BOOK REVIEWS

John Grant McLoughlin

The Mathematial Century: The 30 Greatest Problems of the Last 100 Years
By Piergiorgio Odifreddi, translated by Arturo Sangalli, published by Princeton Press, 2004
ISBN 0-691-09294-X, cloth, xvi+204 pages, US$29.95.
Reviewed by **Peter A. Fillmore**, *Dalhousie University, Halifax, NS.*

The task that Odifreddi, a professor of mathematical logic at Turin and a frequent contributor to La Repubblica, has set himself in this book—to tell for the educated layman the story of twentieth century mathematics—is a daunting one. The edifice that is mathematics is now so vast that it is quite impossible for any single individual to be familiar in any detail with all of it. As Odifreddi says in his introduction, John von Neumann (1903–57) was perhaps the last of the "universal mathematicians", who could "dominate the entire landscape of the mathematics of their time".

But writing about mathematics is not the same as doing it. By selecting as his guides, firstly, David Hilbert's influential address to the 1900 International Mathematical Congress, "indicating probable directions for mathematics in the new century", together with the work of the Fields, Wolf, Turing, and relevant Nobel Prize winners, he has produced an admirable account that both professionals and laymen can learn from. Not only this, it is brief, readable, and informed by its placement in the intellectual and philosophical landscape.

The book opens with a superb foreword by Freeman Dyson, musing on the dual nature of science: Baconian ("all depends on keeping the eye steadily fixed on the facts of nature") and Cartesian ("I think, therefore I am"), neither of which "has the power to elucidate Nature's secrets by itself". Dyson finds the book too Cartesian for his taste, with not enough emphasis on the jokes and surprises that Nature springs on us (he cites the unexpected relevance of the imaginary unit in physics, the linearity of quantum mechanics, and quasicrystals).

At the heart of the book are two chapters titled Pure Mathematics and Applied Mathematics, the first consisting of discussions, chronologically arranged and each four or five pages in length, from fifteen problem areas, and the second from ten areas. These range from the problem of area and Lebesgue measure (1902) to the solution of Kepler's sphere-packing problem (1998), and from crystallography and Bieberbach's symmetry groups (1910) to the Jones invariant and knot theory (1984). These chapters are preceded by one on the evolution of the foundations of mathematics during the century, and followed by shorter chapters on the influence of the computer on mathematics (brief essays on Turing machines, artificial intelligence, chaos theory, computer-assisted proofs, fractals) and on open problems (odd

perfect numbers, the Riemann Hypothesis, the Poincaré Conjecture, the $P = NP$ problem).

The book is not without its blemishes. It is a translation (from the Italian original of 2000) and there are verbal infelicities, mostly a result of literal translation: maximum [great] circle, second world conflict [war], moonlight [moonshine] conjecture. "Circle" sometimes means just the circumference and sometimes the whole disc. There are a few misprints (homotyopy; Kevin for Kelvin), and a description of which homotopy groups of spheres are infinite omits the obvious ones. But these are minor points; I enjoyed reading this book and recommend it highly.

Puzzles 101: A Puzzlemaster's Challenge
By Nobuyuki Yoshigahara, published by A.K. Peters, 2004
ISBN 1-56881-206-X, paperback, x+121 pages, US$14.00.
Reviewed by ***John Grant McLoughlin****, University of New Brunswick, Fredericton, NB.*

A gem indeed! This is a delightful collection of mathematical puzzles. The style is familiar enough. Numerous puzzles—101 to be precise—are presented sequentially much like a book of brainteasers. A book of brainteasers is common, but this collection is different. Intrinsically, the book captured me as a reader and solver. Perhaps its familiar appearance suggested to me a more-of-the-same sort of expectation. The surprise came while playing with the puzzles, many of which represent twists on familiar forms. I was pleasantly surprised by the quality of the puzzles that constitute the collection.

What makes this book different? Almost all of the puzzles contain some form of visual element. The visuals suggest many different forms of problems, ranging from grids with missing numbers to trisection puzzles to representations of graphs to examples of games with rules. The visuals invite a level of engagement in which one becomes curious to read the text accompanying the diagrams. The style proved to be effective. I found myself accepting many invitations implicitly placed before me.

The book offers puzzles for a wide range of levels. Solutions are provided. This book is highly recommended for armchair puzzlers who enjoy shapes and numbers. *Puzzles 101* will make a nice addition to the collections of recreational mathematicians. Furthermore, the book would be a wonderful one for starting off a budding mathematical enthusiast. The accessibility of the material and the cost are assets that merit mention.

This book introduced me to the work of the late Nobuyuki Yoshigahara. Recently Yoshigahara's name and work have become familiar to me through other contexts. He has been recognized world-wide as a masterful puzzler. His contributions will be missed.