

LOGIC AS TRAGEDY

SYLVIA NICKERSON

History & Philosophy of Science & Technology / U. of Toronto
Toronto, ON, Canada M5S 1K1
S.NICKERSON@UTORONTO.CA

Apostolos Doxiadis and Christos Papadimitrou; art by Alecos Papadatos and colour by Annie Di Donna. *Logicomix: an Epic Search for Truth*. New York, Berlin and London: Bloomsbury, 2009. Pp. 347, including bibliography and appendix. £16.99; US\$22.95. ISBN 1-59691-452-1 or 978-1-59691-452-0.

In a journal dedicated to the study of one man, it seems trivial to mention that the life and times of Bertrand Russell are rich in material. A rebel and war resister with an upper-class pedigree, the subject of numerous affairs sexual and platonic, the author of one of the twentieth-century's most famous technical books, at the nexus of numerous crucial historical events, and the cofounder of analytic philosophy: we can only dream our lives half as interesting or as accomplished. For these very reasons, the authors of *Logicomix* have chosen Bertrand Russell as the focus of their unique graphic novel about the history of logicism.

Although the stated aim of *Logicomix* is to tell the story of "the quest for the foundations of mathematics" (p. 14), this is not entirely accurate. Or, I should say, the story told is not the one you might expect given this description. For the most part, *Logicomix* glosses over the why and how at the heart of technical logic, choosing to focus instead on the melodrama in the lives of the characters portrayed. Even though the revelation of deep mathematical truths may be the hook, it is the human-interest story that is the heart of this book. The cast of characters—which includes Alfred North Whitehead, Gottlob Frege, Georg Cantor, David Hilbert, Ludwig Wittgenstein and Kurt Gödel, among others—is depicted at the centre of a variety of dramatic events. The relationships between and personalities of the characters involved are the principal interest of the authors, although some explication of the logic is included for good measure. In their own words: "we focus on the people. Their ideas interest us only to the extent that they spring from their passions" (p. 23).

Because the focus is on biographical rather than technical elements, *Logicomix* makes for rather digestible comic-book reading. The characters of *Logicomix* are

portrayed as savants who are obsessed with saving the world from a collapse in the foundations of knowledge, while the world is oblivious to the quest under way (even the mathematicians are unaware of the danger: “They are *fools*, Moore!” Russell exclaims to G. E. Moore, p. 113). Moreover, the characters make great personal sacrifices to carry out their mission, as the major thesis of *Logicomix* is that the characters’ proximity to the deep truths of logic brings about insanity and madness in their lives. Overall, the history is treated with equal doses of tragedy and romanticism. In this fashion, the authors develop a story entirely simpatico with the comic medium: “The form is *perfect* for stories of *heroes* in search of *great goals*. . . . The *heroes* of the ‘*quest*’ are fascinating people. *Passionate* . . . *tortured*. In fact, true *superheroes!*” (p. 22).

The book begins with characters Apostolos and Christos walking through Athens. Apostolos is introduced as the principal author of “the quest” (how the characters refer to the comic they are writing). Christos, a theoretical computer scientist, has flown from Berkeley to Athens to help Apostolos with the book. Christos and Apostolos discuss the comic as they walk through different neighbourhoods of the city, many of which are beautifully rendered in bright colours by artist Alecos Papadatos (for example, on p. 21). When they arrive at the studio, Apostolos introduces Christos to Alecos (the artist), Annie (the colourist) and Anne (the researcher), who all work on various aspects of the comic book. The frame story of the creators working on the comic book itself is woven into the whole story, but primarily it bookends *Logicomix* at the beginning and end.

From the perspective of this exterior story we flip into an intermediate narrative in which we are introduced to the main character of *Logicomix*, Bertrand Russell. We meet Russell on 4 September 1939 at an American university, where he is about to deliver a lecture on “The Role of Logic in Human Affairs”. Isolationist protesters picket the lecture, begging Russell to cancel his talk and take a position against American involvement in the European war. This intermediate story introduces the reader to the elder Russell, public intellectual, famed pacifist and war resister.

