of the book: page thirty-eight contains only the statement, "Two years and two months into their marriage Marie gave birth to a six-pound baby girl. They named her Irene;" page forty-three, a reproduction of an X-ray image of Wilhem Röntgen's wife's fingers and wrist; and page eighty-three, a brief but devastating recounting of the bombing of Hiroshima from survivor Sadae Kasaoka. Even the chapter titles play a part in weaving the metaphorical interconnections Redniss seeks to make, highlighting the way in which scientific language encapsulates and creates meanings within and beyond the boundaries of science. The first chapter "Symmetry," a key conceptual framework underlying much of modern physics, is laid out so that the story of Pierre and Marie's early lives, in the form of biographical fragments and quotes from their collective papers, mirror one another on each of the facing pages of the chapter, while the last chapter, "Daughter Elements," a termed borrowed from the vocabulary of nuclear physics, tells the story of Marie's death and the carrying on of her work by her daughter Irene Joliot-Curie.

One might imagine that such a fragmented biographical narrative might be difficult to follow, but somehow Redniss is able to strip bare the details and distill the essential moments of the Curies' passionate personal and scientific life while simultaneously providing an abbreviated, yet exhilarating history of radioactivity in the twentieth century. She captures how serendipity, hard work, and genius coalesced in their scientific work, how magical radioactivity seemed at the time of their discoveries, and how shockingly dangerous, in retrospect, the experiments they carried out were. *Radioactive* reverberates with energy and captures the cataclysmic cultural changes—nuclear energy, war and medicine—wrought by their (and other's) groundbreaking science; a powerful and unique book, for historians, and non-historians alike.

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Nothing Less Than an Adventure: Ellen Gleditsch and Her Life in Science. Anne-Marie Weidler Kubanek, Crossfield Publishing, Montreal, Canada, 2010, 185 pp, ISBN 1452842132, $19

In the celebration of the outstanding contributions of Marie Curie, it is widely overlooked that there were other women active in the field of radioactivity during that period. Ellen Gleditsch was one of those forgotten women radiochemists. This definitive book by Kubanek finally brings recognition of the contributions of Gleditsch to the English-speaking world. In addition to researching correspondence of Gleditsch with contemporary scientists, Kubanek painstakingly tracked down and interviewed surviving relatives, friends, and former students of Gleditsch. Kubanek has woven their commentaries into this fascinating biographical study.

Gleditsch was born in 1879 at Mandal in southern Norway. Having a fascination with science from an early age, she excelled in school, particularly mathematics. Had she been a boy, Gleditsch would have progressed to university: instead, her father found her a position as a pharmacy assistant. After qualifying as a pharmacist, Gleditsch tried to obtain a university education and, in this quest, she was aided by a chemistry professor at the University of Oslo, Dr. Eyvind Bødtker. Bødtker hired her as a laboratory assistant and he encouraged Gleditsch to publish her research. Bødtker visited Paris and pestered Marie Curie to accept Gleditsch into Curie's research group. Initially very reluctant, Gleditsch's publication in the *Bulletin de la Société Chimique* plus a promise by Bødtker that Gleditsch was so tiny that she would not take up any significant room in the lab, persuaded Curie to accept her.

Arriving in Paris in 1907, Gleditsch was given the task of recrystallizing the mixture of barium and radium salts in order to concentrate the radium. In addition, Curie asked her to check the claim by Sir William Ramsay that copper, in the presence of radiation, was transformed into lithium. Gleditsch showed that the lithium came from contamination of the reaction vessel, and not from any element transmutation.

Leaving Paris in 1912, Gleditsch applied in 1913 to work for a year with Bertram Boltwood at Yale. Boltwood

sent a discouraging reply to Gleditsch, but by that time, Gleditsch had already embarked on a ship for the United States. Upon her arrival at Yale, Boltwood agreed to have Gleditsch work with him, and subsequently they became good friends. While at Yale, Gleditsch established a precise value for the half-life of radium. She also worked on the atomic mass of lead, which had been shown to differ from one mineral source to another. As meticulous as ever in her measurements, Gleditsch's results provided key evidence for Soddy's discovery of isotopes.

Returning to Norway, Gleditsch obtained poor-paying, low-status positions at the University of Oslo. In June of 1916, Curie requested Gleditsch to return to Paris to work at the radium extraction factory. Gleditsch undertook the perilous wartime crossing from Norway, first to England where Ernest Rutherford had obtained a security pass for her, and thence to France. Gleditsch worked at the factory until Christmas before returning to Norway. After the War, in 1920, Curie asked her to return to Paris to run the research centre while Curie was on a tour to Brazil. The friendship and contacts between Gleditsch and Curie continued for the remainder of Curie's life.

At the University in Oslo, Gleditch's teaching commitments mounted while she endeavored to continue research. Finally, in 1929, against considerable opposition, Gleditsch was appointed Professor of Chemistry.

In the 1930s, as the political situation deteriorated in Europe, Gleditsch offered haven to as many fleeing scientists as she could. Though Lise Meitner had fled to nearby Stockholm, Kubanek points out that, surprisingly, Gleditsch had little contact with Meitner, even though Gleditsch visited Stockholm periodically to see her long-time friend and colleague in radiochemistry, Eva Ramstedt. Throughout the Second World War, Gleditsch was active with the Norwegian resistance movement.

After formal retirement, Gleditsch continued with lecture and laboratory work, while expanding her diverse other interests. Despite having been exposed to so much radiation and suffering from periodic bouts of anemia, Gleditsch lived an active life until her death in 1968 at age 88.

This short review has focused upon Gleditsch's activities within radiochemistry. Kubanek's book has gone beyond this, giving a true sense of Gleditsch's life in the context of a woman scientist in early twentieth-century academia. In addition, there are interesting insights into the workings of the Curie laboratory. Kubanek should be congratulated for having filled a missing piece in the early history of radioactivity.

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The First Miracle Drugs: How the Sulfa Drugs Transformed Medicine, John E. Lesch, Oxford University Press, Oxford & New York, 2007, xii + 364 pp, ISBN 0-19-518775-X, $29.95

John Lesch accomplishes a great deal with this exhaustively researched and well-written narrative about a chapter in the history of science and medicine that has received surprisingly little attention. *The First Miracle Drugs* superbly explores the historical importance of sulfa drugs, persuasively showing how they sparked an expansion of pharmaceutical research and production, and "at the same time effected a significant change in the direction of medicine." (p. 7)

Developed in the 1930s, and used extensively until the mid 1940s to treat common bacterial infections (and particularly effective against streptococcal infections), sulfa drugs rather quickly were overshadowed by penicillin and other antibiotics. What Lesch reveals, however, is how sulfa drug research, application, and chemical theories were instrumental to advances in twentieth-century biomedicine.

First, sulfa drugs demonstrated the power of chemotherapeutic agents, initially developed by Paul Ehrlich during his quest for an anti-syphilitic agent in the early 1900s. Based on the proposition of chemotherapy—namely that chemical compounds introduced into the host organism could destroy disease-causing microorganisms—sulfa drugs represented a successful and dramatic step forward in one of the most important pathways in medical therapeutics. On Christmas Day 1932, the Ger-