Lecturas Matemáticas
Volumen **22** *(2001), páginas 67–69*

Una entrevista con Gian-Carlo Rota

En el periódico institucional *MIT Tech Talk*, del 28 de octubre de 1999, el profesor Gian-Carlo Rota expresó sus ideas sobre los matemáticos, la profesión matemática y sobre el porqué el gran público no las comprende muy bien. Transcribimos en el idioma original el texto de esta entrevista.

What's it like to be a mathematician?

It's the least rewarding profession except one: music. Musicians live an impoverished life. Mathematicians – for what they do – are really poorly rewarded. And it's a very competitive field, almost as bad as being a concert pianist. You've got to be really an egoist. You've got to be terribly self-centered.

Why are there so few women in the field?

Women are more realistic than men – they can see that it's a flight from reality. What they don't see is that it's a flight from reality that works. The distribution of mathematics talent among men and women is exactly the same. But in 40 years of teaching I've seen really good women mathematicians leave the profession, including one very close friend, to my great chagrin. I almost cried.

Why don't we hear about the work of mathematicians?

Mathematicians have bad personalities. They're snobs. Among them, and at MIT, there's a tendency to judgment: people who don't write formulas are tolerated. Mathematicians also make terrible salesmen.

Physicists can discover the same thing as a mathematician and say 'We've discovered a great new law of nature. Give us a billion dollars.' And if it doesn't change the world, then they say, 'There's an even deeper thing. Give us another billion dollars.'

Are mathematicians really so different from other scientists and engineers?

The more experimental scientists and engineers are, the more common sense they have, and so on until you get to the mathematicians, who are totally devoid of common sense.

What do mathematicians do?

They work on problems. There are historical problems floating around. You are in competition with people who came before you. Sometimes you discover the competition wasn't that good after all.

How do they choose the problems?

People like to think that scientists see a need and try to solve that problem. Engineers may work that way. But in math, you don't have an application when you work on a problem. It's not the need prompting the science. The reality is, it's the other way around. You say to yourself, 'I have a feeling there's something to this problem' and you work on it, but not alone. Many people throughout history work on a single problem, not a "lone genius." That's another phony-baloney theory.

And once the problem has been solved?

Applications are found after the theory is developed, not before. A math problem gets solved, then by accident some engineer gets hold of it and says, 'Hey, isn't this similar to...? Let's try it.' For instance, the laws of aerodynamics are basic math. They were not discovered by an engineer studying the flight of birds, but by dreamers – real mathematicians – who just thought about the basic laws of nature. If you tried to do it by studying birds' flight, you'd never get it. You don't examine data first. You first have an idea, then you get the data to prove your idea.

What is combinatorics?

Combinatorics is putting different-colored marbles in different-colored boxes, seeing how many ways you can divide them. I could rephrase it in Wall Street terms, but it's really just about marbles and boxes, putting things in sets. Actually, some of my best students have gone to Wall Street. It turns out that the best financial analysts are either mathematicians or theoretical physicists.

We're also interested in the mathematical properties of knotting and braiding. Someone in 1910 started with knots. You take one, cut it and you get a braid. It's actually one of the hottest topics in math today and holds the secret to a number of problems (I have a gut feeling). If we understand braids well enough, we'll solve all the problems of physics.

Do these have applications for other sciences?

Protein folding is very closely related to this process. But biologists are just at the beginning. As they get deeper and deeper into the DNA structure, they'll need so much mathematical theory they'll have to become mathematicians. There aren't more than two or three people right now who know both math and biology. It takes a tremendous effort. But it's very probable that an understanding of genetics is dependent on understanding knotting.

What sorts of problems have combinatorics solved in the past?

One example is quantum mechanics, which was discovered 30 years ago. The mathematics behind quantum mechanics had been worked out 20 years before by a mathematician who didn't know what it was good for.

What would you like to tell the public about math and science?

Basic science is essential. The need for public relations is essential. We won't survive – continue to get funding – without it. People think we've got enough basic science. But the fact is, basic science costs so little compared to, say, developing a new kind of submarine. It's a law of nature: the things that get cut first are the least [expensive]. Take [the funding for] the National Endowment for the Arts – that was peanuts.