BOOK REVIEW

John Grant McLoughlin

Problems of the Week
By Jim Totten, Canadian Mathematical Society, 2007

Reviewed by John Grant McLoughlin, University of New Brunswick, Fredericton, NB

The author needs no introduction to the CRUX readership. Jim Totten completes his tenure as Editor with this issue of the journal. As the Book Reviews Editor, I am taking the opportunity to acknowledge a recently published work of Jim Totten – another way of thanking Jim for his contributions to problem solving within CRUX and beyond. The publisher, the Canadian Mathematical Society, will surely support me taking such editorial liberty within the review.

Jim Totten taught at Thompson Rivers University (formerly known as the University College of the Cariboo) from 1979 to 2007. Each week of the academic semesters featured a different posted problem with minimal repetition of individual problems over the years. This publication features a selection of 80 such problems used prior to Fall 1986. In fact, some were first used by Jim at Saint Mary’s University from 1976–1979.

The problems take a range of forms spanning an array of topics as noted in the Table of Contents. A helpful “Index of Problems by subject matter” can guide solvers toward topics of interest. The subjects (and subheadings) are: Algebra (Equations, Functions, Word Problems, Other), Analysis, Combinatorics, Geometry (Triangles, Circles, Other), Logic, Numbers, Probability, and Recreation. Many problems are cross-referenced to two subjects.

Problems of the Week is Volume VII in the series ATOM (A Taste of Mathematics). Publications in the series are intended for keen high school students, mathematics teachers, and problem solvers who wish to engage with accessible material. The ATOM materials lend themselves to independent study or collaborative projects. This book is no exception as it grows out of collaboration with students though the inclusion of detailed solutions allows one to learn much math independently from problems that may appear beyond one’s grasp.

I am reminded of my undergraduate studies at the University of Waterloo, particularly in two separate courses, commonly referred to as the “100 Problem Courses.” Many of the problems introduced to me by Dean Hoffman or Ross Honsberger appear in this book. The introduction clarifies that this is not coincidental, as Jim writes in the dedication: “For showing me that not only was it acceptable to be excited and enthusiastic about mathematical problem-solving, but that it was to be strongly encouraged, I am dedicating this book to Ross Honsberger.”

A few problems are stated here to pique the interest of problem solvers.
3. In a certain classroom, there are 5 rows with 5 seats per row arranged in a square. Each student is to change her seat by going either to the seat immediately in front or behind her, or immediately to the left or right. (Of course, not all possibilities are open to all students.) Determine whether this can be done, beginning with a full class of students.

Try to generalize to a rectangular array and find the conditions under which such a change of seats can be managed.

16. The three sides and height of a triangle are four consecutive integers. What is the area of the triangle?

48. The Ramada County Department of Highways has just resurfaced the county roads, and now the yellow stripe down the middle of the road must be repainted. The truck used for this purpose is very inefficient as far as gas consumption is concerned, and thus the Department would like to have the truck travel the shortest distance possible. A road map of the county is shown (with distances given in kilometres). The county truck is garaged in Midville, and it must return there when the job is done. How many kilometres must it travel and what route should it take?

61. Given any two points $A$ and $B$ on the circumference of a circle, and $E$ the mid-point of the arc $AB$ (note that there are really two arcs that could be called $AB$; it does not matter which one we choose as long as the rest of the discussion is assumed to pertain only to points and arcs lying on the arc $AB$ that we chose). Let $P$ be any point on the arc $EB$ and construct $EN$ perpendicular to $AP$ with $N$ on the chord $AP$. Prove that $AN = NP + PB$ (we are dealing only with magnitudes of line segments here).

This book is an excellent addition to a library, a departmental coffee room, or the math teaching office in a school. Those who like problem solving will enjoy this compact resource, whether a high school student aspiring to learn advanced math or a seasoned mathematician who likes a challenge.

As the Book Reviews Editor through Jim’s entire editorial tenure, I wish to express my gratitude for the privilege of working with Jim in this capacity.

Addendum. The review was sent to Jim less than two weeks before his sudden passing. As noted on the inside front cover, Jim is a Co-Editor of this issue. Indeed the loss to the mathematical community is great. The spirit of Jim Totten is remembered fondly in this review.