

How Andy Got Well, 1896 X-Rays

By Gilbert Gia
Copyright © Gilbert Gia, 2009

In August 1896, Andy Minner was sewing carpeting at Jacob Niederaur's workshop on 19th Street when he tripped and jammed a steel needle into his right leg. Somewhere behind his knee a 1-1/4-inch section of the needle had broken off. Bakersfield had a new hospital and several doctors, but none was willing to do exploratory surgery.¹

Minner returned to work for several days but grew increasingly lame; Bakersfield doctors referred him to well-known San Francisco surgeon named William F. McNutt. Minner recalled, "I called on Dr. McNutt and told him what I had come for. He examined my knee, and saw where the needle went in. He informed me that to remove it was a critical operation unless the exact location of the needle was known."

Fifty-seven year old William Fletcher McNutt, MD, had been a surgeon in the US Civil War, a student at the Edinburgh Royal College of Physicians, and in 1896 was medical lecturer for the University of California. His fraternal, political and professional associations kept him abreast of discoveries in science and medicine. Fortunate for his new Bakersfield patient, a revolutionary tool had been recently discovered. Dr. McNutt told Minner that he would have to have his knee photographed by a new process called x-ray.

A year earlier, German physicist Wilhelm Konrad Roentgen discovered a radiation he named "x-ray" for the algebraic expression of unknown quantities.² *Nature Magazine* translated Roentgen's findings into English, and in May 1896 subscribers to the *New York Times* read about a machine that magically revealed a bullet lodged inside a man's hand.³

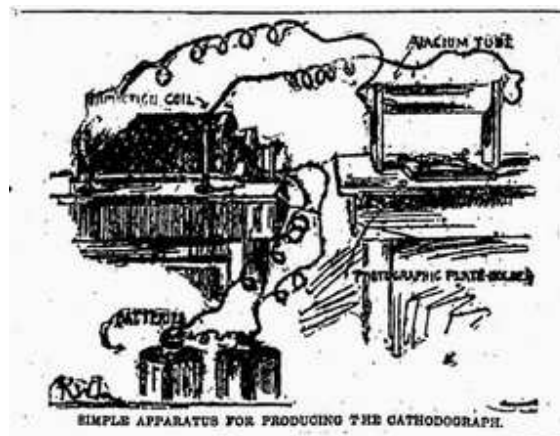
¹ Daily Californian, Sep 22, 1896. Subsequent references to Minner are from this article.

² Dr. W. C. Roentgen, "On a New Kind of Ray, A Preliminary Communication"; <http://www.emory.edu/X-RAYS>

³ New York Times, May 20, 1896

Public interest in x-ray was enormous in 1896, and for twenty-five cents New Yorkers could observe an x-ray machine in operation. A popular poem also fueled the curiosity by suggesting that x-rays could do more than just look at bones: "I'm full of daze / Shock and amaze / For now-a-days / I hear they'll gaze / Thru' cloak and gown and even stays / Those naughty, naughty Roentgen Rays."

In mid-February 1896, New York physician W.C. Peckham was at Dartmouth College where he x-rayed the right wrist and forearm of William Nolan, an ironworker who had been injured several weeks earlier and had received prompt medical treatment. After twenty-five minutes of radiation, the x-ray plate showed that Nolan's bones had knitted quite satisfactorily. Peckham commented that x-rays would someday be used in malpractice cases against physicians who were charged with improperly setting broken bones.⁴



On May 3, 1896 the *Los Angeles Times* explained in great detail how to build an x-ray machine at home. Newspapers of 1896 praised x-ray as the miracle salvation for human suffering. Among cases cited, many of them were surprisingly similar to Minner's injury. In April and June 1896, the *New York Times* wrote about two women who'd accidentally run steel needles into their hands. In both cases broken pieces remained inside. X-rays showed the locations of the needles, and subsequent surgeries restored the women to health. Not mentioned was exactly how many minutes the women received radiation, but the wrist of an injured West Point cadet was radiated for sixty minutes before showing that he had no crushed bones; amputation was avoided.

⁴ *New York Times*, Feb 18, 1896

In Summer 1896, the son of a Major General Maurice had been injured in a riding accident in Great Britain. Subsequent x-ray of the young man's damaged arm revealed a severe shoulder dislocation instead of the dreaded compound fracture. He was chloroformed, and the dislocation reduced, but the swelling didn't subside. Concern mounted that the shoulder had been improperly set, but a second session of x-ray showed that the joint was positioned correctly. "General Maurice is now warmly advocating the provision of every hospital with a necessity apparatus for taking Roentgen Ray photographs."⁵

At the beginning of 1896 x-ray operators radiated patients for up to forty-five minutes in order to obtain clear images, but exposure time soon fell by half. By Summer 1896 exposure time was reduced to a bit more than two minutes. The reason for the reduction was the new process was beginning to show its fatal side.

