

high levels of radium, but these few cases are not suitable subjects for epidemiologic studies of the effects of internally deposited radium. Thus, the radium dial painters have been the only cohort of exposed persons found suitable for such epidemiologic studies.

The Dial Painting Industry

The early industrial uses of radium capitalized on the element's ability to cause some specific materials to fluoresce. This fluorescence was well known, because it provided one of the early methods of measuring the strength of an alpha-emitting source. Observation through a microscope of the number of flashes of light given off in a measured time interval by a suitable screen allowed the number of alpha particles given off by a small source to be determined. Not surprisingly, attempts were made to find materials that would glow continually under constant, heavy bombardment.

The first use of such a radioluminous material in the United States was in 1903 by Dr. George F. Kunz, who is reported to have painted the hands of his wrist watch so that he could read it in the dark.* Kunz filed for a patent in September 1903 and was subsequently issued a patent for a radioluminous compound to be used on watches. A very similar patent was filed by Mr. Hugo Lieber in May 1904 for a radioluminous compound. The Ansonia Clock Company of New York was the first firm to produce and sell radioluminous products. The radium for their products was undoubtedly acquired from Europe.

The individual who was primarily responsible for expanding the use of radioluminous products was Sabin A. von Sochocky, who had earned both a medical degree and a Ph.D. in Europe before immigrating to this country in 1906. In 1913, apparently to earn money to finance his medical research, he developed a radium paint and sold some 2,000 radium dial watches. Because a large and growing market existed in this field, von Sochocky continued his research on radioluminous compounds. In 1915 he, with Dr. George S. Willis, founded the Radium Luminous Materials Corporation, which provided

* This information, and much of what follows, was found in the notes of Swen Kjaer, which are now in the files of the Internal Emitter Program at Argonne National Laboratory. Kjaer, an employee of the U.S. Department of Labor, Bureau of Labor Statistics, traveled extensively, visiting institutions and individuals who reportedly were using radium in their work. The notes record Kjaer's findings on field trips made in 1925 and 1928. These notes were turned over by Kjaer to the Radium Research Program in New Jersey in 1959, then subsequently to Professor Robley Evans at the Massachusetts Institute of Technology, and in turn to Argonne when the other programs were terminated.