

# Seeing the bones of things

## *A scan of x-rays' early history*

Patrick J. Sullivan MD

When it happened, the world proved astonishingly receptive to this radical shift of perception. Overnight, much of what had seemed solid only the day before was shown to be translucent, even transparent.<sup>1</sup>

Hans Castorp saw exactly what he should have expected to see, but which no [one] was ever intended to see and which he himself had never presumed he would be able to see: he saw his own grave. Under that light, he saw the process of corruption anticipated, saw the flesh in which he moved decomposed, expunged, dissolved into airy nothingness—and inside was the delicately turned skeleton of his right hand and around the last joint of the ring finger, dangling black and loose, the signet ring his grandfather had bequeathed him ... [he] beheld a familiar part of his body, and for the first time in his life he understood that he would die. And he made the same face he usually made when listening to music—a rather dull, sleepy, and devout face, his head tilted toward one shoulder, his mouth half-open.

The director said, “Spooky, isn’t it? Yes, there’s no mistaking that whiff of spookiness.”<sup>2</sup>

These passages are reminders of the cultural, psychological, and philosophical implications of a now familiar medical technology; reading them now, when far more detailed views of the inside of the body are commonplace, they recall how strange and wondrous and unsettling a simple x-ray scan once was and can still be. Fundamentally, our capacity to see into ourselves—having the invisible made visible—is profound.

### In the beginning

X-ray technology was developed in Germany in the late 19th century, and Wilhelm Röntgen announced his discovery to the world in January 1896.<sup>3</sup> That same year, in what was surely one of the first appearances of x-ray scans in Canada,

[a] young man began to appear at the entrance of a theater on Yonge Street, Toronto’s main street, with a small coil-type x-ray machine and a hand fluoroscope. For a quarter he would let the curious see “ghostly shadows of the bones of their hands on his screen.”<sup>4</sup>

Although the following classified advertisement appeared in the *The Globe* some months later, it might

be similar to the way in which the Yonge Street entrepreneur got started:



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This small example speaks to the larger social context of this period in a number of ways. How is it that x-ray apparatus were available in Ontario, being used for commercial gain as forms of entertainment, so soon after being revealed in Europe? Perhaps the fundamental reason is that Röntgen publicly revealed then declined to patent his relatively simple technology. Anyone with access to basic experimental physics equipment could try to generate x-rays for themselves, and within weeks, many did. By August 1896, a relatively larger entrepreneur than the Yonge Street huckster, General Electric, was listing a full range of x-rays products in its catalogue.<sup>6</sup>

There were those like Hans Castorp who were unsettled by these new visions, the exposure of bones alluding to death, the renegotiation of what was private and what was public.<sup>7</sup> But the fact that there were crowds ready to pay to see the new phenomenon highlights the widespread curiosity about its novelty and also points to an incipient visual culture for which the public was already primed. X-ray images were a unique component of a larger wave of image production technology that had started with cameras and that would become a permanent popular culture fixture through television, movies, and computers.<sup>1,8</sup>

For some individuals, curiosity about x-ray scans was satisfied after witnessing their bones on screen. For others, x-rays revealed a “fourth dimension” and were linked to spiritualism and the occult; their early influence on the philosophical and creative understanding of the limits of perception also influenced contemporary artists. This is evidenced in some works by Duchamp, Kupka, and less obviously Picasso.<sup>9</sup>

## Novel to normal

The Yonge Street presentation of x-rays might have been what first brought doctors in Toronto into direct contact with an x-ray apparatus. The young showman developed severe burns on his hand after using it repeatedly to demonstrate to the public the safety of his fluoroscope. He went to see a Dr Edmund E. King for treatment. Dr King is quoted as saying,

I'm afraid I was more excited about the way the burn had been suffered than the burn itself. I asked my patient to bring his mysterious outfit to the office, and used it with a success that surprised me in the examination of one or two fracture cases.<sup>4</sup>

Dr King immediately incorporated x-rays into his practice, and there is no doubt that in some limited ways the larger medical community did as well. The first well-documented clinical use of x-ray technology in North America was in Montreal, Que, on February 3, 1896, only about a month after Röntgen announced his findings. A Montreal physicist named John Cox exposed Tolson Cunning to x-rays for 45 minutes, producing a plate that showed a bullet in his calf; the bullet was subsequently removed by Dr Robert C. Kirkpatrick of McGill University.<sup>10</sup>

It is also interesting to note that many members of the medical establishment greeted the new x-ray images with scepticism. This might be because, notwithstanding the early successes, their utility seemed limited to detecting foreign bodies and fractures. Seen as a “novelty offering little beyond traditional techniques such as palpation,”<sup>11</sup> some considered x-ray scans unlikely to permanently change clinical practice. At a more intuitive level, in a theme that has been played out with the introduction of each new medical technology, some were concerned that x-ray imaging constituted a threat to the art of bedside medicine.<sup>1</sup>

Another aspect of physicians' hesitation to fully embrace the use of x-ray technology was that it was a discovery made by a physicist rather than by a medical professional. When x-ray imaging was first introduced, physicians knew no more about x-rays than anyone else. Dr James Burry of Chicago, Ill, who would go on to become the first American physician to produce x-rays, initially used an ordinary incandescent light bulb instead of a Crookes tube in constructing his apparatus, “no doubt misled by newspaper reports circulating at the time.”<sup>10</sup>

Therefore, in the earliest years, physicians needed the assistance of technologists to perform x-ray scans; these tended to be physicists who had emulated Röntgen's experiments. The Röntgen Society, formed in Britain in 1897, included physicists, engineers, and other “lay people”; self-taught radiographers not only received referrals from physicians but achieved renown as x-ray

interpreters.<sup>1,12</sup> Indeed one imagines Dr King's patient in 1896, being more experienced with the fluoroscope, instructing the physician on how to use the apparatus, perhaps even pointing out what he noted to be typical or abnormal. But by 1903 the *British Medical Journal* argued that “laymen should confine themselves to the more mechanical act of producing a picture and abstain from assuming a scientific knowledge of the bearings of radiographs on diagnosis or prognosis.”<sup>13</sup>

## Negative exposure

As lines of professional propriety were drawn around the new technology, what would also emerge in subsequent years was the “dark side” of Röntgen's discovery: Lost in Dr King's excitement about using x-rays for the first time was how he treated his patient's radiation burns. Given that for years many physicians refused to acknowledge that radiation did cause burns, he might not have even included the boy's occupational exposure in his differential diagnosis. Dr King would go on to lecture about x-ray technology to the Toronto Medical Society; in the recorded history, he does not mention his tutor.<sup>14</sup> What became of that Yonge Street huckster is unknown.

Within a few decades, x-rays and their radical properties became normalized within the domain of science and medicine. When American artist Robert Rauschenberg used a full-body x-ray scan of himself in his life-size lithographic print “Booster” in 1967, “viewers recognized the image immediately as a variation on their own routine medical experience.”<sup>9</sup>

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### Acknowledgment

The author thanks Dr Ian Cameron for his encouragement and advice.

### Competing interests

None declared

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