

spectral statistics in classically chaotic systems are also believed to match the predictions of random-matrix theory. These observations hint at the possibility that the heights of the Riemann zeros might be the energy levels of some quantum chaotic system. Interestingly, if this were true, it would prove the Riemann hypothesis!

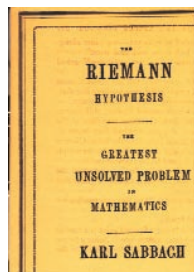
The connections between the Riemann hypothesis and quantum mechanics have generated considerable excitement. But although such connections have inspired several new lines of attack, a proof still continues to be elusive. Nevertheless, these connections have been used to suggest answers to some other long-standing and important problems relating to the zeta function.

Three books have recently been published that explain the background and history of the Riemann hypothesis and are aimed at a general audience. Of the three, Marcus du Sautoy's *The Music of the Primes: Searching to Solve the Greatest Mystery in Mathematics* is the most straightforward to review. Du Sautoy is a mathematician at the University of Oxford in England. His book explains the basic mathematical ideas at a level accessible to readers who have no more than a high-school-level mathematics background. It also contains a wealth of marvelous mathematical anecdotes. Du Sautoy clearly has a passion and talent for communicating with nonexpert audiences. His style will also appeal to researchers in other areas of science and mathematics.

Karl Sabbagh is a journalist, author, and television producer who specializes in covering scientific subjects. His book *The Riemann Hypothesis: The Greatest Unsolved Problem in Mathematics* is the least mathematical of the three. It focuses more on so-

Montgomery conjectured that correlations between the heights of the zeros on the scale of their mean spacing are statistically the same as those of the eigenvalues of large random Hermitian matrices. And quantum

biological (or anthropological) issues: What drives researchers to work on a problem that has defeated so many of the most brilliant mathematical minds for nearly 150 years? Some people have devoted a significant fraction of their creative lives to the Riemann hypothesis without, as far as we know, bringing us any closer to a solution. Sabbagh treats this human side of the story in a thoughtful and interesting way. In particular, he concentrates on Louis de Branges de Bourcia, a modern-day mathematician who has already proved one famous conjecture due to Ludwig Bieberbach in 1916. De Branges de Bourcia has repeatedly claimed to have proved the Riemann hypothesis, but his claims have never been accepted by the wider mathematics community. (As it happens, the mathematics community was slow to accept his proof of the Bieberbach conjecture.) Sabbagh paints a sympathetic but ultimately tragic picture of this important mathematician who now feels isolated from and ignored by other researchers in the field.



John Derbyshire has a background in mathematics but now works as a novelist and journalist. His book *Prime Obsession: Bernhard Riemann and the Greatest Unsolved Problem in Mathematics* is the most unusual.

The odd-numbered chapters contain mathematical material, and the even-numbered ones contain historical and background information. Derbyshire's book includes significantly more mathematics than the others, but it is still accessible to anyone comfortable with simple mathematical formulas. The author's goal is to explain Riemann's connection between the primes and the zeros of the zeta function, as well as other important 20th-century mathematical developments. For Derbyshire to have pulled his objective off so successfully is a remarkable achievement.

It would be invidious to compare these books directly because each has different aims. For professional scientists or mathematicians who want to know about the history of the Riemann hypothesis and the mathematics associated with it, du Sautoy's book might be the most appropriate. It also contains more information about the links between the hypothesis and quantum mechanics than the other two books. For nonscientists who want to gain an insight into research culture and the way researchers think, Sabbagh's book is likely to be interesting. And finally, for

readers who seek a deeper level of understanding of the hypothesis and more biographical details about Riemann, Derbyshire's remarkable book is, in my view, a gem.

Jonathan P. Keating
University of Bristol
Bristol, England

New Books

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Silicon Carbide: Materials, Processing, and Devices. Z. C. Feng, J. H. Zhao, eds. *Optoelectronic Properties of Semiconductors and Superlattices* 20. Taylor & Francis, New York, 2004. \$160.00 (389 pp.). ISBN 1-59169-023-4

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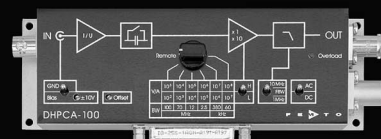
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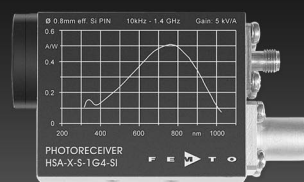
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