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RESEARCH

The Elements of a Life: Lauren Redniss's Graphic Biography of Marie Curie

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This article explores how Lauren Redniss's *Radioactive: Marie & Pierre Curie: A Tale of Love and Fallout* (2010) uses expressive drawings, lettering, layouts, tableaux, colour, photographs and archival documents to challenge traditional biographical conventions. Drawing on art history, comics studies, feminist science history, and biography theory, it proposes that *Radioactive* initially invites readers into the pleasures of intimate knowledge of a complex female figure through alluring hand-drawn visual sequences that recreate both Curie's era and aura. However, this romanticized and even eroticized view of the subject shifts as the graphic biography of Marie Curie transforms into the graphic biography of her primary discovery, the element radium, and the later twentieth century tragedies of atomic warfare and nuclear fallout. The article concludes that *Radioactive* is an experiment in graphic biography that highlights how the border between the seen and the unseen cuts across atomic science, biographical narrative, and visual storytelling.

Keywords: graphic biography; Marie Curie; science comics; women in comics

Marie Curie has been depicted in comics for nearly a century as a complex icon of the brilliant female scientist whose passion for her dangerous research ultimately destroys her. Often portrayed as a positive, albeit tragic, icon to encourage girls and women to pursue careers in science, more recent graphic biographies of Curie by feminist artists complicate the celebrated facts of her life story, and challenge enduring gendered clichés of her personal and professional sacrifice. The most sustained recent Curie graphic biography is Lauren Redniss's *Radioactive: Marie & Pierre Curie: A Tale of Love and Fallout* (2010). Redniss is a New York based artist, illustrator, and graphic designer whose three critically acclaimed books, *Century Girl* (2006), *Radioactive* (2010), and *Thunder & Lightning* (2015), combine visual and verbal storytelling.

ing with archival research, cultural history, and experiments in graphic biography. In *Radioactive*, Redniss blends modernist-influenced line drawings, emotionally resonant colours, expressive lettering, and archival documents to draw Curie at the centre of various personal and scientific networks, into which she also folds herself (images and supplemental material associated with *Radioactive* may be viewed at the archived exhibit page hosted by The New York Public Library: <http://exhibitions.nypl.org/radioactive/>).

Radioactive pushes the generic rules of biography in a visual narrative that is less concerned with the genre's typical conventions of the authoritative narrator and the autonomous self than with using elements of visual documentation and display to convey a sense of Curie's persona as much as the facts of her person. This intimate approach is particularly evident when *Radioactive's* portrayal of Curie is contrasted to another recent graphic biography, *The Radium Fairy*, by Chantal Montellier, which takes a third person and more detached view of Curie's life. While visually dramatic and at times surrealistic, Montellier adheres to biography's conventional linearity and avoids speculating on its subject's interior life. Conversely, Redniss breaks with biographical tradition to produce a graphic example of 'the new biography,' a term life writing scholars use to describe a cluster of practices in prose biography, notably "the relaxing of constraints of evidence, greater use of such storytelling forms as dialogue and setting, and the introduction of uncertainty or speculation" (Smith and Watson 2010: 298).

In what follows, *Radioactive* serves as the main case study to ask how the visual form of graphic biography, with all of its gaps, tensions, and juxtapositions, might be particularly well suited to the new biography's project to subvert what Pierre Bourdieu terms the "biographical illusion" of a coherent, knowable life story told objectively by an authoritative narrator (Bourdieu 2000). Drawing on art history, comics studies, feminist science history, biography theory, and a brief discussion of how Montellier's *The Radium Fairy* takes an alternate approach to Curie's graphic biography, I propose that *Radioactive* initially invites readers into the pleasures of intimate knowledge of a complex female figure through alluring hand-drawn visual sequences that recreate both Curie's era and aura. But, this romanticized and even eroticized view

of the subject shifts as Redniss's graphic biography of Marie Curie transforms into the graphic narrative of her primary discovery, the element radium, and the later twentieth century tragedies of atomic warfare and nuclear fallout. Redniss thereby pivots the visual narrative from the conventional topic of biography – the subject's intriguing life – to the posthumous narrative of the consequences of her lifetime's work in order to construct a relational and self-reflexive graphic biography. In so doing, Redniss draws Curie at the centre of an ever-expanding web of social relations during and after her life, and across time and space.

