His Wife Gave Him a Hand

by Paul A. Schons

Kulturecke

When Wilhelm Röntgen discovered x-rays (*X-Strahlen*) in 1895, he immediately began to envision the application of the rays for medical use. Thus, after considerable experimentation with the rays he had discovered, he was ready to try the world's first x-ray image of a human being. He and his wife Bertha lived in an apartment above the laboratory building where he did his work at the University of Würzburg. He invited Mrs. Röntgen to come down to the laboratory late one evening and x-rayed her hand. The image included with this article is a reproduction of the world's first x-ray image of a human being, Bertha Röntgen's left hand.

Röntgen had discovered the existence of x-rays while working alone late in the evening on November 8, 1895. The object of his experiments that evening involved the characteristics of cathode ray tubes. As he applied electricity to the tube, he was surprised to note that a sheet of material he had coated with barium platinocyanide for a later part of his experiment seemed to give off a faint fluorescent glow. That should not have happened. Neither the cathode rays nor normal light could have caused the fluorescence. He speculated that there must be a different kind of ray at work. He was, of course, excited at the possibility of discovering something new in nature. But he was a very careful scientist and rather than communicating what had the potential to be a major event in physics, he worked day and night for the next eight weeks to be sure of the accuracy of his experiments and to discover the properties of what seemed to be a heretofore unknown kind of electromagnetic ray. He discovered that the ray would penetrate a variety of materials. Only lead seemed to stop it. He soon concluded that exposing a photographic plate to the rays would produce a shadow image of the interior of an object placed between the source of the ray and the plate. By the time he invited his wife to have her hand photographed by the strange new rays, he had invented a crude x-ray camera and had tried out x-ray photographs of a variety of objects in the laboratory.

When he announced his discovery, he was not sure what to call the new rays so he simply used the mathematical symbol for an unknown (x) and called the new rays he had discovered x-rays. His colleagues, who immediately recognized the significance of the new discovery, thought that he deserved recognition for it and proposed the name *Röntgenstrahlen* (Röntgen rays). The rays are still called Röntgenstrahlen in Germany although English uses the term x-rays as originally proposed by Röntgen.

Wilhelm Conrad Röntgen was a shy man and had a sense of scientific propriety which impelled him to avoid drawing attention to himself. Thus, he always resisted the designation of the rays with his name and much preferred the term x-rays. He was nominated and was granted the world's first Nobel Prize in the field of physics in 1901. Due to his shyness he declined to present a public address at the time he was awarded the prize. He was so dedicated to science rather than personal advancement that he did not keep the monetary award from the Nobel committee, but rather donated it to the University of Würzburg where he had made the discovery. He was so convinced that the benefits of science belong to the betterment of humanity, rather than to the enrichment of scientists, that he declined to seek any patents on his discoveries.

In the United States x-ray technology was developed further by a man with a character opposite to Röntgen. Whereas Röntgen was interested in pure science, saw advances in science as for the benefit of humanity and was reluctant to seek personal profit from his work, Thomas Edison was interested in the applications of scientific discovery, was not at all adverse to profiting from science, and was very much a showman in the popularization of scientific devices. In typical Edison fashion he tried out literally thousands of materials to improve the luminescence of x-rays and developed a commercially viable device which would come to be called the fluoroscope.

Edison and his team began to market the device in March of 1896. No one was yet aware of the dangers of x-rays in those early days. Physicians and later dentists began to use x-rays almost immediately, but the fluoroscope was also promoted as an amusement device. X-ray photographic studios were set up to take internal portraits of clients to give to friends. Edison hoped to develop a portable home fluoroscope so that people could peer into themselves and their friends at home. But the most widespread application would be a fluoroscopic machine sold to shoe stores which allowed people to x-ray their feet in new shoes to see if they seemed to fit well.

The shoe store x-rays were popular in the 1940s and 1950s and assumed to be safe. Many children in those days used them as playthings. Edison had recognized the dangers of x-rays early, when his assistant developed cancer from the popular demonstrations of Edison devices. Edison himself, thus, withdrew from the x-ray market as early as 1903. Like Edison, Röntgen also withdrew from work with x-rays soon after the awarding of the Nobel prize. Röntgen ended his career as a professor of physics at the University of Munich. He retired in 1920 and died in Munich in 1923.

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