

Harper...from page 4

Tips for Teachers, Microworlds, Listful Thinking, Q&As, Logo Challenges, The Best of the Rest of the National Logo Exchange.

Many contributions are taken from articles that appeared in the National Logo Exchange and Logo Exchange over the past 8 years. Some articles that have a math theme include: Pythagoreas' Turtle, Tangrams, Undercover Numbers, The Truth about Numbers, Triangle Thinking, and Geo-Logoboard.

My favorite chapter is *Logo Challenges* by Robs Muir. Harper compiled most of these challenges from Muir's column "InLXual Challenges" that appeared in the Logo Exchange for several years. Almost all of these problems would be valuable problem solving experiences for math students. Though there are probably infinite problem solving scenarios that a student could encounter, not all of them would help them to get to know important mathematical principles. The beauty of these challenges is that they help students practice, use, and get to know such principles.

Here's a fun example: *Ad Romanum* (P. 301)

Most elementary and junior high textbooks include (or at least they used to) a section on how Roman Numerals work. The point is to get students to appreciate how much more efficient and effective our base 10 system is. Rarely do they do so, because (assuming the teacher doesn't ignore them) they do those problems just like all the others without much impact. How different it would be if somehow we had managed to miss the Arabic contributions and got stuck with Roman Numerals. Imagine going to MacDonalds and having to pay SCCL for a burger! The need to know would be a bit more significant - particularly if you're hungry. Also, students would discover how clumsy that system is. In Muir's challenge, rather than bringing an artifact to the present, he suggests we go back to the past. *Here is Robs doing the "talking"*.

Return with us to the thrilling days of Nero et Brutus and relive the wonders of the Roman numbering schemes. Perhaps you will discover why ancient Romans had nothing in their future; indeed, the zero had to be invented by the Persians. As you may remember from your fifth-grade math book, the Roman numerals are composed of the "numbers" I, V, X, L, C, D, M and so on, with values represented in our (Arabic) system as 1, 5, 10, 100, 500, 1000, and so on. This challenge requires you to use your ancient QWERTY keyboard to compose a Logo program to translate ancient Roman numbers into the slightly less ancient Arabic numbers. The goal is to permit your Logo computer to add two Roman numbers and provide the answer in more familiar numbering system. For example,

ADD "MCMLXXXIV" "XVI"

RESULT: 2000

(Send us your solutions. We'll print them in the next issue of the Clime News.) I hope this example will whet your appetite for the book. It is well worth the money invested!



Clements...from page 4

needs to persevere trusting that this transitional time is worth it."

Reflecting on the role of Computer Assisted Instruction, Clements says that good CAI has aspects of a good human coach. It will work patiently with a student helping him to understand. Unfortunately, that is the ideal. Today, software can be helpful but it requires intelligent selection, implementation and support on the part of the teacher. Clements goes into depth explaining the various types (Drill and Practice, Tutorial, simulation, and instructional games) referring to what research says about each type and offers suggestions for its use.

The two chapters that were the most interesting to me were on programming and problem solving. In the programming chapter Clements says that though programming in languages like BASIC does not have to be bad for children, he highly recommends the use of Logo as an effective use of the computer. Though the research is mixed about the impact of programming on problem solving skills, clearly with proper teacher guidance the use of Logo can have positive effects on children's learning of mathematical ideas. He shares many examples of activities with Logo that would help children grow mathematically.

In the problem solving chapter, he offers some insights into the problem solving process and makes suggestions for teaching problem solving. For example, he suggests that teachers should present systematic problem solving instruction. Students must solve problems to develop problem solving ability (rather than only learning subskills such as presented by some textbooks, computer programs, and teachers.) This ability develops over a long period. Students benefit from a consistent, planned approach. It is often useful to move from open-ended, exploratory use of programs to challenges concerned with finding and using the most efficient strategies. The environment whether more traditional or open-ended, should be warm and anxiety-free.

This is just a taste of a very delicious book that is filled with hundreds of ideas and applications. Like Dennis Harper's book this is a must buy for anyone interested in quality mathematics teaching.



Greetings...from page 1

has for the use of technology, and some good news about what's happening in one school district. In addition, you will find three articles. The first is *Doing Mathematics in a Logo Environment* in which William Fisher describes a course for undergraduate math majors that he teaches, using Logo as the vehicle to get the students to behave like mathematicians by doing mathematics. Doug Moore shares an investigation he calls *Inspi and Totalturn* that was inspired by Bill Craig's *Inspi* microworld (V. 2, No. 2). The final article *Graphing Functions and their Derivatives* was written by two high school students with the help of their teacher Al Cuoco. In addition, we have our usual array of information about people, resources, and ideas which I hope you will find interesting. Also note page 15 - *ClimeAction II*. Like Public Radio this is our annual appeal to you for support to keep this enterprise afloat. If you believe strongly in the value of Logo as we do, then please fill out this form and help us support Logo use in the mathematics community.