I. An Impossible Icon: The Marie Curie Image

There is a long history of Curie biographies in prose, comics, popular culture, and film going back nearly a century. In her lifetime, magazine coverage and the early celebrity industry participated in her biomythologization. The first woman to win a Nobel Prize, the first person and only woman to win it twice, and the first woman to become a professor at the University of Paris, Curie's professional achievements are extraordinary. As well, she was lionized in her lifetime for the applications of her work to cancer treatment, and it was widely understood that the purpose of her radioactivity research was medical, not political or military (Hellman 1992: 39–41). Her biomythology as a great woman scientist intensified with the 1937 biography, *Madame Curie: A Biography*, written by her daughter, Eve Curie, to manage her mother's image. Picture books and comics about Marie Curie are almost too numerous to count, exist in many languages, and often elicit nostalgic memories of childhood reading and inspiration. The late 1940s *Classics Illustrated* series, "Pioneers of Science," included Curie in its comics biographies of great scientists from Ancient Greece to the twentieth century (Jones 2011: 137). Even when she was alive, women formed the main audience of Curie's fundraising tours and speaking events, and this gendering of her reception has long positioned her as a role model for girls.

The March–April 1946 issue of *Wonder Woman* (Vol. 16) features a short comic strip biography, "Wonder Women of History: Marie Curie" (https://wonder-woman.fandom.com/wiki/Wonder_Women_of_History). As Tim Hanley explains, the "Wonder Women of History" series ran throughout the 1940s Golden Age and consisted of four-page strips drawn in a realistic and historically accurate style. Hanley

summarizes the narrative pattern each strip followed, whether it was about a famous or lesser known woman: “the subject overcame some kind of adversity, usually related to her gender, and ultimately accomplished something of great importance. They were heroic stories, and showed how one woman could have a big impact and influence the world” (2014: 76). The message was clear: girls do not need to have superpowers like Wonder Woman to be successful and make a difference. In Britain, the 1959 issue of the British magazine *Girl*, “seen by comics historians as a watershed,” also included a comic strip biography of Marie Curie (Gibson 2015: 49). Comics scholar Mel Gibson observes that Curie was an ideal subject for a post-war magazine seeking to provide middle-class British girls with activities and role models of appropriate girlhood and womanhood.

But even these instructive comics for young readers prove more complicated than they initially seem. On the one hand, they construct edifying stories to encourage girls into the sciences. On the other hand, even the most didactic examples do not shy away from her private life, especially her romantic and professional relationship with Pierre Curie. As Naomi Pasachoff notes:

It would seem that enduring public interest in Curie’s life is primarily due to the deeply dramatic narrative arc of her life. Her life, if it were a novel, might seem to suffer from a surfeit of plot lines: the motherless child, the Polish patriot, the self-abnegating daughter and sister, the driven expatriate student, the reluctant bride, and the single mother, with a juicy adultery scandal thrown in for good measure. The public appears to like its science seasoned with lots of spice. (2005: 377–78)

For most of the twentieth century, Curie biographies were peppered with gendered clichés that turned her into an icon of an impossible femininity. Julie Des Jardins describes the impact on subsequent female scientists of what she calls the “Marie Curie complex”: “the notion that women in science feel pressured to embody sacrifice, motherhood, devotion, altruism, and humanitarianism and simultaneously, to excel at science through objectivity and detachment” (2010: 43–44). In keeping

with the superhero comics culture developing in parallel to the educational comics culture of the post-war period, Curie was presented to the American public of the time as “a superwoman, too smart, too dedicated, too focused, and too talented to be emulated by ordinary women” (2010: 44). She was a wonder woman of the laboratory, saving humanity through her superhuman intellect, persistence, and sacrifice. And, like many superheroes, the “Curie Complex” proposed a divided figure: a serious scientist by day and a doting mother by night.