However, it is through Russell’s lecture that we are told the actual tale of the quest for the foundations of mathematics. This story begins in an unlikely place: Russell’s childhood. A whole chapter is devoted to describing the young Russell’s life at Pembroke Lodge. In this chapter we follow Russell as he explores the gardens and gets into mischief. At night, Russell is tormented by the sound of an unearthly moan emanating from somewhere within the estate. He vows to find the source of this disturbance, but is hampered by the fact that everyone else denies its existence. Thus, Russell begins to doubt his sanity, and *Logicomix* introduces its major theme, that all logicians are touched with madness.

In his youth Russell discovers the allure of forbidden knowledge in Lord John Russell’s library, learns about mathematical proof through his study of Euclid’s *Elements*, experiences the awakening of his sexual desire, and discovers the true

story of his parents, who once “lived in a ménage à trois” but are now deceased (p. 68). Russell’s “Greek Exercises” diary makes an appearance, where he encrypts his most personal thoughts from the stern and watchful eye of his grandmother (p. 69). Eventually, Russell discovers the source of the nocturnal disturbances: his insane uncle, William Russell, is kept under lock and key in the attic. Upon confronting his uncle, Russell fears he will share the same destiny and become mad. Russell concludes that only by devoting his life to the pursuit of reason will he save himself from this untimely fate.

At this juncture it bears mentioning how much *Logicomix*’s portrayal of Russell owes to Ray Monk’s biography of him for its historical details, its logic and madness thesis, and its judgment of Russell’s story as tragic.¹ *The Spirit of Solitude* and *The Ghost of Madness* are cited in the bibliography of works the authors “most liked or found most useful” (p. 347). Through *Logicomix*, Monk’s recreation of Russell’s life will shape the interpretation of him for a new generation of readers. The same preoccupation with Russell’s emotional life that is present in Monk’s work is evident here. However, *Logicomix* takes this approach not just to Russell, but to all the characters of this story. On the one hand the authors romanticize their characters’ eccentricities and intellectual accomplishments, on the other hand they condemn them for their mental instability, misogyny, racism, or callous approach to their personal lives.

For example, Chapter 2 depicts Russell’s life at Cambridge and his marriage to Alys Pearsall Smith. After Alys and Russell marry, they travel to Jena and Halle, where they visit Frege and Cantor. Frege is characterized as a short-tempered man with misogynist opinions (“Women are such *illogical creatures*. I try to explain the *fact* to my wife ... but she *cannot understand!*” he says, p. 121). In Halle, Russell finds Cantor in an asylum where he develops his latest work: proof that Francis Bacon wrote the works of Shakespeare, and that Jesus was in fact the son of a man (p. 135).² Russell flees, having confronted again the

¹ Although the comic is not 100 percent true to fact (the authors create events that did not occur), they do include historically accurate details. Where Monk notes Russell’s youthful taste in fiction included Ivan Turgenev and Henrik Ibsen (Monk, 1: 52), *Logicomix* depicts Russell reading Turgenev’s *Fathers and Sons* and attending Ibsen’s play, *Ghosts* (pp. 81–3).

² For the most part, *Logicomix* is accurate in its revelations about these mathematicians’ lives. Cantor experienced his first nervous breakdown in 1884–85. This episode came after a productive decade in which Cantor did most of his mathematical work. After his emotional collapse, Cantor began an intensive study of Elizabethan literature. He developed a theory that the philosopher Francis Bacon was the true architect of Shakespeare’s works, and published two pamphlets on the subject. Cantor suffered from periodic mental instability for the rest of his life, and moved in and out of institutions for the mentally ill every two or three years. Cantor died in 1918 at the Nervenklinik in Halle. See Joseph Warren Dauben, *Georg Cantor: His Mathematics and Philosophy of the*

image of madness.

Although *Logicomix* focuses on its heroes' character flaws, it also describes ideas. In the course of the book, Russell explains what is set theory (p. 146) and non-Euclidean geometry (p. 150), Russell's paradox (pp. 164–7), and his theory of types (p. 174, even noting the two versions, simple and ramified, p. 177). Wittgenstein's picture theory (p. 256) and Gödel's incompleteness theorem (pp. 285–6) are also simply explained.

