Book Reviews

Loving + Hating Mathematics

Hersh is a retired applied mathematician who has written several popular books demystifying mathematics for a general audience, while John-Steiner is a retired professor of linguistics and education. Their book seeks to humanise mathematics by emphasising its more personal and emotional aspects. In particular, it claims to dispel the following four widely believed myths: mathematicians are different from other people; mathematics is a solitary pursuit; mathematics is a young person's game; mathematics is an effective filter for higher education.

The book emphasises the historical and social forces that inspire and drive mathematicians. It contains anecdotes, mostly well known, about mathematical prodigies, and lesser known ones recounting the formation of more mainstream mathematicians, especially women and Afro-Americans. There are descriptions of the culture of various mathematical communities, and attempts to exemplify beauty in mathematics.

A chapter called *Mathematics as Solace* includes several examples of mathematicians using their work to ease them through troubling times of sickness, emotional turmoil or imprisonment. On the other hand, in a chapter called *Mathematics as an Addiction*, we learn how at times the single-minded pursuit of an elusive goal, or difficulties in coming to terms with the outside world have led some mathematicians to the brink of mental instability. Notable examples include Alexandre Grothendieck, Kurt Gödel and more currently Grisha Perelman. Others have fallen over the brink, including convicted murderers, such as André Bloch, Ted Streleski, who murdered his doctoral supervisor Karel de Leeuw, and of course the Unabomber, Ted Kaczynski.

A more uplifting chapter concerns longtime friendships and partnerships, including marriage, between mathematicians. The former include Hardy and Littlewood, Cayley and Sylvester, Weierstrass and Kovalevskaya, and Polya and Szegő, the latter, Grace Chisholm and Will Young, and Julia Bowman and Raphael Robinson. The authors seem reluctant to mention homosexual relationships, of which that of Kolmogorov and Aleksandrov is a prime example.

A poignant chapter on *Gender and Age* comes to grips with two controversial issues: the problems faced by women mathematicians from Sophie Germain to Jennifer Harrison, and the effectson ageing mathematicians of their declining power. The final section deals with the *Teaching of Mathematics*, from kindergarten to graduate level. I found this the least satisfactory aspect of the book, as I discuss later.

At first glance then, the book is a brilliant success, putting a human face on mathematics. But when one examines the arguments more closely, some doubts

begin to creep in. Its emphasis on the idiosyncrasies and single-mindedness of many mathematicians goes a long way towards confirming, rather than dispelling, the myth that mathematicians are different from the rest of society.

The myths that mathematics is a solitary pursuit, or a young person's game, are clearly demolished. However, I take issue with the authors' views on mathematical education. Firstly, they are self-contradictory. On the one hand, they decry the poor results of US schoolchildren in international comparative studies and the deficiency in mathematical knowledge and skills of many teachers in US primary and secondary schools, but on the other hand, they claim that school children are burdened with too much mathematics, including, apparently, algebra! The authors explicitly state that since most people will never have to solve a quadratic equation, there is no reason they should be taught to do so at school. Their peculiar failure to consider statistics, with its prerequisites in algebra and calculus, which is relevant to every citizen, belies this claim.
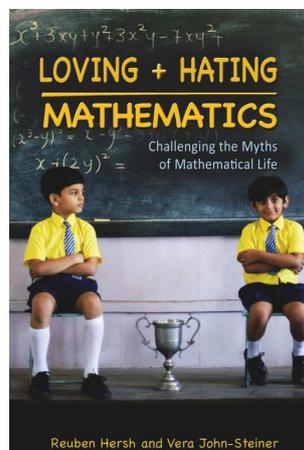
The authors' assertion that success in maths examinations should not determine who wins the competition to enter medical or law school is likewise undermined both by exaggeration and flimsy knowledge of the skills that these professions require. In the first place, these filters are prescribed by the guardians of the gates themselves, who are unable to find a reasonable alternative. Secondly, the authors seem unaware of what is taught in law or medicine these days. For example, the Theory of Evidence is nothing more than applied probability, and no report of a clinical trial is publishable without elaborate statistical analysis. Finally, their claim that a brain surgeon has absolutely no need of any form of mathematics is the worst possible choice of example since among the medical specialties, neurosurgery is probably the one which uses the most advanced mathematics. For example, the 2003 Nobel Prize in Physiology or Medicine was awarded to the brain surgeon Peter Mansfield for his role in developing magnetic resonance imaging, the citation referring specifically to his use of Fourier analysis for efficient gradient determination.

I conclude then that this book is a well-written introduction to some unusual and fascinating aspects of mathematical life. However, it fails to satisfy its aim of debunking myths about mathematics. Unfortunately, it contains several excruciating typos, especially in the proper names. Surely the authors or an editor should have picked up the fact that Fam Chung should be Fan Chung, and that Dieudonné's prename is Jean, not Jacques.

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