BOOK REVIEWS

Amar Sodhi

For this special issue we feature book reviews by Andy Liu and John Grant McLoughlin, former Book Reviews Editors (1991-1998 and 2002-2008, respectively) who each knew Jim Totten for an extended period.

The following sentiment is from Andy: "Jim and I went back way before he became formally involved with **Crux**. His father lived in Edmonton, and he came to visit twice a year. Whenever he was in town, we would get together for a Chinese dim-sum. One day, he asked me why I was no longer doing the review column. Actually, I had already stepped down for a couple of years. However, I replied flippantly I had just been fired by the new editor, little knowing that I was sitting across the table from the new editor himself. He was very upset, and despite repeated apology, it remained a sore point with him. So to set the record straight, I now state publicly that I was never fired by Jim Totten as the Reviews Editor for **Crux**, and in his memory, it is only fitting that I contribute a Book Review to this special issue."

All-Star Mathlete Puzzles
By Dick Hess, Sterling Publishing Co. Inc., New York, 2009
ISBN 978-1-4027-5528-6, softcover, 94+ii pages, US$6.95
*Reviewed by **Andy Liu**, University of Alberta, Edmonton, AB*

Sterling has published a wide range of mathematical puzzle books. At one end are the definitive treatises like Jerry Slocum's *The Tangram Book*. At the other end are rather prosaic offerings. Nevertheless, they do serve a purpose in gradually attracting new enthusiasts. They offer the novices an easier path into the hobby than more serious works like Rodolfo Kurchan's *Mesmerizing Math Puzzles*, Serhiy Grabarchuk's *The New Puzzle Classics*, and the present volume.

Dick Hess is well known to the readers of **CRUX with MAYHEM** as a regular contributor. His intriguing problems always come with an aura of something out of the ordinary. Here are a couple of samples.

Problem 89(A) Find an expression equal to **88** which uses each of the digits **1**, **2**, and **3** exactly once. You may use a combination of the operations addition, subtraction, multiplication, division, exponents, roots, concatenation, decimals, repeating decimals, factorials, and brackets.

Problem 44 The figure at right consists of four unit squares joined edge to edge. Find a polygon, not necessarily convex, such that five non-overlapping copies can fit inside this figure, and cover more than **98%** of its area.

It should be mentioned that Dick Hess is an avid tennis fan, and there are no books by him without problems related to that game. To find out more about these problems, and the solution to the two problems above, buy the book! It is inexpensive and very highly recommended.

John adds: "The second edition of Ravi Vakil's book *A Mathematical Mosaic* has been published. The original edition blended biography, problems, and mathematical connections, in an effective manner. This sentiment is captured in the 1997 **CRUX with MAYHEM** review by Jim Totten, so we therefore reprint Jim's review in its entirety preceded by a brief review of the second edition. As I was the Book Reviews Editor during Jim's tenure as Editor-in-Chief, the opportunity to here accompany a review by Jim is an honour. Jim took a keen interest in the books that were reviewed in **CRUX with MAYHEM**. Indeed, Jim wrote enthusiastically about Stewart Coffin's *Geometric Puzzle Design* in a review published in April 2008.

A Mathematical Mosaic: Patterns & Problem Solving (New Expanded Edition)
By Ravi Vakil, Brendan Kelly Publishing, Burlington, ON, 2008
ISBN 978-1-895997-28-6, softcover, 288 pages, US$19.95
Reviewed by **John Grant McLoughlin**, *University of New Brunswick, Fredericton, NB*

I highly recommend the new and expanded edition of *A Mathematical Mosaic: Patterns & Problem Solving*, but only if you do not have a copy of the 1996 edition already. Quoting from the foreword: "(T)here are few changes here and there from the first edition, but this book remains essentially the same one that appeared in 1996." That comment reflects this reviewer's take on the book.

The book is about 30 pages longer than the original version. Select additions of sections such as "Higher-dimensional versions of Platonic Solids" within the Combinatorics Chapter, insertion of mathematical portraits, and inclusion of a more thorough index account for this difference.

Other changes reflect updating of biographical information and annotated references. Also, Ravi Vakil is now a well established algebraic geometer. However, with this in mind, the October 1997 **CRUX with MAYHEM** review by Jim Totten is still relevant today. It is noteworthy that Ravi Vakil is a founding co-editor of **Mathematical Mayhem** which became part of this journal in 1997, the same year as the publication of Jim's review.

A Mathematical Mosaic
By Ravi Vakil, published by Brendan Kelly Publishing Inc., 1996,
2122 Highview Drive, Burlington, ON L7R 3X4
ISBN 1-895997-04-6, softcover, 253+ pages, US$16.95 plus handling.
Reviewed by **Jim Totten**, *University College of the Cariboo.*

So, you have a group of students who have decided they want the extra challenge of doing some mathematics competitions. You want a source of problems which will pique the students' interest, and which also lead to further exploration. The problem source should lend itself well to independent work. The question is: where do you find the appropriate level enrichment material? Many of us have already tried to answer this question and have a

collection of such problem books. Well, here is a book to be added to your collection!

It is certainly a problem book, but it is much more than that. The author at one moment guides the reader through some very nice mathematical developments, and throws out problems as they crop up in the development, and in the next moment uses a problem as a starting point for some interesting mathematical development.

With a few exceptions the problems in this book are not new, nor are the solutions. They are, however, well organized, both by topic and by level of mathematical maturity needed. Answers are NOT always provided; instead there is often simply a solution strategy or hint given, and occasionally there is simply a reference to some other source for a full-blown treatment. Even when answers are provided, they are not tucked away at the end of the book, but rather they are worked into another topic (usually later in the book, but not always), where they become part of the development of another topic or problem.

The author is a PhD candidate in pure mathematics at Harvard University (at the time the book was written). Being still very young, he knows how to speak to today's teenagers. His sense of humour and general puckishness is present throughout: just when you are lulled into some serious computation in probability, he deviously throws a trick question at you, that has a totally non-obvious answer (non-obvious, that is, until you CAREFULLY re-read the question).

Many mathematics books published today include short biographies on famous mathematicians through history, especially those whose names come up in the theory developed in the book. This book is no exception. But what is unique about this book is the inclusion of Personal Profiles of young mathematicians from several countries that he has met at International Mathematical Olympiads (IMOs) in the past. The profiles are quite diverse, which means that most bright students could find one to identify with and to use as a role model. The author and those he profiles have taken a risk in doing this: they have tried to predict some of the important mathematicians in the early part of the next century. It should be interesting to follow their careers and see if those predictions can come true, or if by placing them in the spotlight, they find too much pressure to deal with.

The problems range from puzzles that elementary school children can do to problems that provide training for Putnam candidates (toward the end of the book). There are many cross-references and connections between seemingly unrelated problems from different areas of mathematics, connections that most students would be unable to make. Many of these connections are new to this reviewer. However, once made these connections are quite clear.

As for his credentials, Ravi Vakil placed among the top five in the Putnam competition in all four of his undergraduate years at the University of Toronto. Before that he won two gold medals and a silver medal in IMOs and coached the Canadian team to the IMO from 1989 to 1995.