When Russell's character visits Frege in Jena, Frege imparts to Russell the necessity of precise logical language, and Russell conveys his admiration of Frege's *Begriffsschrift*. After travelling to Paris to attend the International Congress of Mathematicians, Russell takes inspiration from Hilbert's famous speech on the unsolved problems of mathematics, and dreams about building a ground of total certainty for arithmetic. Inspired by Hilbert's famous words, "in our science there is no 'it shall not be known'", Russell returns to Cambridge where he begins work on *The Principles of Mathematics*.³ Shortly thereafter, Russell discovers the paradox that bears his name (p. 163). At this point, the story breaks away to show various members of the mathematical community—Henri Poincaré, Giuseppe Peano, Cantor, Hilbert and Frege—reacting with either glee or despair upon receiving news of the paradox. Russell and Whitehead are intellectually devastated, but agree to search for the solution together as coauthors of *Principia Mathematica* (p. 176).

In order to facilitate work on the *Principia*, the Russells move in with the Whiteheads. Russell begins to work obsessively, and the intensity of his work compromises his mental health and leads him to believe he is in love with Evelyn Whitehead. The romantic triangle between the couples, combined with taxing intellectual feats, brings about Russell's near-collapse and Alys' nervous breakdown (pp. 182–3). Although they finally manage to prove $1 + 1 = 2$, Whitehead reaches his wits' end with Russell, forcing the publication of the *Principia* (Volume 1) in 1910 (p. 193).

After the *Principia*, *Logicomix* focuses on two more episodes in the history of the foundations of mathematics and logic. One chapter each is devoted to Lud-

Infinite (Princeton, N.J.: Princeton U. P., 1979), and I. Grattan-Guinness, "Towards a Biography of Georg Cantor", *Annals of Science* 27 (1971): 345–91.

³ Hilbert's talk on "Mathematical Problems" is illustrated on p. 152 of *Logicomix*. However, the famous passage from Hilbert's 1900 speech is actually much more eloquent than depicted: "This conviction of the solvability of every mathematical problem is a powerful incentive to the worker. We hear within us the perpetual call: There is the problem. Seek its solution. You can find it by pure reason, for in mathematics there is no *ignorabimus*." See Constance Reid, *Hilbert* (Berlin: Springer-Verlag, 1970), p. 81. Russell did not attend the International Congress of Mathematicians in 1900, although he did attend the International Congress of Philosophy where he discussed logic with Peano.

wig Wittgenstein and Kurt Gödel. Chapter 5 begins by depicting the occasion in 1911 when Wittgenstein showed up unannounced at Russell's Cambridge rooms. The two men launch into a discussion of logic, and their philosophical rivalry begins (p. 226). With the outbreak of World War I, Russell and Wittgenstein diverge in their approach to the war effort. Russell's opposition to the war is portrayed as springing from his application of rationality to human events. Wittgenstein, on the other hand, participates voluntarily as a soldier, his near-death experience giving him the clarity he requires to finish his linguistic philosophy. After the war is over, Russell and Wittgenstein meet in The Hague, where they discuss Wittgenstein's *Tractatus Logico-Philosophicus*. Wittgenstein insists that on many of his finer points, Russell does not understand his philosophy. (Similarly, when the Vienna Circle present Wittgenstein with their manifesto, he assures them that they have completely missed the point of the *Tractatus*.)

Logicomix builds into its story about logic themes of war and education. Chapter 6 describes Wittgenstein's post-war life as an elementary school teacher. Wittgenstein is portrayed as a joyless educator who is particularly hard on students who lack mathematical skill. Meanwhile Russell, with second wife Dora, opens Beacon Hill school. Russell's unorthodox approach to education is depicted as meeting similarly unsuccessful ends, with the added dimension of the school's failure being meted out upon his own children.

In the final chapter about logic, Russell is welcomed at a meeting of the Vienna Circle, where he meets Kurt Gödel. Gödel presents his proof of the incompleteness of second-order logic (p. 286). This event is depicted as the end of the logicist project; a logic capable of underpinning all of mathematics is revealed as an impossible quest. "It's all over!", says the comic character of John von Neumann.

