben Meyers, a 1906 champion in U.S. Amateur Golf, reportedly drank 1400 bottles of Radithor in hopes of curing his broken arm.⁴⁰ Radium later expanded its reach to the entertainment industry in a variety of mediums ranging from novels to cartoons. On Broadway, the song “Radium Dance” became a massive hit after being featured in the musical *Piff! Paff! Pouf!*⁴¹

A lack of government regulation and the enactment of corporate-lenient laws, such as the Wiley Act, allowed radium companies to infiltrate the daily American public life with false scientific information about one of the most dangerous elements on Earth. The American radioactive community grew to match Europe’s, fostering institutions such as the American Radium Society, but its primary purpose was not genuine research but rather to assemble a cadre of “experts” that radium companies could call upon in times of need. This was possible due to the United States’ status as one of the only two countries in the world that allowed (and still allows) direct-to-consumer pharmaceutical advertising.⁴² As this essay will recount, the boom of the U.S. radium market came at the cost of public safety and thousands of employees’ lives. Had the U.S. adopted stricter regulations on radium as done in Europe, this catastrophe could have been avoided. From the moment the U.S. The Bureau of Mines abandoned establishing control over radium production through the bill of 1914, the laissez-faire stage was set that would lead to continuous favoritism of corporation growth over the public welfare.

The Radium Girls

In 1917, the U.S. entered World War I, which led to skyrocketing demand for radium watch dials. The watches became a must-have item for soldiers who used the dim glow of radium to surreptitiously tell time in the dark. By 1918, 94% of all radium produced in America was used for manufacturing radium paint on military dials. The USRC racked up profit and even entered lucrative contracts with the U.S. military between 1917-1921 to supply luminous, radium equipment for military personnel. During this time, the USRC recruited hundreds of new employees to keep up with the market demand.⁴³ Though many factory job applicants had not even finished school, they were hired as long as they fulfilled one, curious prerequisite: they were women.

The USRC’s executives and lab workers consisted solely of men, but strangely, they insisted on hiring only women to paint the watches. The company used various methods to target prospective female job applicants. In 1922, the New Jersey USRC plant expanded its reach by starting another radium dial factory in Ottawa, Illinois.⁴⁴ Ottawa was known for its large reservoirs of silica sand, an essential material for producing high-quality glass, so glass factories made up a significant portion of its economy. Work at the glass factories was extremely labor intensive, making them excellent jobs for men but not for women, children, or people with disabilities.⁴⁵ While there were other jobs available that did not require heavy physical labor, they were difficult to acquire. Although women conventionally had job opportunities in teaching or nursing, most young women in rural Ottawa could not afford higher education like nursing school. Not to mention, Ottawa and New Jersey’s

large population of immigrants sought work rather than education. It was not uncommon to drop out of school. When the USRC built factories in this region and offered non-labor intensive, well-paying jobs, the female youth of Ottawa—some as young as 14 years old—flocked to obtain a spot.⁴⁶ Fortunately for the USRC, many of these women already had painting experience at a ceramics business previously located in the area and were qualified for the job.⁴⁷ Many women were also motivated by the idea of helping their brothers and American soldiers in battle. In the magazine *Survey Graphic*, Katherine Schaub, a 14-year-old Radium Girl, wrote that the girls “were but a few of the many who through their jobs were ‘doing their bit’ [in the war].”⁴⁸ As such, the company also made specific appeals for new workers to support the war effort.

As the USRC grew, it became stricter in hiring solely women for the job. One of the company’s later Ottawa advertisements, featured in the *Ottawa Daily Republic Times*, sported bold headings reading “Girls wanted” and “Several girls, 18 years or over, for fine brushwork.”⁴⁹ Afterward, the company continued to publish advertisements in magazines such as *American* magazine, which was known for its high female readership.⁵⁰ When inquired about their odd hiring standards, the USRC employers replied with the ostensible reason that small, female hands were perfect for the job because they were well-suited for exacting, detailed work.⁵¹

At the time, there was no reason to believe that the USRC was mistreating its female workers. If anything, working at USRC was deemed a decent, if not stellar, job for young women. In the 1910s a women’s industrial hygiene movement emerged that spanned to the 1920s.⁵² Alice Hamilton, the medical investigator for the Illinois Commission on Occupational Diseases who led the movement, raised lead poisoning as a major working condition issue that particularly affected women.⁵³ According to her, women experienced higher rates of lead poisoning because 1) very few women were organized into unions, and thus women lacked the opportunity to redress poor working conditions through collective pressure; 2) women were poorly paid, resulting in malnourished workers who were more susceptible to disease; and 3) women were also burdened with household work, putting a greater strain on their health that also left them more susceptible to disease.⁵⁴ Hamilton visited over 340 business establishments in Illinois, uncovering work conditions that were dangerous to women in Ottawa’s largest industries: ceramics, pottery, and glass.⁵⁵ The USRC was also a major business in the area, but no flags were raised because it satisfied the three standards that the movement focused on: decent wages, a clean work environment, and the respectful treatment of employees. On the surface, the USRC was an excellent workplace for young women.⁵⁶

