

# BOOK REVIEWS

Edited by ANDY LIU

## Mini-Reviews Update

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This is an update of earlier Mini-Reviews (see [1] to [9]), and is an abbreviated form of what appeared in the journals *Delta K* and **AGATE**. Written permission for reprint has been granted by the Alberta Teachers' Association which publishes the above two journals.

### A. Mir Publishers' Little Mathematics Library Series (see [1])

This excellent series has become an unfortunate casualty of the demise of the former Soviet Union. Lost also are *Mathematics Can Be Fun* and *Fun with Maths and Physics* featured in Section I.

### B. New Mathematical Library of the Mathematical Association of America (see [2])

In addition to the new titles listed below, there is also a revised edition of an earlier volume, *Graphs and Their Uses*. It was #10 in the series, but is now #34. Two further volumes have also been published recently.

**USA Mathematical Olympiads: 1972-1986**, by Murray Klamkin, 1988. ISBN# 0-88385-634-4.

This book collects the problems of the first fifteen USA Mathematical Olympiads. While they are presented chronologically, the solutions are grouped according to subject matters, which facilitates using this book for training sessions. There is a very useful 10-page glossary of mathematical terms and results, and a most extensive bibliography.

**Exploring Mathematics with your Computer**, by Arthur Engel, 1993. (see [16])

**Game Theory and Strategy**, by Philip Straffin, 1993. (see [17])

### C. Martin Gardner's Scientific American Series (see [3])

Two more volumes have appeared, and there will be a fifteenth and final volume, about to be released by Springer-Verlag. Several earlier volumes have also changed publishers. The Mathematical Association of America has acquired *Martin Gardner's New Mathematical Diversions from Scientific American*, *Martin Gardner's 6th Book of Mathematical Diversions from Scientific American*, *Mathematical Carnival*, *Mathematical Magic Show*

and *Mathematical Circus*. The University of Chicago Press has acquired *The Scientific American Book of Mathematical Puzzles and Diversions*, *The 2nd Scientific American Book of Mathematical Puzzles and Diversions* and *The Unexpected Hanging and Other Mathematical Diversions*.

**Penrose Tiles to Trapdoor Ciphers**, 1989, W. H. Freeman, 1997, Mathematical Association of America. ISBN# 0-88385-521-6.

Topics covered are Penrose tilings, Mandebrot's fractals, Conway's surreal numbers, mathematical wordplay, Wythoff's version of the game "Nim", mathematical induction, negative numbers, dissection puzzles, trapdoor ciphers, hyperbolas, the new version of the game "Eleusis", Ramsey theory, the mathematics of Berrocal's sculptures, curiosities in probability, Raymond Smullyan's logic puzzles, as well as two collections of short problems. The book contains a surprise ending, the resurrection of Dr. Matrix! There is also an update chapter. Unfortunately, Figures 3 to 6 are inadvertently left out. They are reproduced below.

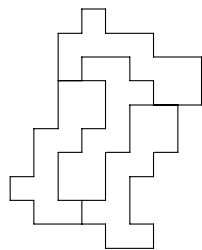


Figure 3.

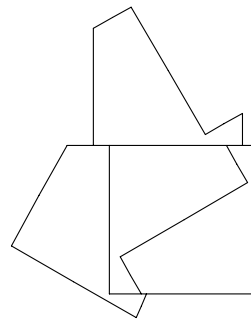


Figure 4.

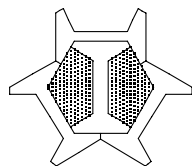


Figure 5.

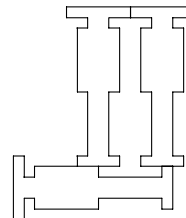


Figure 6.

**Fractal Music, Hypercards and More**, 1992, W.H. Freeman. ISBN# 0-7167-2189-9.

Topics covered are fractal music, the Bell numbers, mathematical zoo, Charles Sanders Peirce, twisted prismatic rings, coloured cubes, Egyptian fractions, minimal sculptures, tangent circles, time, generalized tick-tack-toe, psychic wonders and probability, mathematical chess problems, Hofstadter's *Gödel, Escher, Bach*, imaginary numbers, some accidental patterns, packing squares, Chaitin's irrational number  $\Omega$ , as well as one collection of short problems.

#### **D. Books from W.H. Freeman & Company, Publishers** (see [4])

Note that the most recent book in Martin Gardner's Scientific American Series is a Freeman publication. The first of the books listed below has actually gone out of print, but fortunately Dover Publications Inc. has decided to pick it up.

