The International System of Units (SI), 8th edition

Bureau International des Poids et Mesures, 2006
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The Bureau International des Poids et Mesures has released its eighth edition of the *Système International d'Unités (the International System of Units)*, commonly called the SI Brochure. The brochure is published in hard copy and is also available in electronic form at <www.bipm.org/en/si/si_brochure/>.

The brochure defines and promotes the SI, which has been used around the world as the preferred language of science and technology since its adoption in 1948 through a resolution of the 9th Conférence Générale des Poids et Mesures (CGPM), known in English as the General Conference on Weights and Measures. The SI is a living system that evolves over time and reflects current best measurement practices; accordingly, this eighth edition contains a number of changes since the previous edition. As before, it defines of all the base units and includes all the resolutions and recommendations of the CGPM and the Comité International des Poids et Mesures (CIPM), known in English as the International Committee for Weights and Measures, relating to the SI.

Formal reference to CGPM and CIPM decisions can be found in the successive volumes of the Comptes Rendus of the CGPM and the Procès-Verbaux of the CIPM; many of these are also listed in *Metrologia*. To simplify practical use of the system, the text explains these decisions, and the first chapter provides an introduction to the concept of establishing a system of units in general and the SI in particular. The definitions and practical realizations of all the units are also considered in the context of general relativity. A brief discussion of units associated with biological quantities has been introduced for the first time. Appendix 1 reproduces, in chronological order, all the decisions (resolutions, recommendations, and declarations) promulgated since 1889 by the CGPM and the CIPM on units of measurement and the SI. Appendix 2 exists only in the electronic version and can be downloaded at <www.bipm.org/en/si/si_brochure/appendix2/>. It outlines the practical realization of some important units, consistent with the definitions given in the principal text, that metrological laboratories can make to realize physical units and to calibrate material standards and measuring instruments of the highest quality. This appendix will be updated regularly to reflect improvements in the experimental techniques for realizing the units. Appendix 3 presents units for photochemical and photobiological quantities.

The eighth edition is available on the BIPM Web site in PDF and HTML format, along with a four-page summary of the brochure and a handy pocket version. In addition, an English version is available (although the official record is always that of the French text, and it must be used when an authoritative reference is required or when there is doubt about the interpretation of the text). Translations, complete or partial, of this brochure (or of its earlier editions) have been published in various languages, notably in Bulgarian, Chinese, Czech, English, German, Japanese, Korean, Portuguese, Romanian, and Spanish.

The SI brochure is prefaced by Ernst Göbel, president of CIPM; Ian Mills, president of CCU; and Andrew Wallard, director of BIPM.

www.bipm.org

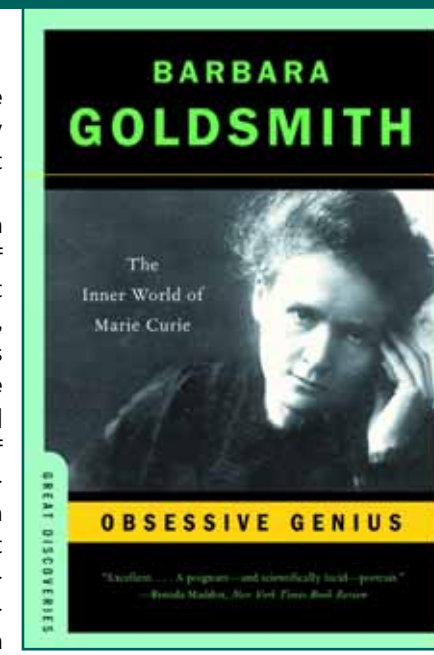
Obsessive Genius: The Inner World of Marie Curie

by Barbara Goldsmith
Great Discoveries Series
W.W. Norton & Co., New York, London, 2004
ISBN 0-393-32748-5