In truth, the USRC was violating safety violations that were much more fatal than the ones battled by the industrial hygiene movement. Inside the studio, the USRC frequently ordered the girls to use a dangerous technique called “lip-pointing” which involved licking the tip of the radium-covered paintbrushes to wet them into the finest point possible.⁵⁷ According to one of the company bosses who went by the title “Miss Rooney,” if the paintbrushes were pointed by dipping them into water, too much radium would be wasted.⁵⁸ At the time, radium was the most valuable substance on Earth, selling \$120,000 for a single gram (\$2.2 million), and every particle of lost radium cost the USRC thousands of dollars.⁵⁹ Mae Cubbery Canfield, a radium girl, recalled, “The first thing we asked [was] ‘Does this stuff hurt you?’ And they said, ‘No.’ Mr. Savoy [the company boss] said it wasn’t dangerous and that we didn’t need to be afraid.”⁶⁰ With no reason to be suspicious, the girls believed him. After all, radium was a wonder drug so, if anything, it should have benefitted them.

The girls lip-pointed diligently for hours every day. Grace Fryer stated in her court testimony, “I could do about two numbers before the brush dried.”⁶¹ In other words, the paint dried quickly so the girls were constantly licking the brushes and consuming radium. At the end of each work day, the girls would be covered in radium powder. Katherine Schaub wrote in *Survey Graphic*, “Here in the room—daylight barred—one could see evidence of the luminous paint everywhere on the worker. There was a dab here and there on her clothes, on the face and lips, on her hands. As some of them stood there, they fairly shone in the dark.”⁶² No matter how much the girls dusted themselves off, no amount of brushing could remove all of the powder.

The *Journal of Industrial Hygiene* observed that their “hands, arms, necks, the dresses, the underclothes, even the corsets of the dial-painters were luminous.”⁶³ The greenish glow the girls emitted as they

commuted home after work even earned them the name “ghost girls.”⁶⁴ Glowing and locally famous, the women developed pride in their jobs. Local newspapers reported that “The girls were the envy of others in the little Illinois town when they stepped out with their boyfriends at night, their dresses and hats and sometimes even their hands and faces aglow with the phosphorescence of the luminous paint.”⁶⁵ While the work, unbeknownst to them, was highly dangerous, it was well-paying and earned them salaries ranked in the top 5% of U.S. female wage earners at the time.⁶⁶ Many of the women wore their best dresses to work so the fabric would shine brilliantly on the commuted home, proudly identifying them as a ghost girl. Some even applied the paint to their teeth to give themselves radiant smiles.⁶⁷ In a later interview, Radium Girl Charlotte Nevins remembered that she and the girls would “turn the lights off and then [we] could look in the mirror and laugh a lot. [We] glowed in the dark!”⁶⁸

While the girls consumed deadly doses of radium under the false promises of USRC, the company executives watched silently, knowing the dark, underlying truth. During this time, USRC was led by a new president Arthur Roeder who had taken over after buying a significant share of the company.⁶⁹ When former USRC president Von Sochocky visited the studio, he witnessed the lip-pointing and briefly warned, “do not do that. You will get sick.”⁷⁰ The girls immediately inquired Miss Rooney about Sochocky’s apprise. However, they were simply told what they already had been told: that “there was nothing to it” and “[radium] was not harmful.”⁷¹

Tellingly, the company executives handled radium with extreme care, making sure to wear gloves and goggles. In fact, the lab workers at USRC—all men—were provided with protective equipment; lead-lined aprons and ivory forceps were issued for handling tubes of radium. Both the lab workers and the radium girls handled similar amounts of radium overall, but only the men received protective gear.⁷² The men and women were also strictly separated during work and only met during supervised company picnics hosted outside of the factory.⁷³ This segregation prevented the women from being aware of the protection they were being deprived of. Moreover, it prevented the men from being contaminated by the radium-covered women. Later, when inquired about the differing treatment of female and male workers, the USRC claimed that the Radium Girls were not given protective equipment because the amount of radium in the paint was so small such measures were not deemed necessary.⁷⁴ However, testimonials from the company executives show that ignorance was not the true reason for denying the Radium Girls protection. The executives of USRC were aware of how dangerous any amount of radium was: Later in 1921, Sochocky wrote himself that “one could handle radium only by taking the greatest precautions.”⁷⁵

So what was the true reason? For starters, denying thousands of Radium Girls expensive protective equipment significantly cut the USRC’s costs. More importantly, there is reason to believe that the USRC thought they could get away with neglecting the girls. USRC never explicitly revealed the intentions behind its peculiar hiring practices of women exclusively. However, many signs suggest this was a calculated move. The USRC recruited painters with vulnerable identities—women, youth, recent immigrants, and those with minimal education—while their lab workers and executives consisted of educated males. The social disparities between the lab workers and dial painters, as well as their following treatment suggest that the USRC had more than just “small hands” in mind when hiring their painters. Because the dial painters’ identities automatically made them negligible to society, the USRC could avoid taking accountability if the world was to learn the truth about radium’s health implications.

