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Book review

Logicomix: An Epic Search for Truth[1]
by Apostolos Doxiadis, Christos H. Papadimitriou, Alecos Papadatos and
Annie di Donna
Uitgeverij De Vliegende Hollander (August 2009)
ISBN: 987-90-495-0040-5, softcover, 345 pages, € 19.95
(published in English by Bloomsbury, New York)

This book was announced in the Spring 2006 issue of Mathematical Intelligencer, where it was mentioned that "*Logicomix*, "a work in progress on which progress is being made," will be published in 2007." It took the authors a bit more time to complete the project. In fact, *Logicomix* has just appeared. It is a most remarkable book which deals with serious philosophical matters in the form of a comics. This book genre, called a graphic novel, became popular thanks to the successful comics *Maus* by Art Spiegelman that introduced the readers to the horrors of Auschwitz. Occasionally it led to most interesting and informative books, like *Palestine* by Joe Sacco.

The book in question introduces the reader to the quest of logicians for laying the foundations of mathematics. It is built around a lecture of Bertrand Russell delivered at the outset of the 2nd World War, in which he discusses his life and opinions, his work on logic, and his encounters with prominent logicians. Also David Hilbert and Henri Poincaré briefly appear in the book in the context of the International Congress of Mathematicians held in Paris in 1900.

The book consists of six chapters. The first two chapters essentially focus on the early years of Russell, depicting in a lively way his youth and first marriage. In Chapters 3 and 4 the action moves towards logic. Through Russell's references to the works of George Boole, Bernard Bolzano and fictitious

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[1]This is a review of the Dutch translation of the book, available through `www.volkskrant.nl/webwinkel` that, remarkably, appeared before the English version.

encounters with Gottlob Frege and Georg Cantor the reader is eventually introduced on page 163 to the Russell paradox (that the set of all sets that are not elements of themselves, neither is nor is not an element of itself). The narrative proceeds through references to Giuseppe Peano, Hilbert and Frege to Bertrand Russell's Gargantuan toil with Alfred Whitehead on their *Principia Mathematica.*

In Chapter 5 Ludwig Wittgenstein makes his entrance. This part of the book is devoted to the great debate between Russell and Wittgenstein about the existence of an objective reality. Some incursions are made into the life of Wittgenstein, such as his decision to join the Austro-Hungarian army in the 1st World War.

In Chapter 6 there appear Kurt Gödel, presenting his incompleteness theorem, John von Neumann (very briefly, only as a commentator on Hilbert's programme), and Alan Turing as the inventor of the Turing machine. The historical perspective is dramatically brought to life by a depiction of the rise of Nazism and the murder in 1936 of Moritz Schlick, the founder of the Vienna Circle.

The book is interwoven in a truly self-referential way with the, sometimes very animated, discussions of the neatly drawn authors (Christos: I like your flowery shirt in which you reappear on page 265) about how to best present the story to the readers. One theme that reappears in the book is the seemingly close affinity of logicians to madness. (On a cartoon on page 281 one of the authors says: *Ils sont fous, ces logiciens!*[2])

The drawings are truly excellent, with a remarkable attention to detail. Thanks to them while reading the book one experiences the strange sensation of watching inside one's head a movie, almost hearing the voices of the main characters. (A question to the authors: having in mind an interest of one of them in the question 'P = NP?' shouldn't the text on the mug of Doxiadis on page 229 be 'P = NP' instead of 'P = SP'?)

The book makes a wonderful reading and intertwines a discussion of serious matters with subtle jokes and detours through Athens. But a non-trivial question arises how useful the book might be to a reader who would like to understand something about the logical foundations of mathematics. I see for it a natural place as an introductory reading for students of the first year of mathematics or of computer science. The book does not provide any technical details, yet it gives the reader sufficient clues to understand what

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[2]They are crazy, these logicians!

kept logicians busy in the critical period from Frege to Gödel. The historical context is admittedly very sketchy, with brief references to the 1st and 2nd World War and Nazism. 25 pages of notes form a useful compendium on the work of the foremost logicians (starting with Aristoteles) and on the relevant concepts and notions (like that of a proof).

A, hopefully, interested student could then continue with the more technical but still informal book *Engines of Logic: Mathematicians and the Origin of the Computer* by Martin Davis, in parallel with a routine course on mathematical logic.

The Dutch translation reads very smoothly. Unfortunately, the publisher succeeded to plant three errors on the back cover. In particular 'his mission' (*zijn missie*) became a 'vinegar mission' (*azijn missie*) and Barry Mazur became Bazzy Mazur.

For endorsements of this book by a prominent historian Howard Zinn and a prominent mathematician Barry Mazur see `www.amazon.com`.

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