The intermediate story ends with Russell discussing the Nazi threat with audience members at his 1939 lecture, and speculating on whether or not logic is a useful tool for solving the world's affairs. On this front, Russell is portrayed as a relativist, arguing that there is no certain road to truth, neither in mathematics nor in politics. Every political position is relative to the person holding that position. This strikes me as an unusual representation of Russell's political attitudes, given that Russell spent much of his life taking sides with respect to political issues.

Logicomix's final ruminations dwell on whether Russell, and by extension the quest for the foundations of logic, was a failure, and whether the lives of the men involved were tragic. Did Russell fail at logic (the fundamental assumptions of the *Principia* were amended by Wittgenstein, then Gödel), at educational reform (Beacon Hill school was a disaster), at love (his failed marriages, his idealism compromised the lives of his children)? The authors seem to accept the idea that he failed. They mention that Russell's son John was diagnosed with schizo-

phrenia, and that his granddaughter committed suicide. Hilbert disowned his only son, Franz, who was mentally ill,⁴ and Frege was possessed by paranoid delusions about Jewish people.⁵ Gödel, convinced that his food was being poisoned, died of malnutrition. The authors conclude that the lives of great thinkers lead them to act terribly or go mad, due to their unnatural obsession with logic and rationality.

Certain aspects of the book at first reading made little sense to me, such as the last chapter, which finishes the exterior frame story with a performance of the Greek tragedy, the *Oresteia*. After rereading the book I've come to understand its inclusion, but the hasty reader will likely be lost as to what exactly a Greek tragedy has to teach about the history of mathematical logic. Throughout the exterior frame story, Apostolos and Christos argue about how to structure *Logicomix*, whether the book is about logic or human passions, whether the theories themselves will be discussed or whether technicalities will be sidelined for melodrama. These debates take them into some bizarre territory (for a book about the history of logic). For example, the reason they depict Christos attending Anne's rehearsal for the *Oresteia* is to build upon their logic and madness theme (p. 216). In these passages, the authors wax philosophical. As Christos writes to Apostolos, "Logicians hate contradictions ... But what is life, in the tragic view which you espouse, if not a bundle of contradictions? ... Sure, Frege, Russell, Whitehead, were excellent map-makers ... But maybe eventually they confused their reality with their maps" (pp. 216–17). Apostolos replies, "What a perfect *definition* of *insanity!*" The final chapter builds towards the logic and madness thesis by working up a grand analogy between *Logicomix* and the *Oresteia*. I assume their point is to convince the reader that the lives of Frege, Cantor, Russell *et al.* were both profound and tragic all at once.

Logicomix falls into a long tradition of popular-culture narratives portraying mathematicians as crazy geniuses (Sylvia Nasar's *A Beautiful Mind*, David Auburn's *Proof*, Darren Aronofsky's *Pi*).⁶ It is nothing new to claim that creative people are unusually susceptible to mental instability. However, studies have not conclusively proved this link.⁷ While it's clear that psychiatric illness does affect

⁴ After an episode in which Franz was determined to save his parents from evil spirits, Hilbert said to Richard Courant, "From now on I must consider myself as not having a son" (Reid, *Hilbert*, p. 139).

⁵ It is true that Frege wrote anti-Semitic comments in his diary the year before his death. See Joan Weiner, *Frege* (New York: Oxford U. P., 1999), p. 3.

⁶ For a somewhat tongue-in-cheek article written about this topic, see Carmen Latterell and Janelle Wilson, "Popular Cultural Portrayals of Those Who Do Mathematics", *Humanistic Mathematics Network Journal* 27 (2004); http://www2.hmc.edu/www_mon/hmnj/latterell.pdf (retrieved 14 Nov. 2009).

⁷ Nancy C. Andreasen, "The Relationship between Creativity and Mood Disorders", *Dialogues in Clinical Neuroscience* 10 (2008): 251–5; Claudia M. Santosa *et al.*, "Enhanced

creativity, bipolar disorder (for instance) does not necessarily make a person more creative. In fact, in the grip of illness sufferers often experience the stifling of their creative production.⁸ While the popular myth lives on that depression or mania, or both, are a source of creative genius, it is yet to be determined whether highly creative people are disproportionate sufferers of mental illness.