Twisted Lies and Two-Faced Doctors

The USRC operated for a peaceful ten years before the Radium Girls had any idea that the paint they consumed daily was slowly killing them. In October 1921, Mollie Maggia, a 23-year-old lady and one of the first dial painters to work at the USRC, began to experience unbearable pains in her lower gum and jaw. She visited a local dentist named Joseph Knef who claimed to be an expert on unusual mouth diseases. Knef treated Mollie

for a variety of illnesses, but her condition only worsened. In just a few weeks, her jaw had begun to disintegrate and her teeth fell out at the lightest touch.⁷⁶ He called the condition an “extraordinary affliction” and “peculiar”—something unlike he had ever seen.⁷⁷ Suspecting that the disease was occupational, Knef visited the USRC asking for a sample of the radium paint, but “this was refused.”⁷⁸ However, rather than uncover the perils the women faced, he viewed the situation as a financial opportunity. For the next five years, Knef would build a false sense of trust with the girls by appearing to genuinely care for them, and subsequently use his connections to strike a deal with the USRC.

As winter passed and Mollie’s disease remained undiagnosed, Knef resorted to using superficial information about her symptoms to make wild conjectures. Based on the fact that she was a young woman living alone with extreme tiredness, sores in the mouth, and joint pain, he concluded that she had syphilis.⁷⁹ This was a serious accusation, as having sexually transmitted diseases was extremely taboo for women in the 20th century.⁸⁰ Moreover, Ottawa was a highly Catholic town “of many churches.”⁸¹ Having syphilis could destroy Mollie’s reputation. On the other hand, this diverted negative attention from radium and was thus favorable to the USRC.

On September 12, 1922, Mollie died at the age of 24 with a missing jawbone and her mouth void of teeth. When Mollie’s family inquired the cause of her death, Knef replied with his original diagnosis: syphilis. She was shamefully buried with syphilis labeled as the cause of her death on her gravestone.⁸²

Knef would misdiagnose Radium patients in a similar manner for several more years. After five years of deceit, in 1926, Knef would approach the USRC with a business proposal saying, “Get [me] a list, then names of the girls, I will keep my mouth shut for as long as I can. Quite a few cases will just die a natural death. I can hold these girls off for four or five years.”⁸³ Essentially, he offered to provide favorable diagnoses to the girls to delay their desire to go to court. The USRC eventually turned his offer down, and would later use the fact that they turned him down to take the moral high ground in court.⁸⁴ In truth, although they turned down Knef, by the time of his proposal the USRC had already hired a cohort of doctors on their payroll to perform the exact service Knef offered.

Shortly after Mollie’s death, another radium girl named Irene Rudolph also began to experience tooth pain and consulted a physician named Dr. Allen. Fearfully, she shared with Dr. Allen how her coworker who recently died had experienced similar symptoms. Dr. Allen decided that Irene and Mollie’s mysterious cases were too similar to be a mere coincidence, and filed a request at the Industrial Hygiene Division to investigate the USRC. Within days, an inspector was escorted to the Orange Plant to conduct an examination.⁸⁵

The inspector immediately noted the bizarreness of lip-pointing and inquired Harold Viedt, a vice president of USRC, about its safety. Viedt replied saying “he had warned [the girls] time and time again of this dangerous practice but he could not get them to stop it.”⁸⁶ The inspection concluded shortly thereafter, with the sending of a radium paint sample to John Roach, the deputy commissioner of the New Jersey Department of Labor for further inspection. Roach arranged for the paint to be tested by Dr. Szamaltolski, a chemist. Five days later, on January 20, 1923, Szamaltolski gravely wrote a letter to Roach saying, “It is my belief that the serious condition of the jaw has been caused by the influence of radium.”⁸⁷ However, Szamaltolski’s lone opinion was overlooked against the plethora of pro-radium literature manufactured by commercial radium exploiters. After reviewing Szamaltolski’s report and the work of the inspector, the Department of Labor took no action without explanation.⁸⁸ During all this time, the USRC was raking in \$5 million (\$75 million today) in profits after producing 2.2 million radium-covered watches for the U.S. military.⁸⁹

A few months later, on June 3, 1923, 22-year-old Helen Quinlan died suddenly from a supposed mouth infection. Shortly thereafter, 21-year-old Irene Rudolph was said to have passed from phosphorus poisoning.⁹⁰ Katherine Schaub, a fellow radium girl, was grief-stricken and confused by the eerie similarities yet completely different diagnoses amongst the past deaths.⁹¹ She filed a report to the Department of Health describing the cases as well as the lip-pointing techniques inside the studios. A memo was filed based on her visit, but it simply

concluded that, “A foreman [at the plant] by the name of Viedt said [her] claims were not true.”⁹² Once again, no further action was taken.