II. Science and Seduction: *Radioactive's* Visual Style

A new era of biographical interest and attempts to redraw Curie's private persona began in 1990, when the embargo was lifted on the personal, and often poetic, writing in her workbooks, letters, and diary of the pivotal year after Pierre's accidental death. *Radioactive* is part of this shift, as it enters and dramatically interrupts the Curie biomythology in its depiction of Marie as a sensual and sexual woman as well as a brilliant scientist. As a result, *Radioactive* is a hard book to classify. It falls somewhere between comic book, artist's book, and scrapbook. It has also been remediated into an online exhibit at the website of the New York Public Library, and *Persepolis* author Marjane Satrapi announced in 2017 that she is adapting the book into a screenplay (*Radioactive* 2011; Booth 2017).

As a print graphic biography, *Radioactive* combines visual technologies of display with the genre of science biography to make visible the hidden energies of radioactivity, as well as the unseen elements of Marie Curie's life. In his study of French graphic biographies about well-known artists, Thierry Groensteen suggests this sub-genre is uniquely challenging because the life of the artist is difficult to construct without also reproducing their art, often resulting in tensions between painting and comics (2017). Cartoonists drawing the lives of modern scientists face the opposite conundrum to those drawing artists' biographies. Instead of having to reproduce the subject's own artistic works, they must find ways to communicate their subjects' scientific accomplishments that are often, especially in the case of atomic research, invisible to the human eye. Various imaging techniques, from radiography to

ultrasound, might find their way into science graphic biographies, and diagrams are an important visual tool for science educators and cartoonists alike (Rifkind 2015).

This unique visual challenge of making visible the invisible is explicit in *Radioactive* from the very beginning. The Prologue is a hand-lettered reproduction of the pioneering American modern dancer Loïe Fuller's "Lecture on Radium" (January 20, 1911). Fuller is famous for her luminescent costumes and experiments with chemical compounds for stage lighting that brought late Victorian scientific developments onto the avant-garde stage. Redniss explains later that, like "a moth to the Curies' flame, Loïe Fuller came to dance in their home" (2010: 64). Her Prologue lecture describes radium as a one of "nature's magics"; the element is magical because it was, at the time, a mystery to human understanding (Fuller qtd. in Redniss 2010: 7). Fuller then turns from magic and mysteries to evidence and belief: "If Radium can bring to our vision those things which we cannot see (as it does the atom), its influence cannot be measured on materialists who say, 'I'll believe when I see' [...] We may not believe, but we do not know that we should not believe!" (2010: 7). In one sense, this Prologue summarizes Curie's life project to reveal radium's properties through laboratory-intensive experiments and evidence-based scientific method. In another sense, Redniss sets up her own artistic project to make visible the invisible sensations of life experience as well as the threads that connect individuals to each other through time and across space. Redniss thus reconstructs the life and legacy of Marie Curie in a graphic biography that crosses aesthetic and genre boundaries to represent its primary subject as a figure at once spectral and luminous, present and absent.

Radioactive draws Curie as a ghostly figure who haunts the atomic age she helped to launch, while she is also a complex example of the female scientist caught between public fame and private passions. The book's visual style supports her evocation of Marie's persona in at least two ways: the historical period of Curie's life is evoked through references to early twentieth century modernist painting, and the scientific work of Curie's lab is reproduced aesthetically in the form of cyanotype prints. Redniss's distinctive style of contour line drawings evokes the figure drawings of Modigliani and group compositional style of Cezanne, while her

