A STORMING OF OUR PYTHAGOREAN ARISTOCRACY

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John Dossey, the current Past President of the National Council of Teachers of Mathematics (NCTM), reports [1] that those who demonstrate mathematics proficiency by profession still have groveling worshippers among the non-proficient. Many people still tend to fall to their knees and decry their own poor mathematics ability when making the acquaintance of a mathematics teacher, mathematician, engineer, programmer, or dollar-bill change machine. This worship, or the effort to cultivate such worship, began at least as far back as the Pythagoreans, who, as even Donald Duck heard in Mathmagic Land [2], met secretly and did not share their discoveries with outsiders. Reports hold that members of the society were dispersed and their buildings demolished in a pro-democracy uprising; some angry outsiders, it seems, didn't like Pythagorean elitism [3].

I don't recall exactly when I was first bitten by Pythagorean false pride, but my high school classmates gleefully recall one particular outward manifestation. By the time I needed a slide rule for high school chemistry, I was aware that math ability implied status. So I purchased the biggest slide rule available — a dual-base vector log log Picket & Eckel monstrosity with 34 lines of scales — and wore it in school on my hip. Whenever my adolescent insecurity felt the need for a Pythagorean ego fix, I calculated something, like a grade average, the time, or a dollar's change, and imagined an aura of superiority.

Pythagorean separatism was thus established by apparel and the existing tendency of classmates to believe the American Mathematics Mystique. ("He's on a higher intellectual plane" was the lie I coveted.) The Mystique lived on in college, despite my discarding the outward status symbol. I began to get invited to parties, and, I would naively reveal my major upon request. The reaction to "My major? Why, uh, math", was an invariant "Oh." Which was all the conversation and social acceptance I had with most such inquirers. Honor and loneliness. The Majestic Mystique. To the better-looking inquirers I began to want to lie about my major.

"Business." "PE." "Fishing." My amulet of academic pride had become a major social albatross.

My first job after graduation was a summer stint as a counselor with a co-ed YMCA resident camp. None of the energetic, highly personable, certifiably recreational Y-types of that era held my enduring slide-rule Pythagorighteousness against me. In their sphere of true competence, they knew that fresh air and responsibility for kids' whereabouts would diminish my hangups. And how! At parties in later years, when I replied to inquiries about profession, I spoke sincerely and almost entirely of summertime joys of getting ghetto kids to accept creepy noises in the dark forest. By this time, of course, the attractive inquirers were responding with more than "Oh" in the few occasions when I was indiscreetly honest about my true "profession": reactions included, "Oh, I *hated* my math teacher", just before I was again abandoned to the macrame wallflowers, seabird and all.

Had the inquirers started looking around for buildings to wreck back then, I wouldn't have known why, but I wouldn't blame them now in retrospect. I was neck-deep in a Pythagorean pedagogy with colleagues when not at parties, extending false pride and avoiding concern about what happens to the students confused by or counseled away from the secret meetings that the essential math classes had become. Such avoidance of guilt was easy. At my school the mathematics department alone showed year-to-year gains in achievement scores, and alone produced content-area means ahead of the nation's. What the heck. We just-plain higher-plane folks were better at subject matter, delivery, *everything*. Somehow I managed to ignore the matter of true competence so recently observed in Y-camp colleagues.

Oh, sure, we secondary mathematics teachers sometimes admitted that there were some kids we couldn't teach. They were undermotivated or math wasn't their strength, we said. The American Math Mystique, "Math is for the Few", gave us absolute protection from public censure for our pedagogical failures, the likes of which no football coach, music or play director, or driver's education teacher ever enjoyed. When our kids turned in poor finals, it was because they hadn't studied, we said. But then we made our finals easier, made final exam grades less and less a part of the final grade determination, and allowed more and more beforehand time for in-class final exam cramming. The students got their grades, and questions of actual long-term education were avoided. We made the system "work." No one needed to tell us a thing. We were superior about mathematics *and* pedagogy. Close the door, please. This department meeting is secret.