In late 1923, more deaths and ailments plagued the factory. Quinta McDonald suffered from excruciating bone pains, Hazel Vincent was losing teeth, Marguerite Carlough developed a severe toothache, Gryce Fryer’s feet were nearly paralyzed, and Katherine Schaub began to experience mouthaches.⁹³ In January of 1924, a nearby resident wrote to the New Jersey Department of Labor concerning harsh fumes emitted by the Orange plant. With the general public now becoming interested in the cases, the concern was taken higher up to John Roach’s superior, Commissioner Andrew McBride, who was then advised to notify the U.S Public Health Service. However, McBride refused to escalate the issue any further, saying there was not sufficient evidence to warrant doing so. His resistance to taking action was arguably motivated by the fact that as per state law, the Department of Labor’s jurisdiction was limited to conducting inspections and had no authority to stop industrial processes even if they were harmful.⁹⁴ Additionally, the Department was pro-business, with a history of allowing monopolies such as Standard Oil to escape antitrust laws.⁹⁵ As a result of these factors, the Department did not call for further investigation into the USRC. Overall, despite the fact that various government organizations were alerted multiple times by Radium Girls, doctors, and even residents in the area, the situation was continuously ignored.

As more girls fell ill, more workers resigned and no one wanted to replace them; the USRC began to experience “considerable difficulty” recruiting staff.⁹⁶ While the lack of employees was one concern, there was an even bigger problem looming over their heads. Grace Vincent, the mother of Radium Girl Hazel Vincent, had sent the USRC a letter threatening to “make [a] claim for compensation on account of [her daughter’s] illness.”⁹⁷ The USRC decided to launch their own investigation to find concrete evidence that could erase the rumors and suspicions in the case of a lawsuit. In March 1924, Arthur Roeder approached Dr. Cecil K. Drinker, professor of physiology at Harvard School of Public Health, to conduct a study at the factory based in Orange, New Jersey. Drinker was a recognized authority in occupational disease and his support was what the USRC needed to absolve itself from blame.⁹⁸

Drinker toured the factory and met with several of the laboratory’s chemists. He pointed out that the chief chemist, Dr. Edwin Leman, had “serious lesions” on his hands, but Roeder dismissed the observation, saying that “no malignant growths had ever developed on the basis of radium lesions.”⁹⁹ Drinker would later write that Roeder’s claim was “a statement so easy to disprove as to be ridiculous” and that overall, an unconcerned attitude seemed to be a “characteristic of those in authority throughout the plant.”¹⁰⁰ Drinker met with several of the symptomatic dial painters and conducted thorough medical examinations of twenty-five of the workers. On June 3, 1924, Drinker delivered his final report to Roeder, which concluded that radium was the cause of illness.¹⁰¹

Fifteen days later, Viedt wrote to Roach at the Department of Labor to share Drinker’s verdict. He omitted the vast majority of Drinker’s report and only sent a table of the worker’s blood tests that showed their blood to be “practically normal—though not a single worker had “wholly normal” blood.”¹⁰² “I do not believe,” Viedt wrote confidently in his letter to Roach, “that this table shows a condition any different than a similar examination would show of the average industrial worker.”¹⁰³ The department agreed, saying that the table showed that “every girl is in perfect condition.”¹⁰⁴ President Roeder immediately spread the news and, as he hoped, the plant’s press situation improved. “Rumors quieted considerably,” he observed in an internal memo.¹⁰⁵

In the wake of a plethora of health complaints coming from New Jersey, the Bureau of Labor Statistics launched a federal investigation into industrial poisons. The Bureau was run by Ethelbert Stewart and his subordinate, Swen Kjaer. When Kjaer met with Rufus Fordyce, another vice president of USRC, he was told to “handle the subject carefully, so as not to cause alarm among the workers.”¹⁰⁶ As a result, only three girls among thousands would even be questioned. Kjaer noted that the men in USRC’s laboratories were “well protected by lead screens,” whereas the women openly practiced lip-pointing.¹⁰⁷ When Kjaer inquired about lip-pointing, the superintendent Miss Murray told him that the girls “had been admonished not to tip the brushes in the mouths

without washing them carefully first in the water provided for such a purpose.¹⁰⁸ On the day he toured the plant, he observed that the girls did indeed have water on their desks to clean their brushes. However, when Fordyce showed him photographs of the studio taken at a different time, Kjaer noticed that water was not in evidence on the tables.¹⁰⁹ At the end of the tour, he wrote that although the girls were lip-pointing, they all seemed to be “healthy and vigorous.”¹¹⁰

