Calendar

Mr. Math Faces the Seven Mysteries

A Young Person's Game Explored

'The Math Guy," as he's known on National Public Radio, admits to an "evangelical streak." That's why he popularizes mathematics. He reaches out to the laity in his *Weekend Edition* commentaries and in other media-friendly ways. "That's why I'm talking to you," he says by phone from his office at Stanford University, a few days before the start of his new-book tour.

His real name is Keith Devlin, and perhaps partly to democratize himself, he claims to have disliked mathematics as a student. "I wasn't particularly good at it. I found it boring, as it was in that stage." He means the lower forms, not the super mathematics that has become his subject. He went to high school in the United Kingdom, starting "the year after Sputnik went up, so like a lot of kids, I wanted to be a scientist." But science required that he study math. "That was the motivation." Soon he switched to studying math exclusively, having found its upper reaches much more interesting than science.

LOCAL EVENTS

The new book's subject is a set of seven problems so difficult that Devlin doesn't attempt to explain them to the hoi polloi except in a cursory way. Selected by an international committee, the problems have been around a while but are called the Millennium Problems because the prizes for their solutions were announced in 2000. They might as easily be called the Million-Dollar Problems; that's the sum being offered for each solution by the Clay Foundation of Cambridge, Massachusetts.

How many people on earth right

now does Devlin reckon are capable of solving these problems?

"It's not clear that *anybody* is capable of solving them," he says. "A better way of looking at it is: How many people, if a solution were advanced, would be able to say, 'This might be right'? Probably 200 or 300 in the world."

Recently, Martin Dunwoody, who teaches at the University of Southampton, England, proposed a solution to the problem called the Poincaré Conjecture. (French physicist and mathematician Henri Poincaré [1854–1912] formulated it.) Asked about Dunwoody's proof, Devlin says, "Every 20 years or so, someone claims to have solved that one. Dunwoody is a respectable mathematician, but most people, when they saw the announcement, said, 'We don't think he's done it.' It was a bit unfair — a snap judgment. They thought, 'No. It just doesn't seem that he would have it.' And, indeed, he hadn't. The proof wasn't valid. But it took a while for people to be sure. In modern math, it can take months."

The Poincaré Conjecture deals with topology. Even topology's definition is difficult to comprehend. Suffice it to say that proving mathematically that two objects — say, a golf ball and a tennis ball — are topologically the same is easy, relatively speaking; proving mathematically that two objects are *not* topologically the same has yet to be done. In a video filmed at a bakery (accessible on *www.claymath.org*), Devlin stretches bread dough to explain this concept in a visual way.

A problem called P Versus NP is about computation — i.e., computers. Beyond that simple statement, it's a quagmire for the uninitiated. Still, P Versus NP is the only one of the seven that Devlin believes could possibly be solved by "some unknown person," rather than a current superstar of math. "It is possible" — not probable — "that some kid of 20 years old will come out of India or Pakistan or somewhere and solve it. That's because what its solution may take is a clever new idea." (The others problems, he writes, "are buried deep within a mass of heavy-duty mathematics, which has to be mastered before you can begin working on the problem itself.")

