

The Value of X

A story by the students of class 4B Informatics at IIS Giuseppe Luigi Lagrange in Milan, in collaboration with the Bracco Historical Archive.

On the evening of November 8, 1995, only one light was on in the Röntgen household: a desk lamp. In the quiet semi-darkness of her room, broken only by the ticking of the clock, Sofia stared at her math homework with resignation. Beneath that light, the young girl appeared focused and visibly tired. Her brown eyes, usually lively, were dull, as if every thought had come to a halt in front of those seemingly incomprehensible numbers.

Find X, the assignment said, with an air of apparent politeness. It was in situations like this that the student lamented not having inherited at least a bit of the scientific talent that was typical in her family. The origin of this supposed predisposition traced back to her great-great-grandfather, Wilhelm Conrad Röntgen, the German physicist known for his research on cathode rays. From that illustrious ancestor, the young girl was convinced she had inherited something after all: misfortune. A car accident had ended the scientist's life before his discoveries could lead to truly significant results. *Find X*: Sofia's gaze returned to the prompt, now less polite - on the contrary, it seemed to be urging her not to waste time and to write something meaningful on the blank sheet in front of her. Only a few pencil marks decorated that otherwise empty page: 11/8/95. A day spent doing everything except those pointless math exercises. And yet, that date reminded her of something. *Find X*, the instruction pressed on, now with a decidedly more peremptory tone. The chair, however, was empty, and the pencil laid across the almost untouched page. Swept away by the thoughts stirred by that date, Sofia was now standing in front of the bookshelf.

She had never met her great-grandfather, Conrad Röntgen's son. All she knew about him was that he had moved from Bavaria to Italy for work, and that he had compiled a collection of news clippings. These clippings featured peculiar individuals, all united by the misfortune of having seen their projects cut short. She couldn't explain why all this was coming to mind at that exact moment. And yet, there she was, holding the old binder, passed down from that unknown great-grandfather to her father, and from him to her, as a gift for her eighteenth birthday. Inside were those yellowed newspaper articles. Each generation had added some items to the collection. A strange family tradition. They were clippings from many different countries, written in all the major languages.

Marie Curie: The Powerlessness of Science in the Face of War's Wounds

October 1914, Paris. Marie Curie's efforts to assist wounded soldiers continue. The scientist has outfitted around twenty vehicles - the Petit Curies - equipped with medical devices, in an attempt to provide aid to military personnel in need of care. In too many cases, however, science has proven powerless. Despite the admirable efforts of the researcher, who is also assisted by her daughter Irène, the reality has been harsh: countless lives have been lost because it was impossible to detect bullets hidden deep within tissue or internal fractures invisible to the naked eye. Madame Curie, already the recipient of two Nobel Prizes - one for Physics in 1903 and another for Chemistry in 1911 - has often expressed her frustration at these limitations. Aware of the boundaries of medicine, she has repeatedly voiced her disappointment in the face of such insurmountable obstacles.

Frida Kahlo, the Denied Future of a Young Student

September 17, 1925, Mexico City. A serious accident occurred today involving a bus and a tram near Coyoacán. Many were injured; the only fatality was a young student, Frida Kahlo, returning home from school with her boyfriend. Despite her rapid transport to the hospital, doctors were unable to assess the true extent of her internal injuries. The death of the eighteen-year-old has shaken the local community, which mourns the future denied to the young woman, who had dreamed of becoming a doctor and was passionate about painting.

Martin Luther King Jr., The Interrupted March

September 20, 1958, New York. This morning, civil rights activist Martin Luther King Jr., leader of the movement for African American civil rights, was stabbed by a woman during a book signing in a Harlem bookstore. The blade pierced deeply, making precise surgery impossible. The man died shortly after the operation. "There was nothing more we could do", the surgeon admitted. Perhaps, if there had been a way to see inside, to understand without cutting blindly, things might have gone differently.

The names continued. Women and men, distinguished victims. People seemingly destined to change the world but stopped before their time. That evening, the girl gave up on solving for X in her math exercises but kept flipping through the newspaper clippings at her desk. Or at least she tried, until a strange sleep overcame her. A restless sleep, filled with memories that weren't hers, of different paths, of possibilities.

Sofia opened her eyes again. The light was cold, the ceiling white, a steady rhythmic sound accompanied her breathing. Was she dreaming? "You're awake?" Asked a gentle voice. The young girl looked around, disoriented - her head was throbbing. Her brown eyes darted from object to object, searching for familiar landmarks. Next to the bed, on a small table, there was an image - some kind of black-and-white photograph showing nothing but strange, shadowy shapes in chiaroscuro. What's that? she asked the man in the white coat. The doctor looked at her as if she were joking. It's your X-ray: a cranial scan. After the fall in the street, it was wise to run some tests. Sofia's eyes widened. X-ray. Seeing inside. She needed to know more. It was a strange dream, but she might as well live it to the fullest. Shortly after, she left the hospital. She knew the city well—it was her Milan, exactly as she remembered it, except for a few small differences. She headed to the Sormani Library to continue her research.

There, the girl found books that described how X-rays had revolutionized the world—not only in medicine. Thanks to those invisible rays, it was possible to see inside ancient sarcophagi without opening them, to read the most delicate papyri sealed for centuries, or even to discover what lay beneath the surface of famous paintings. There was a Picasso painting, *The Old Guitarist*: an X-ray had revealed another hidden portrait beneath the surface, erased but not entirely gone. She lingered on airport security checkpoints. How many hours had she lost during her travels because of security checks? "Yes, at least another hour in line"; "Please open your bag"; "What's in that pocket?" The X-ray machine made the invisible visible. As she kept reading, Sofia also discovered Iopamidol, a contrast agent developed by the Bracco company. A way to make X-rays even more effective. While taking notes in a quick but neat handwriting, her slender hands trembled slightly with emotion. This was the path to follow.

The X she was looking for wasn't just a letter, nor a simple unknown to solve. It was a symbol. It represented everything that could now be seen, understood, uncovered. Sofia picked up one last book.

November 8, 1895. While studying cathode rays, Wilhelm Conrad Röntgen accidentally discovered mysterious rays - called X to indicate their unknown nature -that could pass through bodies and imprint themselves on photographic plates. A tear moistened the page.

Sofia was already on a bus, headed to the Bracco Historical Archive. There, she was certain she would find the final answers to her questions. Upon arriving at the facility, she was warmly welcomed by several archivists. The young woman had the distinct feeling they had been expecting her. The archivists led her into a spacious study room and laid out several documents for her.

The story she was interested in dated back to research carried out in the 1970s at the Bracco Laboratories in Milan's Lambrate district. Under the guidance of entrepreneur Fulvio Bracco and through the work of Professor Ernst Felder, researchers had discovered a molecule known as lopamidol. Unlike the substances used up to that point, this contrast agent made it possible to look inside the human body without pain. Thanks to its superior ability to absorb X-rays, lopamidol could be used in radiographs and CT scans to produce much clearer images—all without any significant side effects for patients. Starting in the 1980s, when it was introduced to the market, this innovation allowed for more accurate diagnoses and helped save thousands of lives.

The young woman was exhausted. Under her hands lay not a single blank page, but notes, annotations, and diagrams summarizing everything she had learned. She kept writing until her eyes closed once again.

The morning of November 9, 1995. In the Röntgen household, a single light was already on: a desk lamp. In the dim light of her room, Sofia opened her eyes. In front of her, unfinished math homework. In her hands, she clutched a notebook. It took her a moment to realize she was back. Then she looked down at what she had written: pages filled with calculations, names, questions, and answers. Maybe, with a bit of luck, a young woman could change the future of her world.