Kjaer also interviewed Ottawa’s dentists to see if they had encountered any extreme conditions of their patients’ mouths as New Jersey dentists had. However, many of the doctors and dentists located around the plants had connections to the USRC and complied with requests to only release information favorable to the company. After interviewing some of the largest dental practices in town, Kjaer was repeatedly told that there had been “no evidence of malignant disorder.”¹¹¹ Three weeks into the case—an unusually short time for a national investigation—he was ordered to wrap things up. Kjaer’s boss, Ethelbert Stewart, justified the abrupt end of the investigation saying, “Radium paints came to our attention in connection with our campaign against white phosphorus; phosphorus then was our chief interest and we found that it was not used in the elements which go into luminous paint.”¹¹² In other words, the investigation was dismissed because radium poisoning was not on the radar of ongoing nationwide studies on industrial poison, which mostly focused on phosphorus. However, Stewart would later confess with an ambiguous reason: “I abandoned the inquiry not because I was convinced that no problem existed outside of the United States Radium Corporation, but because the expense of follow-up made it impossible for the Bureau to continue.”¹¹³

Shortly after Kjaer’s investigation, Cecil Drinker, who had identified radium as the source of the Radium Girls’ illness, wrote a follow-up to Roeder (USRC president) urging him to publish his full study saying “your strongest position is one which must convince the public that you have done everything humanly possible to get to the bottom of the trouble in your plant.”¹¹⁴ Roeder turned down the suggestion, which compelled Drinker to visit Roach directly to see what the USRC had said about his report. When he discovered that all Roach had received was the table of “partially normal” blood tests, he was stunned and confronted Roeder face-to-face. Roeder soothed Drinker by saying that “he would at once see to it that [Roach] received a complete copy of the original report.”¹¹⁵ At this point, however, the USRC was desperate for a new medical expert to support them with favorable research. They turned to Frederick Flinn, an assistant professor of physiology at Columbia University, who was located nearby.¹¹⁶

Flinn was not licensed to practice medicine, and his degree was in philosophy.¹¹⁷ However, he was previously hired by a company called Ethyl Corporation to find evidence that lead-infused gas was safe.¹¹⁸ Since hiring an actual medical professional was the last of USRC’s concerns, the USRC put Flinn on their payroll and referred sick radium girls to him, without informing the girls that he was working for them. Flinn examined not just all the girls at the factory but “practically every girl now working in this industry” and diagnosed them all as healthy even while aware of the gravity of their illnesses.¹¹⁹

In 1925, Dr. Harrison Martland, a chief pathologist at Newark City Hospital, was appointed as the Essex County physician, and assumed the responsibility for the welfare of all residents within those borders, including Orange, New Jersey.¹²⁰ On June 7, 1925, when the first male employee of the USRC died, Martland was officially called to attention.¹²¹ The USRC agreed to help Martland test the employee’s tissues and bones in the radium-factory laboratory if he promised to keep his conclusions secret. After testing the body with an electrometer, Martland found that the remains were saturated with radioactivity. That day, Martland made history; this was the first time radioactivity was measured in a human body.¹²²

Suspicious, Martland conducted a separate series of tests on the dying Radium Girls, Katherine Schaub, Quinta McDonald, Sarah Maillefer, and Grace Fryer, away from the eyes of the USRC. He only found 180 micrograms of radium in Sarah’s body, but it was enough to cause “a type of radiation never before known to have occurred in human beings.”¹²³ It was clear from the extensive tests and even their mere physical appearances that all four girls “showed the presence of radioactive substances.”¹²⁴ They had developed tumors the size of beach balls and their jaws were decaying fast enough to be seen rotting in real-time—a disease later named

“radium necrosis.”¹²⁵ Although the girls were devastated to learn about the gravity of their sicknesses, they were relieved to finally receive a tool to fight for justice: a proper diagnosis. One by one, Katherine Schaub, Quinta McDonald, Sarah Maifeller, Grace Freyer, and Edna Hussman stepped up to seek justice, each demanding \$250,000 in compensation from the USRC.¹²⁶

In retrospect, the USRC’s decision to hire vulnerable populations—women, immigrants, children—paid off. It allowed the company to thrive for decades while avoiding accountability. The company successfully concealed the true cause of the girls’ illness by exploiting these vulnerable identities. It was almost too easy to refer the resourceless girls to fake doctors and smear their reputations with accusations of contracting syphilis. It is not surprising that the start of the end only occurred when the first male worker at the USRC died. Perhaps this was the USRC’s pivotal mistake: letting a man die. Meanwhile, the state and federal government organizations nicely played into USRC’s cover-up scheme, paying no attention to the situation even after being alerted multiple times. They turned a blind eye to any signs of trouble at the USRC because the radium industry was invaluable to the U.S. economy and military.

