

Lies, Truth, Madness, and Mathematics

A review of



A Madman Dreams of Turing Machines

by Janna Levin

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Reviewed by

[Gordon Pitz](#)

Why would a psychologist be interested in *A Madman Dreams of Turing Machines*, a book about two mathematicians written by a theoretical physicist? Well, consider that the physicist, Janna Levin, has proved herself able to write clever, imaginative explanations of the most abstract theoretical ideas and that no mathematicians have had more impact on science in general, and psychology in particular, than Kurt Gödel and Alan Turing. Consider further that both mathematicians were fascinated by the Snow White story, that one of them was probably paranoid and starved himself to death, and the other was homosexual and committed suicide by eating a poisoned apple, and one has all the ingredients of a great psychological drama.

The Roman philosopher Seneca said, “There is no great genius without some touch of madness.” Two thousand years of attempts to verify this assertion have had limited success (see Waddell, 1998). In recent years, though, there seems to have been a particular attempt

to associate madness with mathematicians. Sylvia Nasar's (1998) *A Beautiful Mind* described how a schizophrenic mathematician won a Nobel Prize. David Auburn's (2001) *Proof* explored the connection between mathematical genius and bipolar disorder, and Mark Haddon's (2004) *The Curious Incident of the Dog in the Night-time* described the story of a mathematically brilliant youth with Asperger's syndrome. I know of no evidence that psychological disorders are any more common in mathematicians than in, say, poets or painters, but given that most of us do not really understand what a mathematician does, a person might be excused for believing that an interest in higher mathematics is a major risk factor for psychological disorders.

Levin's book may reinforce this distrust of the mathematical mind. She paints a portrait of Gödel and Turing, creating imagined conversations around the known facts. The intent, presumably, is to help the reader understand the events that influenced these men and the states of mind that they experienced in their work and in their daily lives. In that goal she undoubtedly succeeds, but the reader must draw conclusions from her story with great caution.

The Cast of Characters

To appreciate Levin's book, the reader should have some knowledge of why Gödel and Turing are such important figures. Gödel is best known for his two “incompleteness” theorems, which revolutionized mathematics by proving its fundamental incompleteness. He was a member of the Vienna Circle, a group of philosophers, most of whom were dedicated to an empirical, logical approach to the solution of philosophical problems. He must have startled others in the circle by demonstrating that for any axiomatic system there are always propositions that are true but that cannot be proved to be true. The proof of the Gödel theorems is based on the classic paradox of the liar—how do we assess the truth or falsity of the statement “I am telling a lie”? If we consider the statement to be true, then it must be false, and vice versa. The theorems are more profound than this, of course, but a number of approachable explanations have been published. My favorite is Smullyan's (1978) book *What Is the Name of This Book?*, the title of which captures the self-referential quality of the troublesome statements.

Gödel's theorems put an end to attempts to create a formal, logical foundation for all of knowledge. They have since been the source for much of the contentious argument over artificial intelligence. Lucas (1961) asserted that the theorems prove that machines can never simulate human minds. They show that to assess the truth of some statements it is necessary to step outside of the system within which the statement is made. Whether a machine could ever do this has become a matter for serious philosophical debate.

Turing is best known for his success in providing a mathematical foundation for machine intelligence. His papers on computability owed a great deal to Gödel's work, but the ideas led him in quite different directions. He grappled directly with the question of how “mind” might arise from a machine. While agreeing with Gödel that some problems are not computable, he concluded that any problem addressed by the brain must be computable, and thus he argued directly against the position taken by Lucas (1961).

For most psychologists, Turing's best-known contribution may be the so-called Turing Test, by which a person might determine whether a machine has successfully simulated human thinking. It should be noted, though, that Turing probably considered this to be an incidental issue in his major paper on computability. He is also well known for his work during World War II in breaking the German Enigma code, work that became the basis for a movie and TV series. His work on code breaking prompted Turing to think seriously about how to create a computing machine, and it is no exaggeration to suggest that he is a founding father of the modern computer. A “Turing machine” is a set of abstract, logical operations that suffice to solve any computable problem, and thus describes the essence of a computer. Turing also believed that this set of operations could solve any problem that the human mind is capable of solving.