I was disappointed by the female characters in the book. Russell's first wife, Alys, is depicted as a simple woman, as her presence is the foil for *Logicomix's* explanation of technical concepts. By leading Alys through the Hampton Court maze, Russell teaches her the gist of Boole's propositional conjunctives. During their trip to Germany, Russell uses their hotel to explain to Alys the idea that infinity can be put into one-to-one correspondence with infinity plus one (Hilbert's hotel paradox, pp. 127–9). Of course, these episodes are presented for the reader's benefit. First concerned that Russell will become a great man ("I wouldn't want to be the 'great man's' wife!" she says, p. 125), Alys ultimately becomes a victim of Russell's quest (pp. 182–3). It is true that the history of logic does not involve any prominent female actors, and Russell was a ladies' man. All the female characters in *Logicomix*—except for Lady John Russell, who is portrayed as a villain—are objects of Russell's lust (his German tutor, Alys Russell, Evelyn Whitehead, and Dora Russell). This book unfortunately reinforces the standard great men approach to history, in which women are marginal, obstructive, or otherwise left out. The real women in Russell's life were complex and intelligent. It would have pleased me to see that reflected in *Logicomix*, even in a minor way.

For the artwork I only have praise. Alecos Papadatos makes clever use of standard comic techniques, such as showing the passage of time by changing seasons between panels (p. 179), or giving the illusion of slow motion by showing minute change in an otherwise static scene (p. 163). Alecos, along with colourist Annie Di Donna, creates many atmospheric landscapes that reflect the emotional world that the characters inhabit. I'm particularly fond of the city of Athens in full Mediterranean colour (pp. 201–3), Berkeley at night, a city of lights (p. 208), and Wittgenstein, having just survived a barrage in no-man's land (pp. 250–1). The team has done its visual research, as all the characters bear a recognizable likeness to the people they depict.

In the realm of publishing, graphic novels have become more popular in recent years. Sales of graphic novels in the US increased by five percent in 2008.⁹

Creativity in Bipolar Disorder Patients: a Controlled Study", *Journal of Affective Disorders* 100 (2007): 31–9.

⁸ Albert Rothenberg, "Bipolar Illness, Creativity, and Treatment", *Psychiatric Quarterly* 72 (2001): 131–47.

⁹ David Colton, "Comic Books Sold Well in 2008; Graphic Novels Did, Too", *USA Today*, 12 Jan. 2009; <http://www.usatoday.com/life/books/news/2009-01-11-comics->

Although the genre has traditionally been a commercial risk for publishers, publishing companies aware of the growing market for graphic novels are looking for material like *Logicomix* to fill this niche. In fact, *Logicomix* spent several weeks on the bestseller list in Greece, and debuted at number one on the *New York Times* list of bestselling paperback graphic books.¹⁰ To date, it has spent six weeks on the *New York Times* list, competing with other popular graphic titles, such as *Watchmen*, *Buffy the Vampire Slayer* and *The Zombie Survival Guide*.¹¹ Rights for the book have been sold for the French, Turkish, Hebrew, Dutch, Italian, Chinese, Portuguese and Thai language markets.¹²

The same elements of great men and melodrama that I take issue with in *Logicomix* are the very stuff that first piqued my curiosity about Russell's life and work. However, every story loses something (or gains something) when it is deprived of the finer points. That said, the beautiful graphic work that is *Logicomix* is sure to attract and please an audience already interested in Russell, and the book is likely to create a new audience for Russell as well. The romantic glow that *Logicomix* casts upon this slice of somewhat obscure intellectual history will most likely endear the story to a popular audience.

sales_N. htm (retrieved 14 Nov. 2009).

¹⁰ Alison Flood, "Bertrand Russell's Mathematical Quest Adds Up to Unlikely Graphic Novel Hit", *The Guardian*, 27 April 2009; <http://www.guardian.co.uk/books/2009/apr/27/graphic-novel-logicomix-bertrand-russell> (retrieved 14 Nov. 2009).

¹¹ "Best Sellers: Graphic Books", *The New York Times*, 12 Nov. 2009; <http://www.nytimes.com/2009/11/22/books/bestseller/bestgraphicbooks.html> (retrieved 14 Nov. 2009).

¹² This information is available from the official *Logicomix* website, <http://www.logicomix.com/en/> (retrieved 14 Nov. 2009).