“The Case of the Five Women Doomed to Die”

In the summer of 1927, the women officially filed a pleading to the Court of Chancery, a court authorized to apply principles of equity rather than a strict reading of the law.¹²⁷ The USRC received the girls’ settlement demands, and journalists flocked to get the inside scoop. The case became known as “The Case of the Five Women Doomed to Die,” and although this was mainly a sensationalist moniker meant to grab the attention of the public, it held a degree of truth.¹²⁸ The Radium Girls themselves faced a life expectancy of only a few months, while they filed a plea for a case that, due to unjust laws, was also doomed to die.

For starters, no attorney was willing to represent the girls in court. Aside from Dr. Harrison Martland, the first person to diagnose the girls with radium poisoning, the science community was exceedingly pro-radium, and in the public’s eye, radium was still a magical elixir. With medical “experts” like Frederick Flinn soothing the masses and radium employees, even the Radium Girls who were experiencing symptoms of radium poisoning were skeptical of radium’s harms. Moreover, the girls were facing an immensely wealthy, well-connected company armed with an abundance of financial resources and government connections.¹²⁹ The Radium Girls were immigrant children from poor areas, and by that alone they were already considered disposable by the law.

Even after finally getting a young man named Raymond H. Berry, a fresh Yale graduate, to defend them, the law put the girls at a disadvantage. In New Jersey, the Workmen’s Compensation Bureau laid out 9 occupational illnesses that workers could be compensated for, but because railroad accidents were the most common occupational hazard at the time, they were all railroad-related injuries. Chronic illnesses, like radium poisoning, were not included.¹³⁰ Moreover, there was a five-month statute of limitations, meaning any legal claim had to be filed within five months of the point of injury.¹³¹ At the USRC, the girls had worked for years before experiencing radium poisoning’s primary symptoms. Radium advances extremely slowly in the body, so it was almost impossible to recognize radium poisoning within five months of exposure.¹³²

In Illinois, occupational safety regulations centered around “the inhalation of silica,” since most of Ottawa’s workforce was dedicated to mining its silica reservoirs which supplied its large glass industry.¹³³ Thus, there was no mention of radium poisoning in the 1911 Illinois Occupational Disease Act. Nor was it mentioned in federal worker’s protection laws like the Employers’ Liability Acts of 1906 and 1908, which also focused solely on railroad diseases.¹³⁴ It was unthinkable at the time that there could be a slow-developing disease of this gravity caused by toxins from the workplace.

Eventually, in 1926, the five girls were able to convince the New Jersey Manufacturer’s Association to add radium necrosis to the list of compensable diseases. However, this was merely a method of appeasement to prevent other radium girls from being compensated in the future. Many girls were denied compensation for

radium poisoning in other parts of their body, since radium necrosis is a form of radium poisoning that specifically affects the jaw.¹³⁵ Moreover, the Judge stated that the bill “would not be retroactive; so that as far as these girls were concerned, nothing could be done.”¹³⁶ In other words, no one exposed to radium before 1926 could claim compensation. Overall, the bill was designed so that no one after the Five Doomed to Die would ever be compensated.

In 1928, the girls took the case to federal court where the statute of limitations was a slightly more generous two years. Fortunately, the five girls had filed their case within the statute, so was eligible for consideration.¹³⁷ However, even at the federal level, the USRC leveraged multiple loopholes to jeopardize the plaintiffs’ legal case.¹³⁸ At this point, the girls were at their deathbed. They had spent years acquiring an attorney and barely managed to add radium necrosis to the list of occupational diseases. Grace Fryer’s jaw was curretted seventeen times. Pieces of her jawbone were slowly unhinging, and her spine had decayed to the point where she was forced into a hunching position. Quinta’s ankles were so rotten that she could no longer wear shoes without experiencing excruciating pains.¹³⁹ Even so, starting in January of that year, the sickly girls appeared in court time and time again to share their experience. In April, after four months of non-stop trials, the Radium Girls finished their testimonies and handed the podium to the USRC. However, in an off-the-record discussion, USRC attorneys stated that their own witnesses would not be available as many were “going abroad for several months” to Europe for summer vacation, and the judge agreed that it would be “impossible to proceed” until September.¹⁴⁰ The USRC had purposely delayed the trial, essentially endeavoring to kill the Radium Girls with time before they ever had a chance to fight back.