Devlin often compares mathematicians to athletes. "It's a young person's game," he says. "Very few have done great work beyond their mid-40s. By the time you've been doing mathematics for 15, 20 years, you begin to get in mental ruts and can't look at a
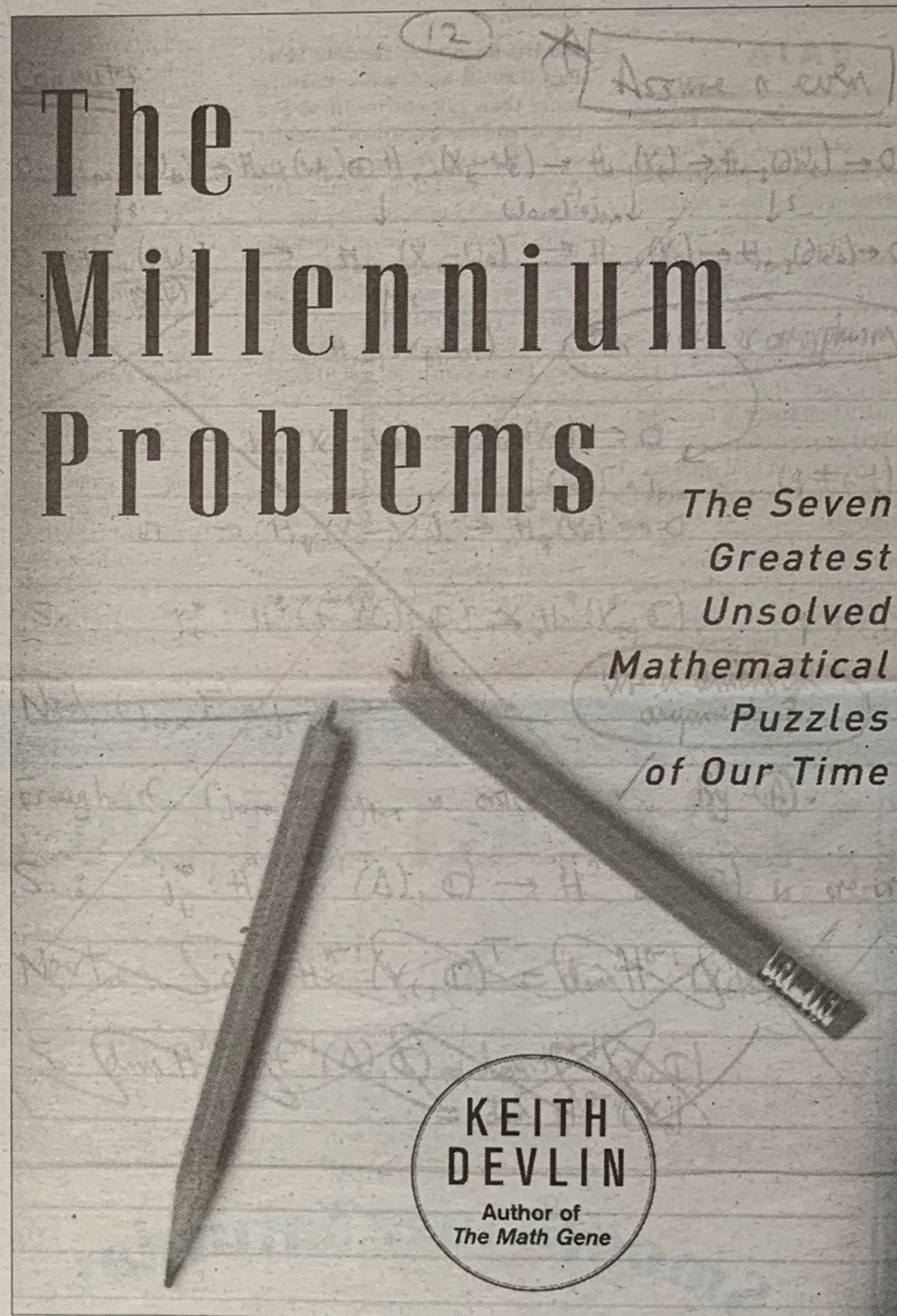
problem with fresh eyes anymore. In other disciplines, philosophy and so forth, you become more revered and perhaps better as you get older."

Math doesn't benefit from the wisdom we associate with age?

"In mathematics, wisdom may, if anything, be a bit of a dead weight."

Could it be that what mathematicians need is something we associate with youth?

