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Book Review: Mathematical Reflections by Peter Hilton, Derek Holton and Jean Pedersen

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$+ b$, where m is the line's slope and b its y-intercept..." Suffice it to say that the ensuing discussion employs b in both its meanings.

I was even more disturbed by an extended discussion (pp. 179-183) in which "slope" and "curvature" appeared to be used interchangeably. Was I being overly critical? Then comes this sentence: "Curvature is assessed at a point by reference to the slope of a line tangent to the curve at that point, the curve acquiring its slope at second hand, it is true, but acquiring nonetheless a slope and so a number embodying and then expressing its curvature."

The mathematician will find here amusing anecdotes, charmingly expressed, and rich metaphors, to enliven mathematical ideas. But if he or she wishes to assign readings from this book to students of calculus, my advice is to select such readings carefully.

Book Review: *Mathematical Reflections* by Peter Hilton, Derek Holton and Jean Pedersen

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Mathematical Reflections. Hilton, Peter; Holton, Derek; and Jean Pedersen. Springer, 1997.

I believe the following book is particularly suited to study by those who are or will be teachers of math and science: *Mathematical Reflections* by Peter Hilton, Derek Holton, and Jean Pedersen. After 8 chapters of delightful math, the short 9th chapter contains some very useful and thought provoking reflections on "how math should be done" and "principles of mathematical pedagogy." The following comes from a section on the special role of geometry in secondary and undergrad math.

"In fact, geometry and algebra, the two most important aspects of math at these levels, play essentially complementary roles. Geometry is a source of questions, algebra is a source of answers. Geometry provides ideas, inspiration, insight; algebra provides clarification and systematic solution."

"Thus it is particularly absurd to teach geometry and algebra in separate watertight compartments... Geometry without algebra leaves the student with questions without answers, and hence creates frustration; algebra without geometry provides the student with answers to questions nobody would ask, and hence creates boredom and disillusion. Together, however, they form the basis for a very rich curriculum, involving discrete and continuous math."

In arguing against the separation and restriction to synthetic geometry methods, they point out that completing geometric problems by Euclidean means almost always exploits some clever trick, an ingenious construction—so, roughly speaking, each problem "requires its own special idea. And none of us is bright enough to function, in any aspect of our lives, with such an enormous idea-to-problem ratio; we have to make a good idea go a long way. ... So remember: All Good Ideas in Maths Show Up in a Variety of Mathematical and Real-World Contexts."

Finally, I note that Peter Hilton (mathematician, SUNY Binghampton) has collaborated with Stephen Willoughby (former NCTM Pres., Prof. Univ. AZ), Carl Bereiter (cognitive psychologist), and Joseph Rubinstein (biologist) over a period of many years to develop the series of elementary math texts called Real Maths for K-8 originally published by Open Court, and its latest version now called Math Explorations and Applications published by SRA/McGraw-Hill currently available for K-6. I'd like to hear commentary on this series from those who know it well. Also, can someone point me to reviews of this series, with comparison to others?