**The Puzzling Adventures of Dr. Ecco**, by Dennis Shasha, 1988.

The title character calls himself an omniheurist, solver of all problems (mathematical). The narrative is by a Watsonesque companion, Prof. Scarlet. Ecco's clients range from government officials, industrialists, eccentric millionaires to no less than the President of a Latin American country. They brought him important, instructive and interesting problems in discrete mathematics, all of which Ecco solves to their satisfaction. The book concludes with the mysterious disappearance of Dr. Ecco.

**Codes, Puzzles, and Conspiracy**, by Dennis Shasha, 1992. (see [11])

**New Book of Puzzles**, by Jerry Slocum and Jack Botermans, 1992.  
(see [12])

**Another Fine Math You've Got Me Into . . .**, by Ian Stewart, 1992.  
(see [13])

#### **E. Oxford University Press Series on Recreations in Mathematics** (see [5])

**The Mathematics of Games**, by John D. Beasley, 1989.  
ISBN# 0-19-853206-7.

This book analyses mathematically some card and dice games, nim-type games, a version of John Conway's "Hackenbush", as well as providing a mathematical model for the study of some sports games. The principal techniques are counting, probability and game theory. Some mathematical puzzles are also considered.

**The Puzzling World of Polyhedral Dissections**, by Stewart T. Coffin, 1990.  
ISBN# 0-19-853207-5.

This is a labour of love from an expert craftsman. Starting with two chapters of two-dimensional geometric puzzles, the author eases the readers gently into the third dimension and soon launches into his specialty, the burrs, which are assemblies of interlocking notched sticks. The book is profusely illustrated with black-and-white line drawings and photographs. It concludes with a chapter on woodworking techniques.

**More Mathematical Byways**, by Hugh ApSimon, 1990.  
ISBN# 0-19-217777-X.

This book contains fourteen chapters. The first three form a sequence but the others are independent of each other. Unlike the earlier volume by the same author, the problems are of uneven level of difficulty, ranging from the relatively simple Alphametics to others which require a considerable

amount of what the author calls “slog”. One of the chapters, titled *Potential Pay*, is not really a problem but a commentary on a classic paradox.

#### **F. Raymond Smullyan’s Logic Series** (see [6])

**Satan, Cantor, and Infinity**, 1992, Alfred A. Knopf.  
ISBN# 0-679-40688-3.

In this book, a remarkable character known as the Sorcerer makes his debut. He escorts the readers on a wonderful guided tour, visiting familiar grounds such as the domains of the knights and the knaves, and those bordering on the land of Gödel. There are also ventures into new territories, including an island where intelligent robots create others which can continue this process *ad infinitum*. This eventually leads to the pioneering discoveries on infinity of the great mathematician, Georg Cantor. The readers may be amused to discover how Satan got into the picture.

#### **G. Dolciani Mathematical Expositions Series of the Mathematical Association of America** (see [7])

In addition to the new titles listed below, three further volumes have been published recently.

**More Mathematical Morsels**, by Ross Honsberger, 1991. (see [10])  
ISBN# 0-88385-313-2.

This is a collection of 57 problems, almost all of which are taken from the Canadian Mathematical Society’s journal *Crux Mathematicorum*, plus further “gleanings” from its famed *Olympiad Corner*.

**Old and New Unsolved Problems in Plane Geometry and Number Theory**, by Victor Klee and Stan Wagon, 1991. ISBN# 0-88385-315-9.

This book is divided into two halves, as suggested by the title, though the second half also covers problems about some interesting real numbers. Each half consists of two parts. In the first, twelve problems are presented, giving the statement, known results and background information. In the second, the same twelve problems are reexamined for further results and extensions. Each half concludes with a comprehensive bibliography. Although the problems are unsolved, and therefore hard, it is not impossible for them to yield to an inspired attack. Even if this does not happen, gifted students who are willing to attempt them will find their mathematical talent enhanced.

**Problems for Mathematicians Young and Old**, by Paul Halmos, 1992.  
ISBN# 0-88385-320-5.

The fourteen chapters of this book are titled Combinatorics, Calculus, Puzzles, Numbers, Geometry, Tilings, Probability, Analysis, Matrices, Algebra, Sets, Spaces, Mappings and Measures. The author, a ranking mathematician and master expositor, wrote this book for fun, and hoped that it will be read the same way.

**Excursions in Calculus**, by Robert Young, 1992. ISBN# 0-88385-317-5.

The subtitle of this book is *An Interplay of the Continuous and the Discrete*. Using calculus as a unifying theme, the author branches into number theory, algebra, combinatorics and probability. The book contains a large collection of exercises and problems.

