On this day in 1895, physicist Wilhelm Conrad Rontgen (1845-1923) becomes the first person to observe X-rays, a significant scientific advancement that would ultimately benefit a variety of fields, most of all medicine, by making the invisible visible. Rontgen’s discovery occurred accidentally in his Wurzburg, Germany, lab, where he was testing whether cathode rays could pass through glass when he noticed a glow coming from a nearby chemically coated screen. He dubbed the rays that caused this glow X-rays because of their unknown nature.

X-rays are electromagnetic energy waves that act similarly to light rays, but at wavelengths approximately 1,000 times shorter than those of light. Rontgen holed up in his lab and conducted a series of experiments to better understand his discovery. He learned that X-rays penetrate human flesh but not higher-density substances such as bone or lead and that they can be photographed.

Rontgen’s discovery was labeled a medical miracle and X-rays soon became an important diagnostic tool in medicine, allowing doctors to see inside the human body for the first time without surgery. In 1897, X-rays were first used on a military battlefield, during the Balkan War, to find bullets and broken bones inside patients.

Scientists were quick to realize the benefits of X-rays, but slower to comprehend the harmful effects of radiation. Initially, it was believed X-rays passed through flesh as harmlessly as light. However, within several years, researchers began to report cases of burns and skin damage after exposure to X-rays, and in 1904, Thomas Edison’s assistant, Clarence Dally, who had worked extensively with X-rays, died of skin cancer. Dally’s death caused some scientists to begin taking the risks of radiation more seriously, but they still weren’t fully understood. During the 1930s, 40s and 50s, in fact, many American shoe stores featured shoe-fitting fluoroscopes that used to X-rays to enable customers to see the bones in their feet; it wasn’t until the 1950s that this practice was determined to be risky business. Wilhelm Rontgen received numerous accolades for his work, including the first Nobel Prize in physics in 1901, yet he remained modest and never tried to patent his discovery. Today, X-ray technology is widely used in medicine, material analysis and devices such as airport security scanners.