John Dossey [1] takes issue with the American Mathematics Mystique (my phrase, not his) at two levels. He recently stated that whenever he hears a hero-worshipper's "I never learned math very well, and neither did my ancestors", he replies, "That's okay; myself, I never learned to read." More seriously, Dossey points out that Japanese students who fail mathematics are not excused as having some mathematic-genetic weakness, such as asymmetrical brain hemispheres. The Japanese hold that mathematics achievement failure results from substandard effort, because anyone can learn mathematics. Dossey says that we need to adopt and evangelize that attitude. I agree. We need to tell us pedagogical Pythagoreans that our lodge meetings are over. The literal crumbling of school houses is not called for this time, but the bending of some old aluminum slide-rulers might be a positive, symbolic gesture.

Another positive step: we need to stop practices such as "weeding out" half of those enrolled in upper-division college mathematics courses before the drop deadline, out of desire to have fewer exams to grade now and less competition for professional laurels as the years go by. Yet another step: secondary mathematics teachers need to buy lunch at least once annually for one elementary teacher, to hold off the compulsion to wave slide-rules and calculus texts in their faces. Of all of my old Pythagorean-pedagogical hangups, the most ridiculous was that I was pedagogically superior to elementary teachers because I could teach trigonometry and they couldn't. But the elementary classroom is really where the action is; the students who don't make it there in mathematics will have immense difficulty catching up with those who do. Their teachers deserve our inner respect and our outward encouragement, and no condescension in or out.

And who else, outside of our own pedagogical spheres, should see the smoke of our storming?

1. *The high school counselors*. Most were themselves excluded from our content-area secrets in subtle ways. Some counselors may have even flunked out of teaching, and may strongly doubt the ability of any of their colleagues to communicate anything on so high an intellectual plane, especially to the students that they deal with most frequently. Until we get the needed constitutional amendment requiring the same four years of math as is required for language arts (where no mystique exists), we need to

tell counselors that we are opening our class meetings and, for the sake of our students' future employment/academic/citizenship potential, enrollment in our meetings is mandatory. *All* students need as much math as we can give or force-feed to them — especially those who *don't* do well. The unable must be enabled, for they too live in our world.

To the counselors who object with, "When will they ever use this?", we say, "An educated person is one who knows more than what is absolutely minimal." To the counselors we must say, an "F" is hardly ever an indicator of irregular brain hemispheres. An "F" usually means, "Take the course over again." By virtue of his slide-rule delayed and mostly irresponsible undergraduate social debut, yours truly was told in "F" language to take five senior-level math courses over, twice in the case of one course. My oldest daughter took Algebra Two over, and it took her parents' persuasion to get her to accept the best-in-school award that second year. "You're an Example to the Youth of America," we said. And to the high school counselors, too.

2. *Our meritorious societies of research mathematicians.* The Fibonacci Society is a wonderfully productive organization with no secrets and many contributions from people who do not do mathematics professionally nor receive groveling worship. Contrived elitism is not prerequisite to the advancement of knowledge. We also do not need "Those who can't do, teach" or "Those who can't teach, do." In no other form is our compulsion to don slide rules of aristocracy so evident as in these bombastic attempts to scramble up over one another. The John Dosseys of the research organizations must let themselves be heard. As most research mathematicians are professors of upper- division undergraduate courses, one positive goal would be the establishing of "water and prune" practices to replace the "weeding" tradition described above. No weakening of entrance or exit requirements is needed nor is here suggested. Pedagogical effectiveness *is* needed and is here demanded. Which brings up my next group of outsiders.

3. *Our supervisors, administrators, and teacher trainers.* Vern Holzer, a former salesman who now teaches mathematics at Farmington Junior High in Salt Lake City, recently stated, "My training as a salesman was very specific, to getting results only. I was told to get results, or find out how, or get out. My training to be a teacher and subsequent classroom evaluations were as nebulous as sales training and evaluation were specific." It is time we stopped hiding our ineffectiveness behind the Mystique, and

also from behind the supposition that there are no easy answers to failures in mathematics education. Just because most of our vocal sojourners haven't found any easy answers doesn't mean there aren't some easy answers somewhere. The truly competitive world outside of mathematics education would never give in as easily.