**The Wohascum County Problem Book**, by George Gilbert, Mark Krusemeyer and Loren Larson, 1993. (see [14])

**Lion Hunting & Other Mathematical Pursuits**, edited by Gerald Alexanderson and Dale Muggler, 1995. (see [18])

**The Linear Algebra Problem Book**, by Paul Halmos, 1995.  
ISBN# 0-88385-322-1.

The whole book is a sequence of structured problems. Like the preceding volume, most of this book is beyond high school level. However, the introductory problems are certainly not intimidating, and inquisitive students may be lured into a most rewarding exploration, laying a good foundation for their undergraduate studies.

## H. Books from Dover Publications, Inc. (see [8])

**Excursions in Number Theory**, by Stanley Ogilvy and John Anderson, 1988. ISBN# 0-486-25778-9.

This book covers the basics of classical number theory. Topics include prime numbers, congruences, Diophantine equations and Fibonacci numbers. The narrative style is very soothing. It concludes with 20 pages of elaborations and commentary on some finer points raised in the text.

**Excursions in Geometry**, by Stanley Ogilvy, 1990.  
ISBN# 0-486-26530-7.

The first half of this book is on inversive geometry, and the second half on projective geometry. These two topics are linked by the concept of cross-ratio and the study of the conic sections. It is in the same style as the preceding volume.

**Excursions in Mathematics**, by Stanley Ogilvy, 1994.  
ISBN# 0-486-28283-X.

The original title of this volume was *Through the Mathescope*. The opening chapter is titled *What Do Mathematicians Do?* It is followed by lively tours of number theory, algebra, geometry and analysis. The last chapter is titled *Topology and Apology*.

## I. Books from Various Publishers (see [9])

*Selected Problems and Theorems in Elementary Mathematics* has been acquired by Dover and renamed *The USSR Olympiad Problem Book*. Dover has also picked up *The Moscow Puzzles*. The Mathematical Association of America has published *Five Hundred Mathematical Challenges*, comprising

the first five booklets of the project, *1001 Problems in High School Mathematics*. (see [19]) The Canadian Mathematical Society has published *The Canadian Mathematical Olympiad, 1969–1993*, edited by Michael Doob and Claude Laflamme. This book combines two earlier volumes, *The First Ten Canadian Mathematics Olympiads, 1969–1978* and *The Canadian Mathematics Olympiads, 1979–1985*, and adds the contests from 1986 to 1993. (see [15])

### **Cross References to other entries in *Crux Mathematicorum*:**

1. A. Liu, Mini-reviews, MIR Publishers' Little Mathematics Library Series, 1989, 142-147.
2. A. Liu, Mini-reviews, MAA's New Mathematical Library Series, 1989, 171-176.
3. A. Liu, Mini-reviews, Martin Gardner's Mathematical Games Series, 1989, 202-206
4. A. Liu, Mini-reviews, Books on popular mathematics from W. H. Freeman, 295-297.
5. A. Liu, Mini-reviews, Oxford University Press' Recreation in Mathematics Series, 1990, 42-43.
6. A. Liu, Mini-reviews, Raymond Smullyan's books on logic puzzles, 1990, 106-108.
7. A. Liu, Mini-reviews, MAA's Dolciani Mathematical Exposition Series, 1990, 237-238.
8. A. Liu, Mini-reviews, Books on popular mathematics from Dover, 1991, 11-13.
9. A. Liu, Mini-reviews, Books on popular mathematics from various publishers, 1991, 74-77.
10. A. Liu, Review of *More Mathematical Morsels*, 1991, 235-236.
11. A. Liu, Review of *Codes, Puzzles and Conspiracy*, 1992, 204-205.
12. A. Liu, Review of *New Books of Puzzles*, 1993, 13-14.
13. R.K. Guy, Review of *Another Fine Math You've Got Me Into*, 1993, 46-47.
14. A. Liu, Review of *The Wohascum County Problem Book*, 1993, 202.
15. R. Geretschläger and G. Perz, Review of *The Canadian Mathematical Olympiad Book, 1969-1993*, 1994, 15-16.
16. G.C. Denham, Review of *Exploring Mathematics with Your Computer*, 1994, 134-135.
17. M. Larsen, Review of *Game Theory and Strategy*, 1995, 88.
18. A. Liu, Review of *Lion Hunting and Other Mathematical Pursuits*, 1995, 304-305.
19. M. Kuczma, Review of *Five Hundred Mathematical Challenges*, 1996, 313-316.

