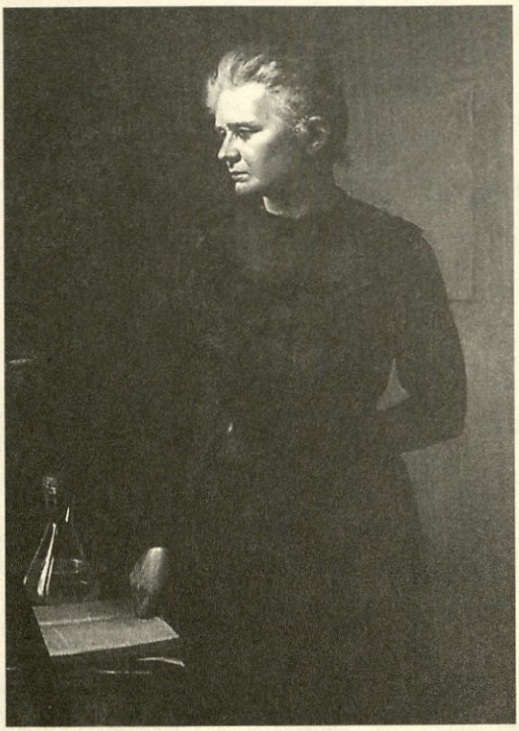
Marie Curie and the Centenary of the Discovery of Radioactivity

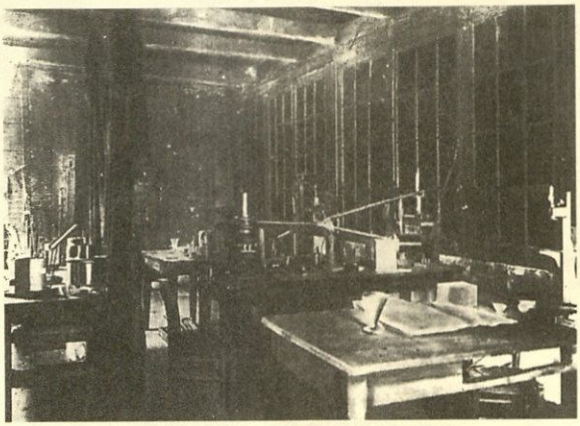
Marie Sklodowska Curie in 1903, the year she shared the Nobel Prize in Physics with Pierre Curie and Henri Becquerel.

Curated by Lynn Gamwell



Marie Sklodowska Curie, *by Daniel Graves, 1995, oil on canvas, 60 x 40 in. The Dibner Institute for the History of Science and Technology and The Burndy Library*

This exhibit documents a fascinating chapter in the history of modern chemistry, physics and medicine, the discovery of radioactivity in the 1890s—and celebrates the life of a researcher who has been an inspiration to women in science throughout this century, Marie Curie. The exhibited items are on loan from the New York Academy of Medicine; the Mütter Museum, College of Physicians in Philadelphia; the Dibner Institute for the History of Science and Technology and The Burndy Library, Massachusetts Institute of Technology; and the Society in Tribute to Marie Sklodowska Curie, Warsaw, Poland.



In 1898 Marie and Pierre Curie, working in this laboratory, discovered two radioactive elements, polonium and radium.

Radioactivity, the property of certain types of matter to emit energy spontaneously, was discovered in 1896 by French physicist Henri Becquerel as an indirect consequence of the discovery of X rays the previous year by German physicist W. C. Röntgen. Wondering whether fluorescent substances give off X rays, Becquerel discovered that a compound containing uranium gives off radiation caused by neither sunlight nor fluorescence. Following up on Becquerel's discovery, Polish-born French chemist Marie Curie showed in 1897 that the intensity of the radiation from the uranium compound (potassium uranyl sulfate) was

Polish edition of Marie Curie's 1904 doctoral thesis on radioactive substances.

always in proportion to the quantity of uranium present. Thus she established that the radiation comes from the uranium atom specifically; it is an atomic phenomenon.

Marie Curie wondered why certain uranium ores produced more "radioactivity" (a term she coined in 1898) than could be explained by their uranium content. Suspecting that the ores contained other radioactive elements, she worked with her husband, French physicist Pierre Curie, to extract the trace elements. In 1898 they discovered just such an element, which they named "polonium" for Marie Curie's homeland, and, within six months, another, which

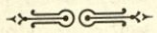
they named "radium" because of its intense radioactivity.

For their work on radioactivity, Becquerel and Marie and Pierre Curie shared the Nobel Prize in Physics in 1903, and for the discovery of polonium and radium, Marie Curie, by then a widow, was awarded the Nobel Prize in Chemistry in 1911.

Meanwhile, in England, work had begun on the subatomic structure of matter. In 1897, the first subatomic particle, the electron, was discovered by physicist J. J. Thomson, and by 1911, physicist Ernest Rutherford had gathered enough information about these particles and others to propose his theory of the nuclear atom. Thus the research of chemists and physicists of this era gradually led to the conclusion that radioactivity results from the spontaneous decay of certain atoms through the emission of subatomic particles.

The history of radioactivity divides with the year 1934: the earlier period was devoted to natural radioactive elements, the later to artificial radioactivity. In 1934, the first man-made radioactive element, phosphorus-30, was produced in the laboratory by French physicists Irène Joliot-Curie, the daughter of Marie and Pierre Curie, and Frédéric Joliot-Curie. For the discovery of artificial radioactivity, the Joliot-Curies shared the Nobel Prize for Chemistry in 1935.

At her death in 1934, Marie Curie's legacy included two research institutions established as a result of her efforts: the Radium Institute in Paris, which opened in 1913 in her adopted country, and its sister laboratory that opened the following year in her homeland, the Radium Institute in Warsaw. At these laboratories and in research centers around the world, the discovery of radioactivity a century ago has led to extensive research into this phenomenon and its widespread applications in chemistry, physics, medicine and industry.



New York Academy of Sciences

2 East 63rd St. (at Fifth Avenue)
New York, New York
October 2 - December 18, 1998
Monday - Friday: 10 a.m. - 5 p.m.

Bristol-Myers Squibb Company Gallery

Route 206 and Province Line Road
Princeton, New Jersey
January 17 - February 21, 1999
Monday - Friday: 9 a.m. - 5 p.m.
Thursday: 9 a.m. - 7 p.m.
Saturday - Sunday: 1 - 5 p.m.

Binghamton University Art Museum

State University of New York
March 5 - April 2, 1999
Tuesday - Friday: 1 - 4 p.m.

This exhibition is presented at the New York Academy of Sciences, with the generous support of the Florence Gould Foundation, in connection with an international conference on the centenary of the discovery of radioactivity, October 8-10, 1998. The conference is organized by the New York Academy of Sciences in cooperation with the New York Academy of Medicine, the Polish Academy of Sciences and the Haut Comité pour la Centenaire de la Découverte de la Radioactivité of France.