

Let's Face It!

Things, in the world of mathematics teachers, are not all they could be. Of course, this is entirely the fault of (check all):

- a. The government which: () is not paying us well enough, () is not giving us any status,
- b. The students who are: () too dumb, () not motivated,
- c. The administration which: () does not recognize us, () does not understand us.

I think that covers it more or less.

I will argue in this column that *we* are the main culprits. My point is that what we do bears as much resemblance to mathematics as freeze dried coffee does to the real stuff. I may not dare go as far as saying that it stinks but I will strenuously argue that it does not taste very good and that, in fact, most of what we do is sugar coating the bitter pill. In future columns therefore, I shall re-examine some of our assumptions in some details. I shall begin by debunking the following myths:

Myth #1. Mathematics is useful. How very convenient! Useful to whom? Other than for current and prospective math teachers, forget it. So why should anyone study mathematics?

Myth #2. Mathematics is hard. How very convenient! How come *we* were able to learn some of it? And I beg you to consider at least *that* question. Besides, doesn't it depend on *what* mathematics? How come a computer that couldn't drive a car, can't recognize a cat from a dog can do any of the problems we assign to our students?

Myth #3. Whether one likes it or not, studying mathematics is painful. How very convenient! The students would certainly agree. But are we really asking students to *study* mathematics? Isn't it what we are asking our students to do which is painful?

We all learned mathematics. At least some mathematics. At least a long time ago. Well, if not a long time ago, then it looks as if we wished it were so. The fact is that we have forgotten what it was to *study* mathematics. You don't agree. Then consider the following:

i. Why aren't we studying mathematics anymore? I mean, right now! Come to think of it, when was the last time we took a course in mathematics? I don't mean a minicourse at the AMATYC meeting or one of these summer courses, special deluxe for teachers. I mean a real honest to god graduate course. In competition with regular graduate students. Say, algebraic number theory, homotopy theory, nonlinear functional analysis. For that matter, how come we don't even have seminars in our departments?

ii. Why is it that we are prisoners of textbooks? Why is it that, whenever we want to teach a course, the first thing we do is reach for a textbook? You mean *we* don't need a textbook but the *students* do? How come then we don't let the students choose their textbooks? Are we really saying that there is that much of a difference among all the algebra textbooks on the market? Why then are we always unhappy about textbooks? Why don't we write our own notes?

iii. Why are our classes so boring? I am sorry, I didn't mean yours, I meant your colleagues! Would *you* want to sit in for a semester on *any* math course in your institution? Then how come you don't and why do you wonder that the students only do it under duress? You are saying that you don't see the point as you already know that stuff. Well then, how about **i.** above?

iv. Why are our classes *required*? If we are doing such a wonderful job, how come so many students are failing? If mathematics is such a useful subject, how come students are so, let us say, lackadaisical in their math studies?

To give you an idea, if you haven't already guessed, of where I stand on such issues, let me tell you, briefly, my view on "The popularization of mathematics" a study to be done by the International Commission on Mathematical Instruction at its Leeds seminar on September 17-22, 1989 in Leeds, England. Put succinctly, the question proposed to the conference seems to be: "how come the public isn't buying what we do?" to which, then, the answer obviously is: "because we are doing a dismal job of selling it".

Consider first that, indeed, "*unlike other sciences, mathematics, or at least some parts of it, is taught to all schoolchildren*" (A. G. Howson, J. -P. Kahane, & H. Pollak, 1989). This means that, whatever the public's idea of mathematics is, it got that idea from us and that we have no one to blame but ourselves. We had our chance with a captive audience and we blew it. This suggests that we should perhaps begin by popularizing mathematics in the schools. But, perhaps even more important is the fact that, by and large and just as with reading, we try to sell mathematics under the pretense that it is useful, nay, that it is indispensable: "*To get a good job, get an education*". And, of course, nobody buys that. That mathematics is useful *globally*, at the level of society, is certainly true. That mathematics is guaranteed to be useful *locally*, at the level of the individual, is almost completely false.

Ah, but we hear you saying, you cannot be *really* successful, say be a nuclear physicist or a physician or even a businessman, if you don't know the appropriate mathematics. Well, a few months ago, there appeared in the Philadelphia Inquirer an article on a couple of whiz kids who were making millions trading some exotic options on the exchange. What was interesting is that their background included business degrees with an impressive amount of mathematical statistics and probabilities but what was even more interesting is that they had first learned their trade on the New Jersey racetracks and then had gone on to Las Vegas play professional poker for a couple of years before coming back to Philadelphia's stock exchange. Would anyone be willing to take bets as to the part of their education that contributed to their current success? More generally, you only have to think of the number of well educated people, physicians for example, who have told you: "Ah! you are in mathematics, I never went beyond calculus and I don't remember any of it".

I learned to read because I felt that reading would afford me pleasure, because it allowed me to escape and not because I needed to be able to read instruction manuals. Similarly, I did not go into mathematics because it allowed me to find the profit a farmer makes by enclosing his field at so many francs a meter of barbed wire, etc. In was partly in spite of my teachers and they taught mathematics, not cookbooks. I went into mathematics because I fell in love with mathematics, even though I knew early on that this love would never be requited and that I would never be able to prove a lemma or even a theorem.

I believe that I should make and promote mathematics just the way any artist makes and promotes art even if, once in a while, unlike most arts, ours is recuperated, often in completely unpredictable ways, by industry. And, let us not forget, most of all by the military-industrial complex. That we are getting paid to practice our art infinitely more than most artists ever are to practice theirs is only an accident usually due to some misunderstanding. On the other hand, the world would be a very dull place without art and this, I think, is our real, our only importance, even if it is not the thing to say when you are applying for a teaching position or for a grant.

Of course, in the western ethics, and in the US seemingly more than anywhere else, one is not supposed to enjoy anything, mathematics no more than reading or anything else. Even more so, one is not supposed to enjoy something that one thinks few can enjoy. So, we hide behind the

usefulness of mathematics to sell it, even though this usefulness is far from being obvious at the level of the individual.

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P. S. What do *you* think?

Howson, A. G., Kahane, J. P., & Pollak, H. (1989). The Popularization of Mathematics. *Notices of the AMS*, 36(Number 1), 23-7.