colour-saturated tableaus reference Chagall and her rich blues recall Picasso. These influences produce a dreamy vision of bohemian early twentieth-century Paris, and yet are very contemporary in their comics-inspired interactions with hand-written verbal text, albeit without conventional speech balloons and panel frames. These visual references to celebrated modernist artists elevate the work from comics to high art, and echo early twentieth century painters' experiments in the dynamic and often erotic tensions between human figures. For instance, the double page spread describing Marie and Pierre's 1895 honeymoon explains on the left page that they were charmed by the flowers in the forest of Compiègne, while the right page is a yellow and ochre tinted drawing of their naked bodies in nature. With a nude Marie in the background, Redniss draws Pierre nude in the foreground, picking water buttercups that glow white on the page in the same way test tubes of radium will glow in Marie's hand later on (Redniss 2010: 72). This scene recalls Loïe Fuller's "Lecture on Radium" as it draws a mystical scene of the magic properties of nature and implies, through visual correlation, that water buttercups and radium were equally enchanting to the Curies.

Science, sensuality, and sexuality appear throughout *Radioactive* in images of magic, mystery, and mysticism. After Pierre's devastating accidental death (in April 1906 he slipped and fell under the wheels of a horse-drawn cart on the streets of Paris), Marie's love affair with Pierre's married student, Paul Langevin, was the topic of much tabloid scandal and official disapproval. Redniss celebrates their passion in deep orange and fiery red hues that intensify the ochre palette of the earlier honeymoon image and once again recall paintings of nudes by Matisse and Gauguin. Quotations from the "impassioned letters" between Marie and Paul radiate out from the line drawings of their nude bodies to corroborate the intimate and erotic visual scene in words (2010: 123).

Depicting Curie in relation to her male professional and romantic partners clearly genders the story of her scientific life; it is a narrative strategy the many prose and graphic biographies of Darwin, Pasteur, Einstein, Oppenheimer, Feynman, and other male scientists resist. Despite its contemporary view of Marie's sexuality, in many ways *Radioactive* reproduces the history of Curie biographies that oscillate

between admiring hagiography of a strong woman and empathetic victimology of a wasting woman who was, ironically, destroyed by the substance she discovered. While I agree with many reviewers that Redniss romanticizes Curie on several levels – she becomes both an erotic figure and an idealized one – I also believe that *Radioactive* is at once visually seductive and ideologically complex, and that it highlights how the border between the seen and the unseen cuts across atomic science, biographical narrative, and visual storytelling.

Radioactive's investment in reproducing the sensations of Curie's life as much as the facts of conventional biography is reinforced by Redniss's decision to use cyanotype printing for many of the images. Cyanotypes are an early form of photographic printing that combine chemicals and exposure to ultraviolet rays to produce an image in Cyan blue. They were popular with nineteenth century female botanists, most famously Anna Atkins. So, Redniss's choice of this medium inserts Curie into a longer history of female scientists and allows the biographer to get closer to her subject by engaging in an early form of radiation exposure herself. The cyanotype images appear throughout *Radioactive* and give the book an auratic quality. As Redniss says in an interview, "That blue has sort of a twilight quality. And because you are getting a negative of the drawings, they often have a white line. And that to me had this certain kind of glow that reflected what Marie Curie called radium's spontaneous luminosity" ("The Twilight Softness" 2011). In this comment, Redniss betrays what some reviewers have criticized as her "wide-eyed" (Stephenson 2016: 47) romanticisation of science as a form of magic, her frequent comparisons in interviews between the cyanotype's slow revelation of an image to Curie's painstaking work to reveal the natural mysteries of the element radium. The imagery of *Radioactive* reflects Redniss's comment that the project "presented a really interesting challenge because it's largely about invisible forces. It's about love. It's about radioactivity, these things that we can't see, and so to make a visual book about that was an intriguing challenge for me" ("The Twilight Softness" 2011).

III. From Dream to Nightmare: Chantal Montellier's *The Radium Fairy*

Predictably, Redniss's mystification of Curie's work has irritated some historians of science. Physicist Sharon Stephenson points out that Redniss ignores the fact that

radioactivity can be seen with the right technology, just not by the human eye, and that perhaps scientists like her, who “understand Marie Curie’s world, a world of data, of graphs, of precision and accuracy, are the only ones who should hold her dear” (2016: 36). This is a classic tug-of-war over biographical authority and authentic representation, between scientific history and cultural history, and Stephenson’s comment also betrays her irritation with Redniss’s feminized and mystifying rendering of Curie’s relationship to her science.

