BOOK REVIEWS

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*Mathematical Delights*
By Ross Honsberger, Mathematical Association of America, 2004
Reviewed by Ed Barbeau, University of Toronto, Toronto, ON

There was a time when Ross Honsberger of the University of Waterloo performed a mathematical concert at each annual meeting of the Ontario Association for Mathematics Education. Eager mathematics teachers would pack a large auditorium for a polished and witty exposition of about ten of Honsberger's favourite problems and their solutions, selected for their elegance and capacity to surprise and delight. Those who show up at the annual marking bee for the Waterloo contests still can enjoy such a treat.

These problems found their way into a succession of books published by the Mathematical Association of America. No fewer than eleven of the first twenty-eight volumes of the Dolciani Mathematical Exposition Series, including the inaugural four and this one, are from his hand. That is a lot of beautiful mathematics!

While his earlier books consisted of longer essays on individual problems, this one is a miscellaneous collection of problems from a variety of sources, briefly treated. Demanding at most the background of a second-year undergraduate, the author aims to "put on display little gems that are to be found at the elementary level". The first part of the book, Gleanings, contains problems and solutions drawn from contests like the Putnam, journals like Mathematics Magazine and The College Mathematics Journal, and published collections of problems. The second part, Miscellaneous Topics, focuses on the work of particular correspondents (Liong-shin Hahn, Achilles Sinefatopoulos and George Evagelopoulos) and problems from particular sources (New Mexico Mathematics Contest of 2002, and The Book of Prime Number Records by Paulo Ribenboim). Finally, just to make sure the reader is not content to be a spectator, Honsberger poses 27 challenges, with solutions provided in a separate section.

As you would expect, the problems are drawn from the standard competition areas of number theory, combinatorics, algebra, and geometry. They are attractive for different reasons. Sometimes the result itself surprises. (As Honsberger often asked in his lectures, "How does someone think of such things?") At other times, there is an unusual strategy leading to a straightforward dénouement. But the most satisfying solutions are clever, unexpected, and brief. Sometimes a serious research problem has such a solution. Witness this question of M.V. Subbarao of the University of Alberta: *Are there } ≥ 2 distinct odd primes } , } , . . . , } and an integer } for which } (} + } ) (} + } ) . . . (} + } ) − 1 is divisible by (} + } − 1)(} + } − 1) . . . (} + } − 1)?* A $100 award went to C. Offord
and R. Wentz for an almost trivial example where $r = 2$ and the primes are twins.

In part, the book celebrates the human ingenuity that generated the problems and solutions, the latter occasionally during a competition. For example, the 1988 IMO problem to show that $(a^2 + b^2)/(ab + 1)$ is square whenever $a$ and $b$ are integers for which $ab + 1$ divides $a^2 + b^2$ was a notoriously challenging one for which a Bulgarian student gave a prize-winning solution during the competition.

The geometry problems are the most fun. There are a number of intriguing results about the sizes of circles inside an arbelos (a region bounded by three tangent semicircles with a common diameter). From The College Mathematics Journal come two short constructions for the tangent to an ellipse from an exterior point.

The book has an index for names and another for terms, with each item keyed to the section rather than the page containing it.

aha! A two volume collection
By Martin Gardner, Mathematical Association of America, 2006
Reviewed by Amar Sodhi, Sir Wilfred Grenfell College, Corner Brook, N.L.

As a teenager, I would eagerly look forward to reading the new Martin Gardner book that came to the public library or bookstore. Each chapter was taken from Gardner’s insightful column in Scientific American. I would joyfully spend an hour or so to read and digest the material contained therein.

In the aha! series, however, paradoxes (in part 1) and puzzles (in part 2) are presented in a series of vignettes. Each vignette is accompanied by a cartoon strip which introduces the reader to the problem being discussed.

The topics touched on in this work will no doubt be familiar to the older readers of CRUX with MAYHEM, but this does not matter. Gardner’s inimitable style ensures that the knowledgeable reader can enjoy the book as if it were a collection of much loved poems. Even a reader who has little exposure to aha! aspects of mathematics may, like my wife and teenage daughter, find this entertaining yet thought-provoking book hard to put down.

Originally published in separate volumes as: aha! Insight (W.H. Freeman and Company, 1978) and aha! Gotcha (W.H. Freeman and Company, 1982), this welcome amalgamation of these classics makes for an ideal gift for anyone, young or old, who has yet to discover Martin Gardner.