
Zbl 1160.01001**Rittaud, Benoît****The fabulous destiny of $\sqrt{2}$. (Le fabuleux destin de $\sqrt{2}$.)** (French)

Paris: Le Pommier. 451 p. EUR 29.00 (2006). ISBN 2-7465-0275-5/pbk

Despite what one might perhaps fear from the title, this book is a fine example of French *haute* vulgarisation, popularization which not only tells the results of science but also introduces to the methods and reasoning behind these results in a way which can be followed by an intelligent and interested reader with little preliminary knowledge (but can still be read with pleasure and profit by a reader with much more background).

The story, as indicated by the title, is spun around the square root of 2. The argument starts from absolute basics: the structure of the decimal place value system and the use of letters in algebraic calculation; but it comes far around, and introduces a large number of concepts and techniques that can serve to elucidate the properties of $\sqrt{2}$: various proofs of the irrationality of $\sqrt{2}$, making use of a number of different techniques; various procedures for finding approximations to $\sqrt{2}$ (and π), with discussion of their speed of convergence; modular arithmetic; g -adic numbers; continued fractions (including symmetric continued fractions and other variants); ascending continued fractions; Euclidean algorithm and Euclidean rings; normal numbers; Farey approximants; and quite a bit more. For some matters, full proofs are provided, for other sketches or heuristic hints are offered. Regularly, it is pointed out when questions remain open. Links to applications (in computer science, random number generators, paper formats, musical scales, etc.) are explained or used as starting points.

Not surprisingly, one aspect of the presentation is historical. There are a few historical blunders - e.g., (p. 247) a claim that the Seleucid era (third and second century BCE) precedes 1900 BCE; and (p. 354) a wrong identification of the leap years of the Gregorian calendar. However, these are unimportant - nobody is after all going to learn historical details from a book like the present one. Much more important is the author's historical sensibility to the different kind of questions that different mathematical cultures will raise.

Noteworthy is Chapter 12 about "how not to see $\sqrt{2}$ everywhere", a well-argued warning against the rampant tendency to find $\sqrt{2}$ or (more often) π or the "Golden number" in all situations where ratios approximating these turn up accidentally.

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- *01-02 Research monographs (history)
- 00A05 General mathematics
- 00A06 Mathematics for non-mathematicians
- 11-03 Historical (number theory)