reviewed by Stanislaw Penczek

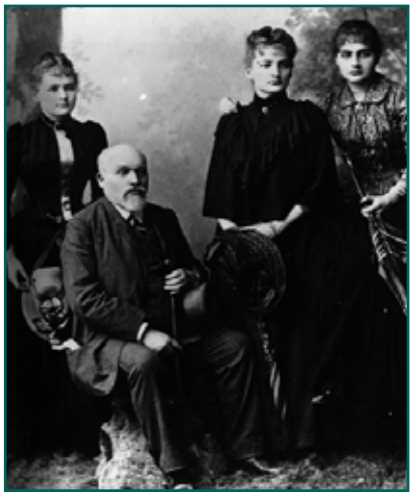
Barbara Goldsmith, a well-known historian and writer, was given access to Marie Curie's original diaries and letters and has used these documents to create a profound portrait of a brilliant scientist and a courageous woman. I believe that every chemist, and perhaps every scientist, should read this book.

Goldsmith tracks Curie's life from a childhood in Warsaw through instruction at the Sorbonne to her marriage to the young physicist Pierre Curie. She describes how the Curies built on A.H. Becquerel's discovery of radioactivity to explain its source as an



atomic property and to subsequently discover the first two radioactive elements, which they termed *polon* and *radium*—opening the way to the exploration of the inner structure of atoms. In 1903, the Curies and collaborator Becquerel were awarded the Nobel Prize in physics in recognition for their discovery of radioactivity.

Goldsmith relates in detail, and with great sympathy, how triumph and tragedy ruled Curie's life in turn. Following the 1903 Nobel award, in 1906, Pierre Curie died in a roadside accident. In 1911, Marie Curie was awarded a second Nobel Prize, this time in chemistry—but the moment was clouded by the French Society's condemnation of Curie for her affair with married physicist Paul Langevin, a former student of Pierre Curie, and the Nobel Committee's attempt to rescind the award when news of the affair surfaced. Goldsmith quotes a letter from Curie regarding the scandal: "I cannot accept the idea that the appreciation of the value of the scientific work should be influenced by libel and slander."



The young Marya Sklodowska, who became Madame Curie, is shown standing at left, behind her father, Wladyslaw, with her sisters Bronya and Helena at right. *Courtesy of the Curie and Joliot Association/Curie and Joliot-Curie Fund.*

During World War I, Curie commandeered the automobiles of well-to-do French women and organized a fleet of mobile X-ray units (that became known as "Les Petites Curies") to assist the doctors working on the front lines of battle. In later years, she established two research institutes, one in Paris and one in Warsaw, dedicated to the study of radioactivity.

In 1934, the year of her death, Curie had a final triumph: her daughter and son-in-law's receipt of the Nobel Prize for their discovery of artificial radiation. Frederic Joliot-Curie, Curie's son-in-law, wrote of their discovery that "I will never forget the expression of intense joy which came over her [Marie] when Irene and I showed her the first artificially radioactive element in the glass tube."

Goldsmith is a long-time admirer of Curie; she writes that as a teenager, "Madame Curie was my idol. Under the picture [I tacked up] I had placed two of Madame Curie's quotations: 'Nothing in life is to be feared. It is only to be understood,' and 'You cannot hope to build a better world without improving the individuals.'" Goldsmith's accomplishment in this volume is in capturing the unparalleled joy that accompanied Curie's scientific discoveries and in revealing her dedication to scientific pursuit not as a sacrifice, but rather as the result of a fierce, internal drive—one that led her to refer to radium as "her child."

Albert Einstein has referred to Marie Curie as being "as cold as a herring," but the source material that Goldsmith mines (and reprints in this book, for the first time) paints a different picture. In a letter to her sister, the young Curie wrote, "Sometimes I laugh all by myself and contemplate my state of total stupidity with genuine satisfaction."

Einstein was correct on one count: he repeatedly stated that character, persistence, and courage were the most important qualities for a scientist. Madame Curie had all three. On 20 April 1995, more than 50 years after her death, Curie was recognized for these attributes and for her scientific brilliance. Under the chairmanship of the presidents of France and of Poland, the ashes of Marie and Pierre Curie were moved to rest under the famous dome of the Panthéon in Paris. Curie was the first woman to be buried there in recognition of her own accomplishments.

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