

BOOKSHELF

Mathematics for the Imagination by Peter M Higgins, Oxford University Press, ISBN 0198604602, £7.99 (€13).

As a citizen of Antwerp, the place where the Renaissance produced some of its finest atlases, I was of course very pleased to read a book that for once properly explains the work of Gerardus Mercator.

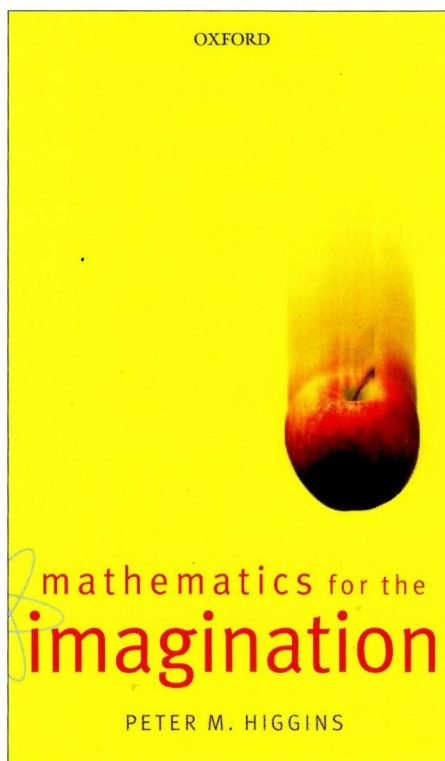
Fortunately (or perhaps unfortunately), I am not familiar with Peter Higgins' other books that popularize mathematics, so this is an impression of one work only. The author states that he wants to give something interesting to everyone. That is a very large audience, and I'm convinced that reality is somewhat more selective.

The book starts densely; each sentence has its weight, and speed-reading will not work. While I personally like that, it may lose some of the target audience now and then. I found the beginning of the trip rather bumpy; the first figure is a strange map of the world, and the second one has a confusing caption. The explanation of the date line is simply inadequate. A book on mathematics that still uses imperial units in a metric world is also annoying. Some concepts are introduced without any previous explanation. A few errors are merely funny; the inhabitants of the US state of Nevada will be pleased to learn that they share a border with Colorado, so maybe we do need five colours to paint the map!

However, after the rough road of the first 40 pages or so, the going gets good, and I found the reading most pleasing. A book of this type will inevitably talk about how certain parts of mathematics came to be discovered, and that means lots of history and people. Higgins' book has a number of interesting details that were new to me, including the fact that Abraham Lincoln took Euclid's elements with him on trips, as a source of mental relaxation.

There is a lot on classical plane geometry, mostly involving triangles. It is very pleasing to be able to refresh your school maths with these excellent chapters. There are some very good summaries of the properties of conical sections, though the accompanying drawings should have been made using proper tools; conical sections are too beautiful to be illustrated with the crude approximations the publishers have allowed. This made me cringe more than once!

The chapter on symmetries seems a bit out of place, especially considering that there is no treatment of groups, fractals, or the theo-



rems of Gödel and Turing. A number of quite recent, but still "classical" developments that are familiar to everyone got no mention: Rubik's cube for example, and more on Penrose tilings. Today's computer graphics and printing are almost entirely based on Pierre Bézier's curve, and some entertaining exposition of its remarkable properties would have been a welcome addition to the geometry parts of the book.

However, the mere fact that I have a thirst for more means I have spent several hours of exciting reading.

Robert Cailliau, CERN.

JINR Information and Biographical Guide

For readers of Russian, the Joint Institute for Nuclear Research (JINR) in Dubna has just produced the second issue of its *Information and Biographical Guide*. Including 680 short biographical summaries of the scientists who created JINR and who have worked or are working there, the book profiles specialists in physics, mathematics, chemistry, radio-biology and engineering from more than 20 countries. It is a thorough compilation of JINR history, scientific discoveries, prizes and literature about the Institute and its scientists. Enquiries should be addressed to the editor, M G Shafranov, at shafran@sunse.jinr.ru; fax +7 09621 65767.

Books received

Gauge Theories in Particle Physics Third Edition Volume 1: From Relativistic Quantum Mechanics to QED

by I J R Aitchison and A J G Hey, Institute of Physics Publishing, ISBN 0750308648, £29.99 (€48).

For the third edition of this classic graduate textbook, first published in 1982, the authors have substantially enlarged the text to reflect developments both in university curricula and the field of particle physics. New introductory chapters have been added to give a historical account of the properties of quarks and leptons. Volume 2, covering the non-Abelian gauge theories of QCD and electroweak interactions, is scheduled for publication in 2003.

Introduction to Quantum Fields on a Lattice

(Cambridge Lecture Notes in Physics) by Jan Smit, Cambridge University Press, ISBN 0521890519, £21.00 (€33).

This book is based on a series of lectures given by the author at an advanced undergraduate/beginning graduate level.

Finite Element and Boundary Element Applications in Quantum Mechanics

(Oxford Texts in Applied and Engineering Mathematics) by L Ramadas Ram-Mohan, Oxford University Press. Paperback ISBN 0198525222 £24.95 (€39); hardback ISBN 0198525214 £49.95 (€79).

Mathematical Methods for Physics and Engineering

(second edition) by K F Riley, M P Hobson and S J Bence, Cambridge University Press. Paperback ISBN 0521890675 £27.95 (€44); hardback ISBN 0521813727 £75.00 (€119).

Sketches of an Elephant – A Topos Theory Compendium

by Peter T Johnstone, Oxford University Press. Volume 1 ISBN 0198534256 £100.00 (€158); volume 2 ISBN 0198515987 £100.00 (€158); both volumes ISBN 01982496X £175.00 (€277).

This comprehensive two volume set on the theory of topos – the abstract construction of algebraic geometry – owes its title to the Indian tale of four blind men asked to describe an elephant. Each of them inspects a different part of the animal by touch, and each comes up with a very different description. The same, says Johnstone, is true of topos – how you describe them depends on how you approach them.