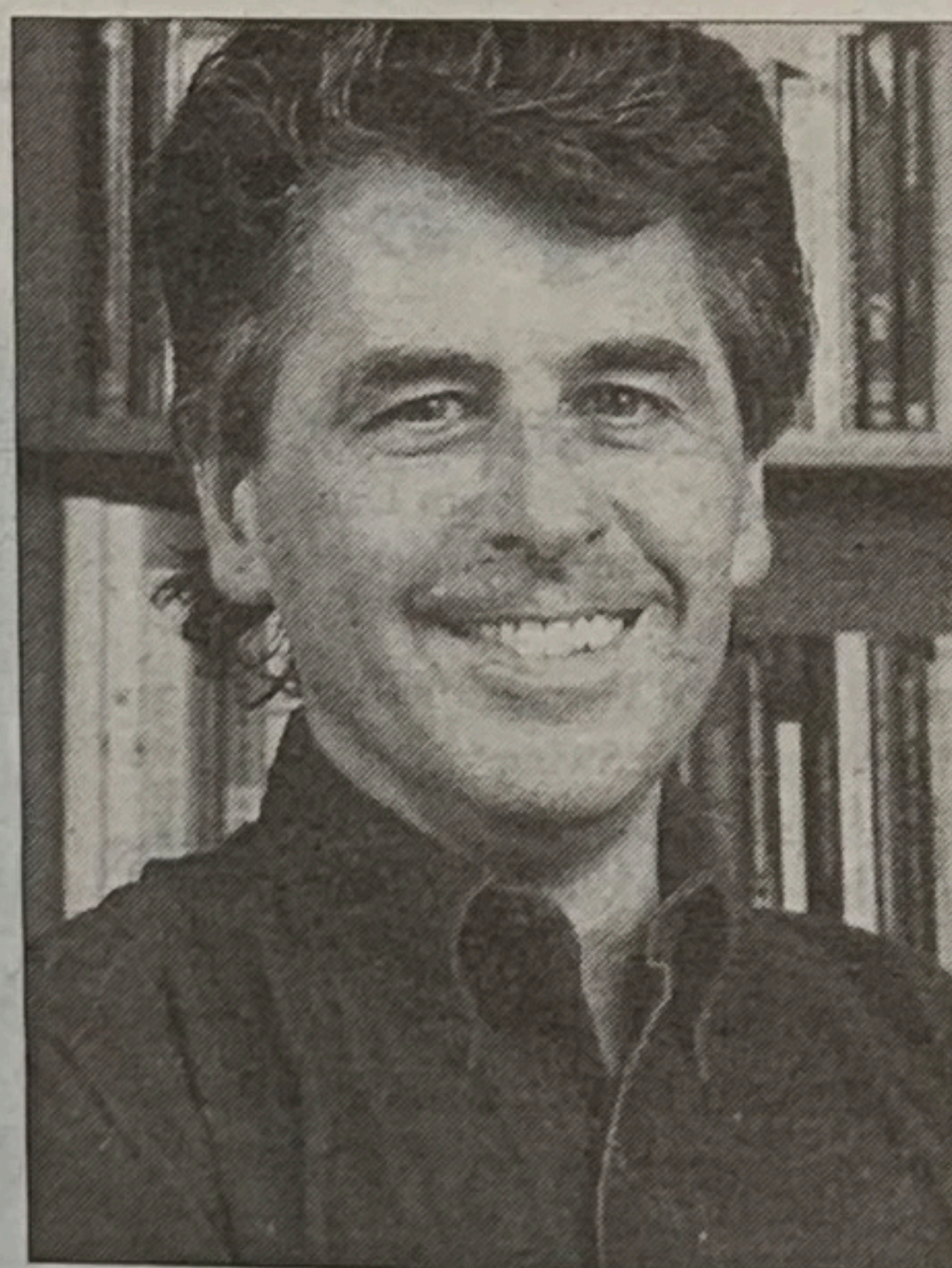"Oh, lots of cockiness, yes. Some of the best are cocky, self-assured, brash."

Devlin doesn't claim cockiness for himself; in fact, he sounds humbled by math. "For many years, I did nothing but mathematics and was good at it, in the sense that I could see problems quickly. I had a good feel for it. Then as I grew in seniority [in academia] I

became a department chair, then a dean, and spent less time doing mathematics itself." During that time, he also began his career as a popularizer. "Now I find it very hard to concentrate on mathematics."

— *Jeanne Schinto*

Book signing by Keith Devlin, "The Math Guy"
The Millennium Problems: The Seven Greatest Unsolved Mathematical Puzzles of Our Time
Tuesday, November 19, noon–1:30 p.m.
UCSD Bookstore, Price Center
9500 Gilman Drive, La Jolla
Free
Info: 858-534-3149

The Millennium Problems

The Seven Greatest Unsolved Mathematical Puzzles of Our Time

KEITH DEVLIN
Author of *The Math Gene*

Keith Devlin