

Barry Mazur believes that maths and literature are driven by the same imaginative impulse.

Q&A Barry Mazur

The maths raconteur

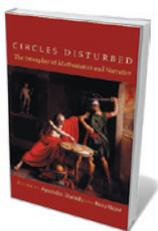
Barry Mazur, a mathematician at Harvard University in Cambridge, Massachusetts, has explored the literary side of mathematics. With the publication this month of *Circles Disturbed*, a collection of essays on mathematics and narrative that he edited with writer Apostolos Doxiadis, he talks about the overlapping realms of mathematics and the imagination.

How did you get into mathematics?

Through electronics. At school I read popular works on electromagnetism. I found it baffling that there could be action at a distance that let energy travel through a medium you couldn't touch. As a student at the Massachusetts Institute of Technology in Cambridge, I saw mathematics as a gateway to a more philosophical understanding of electronics. I wanted to understand physical principles, such as conservation of energy, from a Euclidean standpoint: rarified and axiomatic. I later saw that this was impossible, but I became riveted by mathematics. I came to Harvard in 1959, starting in topology then moving to algebraic geometry, which has led me to number theory.

What inspired you to write your 2003 book, *Imagining Numbers*?

It began as a letter to a friend. We had been chatting about the difficulties of imagining certain things and he said that he would like to know what imaginary numbers were. It took more than 200 years for mathematicians to



Circles Disturbed: The Interplay of Mathematics and Narrative

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APOSTOLOS DOXIADIS
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become comfortable with them, so I thought it might be instructive not to directly teach this to my friend, but to help him to arrive at his own familiarity with them. I wrote him a letter inviting him to do just that. It expanded, circulated among literary friends, and eventually became the book.

And *Circles Disturbed*? The concept came from Apostolos Doxiadis. His 1992 novel *Uncle Petros and Goldbach's Conjecture* marries literature and mathematical themes, and his 2008 graphic novel *Logicomix* is about the mathematicians Gottlob Frege, David Hilbert, Henri Poincaré, Ludwig Wittgenstein and Kurt Gödel, and the early-twentieth-century crisis in

the foundations of mathematics. Apostolos invited mathematicians, historians and literary scholars to write about mathematics and narrative. They met in Greece in 2007 to discuss their work; this was the origin of *Circles Disturbed*. They interviewed one another to make their contributions more accessible. These interviews are available at www.thalesandfriends.org.

How can historians tell the story of maths?

You can recount mathematical lives, as Peter Galison does in the book. His essay contrasts the biographies of John Archibald Wheeler — whose mechanical illustrations of mathematical operations were influenced by his upbringing on a Vermont farm — and Nicolas Bourbaki, the pseudonym of a group of Parisian mathematicians whose vision of mathematical progress was monolithic and structural. Or you can take the meta-historical approach, as Amir Alexander does in his essay, which discusses how the transformation in mathematics in the eighteenth and nineteenth centuries was partly guided by the stories told about it. You can do a close reading of dramatic mathematical texts, as in Federica La Nave's examination of a work on imaginary numbers by sixteenth-century Italian mathematician Rafael Bombelli, who laboured for decades over the question of whether these numbers are fictitious.

And is it possible to use mathematics for literary purposes?

Yes, you can reverse roles. A mathematical sensibility is useful for illuminating patterns and structures — such as the structure of narrative, as in our book. A seminal example is French literary theorist Gérard Genette's 1972 modelling of the tangled layers of time in the writings of Marcel Proust.

Is there a place for dreams in mathematics?

In Michael Harris's chapter on intuition in *Circles Disturbed*, he recounts how mathematician Robert Thomason had a dream in which a dead friend (not a mathematician) made a mathematical claim. Although the claim was false, it inspired Thomason, once awake, to successfully complete his mathematical project, and to include his friend as a co-author in the published paper.

What do the pursuits of maths and literature have in common?

The common thread is urgency. Mathematicians are impelled by an urgent desire to understand. In literature, there is a similar impulse to engage in an all-absorbing imaginative experience. When it comes to mathematical inspiration, the imagination could be considered the ghost in the rational machine of proof-making. ■

INTERVIEW BY JASCHA HOFFMAN