The clamor of our slide-rule egos shouts down most of the effective, obvious, tried-and-true ideas as unsophisticated. The Elkhart (Indiana) Institute, which never aspired to the Ivy League, one preached seven educational principles to its teacher trainees: "(1) Review. (2) *Review*. (3) Review! (4) REVIEW. (5) *REVIEW*. (6) REVIEW! (7) *REVIEW*!" (E. Good, 1986) Ho, hum. How dull and blase! But: let us provoke ourselves with the realization that an elitist's adverse reaction to distasteful but solid old wisdom is a cornerstone to erecting walls around the next Pythagorean secret conclave. Effectiveness in the world of business and sales knows no such labeling as "old" and "new" strategies. What matters is what works. Let's run Effectiveness up the same flagpole that in the past has held the banners of Whole-Child, Behavioral Objectives, Accountability, and Critical Thinking. The flag-corps bearing these colors of effectiveness will consist of last and biggest group of outsiders. Who else?

4. *Parents*. We have largely talked them out of it, but they too can still learn mathematics, and, moreover, they can still run the schools. They need to know that their own failures in mathematics had little to do with their genes or the subject. Parents must see their children as the Japanese do (as *capable* children), and they must demand results from the rest of us — children, teachers, administration, counselors, and teacher trainers. Anyone who tries to diffuse this parental demanding gets grounded (children), fired (teachers, counselors, administrators, education professors), or voted into retirement (school board members). Parents are presently among the quickest and worst in kneeling and worshipping mathematicians. The sure cure would for them to study mathematics again, to enroll in night courses or correspondence schools, or do homework along with their kids. Short of that, we should kick their parental backsides when they kneel, haul them to their feet by the lapels, salute them, and say, "Yes, Sir (or Madam)" until they acknowledge our deference. They must put splints on the limp wrists of our bosses, strip us of our slide-rules, position some wrecking cranes outside our Pythagorean fortresses, inscribe "democracy" on each wrecking ball, and rev up the diesel engines to a threatening roar.

Whether or not any parents ever start swinging the booms in our direction, it will matter less than a change in their submissive worship. Wrecking crews are, in fact, old hat to us by now. For several decades we have been at once dodging, deflecting, and trying to ignore a highly destructive assault from overseas, a storming which in one sense may as well be over. While we have hidden behind our protective Mystique shield, shouting "Crisis! Give us more research money!" whenever anyone threatened our profession with serious scrutiny, the Japanese have carried away our national industry and initiatives. (Dossey again: less than 50% of U.S. patents are to citizens or corporations of the United States [1].) The sun has long since set on the Japanese Pythagoreans, and we helped in the setting. We conquered them, gave them political power once reserved for the semi-deified emperor, and showed them how to compete vigorously. Meanwhile, our own Pythagorean need to elevate ourselves above our fellows invited us to perpetuate American emperor myths about supposed mathematics and mathematics education secrets and intellectual planes. Results? We removed most of our countrymen and women from effectively competing with each other, or with us for our jobs and status, and also from significant international competition in most any field of technological endeavor.

I am reminded here of the urging of some of the New Math advocates: "Let the cream rise to the top." What has happened in the United States is that we have fallen victim to the assumption that there is a fixed supply of cream, and that the potential for academic excellence is genetic, not experiential. Our foreign competition, on the other hand, has decided that the supply of cream is a function of education. If we simply assume that mathematics ability is primarily something that people are born with, we may as well abolish the profession of mathematics education and trust the mathematicians to teach their own offspring. A consequence of our negative, genetic-aristocratic attitude is that where we now have little except some cream and abundant, artificially-created skim milk, our international competition has rich cream at the top AND more rich buttermilk just *below* the top than what the USA has seen since about 1963.

It is time to learn from our former pupils. With the evident success of their "Math is for Anyone" anti-Pythagoreanism, the Japanese have removed the Mystique of the Emperor Mathematician from around our discipline and have set the sun down on our Pythagorean hidey-holes. Now we and our students must raise our eyes and behold ourselves. We are no more holy and deserving of obeisance than the old kings, emperors, and czars. It's high time we pursued effectiveness in mathematics achievement for all students in (and on behalf of) the democratic USA, without regard for the cost in terms of our egos, unconcerned for how offensive, obvious, easy, or ancient the ends of our pursuit may be.

References

1. J. Dossey, Mathematics Education in an Era of Reform: What are the Issues? Keynote address to the Utah Council of Teachers of Mathematics, 1987.

2. Donald in Mathmagic Land, Walt Disney Educational Media Company, Burbank, CA, 1959.

3. H. Eves, *An Introduction to the History of Mathematics*, Third Edition, New York: Holt, Rinehart, and Winston, 1969.