# BOOK REVIEWS

## Amar Sodhi

*When Less is More : Visualizing Basic Inequalities*
By Claudi Alsina and Roger Nelsen,
Mathematical Association of America, 2009
ISBN 978-0-88385-342-9, hardcover, 164 pages, US$58.95
*Reviewed by* ***Bruce Shawyer****, Memorial University of Newfoundland, St. John's, NL*

I have always (at least, since my High School days) been a great believer in the power of Geometry to lead one into understanding Mathematics.

*Let no one ignorant of Geometry enter here.*

Tradition has it that this phrase was engraved at the door of Plato's Academy, the school he had founded in Athens. Proclus tells us about 750 years later that Ptolemy Soter, the first King of Egypt and the founder of the Alexandrian Museum, patronized the Museum by studying geometry there under Euclid. He found the subject difficult and one day asked his teacher if there was not some easier way to learn the material. To this Euclid replied,

> *Oh King, in the real world there are two kinds of roads, roads for the common people to travel upon and roads reserved for the King to travel upon. In Geometry there is no royal road.*

Claudi Alsina and Roger Nelsen's book expounds the principle that many inequalities become much more apparent when they can be visualized. Of course, Roger Nelsen is famous for his "Proofs without Words" that are wonderful examples of this principle.

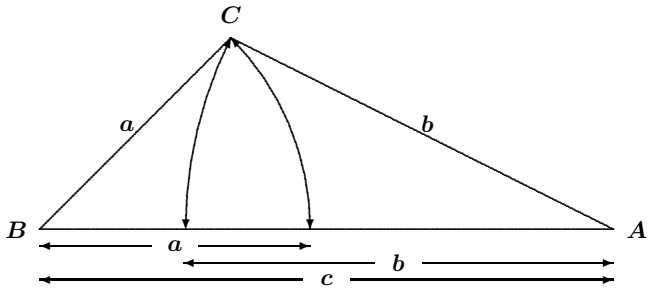
To quote Charles Ashbacher :

> *Proofs without words will not work everywhere, but when they do, it can be the difference that makes the light bulb of understanding burn bright.*

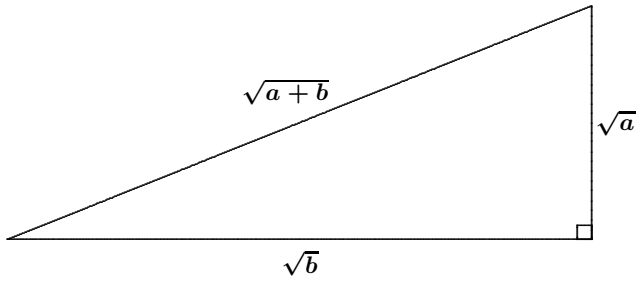
This book takes a range of inequalities from the simplest and best known to the more complicated and somewhat obscure. The exposition is well presented with easy to follow diagrams and there are challenges to the reader in every section.

I should like to illustrate an example to give a flavour of what to expect.

> **The subadditive property of the square root function**.
>
> First, we show that the length of any side of a triangle is less than or equal to the sum of the lengths of the other two sides.




Now, we take a right triangle with legs of lengths $\sqrt{a}$ and $\sqrt{b}$. Use of the Pythagorean Theorem gives the length of the hypotenuse as $\sqrt{a+b}$.




An application of the first result shows that $\sqrt{a+b} \leq \sqrt{a} + \sqrt{b}$.

This book should be in the personal library of everyone who teaches Mathematics where inequalities come into the curriculum. And this means that almost everyone who teaches Mathematics should own this book.

*I Want to be a Mathematician, A Conversation with Paul Halmos*
A DVD produced and directed by George Csicsery, Zala Films,
for the Mathematical Association of America, 2009
ISBN 978-0-88385-909-4, Running time : 44 minutes, US$39.95
*Reviewed by* **Brenda Davison**, *Simon Fraser University, Burnaby, BC*

In the DVD, 'I Want to be a Mathematician', Paul Halmos (1916-2006) is interviewed late in his career by Peter Renz, primarily about his teaching. Interspersed are interviews with several people who worked or studied with Halmos, notably an emotional Don Sarason whom Halmos considered to be his best student.

The title of the DVD follows from the title of Halmos' book *I Want to be a Mathematician, an Automathography in Three Parts* but the content does not. Where the book is really an excellent meditation on one person's journey from chemical engineering to philosophy, ending in mathematics, the DVD focuses primarily on the teaching of mathematics. For Halmos, the best teaching consisted of the Moore method with softened edges. The Moore method is a discovery based teaching technique where the teacher does not

tell but rather asks and leads students to discover the ideas for themselves. Perhaps the reason for this emphasis is that, in the end, Halmos considers himself to be primarily an expositor of mathematics — his teaching and his textbooks are what he is most proud of.

The technical aspects of the DVD are good : the lighting, camera motion, the speed of the presentation, the Bach violin background music make for an easy to watch, easy to follow introduction to Halmos.

The DVD should appeal to two groups of people : 1) those starting their teaching career, after having already decided to make mathematics their subject and who are reflecting on how best to convey mathematical content to their students, and 2) those who are deciding whether or not to take on mathematics as an undergraduate or graduate major.

This second group will not be served solely by the DVD. For this group, the function of the DVD will be to provide a short, easy introduction to Halmos which can then be followed by reading some or all of the book of the same title. The transition is made easy by the inclusion of several long excerpts from the book on the DVD. These can be read on a Windows or Macintosh based computer as DVD-ROM content and will allow a quick and inexpensive look into Halmos' book prior to committing to purchasing it. I would most definitely recommend that someone considering mathematics as a career buy and read the book. Halmos is honest about himself, his profession, the people around him and he is particularly careful not to present himself as a finished, polished package. This provides the reader with the opportunity to glimpse a mathematician in the making.

Someone interested in studying in the United States will also benefit from discussion that spans the last 70 years of American mathematical activity in such geographical dispersed areas as the Institute for Advanced Study in Princeton, Syracuse, Indiana and Santa Clara Universities, and the Universities of Michigan, Hawaii and Illinois.

The well-written book has the added advantage that the mathematics that Halmos produced is discussed in an accessible way. Furthermore, many different topics are touched upon as Halmos changed his focus from one area of mathematics to another several times throughout his career.

So, watch the DVD and allow it to lead you to the book.