These critics might be more approving of another recent Curie graphic biography that positions its narrative more firmly in the world of measurable science and provides an instructive example of the multiple visual and narrative possibilities available to the graphic biography. Although its title (in both French and English) contradicts its representation of Curie as a strong woman and successful scientist, *The Radium Fairy* (2016) by French feminist cartoonist Chantal Montellier, in collaboration with Renaud Huynh (Director of the Musée Curie) also tells Curie’s life story from a contemporary point of view. Unlike Redniss, who installs a third person narrator alongside multiple other voices, Montellier uses flashbacks told by Marie in the first person. The cartoonist removes herself verbally and depicts the double story of love and science from a visual distance, in public settings rather than intimate private ones, framing the romantic couple with their diagrams. Whereas *Radioactive’s* pages produce pleasing visual harmonies, *The Radium Fairy* moves towards visual dissonance. Joe McCulloch observes that Montellier’s work in political illustration prior to her shift to narrative comics in the 1970s is evident as “a product of deliberation, drawing attention to the mechanics of what she is doing to assemble the page and thus demanding the reader pivot to an analytic state” (McCulloch 2017, emphasis his). The dynamic layout of the page on which Marie flashes back to Pierre’s death (**Figure 1**) achieves the “surreal texture” McCulloch sees in the whole comic, producing “a deep and unnerving sense that something has gone completely wrong with the seeming order of the world” (McCulloch 2017).

In contrast, Redniss represents Pierre’s death in a double page cyanotype blue spread that pastiches Chagall’s horses and high angle views of Paris skylines, with the narrative lettering enclosed in the horse cart outline (**Figure 2**). Neither graphic biography attempts a realistic rendering of this traumatic event in Marie Curie’s life:



Figure 1: Marie Recalls Pierre's Death in *The Radium Fairy* by Chantal Montellier and Renaud Huynh, 2016: 15. © 2016 DUPUIS – Chantal Montellier & Renaud Huynh.

Montellier's irregular layout, large red splash, and repetition of the oncoming wheels and horses constructs a violent, surrealist nightmare while Redniss's large scale cityscape and distorted human and animal bodies create an expressionistic, folkloric hallucination.

That these two graphic biographies employ very different styles to tell the same story supports the respective artists' narrative investments as well as their visual auteurism. Montellier draws Pierre as a political radical and humanitarian inspired by



Figure 2: Pierre's Death in *Radioactive* by Lauren Redniss, 2010: 96–7. © It Books/HarperCollins – Lauren Redniss.

his father, a doctor who served the poor and joined the rioters during the Commune (Montellier and Huynh 2016: 8–9). Redniss scarcely mentions this side of him, dwelling much more on his Spiritualist beliefs and interests in the occult to blur the borders between science and séance. Following through on Fuller's Prologue invitation to connect radium to mystery and magic, Redniss provides a cultural history of Spiritualism and quotes from Pierre's letters: "If the Spiritualist claims proved to be true, Pierre wrote, there was 'nothing more important from a scientific point of view.' He analyzed data from a séance as he would have in any laboratory experiment" (2010: 53). Moreover, the graphic biography itself becomes a kind of séance, a conjuring of Marie and Pierre back from the dead in ghostly images by the medium who is the artist/narrator/magician.

The ethos of the séance is present in the luminous cyanotypes and becomes intensified in images of disease and death. Again, *The Radium Fairy* provides an instructive contrast. When Montellier draws Marie in the final stages of leukemia induced by radium exposure, she inserts the surreal figure of the Grim Reaper, coloured in the radiation symbol's bright yellow, into the bottom left of a panel

dominated by the elderly Marie. Although terminally ill, Curie looms over this frightening personification of death and remains a solid body and an imposing figure. In contrast, Redniss draws her at this same stage as a spectral, disappearing figure (**Figure 3**).