Madmen, Dreams, and Turing Machines

In an earlier book, Levin (2002) provided a highly personal, vivid account of the current state of theoretical physics; in a series of letters to her mother, she integrated questions about the origins of the universe with details of her personal life. She has adapted the style of that first book to her largely imaginary account of the lives of Gödel and Turing. She is honest throughout in admitting that the story is her own, invented to make sense of the truth. “Some truths can never be proven by adhering to the rules. So this whole story about truth is a lie” (p. 4). And so she adapts the liar's paradox for her own purpose.

With some minor exceptions, the story is woven around the known facts, but the level of detail exceeds anything that could be known for sure. “The iron frame of Kurt's bed was a brutal conductor of the chill singeing his hand so sharply as he hoisted himself awake this morning that it might as well have left a burn” (p. 47). From time to time, the author appears in the story in the first person, commenting on her characters, as if to suggest that it is the author herself who is dreaming of these men.

She is sometimes deliberately provocative—“Gödel didn't *believe* that truth would elude us. He *proved* that it would” (p. 12). She returns many times to the same themes: the poisoned apple, the liar's paradox, the difference between truth and proof, and the human mind as a machine. Minor characters are introduced to provide a suitable commentary. For

example, the blind Olga Hahn-Neurath, wife of philosopher Otto Neurath, serves as a counsel of wisdom to the Vienna Circle and to Gödel.

Sometimes I found Levin's florid style to be distracting. For example, with reference to Olga, she writes, "Tonight she sits close to Otto, drawing on a fresh cigar, preoccupied with the juicy tang of the tobacco and the hot image of orange embers the burning cigar ignites in the memory of her eyes" (p. 81). Nevertheless, her characters emerge as vivid and believable individuals, even if the story is a dream.


If Levin herself is the dreamer, who is the madman? Turing was no madman, in any sense of the term. Some commentators have suggested that he may have been autistic, but there is no evidence to support that conclusion. Certainly he was shy, lonely, and socially inept. He was unashamedly homosexual at a time when homosexuality was not only unacceptable in Britain, but illegal. He was unwise enough to openly admit his homosexuality to police officers and, like Oscar Wilde, was convicted of "gross indecency." He was forced to undergo hormone "therapy" for his homosexuality, and perhaps as a result committed suicide by eating an apple laced with cyanide.

Gödel, like Turing, was a social outcast. He showed a similar insensitivity to the reactions of other people. During a visit to the United States in 1936, he seemed unaware why Jewish friends he met there might have wanted to leave Vienna. Gödel displayed serious delusions of persecution, and could perhaps be described as mad. He would eat only food prepared by his wife (and not much of that), and when she became incapacitated he starved himself to death. It is unlikely, though, that he dreamed of Turing machines.

Levin's book captures brilliantly the common themes in the lives of these two men and their unique personalities. She addresses one other important difference between the two. Although both contemplated the foundations of knowledge and logic, and although each in different ways demonstrated the inherent incompleteness of formal systems, their mathematical proofs led them in dramatically different directions. For Gödel, it led to something like Leibnitz's belief in a rational theology, and an ontological proof of the existence of God. For Turing, it led to the conclusion that there is no God and that the human is just another computing machine.

A Madman Dreams of Turing Machines is not a biography. It is not an account of mathematical genius, nor a discussion of the connection between genius and madness. The author has created her own account of the lives of two extraordinary people from existing biographies, and the reader must draw his or her own conclusions from this account. It is hard to know what conclusions ought to be drawn. Perhaps it is all a lie. But it is an imaginative lie, and if it prompts the reader to think deeply about issues of truth and reason, free will and determinism, and the place of brilliant but disturbed people in our society, then it is a worthwhile lie.

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