The Radium Girls were devastated. “I can’t go on this way. I wish I wasn’t going to live another month,” cried Katherine Schaub as she collapsed in church the next day.¹⁴¹ Grace Fryer had developed a fear of moving the slightest inch: “I don’t dare do much with my hands for fear of being scratched. The least scratch will not heal because of the radium.”¹⁴² Due to the girls’ outcries, federal Judge William Clark was appointed as an unofficial mediator on May 30.¹⁴³ After negotiating with the USRC, the company agreed to consider a settlement in June with the motive of what they called a “cleverly designed campaign of publicity” where “the human aspect of live women doomed to die was played up in an appealing manner.”¹⁴⁴ In other words, the USRC was happy to pay compensation as a public stunt, especially when the girls were willing to take anything for their hefty medical expenses. Berry argued for a cash lump sum of \$15,000 to each woman and a pension of \$600 per year for life to cover past and future medical expenses. On June 4, Judge Clark announced that the USRC was paying a slightly lower lump sum of \$10,000 with \$600 pension—but there was a catch.¹⁴⁵ For all future medical payments, the girls would be examined by a committee of three doctors. One physician would be appointed by the girls, one by the company, and one mutually agreed. The deal was that “if any two [doctors] of this board should arrive at an opinion that the girls are no longer suffering from radium, the payments are to cease.”¹⁴⁶ It was very plausible that the USRC could manipulate the mutually agreed physician into a situation where, just as they did with Frederick Flinn, the girls would be diagnosed healthy and pension payments would cease. Moreover, it was later revealed that Judge Clark was a friend of the USRC directors and a stockholder of the company.¹⁴⁷ It was likely that he was biased in their favor.

Throughout the case of the Doomed to Die, the government and court supported the USRC in any way possible. Although worker’s protection laws like the radium necrosis bill were passed, they were designed to be as little threat to business as possible. The girls didn’t even receive a fair hearing since their judge was a USRC stockholder, resulting in an unfair verdict where compensation was given but only enough to support them until the public deemed the USRC as a just company and diverted their attention elsewhere.

Much like the government, the media also quietly took the USRC’s side. During this time, the U.S. was in the grip of the Great Depression, and the Radium Girls were despised by their communities for suing one of the remaining, surviving firms. “Some of them shun us as if we had the plague,” mentioned Olive Witt, one of the Radium girl’s friends.¹⁴⁸ The *Chicago Daily Times*, which followed the five Radium Girls’ journey from start to finish, only fueled the fire. They referred to the girls with derogatory phrases such as the “living

dead,” “walking ghosts,” and “toothpick woman,” characterizing them by their illness and physical abnormalities rather than as victims of injustice.¹⁴⁹ The public responded with similar sentiments, saying in newspaper interviews that “the [girls] that people thought died from radium and looked so terrible looked terrible when they were hired.”¹⁵⁰ Other press issues focused less on the women and more on criticizing radium: “Doomed Radium Victims Left Defenseless,” “Victim Faints at Death Query in Radium Suit,” “Ghost Women Await Court’s Decision on Radium Poisoning.”¹⁵¹ In general, the media always villainized the women or radium instead of the USRC.

The Legacy: Shining Girls or Ghost Girls?

Although the Five Women Doomed to Die were successful in achieving compensation from the USRC, over three thousand Radium Girls were not. Many Radium Girls did not meet the five month statute of limitations. Others suffered from various forms of radium poisoning that did not specifically affect the jaw, and thus were refused compensation. In 1933, *Raymond v. The Industrial Commission* changed the statute of limitations so that workers could apply for compensation without penalization if they did not know the precise time they fell ill. However, these legislative changes were later deemed unconstitutional by the Supreme Court when Inez Vallat, an Ottawa Radium Girl, asked for damage reparations, for “fail[ing] to set up an intelligible standard of duty” for being too vague.¹⁵² Moreover, unlike the USRC factories in Illinois and New Jersey, which received high media coverage, the USRC’s smaller subsidies in locations like Waterbury, Connecticut received little media attention. Hence, the USRC did not feel pressured into paying for reparations. The USRC and other radium corporations barely compensated workers in these smaller factories.¹⁵³

The USRC got away with only a dent in its finances whereas every Radium Girl suffered the detrimental health consequences of radium for the rest of her life. The radium they had consumed settled into their bodies and emitted constant, destructive radiation that “honeycombed” their bones, boring holes in their bodies.¹⁵⁴ By 1927—two years after the Five Doomed to Die received compensation—more than 50 girls had died.¹⁵⁵ Those who survived lived a life of excruciating pain, suffering from cancer and losing several of their limbs as radium ate away at their bones. Many who made it to their thirties gave birth to dead children.¹⁵⁶ Because radium has a half-life of 1,600 years, the dead Radium Girls still glow in their coffins today as radium continues to devour their corpses.¹⁵⁷