Over this image, she writes the comment by one of Marie's lab assistants that her "presence in the lab [was] nearly immaterial, 'as if she could walk through walls'" (2010: 171). Gone are the cool and luminous blues of the cyanotypes used for

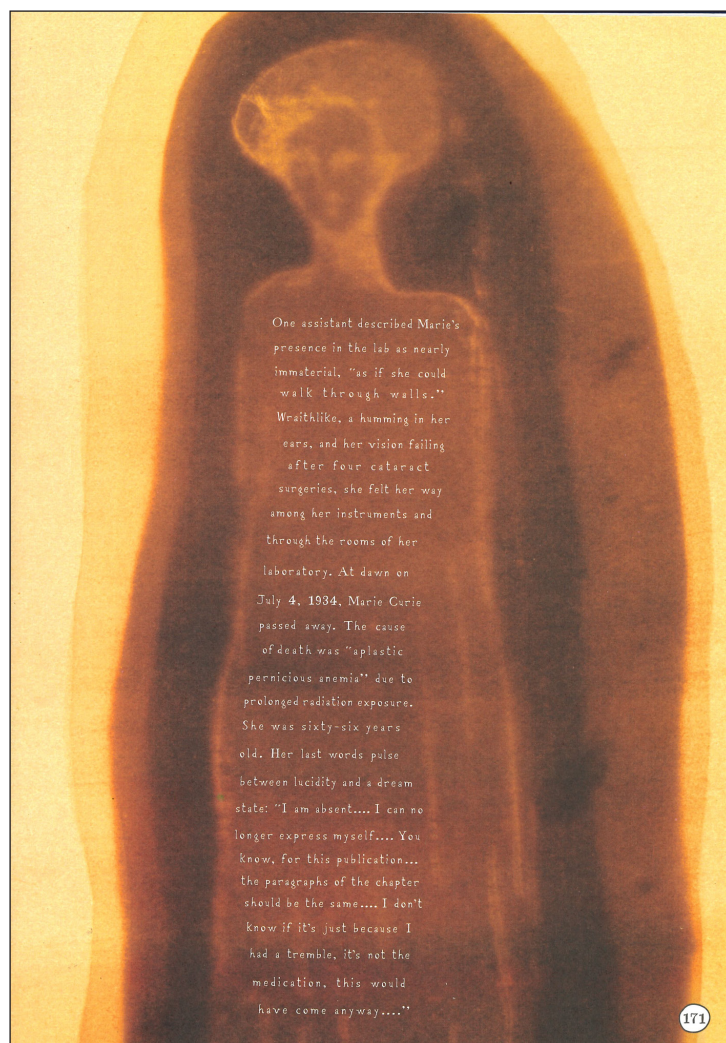


Figure 3: Marie's Death in *Radioactive* by Lauren Redniss, 2010: 171. © It Books/HarperCollins – Lauren Redniss.

scientific imagery; instead, Redniss uses earth and blood tones that recall the vibrant reds of the erotic scenes, thereby reminding us that Marie is a physical woman in a vulnerable body. Her luminosity is replaced by her spectrality; her near invisibility is rendered visible in a pastiche of the very x-ray technology she helped to develop.

IV. After-Effects: *Radioactive* as a Relational Graphic Biography

The images of Marie as a haunting spirit of the lab shift in other sections of *Radioactive* to a more political kind of haunting that extends over time and space. Redniss interweaves her wistful line drawings and evocative cyanotypes with rough black-and-white spreads that recall a cartoonist's sketch book, as well as reproductions of archival documents and photographs that imply a certain level of verifiability. This collision of visual genres supports *Radioactive's* break with the biographical convention of sequence (cradle to grave chronological story) when the life narrative of Marie is interrupted by the biography of the element of radium and multiple stories of its victims. This, in turn, loops the impact of her discoveries back into the story of Marie's life retroactively and posthumously. The non-chronological, polyvocal structure of *Radioactive* thus produces a relational biography that not only tells the double story of Marie and Pierre, as the title promises, but shows how their figurative child, radium, disperses into the world in ways that connect people who are neither proximate nor contemporaneous.