Minner was in San Francisco, but he had to fight for get his x-ray: "I then went to the Mechanics Fair where the examiner's x-ray apparatus was at work under the management of Dr. Jones. I made known to him what I wanted. He wanted to put me off, owing to being so busy with others. But after some persuasion he finally agreed to try."

The Mechanics' Institute had been founded in 1857 to advance technical knowledge in California. By 1896 the Institute was famous for its lectures in practical mathematics, mechanical drawing, ironwork and in diverse arts.⁶ In 1896 the Fair was held in the Institute's new three-story building on Post street, and at the time Minner was there every sort of economically valuable product was being shown, including the x-ray machine exhibited by 34 year-old Edwin H. Jones, MD.

Dr. Jones was know for his earlier work in "galvanic, faradic, and static electricity," but by 1896 he had turned to the pioneering work of William J. Morton, MD, an early Roentgen experimenter and electro-therapist. Thomas Edison once remarked, "Go to Dr. Morton; he is the best x-ray expert in America."⁷

Minner explained Dr. Jones' method of making the x-ray: "It did not take long. I sat down on a chair. Dr. Jones placed a sensitive plate wrapped about with paper between my knees over the wound without removing my clothing, then turned on the ray. Here is the picture." The

⁵ New York Times, Jun 14, 1896 (From London Times)

⁶ The fair of 1874 attracted nearly 600,000 visitors.

photograph showed the needle imbedded next to Minner's knee joint.

By Fall 1896 the hazard of x-ray exposure was generally known. Edison's scientist Nicola Tesla reported he'd experienced "sudden and sometimes even painful shock in the eyes" after his x-ray experiments. Tesla didn't think the problem was associated with x-rays, but his co-worker Elihu Thomson disagreed. Unfortunately, Thomson chose to prove his hypothesis by exposing his own body to x-ray. He was seriously injured. In April, Edison's own eyes became sore after working with x-rays, and Dr. Morton, independent of Edison, also complained of pain and brilliant flashes of light in his eyes after using an x-ray machine.

In 1896 a Nebraska doctor writing in the *New York Medical Record* reported that x-ray practitioners were experiencing lesions, reddened skin and hair loss. One of the earliest deaths from x-ray was Edison's employee Clarence Dally who lost both arms to amputation before ultimately dying from radiation exposure.

By Winter 1896, more than twenty cases of severe x-ray injury were on record, mostly among radiologists and glass blowers who manufactured x-ray tubes. San Francisco radiologist Elizabeth Fleischmann started her x-ray clinic in 1896, and by 1904 pervasive dermatitis of her hands forced her to quit work. The affliction eventually led to the amputation of her right arm and shoulder. Soon after that she died of cancer.

Reports of radiation illness were minor compared to the success stories. Medicine's early enthusiasm is characterized by the work of Chicago electrical engineer Wolfram C. Fuchs. In winter 1896 he'd used his x-ray machine on more than 1,400 patients. The respected Dr. Morton called x-ray technology the greatest blessing ever bestowed on humanity, and he added, "It is now recognized that no hospital in the land can do justice to its patients if it does not possess a complete x-ray outfit."

Andy Minner's surgeon now knew where to probe for the needle. His anesthetic of choice was chloroform, a boon to surgery since 1847. The liquid did give patients headaches, but it had an inoffensive odor,

⁷ Edison had tested more than 1,900 substances before settling on "tungstate of calcium" as the best material for x-ray plates.

rendered patients quickly unconscious, and killed only a few of them.⁸

Minner continued, " After obtaining a proof of the photograph, I went back to Dr. McNutt, and in about twenty minutes he removed the needle. It was down under the sinus, and this was why the doctor did not want to undertake the operation without knowing the exact location of it. He did a perfect job, and he was not long at it. I took chloroform."

Minner was in San Francisco about two weeks before returning to Bakersfield. The morning of September 22 when he stepped off the train, he had in his pocket a keepsake from San Francisco, a one-and-one-half inch piece of blue-black needle. It had changed color while embedded in his knee. Minner's lameness was nearly gone, and he was quite happy.

⁸ The US Army Medical Museum estimated that deaths from chloroform during the Civil War were five per thousand cases.