Those who survived faced a life of being the test subjects of scientific experiments. Over 2,400 U.S. studies were conducted on individuals with radium poisoning—most being former dial painters. One MIT study on 27 Radium Girls was used in the National Bureau of Statistics to establish the official, international radium tolerance level of 0.1 μCi .¹⁵⁸ At Argonne National Lab, the government exhumed the body of the Radium Girls for scientists to study. Several of the women who survived to the middle age were also sent to the lab for tests.¹⁵⁹ This research would alert the Manhattan Project’s scientists of radium’s dangers, propelling them to establish mandatory precautions so that they could build the atomic bomb safely.¹⁶⁰ A report from the U.S. Atomic Energy Commission described the girls’ contributions as “invaluable.”¹⁶¹ Further research on the Radium Girls revolutionized scientists’ understanding of radium and led to the development of arthritis and cancer treatments, radiometric dating, new aspects of aircraft controls, and lightning rods.¹⁶²

The case also illuminated the need for stronger government oversight in the workplace and facilitated the passing of the Occupational Safety and Health Act of 1970, which ensures employees a workplace free of safety hazards, including toxic chemicals. It remains the presiding workers’ safety law today.¹⁶³ The statute of limitations for radiological diseases in Illinois was also extended to 25 years.¹⁶⁴ Even though the dial painters were exhaustively studied and significantly advanced the world’s knowledge of radium, neither survivors nor the families of the victims received compensation for their contributions. To this day, the girls seldom appear in historical accounts about the discovery of radium poisoning.¹⁶⁵ From the start to end of their lives, the Radium Girls were treated as nothing more than guinea pigs for scientific discovery.

The Radium Girls' communities did not escape harm either. Over the last two decades, the U.S. Environmental Protection Agency has toiled nonstop to remove radioactivity in more than a dozen sites across the country. Today, Ottawa, Illinois is the most highly radioactively contaminated site in the U.S. and has been named a "superfund site"—a highly polluted and hazardous location requiring federal intervention to conduct a long-term cleanup of toxic waste.¹⁶⁶ Over 750 homes needed decontamination, as they were built above locations where the USRC had dumped toxic radioactive waste, and more than 200 acres of land were severely affected.¹⁶⁷ A meat-locker company in the area had to shut down after the majority of its employees died of cancer, and a family who purchased meat there found that "every brother got colon cancer within six months of each other."¹⁶⁸ Waste was even found dumped in a schoolfield.¹⁶⁹ The documentary "Radium City," explores present-day Ottawa and describes the town whose slogan was once "where friendliness reigns," as now a "gray, cold looking place... full of weeds, gray spaces, and angry or defensive people."¹⁷⁰

Conclusion

The Radium Girls' tragedy illustrates the devastating impact of prioritizing corporate welfare over public health. The government stood by the side of the USRC from beginning to end, allowing the commercial distribution of a radioactive substance, establishing laws that encouraged deceitful advertising methods, and turning a blind eye to citizens' concerns to preserve the booming radium industry. Even when dealing with the lives of its own citizens, the U.S. government actively worked to deny radium victims justice, appointing a USRC shareholder as the court judge and passing laws designed to limit the scope of compensation as much as possible.

As a result of the unspoken collaboration between the radium industry and government, the entire U.S. public was also misled into integrating hazardous radium products into their daily lives. Today, scientists know that radium is the most radioactive element on Earth, and even a microgram of the substance can saturate a human body with radioactivity for over 1,000 years. Even while aware of these potential dangers in the 1920s, the government allowed an entire radium industry to be built on the basis of false claims, and for a surplus of quack radium products from cosmetics to toys to permeate American civilization.

While past literature analyzing the rise of the radium industry identify the lack of government regulations as the obvious cause of disaster, they often overlook another crucial factor: the marginalized identities of the Radium Girls. The saga of abuses of power that led to the poisoning of 4,000 girls was riddled with opportunities that could have put an end to the injustice, yet missed at every turn. No matter how obvious the gravity and reach of occupational radium poisoning, the Radium Girls were ignored due to their gender, citizenship status, and socioeconomic class. They experienced what is known today as secondary victimization: "when the victim suffers further harm not as a direct result of the criminal act but due to the manner in which institutions and other individuals deal with the victim."¹⁷¹

The USRC's murderous working practices were only excused because they were murdering members of society who were considered disposable. Various contemporary studies still show that this discrimination is still prevalent. Today, in the realm of healthcare, women are seven times more likely than men to be misdiagnosed and discharged in the middle of a heart attack, and wait an average of 20 more minutes than men for care in ER emergencies.¹⁷²

The Radium Girls' tragedy is a critical case study of how subtle influences like gender biases and cultural prejudices can have tangible and crippling consequences on marginalized people. Perhaps if a male worker had never died, the USRC would have continued their murderous operations for several more decades, and the government would have continued to conduct fraudulent investigations like Swen Kjaer's, to protect the company from reprisal.

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