The first time Redniss interrupts the chronological life narrative is when she follows a sequence about the Curies' early research, and their realization they need to give the new property they have discovered a name, with a double page spread of the iconic image of a nuclear mushroom cloud, from an aerial perspective and tinted brown-yellow (2010: 46–7). Compared to other sequences, the verbal narrative is sparse, as Redniss writes this short statement by Marie along the bottom left in white: "MARIE: I coined the word radioactivity." Redniss undercuts her romantic representation of Marie by juxtaposing these words, presumably written in 1898 upon her discovery of radium, with a recoloured photograph of one of the 1940s atomic bomb tests, allowing the semiotic plenitude of the mushroom cloud image to convey the unseen horrors of Curie's late nineteenth century discovery of

radioactivity. Likewise, when Marie gives birth to her second daughter, Eve, in 1904, Redniss juxtaposes this happy event with the information that, in the same year, Ella Oppenheimer gave birth to her son, Robert, who would become “the father of the atomic bomb” (2010: 76). Redniss thus constructs a relational biography of Marie, first through drawing her public and private life in relation to her partners and children, and then moving beyond her subject’s intimate circle to locate her in the larger currents of twentieth century scientific, technological, and political history.

The sequence of pages that follow Eve’s birth interrupt the Marie narrative again with a double spread of an archival document (a dense FBI letter from the file of Irving Lowe, a Manhattan Project physicist who fell afoul of its director), followed by another double page spread of a hand-drawn version of the nuclear fission diagram, next to a topographical map of the atomic bomb damage around Hiroshima (2010: 78–81). These representations of radioactivity’s use in atomic warfare are then personalized on the next double page spread, which reproduce on the left side two photographs of a Japanese woman, Sadae Kasaoka, showing her as a child in 1945 and an adult in 2008, across from a full right side page testimonial of the day the bomb dropped on Hiroshima (2010: 82–83). After the page flip, Redniss inserts photographs of the stark, abstract black paper cut-outs Kasaoka made to illustrate her father’s injuries, black paper peeling off to reveal red underneath (2010: 84–85). This series concludes with the only blank double page in the book. It features one line of text explaining that in June, 1905, the Curies travelled to Sweden to collect their Nobel Prize and that Pierre “was taken with the landscape and the lakes” as well as the long summer nights (2010: 86).

In this sequence of pages, and at other moments, Redniss undercuts the romanticism of the Marie biography with other kinds of images, documents, and voices connected to the Curies posthumously because of their exposure to radiation. Radium’s curative properties and medical applications – especially in developing the x-ray and treating cancer – were what inspired Marie Curie to pursue her research. Its humanitarian potential, Redniss suggests, was why she sacrificed her health and life for her research. However, she could not control the consequences of its uses in atomic weaponry and nuclear power plants. The curative and destructive properties

of radium are another threshold Redniss crosses throughout the graphic biography. The pages immediately following the depiction of Marie's death discussed above shift focus to show a couple who travel to The Merry Widow Health Mine in Montana because they, like thousands of others, believe the extremely high levels of radon can cure a variety of serious illnesses (2010: 172–3). Just as the plot points of Curie's real life seem too fictional to be true, so is the relational biography of radium full of ironies so rich they seem more literary than factual. Redniss, breaking with all of biography's conventions, embraces these narrative excesses and contradictions, illustrating them on the page in an aesthetic of rich visual confluences and confrontations.

Paradoxically, *Radioactive* tries to get at a more authentic, realistic version of Marie Curie through a thoroughly artificial and expressionistic graphic biography. The irregular shapes of text on the page sometimes take the form of concrete poetry, filling in an outline of what they describe; at other times, they become part of the architecture of the page, inside objects or objects themselves. "A Note on the Type" appears at the end of the book: "This book is set in Eusapia LR, a typeface I created based on the title pages of manuscripts at the New York Public Library. It is named after Eusapia Palladino, the Italian Spiritualist medium whose séances the Curies attended" (2010: 201). Palladino appears in the graphic biography when Pierre mentions her in his letter about Spiritualism. The narrator explains that he treated her séances as scientific experiments, even weighing Palladino and "finding that the medium gained six kilos in the course of the session" (2010: 53). She functions diegetically to illustrate Pierre's deeper mysticism than Marie's, and she functions extra-diegetically as the source and inspiration for the lettering. Similar to her use of cyanotypes to create many of the images, Redniss conjures the Curie's world in the very form of the graphic biography. Moreover, Redniss is self-reflexive about the role of the biographer throughout. The book's epigraph is the graphic biographer's mea culpa: "With apologies to Marie Curie, who said, 'There is no connection between my scientific work and the facts of private life' (2010: 5). Two pages later, Redniss's investment in making this connection appears in the Table of Contents, where the chapter titles frame the subject's life narrative through scientific concepts, such as "magnetism" for the story of falling in love with Pierre and "fusion" for the birth of

their first daughter, Irene (2010: 9). Acknowledging her subject's resistance to the very project she has undertaken establishes a conflicted relationship between biographer and biographee, yet also registers an intimacy between them, an expression of psychological insight based on deep research into her life.

Redniss's dual intimacy and distance from her subject, her desire to show us inside Marie's life and to also comment on her legacy, at once constructs and deconstructs the biographical persona of Marie Curie. Although it prefers open panels and tableaux to comics' regular grids and speech balloons, *Radioactive* is part of an emerging field of experimental graphic biographies resuscitating in visual form key ethical and philosophical questions about representing the lives of others. The theatricality of Redniss's pages refuse to lull us into the illusion of simply watching an individual life unfold before us; her self-conscious narration and expressionistic style constantly remind readers that we are reading a construction of a persona, not the life of a person. Thomas Söderqvist suggests that two kinds of science biographies are often overlooked because they are not objective enough: those that function "as a medium for the public commemoration of an alleged great person (eulogy) and as private commemoration (labor of love)" (2011: 634). Both of these sub-genres of science biography risk too much attachment between author and subject, such that reverence can produce hagiography rather than critical inspection. Although he is referring to prose biographers of living scientists, Söderqvist's comments about emotional attachment are productive for thinking about how graphic biography can use drawing, layouts, colour, pastiche, and lettering to transgress the conventional boundaries between biographer and subject, commemoration and critique. He writes:

One can hardly set out to write a biography without being in some way emotionally involved with the central figure. But one has to work hard on establishing a more distant yet attentive stance in the process of writing. The final result should emerge as a happy divorce: the book should be a certification that the writer has freed herself or himself from the central figure. (2011: 643)

As much as *Radioactive* is both a eulogy and a labour of love, it also breaks many of the rules of prose science biographies to question what it means for the writer/artist to “free herself” from the subject. Drawing herself into the page formally – from the medium of cyanotypes to the invention of a typeface – allows Redniss to perform the role of in/visible biographer. She enters herself self-reflexively into the scenes of biography, drawing her attachment to Marie Curie in the verbal and visual signs, traces, and shadows of her subject’s life on the page. At the same time, *Radioactive* is as much the life story of radium as it is of Marie Curie. In her depictions of how radioactivity shapes our current world, Redniss implies that it is impossible for any of us to free ourselves from her central figure, that a “neutral detachment” towards Marie Curie would demand detachment from twentieth century atomic history, nuclear medicine, and even comic books (Söderqvist 2011: 643).

Ultimately, the pleasures of *Radioactive's* pages, its seductive pulls on the reader into its intimate imagery, quirky anecdotes, and affecting stories, masks some of its more insurgent strategies to reanimate the image of one of the world’s most famous women as both luminous icon and spectral shadow. *Radioactive* – like both Curie and radium – is not always what it seems: Redniss produces a visually virtuosic study of a woman to whom she is both deeply attached and whose life narrative comes with the hindsight of the horrors of atomic weaponry and nuclear fallout.

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The author has no competing interests to declare.

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