STEPHEN MAURER
August 11, 2006
(interviewed by Kenneth A. Ross)

This interview took place in Knoxville, Tennessee. Steve wrote an excellent "Mathematical Autobiography" for his students. This autobiography is online, at http://www.swarthmore.edu/NatSci/smaurer1/auto07.html. It contains detailed answers to several of my questions.

When did you get interested in mathematics?

At a very early age. My parents told me that when I was two or three, I used to hide under the table and refuse to eat dinner until I was given a problem and solved it. An uncle who was a chemical engineer gave me problem books and these had a big influence on me. I was also inspired by a 7th grade math teacher who was disorganized and ignored the curriculum. But he inspired me. In particular, he taught the Euclidean algorithm. It was also then that I learned I was good at explaining math – to the other students in my class, who were very confused by Mr. Grant.

My father, who had always wanted to be a professor of classics, read popular math and science books to the kids. He became a lawyer for the U.S. State Department, but he was an academic at heart. He encouraged his sons to study science and mathematics.

Did you ever consider fields other than mathematics as a vocation?

I came to college wanting to be a math major and never changed my mind, though at times I was discouraged and thought of switching to philosophy, which became my minor. Since I knew I was good at explaining math, I figured I would at least be useful to society as a teacher of mathematics. I also considered being an actuary, because I had won the national award for first place on the first actuarial exam. This made it easy for me to get summer jobs. But being an actuary wasn't a strong contender; it did serve as a backup.

What was the special attraction of mathematics?

Well, 1) I was good at it. 2) I was good at explaining it. 3) I was attracted by what I then perceived as the black-white certainty of mathematics in what otherwise for me was a grey and confusing world. 4) I found the informal, reflective life of a professor appealing.

Where did you go to school?

I went to public schools in Montgomery County, Maryland. (I was born in Washington D.C. in August 1946.) Then I went to Swarthmore for my undergraduate studies and to Princeton for graduate studies. For more details, see my "Mathematical Autobiography." Incidentally, neither was my first choice at the time, but they both worked out very well for me.

What did your parents do?

My mother held various elected positions in Maryland, starting with Montgomery County school board and rising to State Treasurer. She had a master's degree in economics. More important, she had excellent people skills and I learned some of them by watching her. In particular, I learned to listen. I already talked about my father. My studiousness, and liking for academia, certainly came from him.

Did they influence your interest in mathematics? If yes, how?

As I mentioned earlier, my father supported my interests in mathematics and science directly.

How about siblings? Did they influence your mathematical development? How?

I was the oldest of three brothers, so the influence went down. The middle brother was three years younger; he was actually better at mathematics in school – at least he did better on contests – but he got his Ph.D. in molecular biology. My youngest brother was six years younger. He studied chemistry as an undergraduate, but ended up being a lawyer for the U.S. Customs Office.

Tell me about undergraduate life at Swarthmore.

This was a great place for me: informal, lots of small seminars with active participation, scholarly students, and a very friendly and accessible faculty. The emphasis was on a quality education. We were encouraged to follow our own interests. We were told to not worry about following what was trendy. The chair of mathematics was Heinrich (Heine) Brinkmann, who came to Swarthmore in the 1930s from Harvard. Al Tucker (see below) later told me students rioted at Harvard when Heine didn't get tenure there. Somehow I also decided that this was the size institution that I liked. I got a sense (correct, as I learned when I returned as faculty years later) that there wasn't an us-versus-them attitude between faculty and administration, that everybody, up to the president, is a friend you see around. I value that.

How did you choose to do graduate study at Princeton?

I chose Princeton because of its prestige and broad strength, because I didn't have any idea of what kind of mathematics I wanted to study. Princeton was difficult for me at first. First, there was much more emphasis, at least among the students at tea, on this or that mathematics being important or not. The point-set topology I had loved was definitely passé. Second, at Swarthmore I had learned how to learn via independent study or through seminars. At Princeton, there weren't similar seminars for first-year students; in fact, there were no courses at all except advanced topics courses. I wasn't used to following lectures, and so retreated to studying for general exams via independent study. I learned a lot, but it was isolating.

Oddly, the Vietnam War came to my rescue. Graduate student deferments had ended, but it looked for a while that teaching school might provide a deferment. So I looked into teaching, and after two years at Princeton I got a job at Exeter. (It turns out this didn't give me a deferment, but in the meantime I had finally realized that a break would be valuable and I had gotten a medical deferment for allergies.) I loved teaching there. Every course was taught around a seminar table, the kids were very active, and I had wonderful and very wise colleagues. This is where I learned to teach.

Still, I wanted to finish what I had started at Princeton, and after 2 years I returned. The time away had given me perspective to see what had not worked and how to correct it. The first "correction" was to switch to the emerging area of "discrete mathematics." The two Princeton faculty in that

area were A. W. Tucker and Harold Kuhn. Kuhn was on leave, so I went to see Tucker.

After first seeing Tucker about taking me on as an advisor, I worried I was making a mistake: conversations with him tended to be one-sided; he did all the talking. But eventually I came to realize that he was actually an excellent advisor; I just had to listen. Because of his broad experience in the mathematics world (including presidency of the MAA), he taught me scads about the profession from his stories. On top of that he was an excellent *thesis* advisor. He had a good feel for what problems were reasonably doable. He started me off with one problem, which I solved in about a month. Then he knew how much tougher he could be and gave me a problem that took a year and became my thesis.

He also was always looking out for my best interests. In the spring of my last year in graduate school, Tucker called me in to discuss my next move. Without telling me, he had already started looking into post-docs for me. I had to tell him that I was actually on leave from Exeter and was planning to return there for at least a year. He said, "Well, I can see that this is what you want to do, so you should do it." But he went on to say that if I stayed there longer, I wouldn't have much chance of returning to college teaching. After my year at Exeter, I went to Waterloo, on a post-doc Tucker had started to arrange the year before and recommended strongly.

As a smaller example of his encouraging my interests, when I was at Exeter I joined NCTM, but on return to Princeton I had let my membership lapse. Tucker encouraged me to rejoin NCTM.

When did you join the MAA?

When I was a senior in college. I received an award from the EPADEL section of the MAA for the highest score in the section on the Putnam. Either the award was the membership, or it inspired me to join at that time.

How did you get actively involved in the MAA? Did you receive mentoring in the MAA at the early stages of your career? By whom?

After I was at Waterloo, I went back to Princeton as an instructor and later assistant professor (Tucker's influence again!). While there I was interested in high school contests. In particular, I was interested in being

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on the MAA Contests Committee. I approached Henry Pollak, who was MAA president at the time, at some meeting, and he said he would look into it, but I didn't hear anything. Sometime later I mentioned this to Tucker who expressed surprise, since he regarded the choosing of committee members and chairs as one of the most important roles of an MAA president (he had been president in 1961-62). Two or three months later I received a letter from the MAA secretary, Henry Alder, which led to my appointment to the committee in 1978. I don't recall if the letter mentioned Tucker, but I knew what had happened.

Later I was involved with CUPM and discrete math issues. This was partly because of my work with the Sloan Foundation. In 1979 I returned to Swarthmore, and then in 1982-84 I took a 2-year leave to help Sloan with its "New Liberal Arts" program (an initiative to encourage the use of mathematics in teaching and research in a variety of disciplines) and other mathematics funding. (I had been recommended for this job to the Sloan president, former Princeton economics professor Al Rees, by Princeton's president Bowen and Princeton Rhodes Scholar and math major Eric Lander.) While I was at Sloan, everybody wanted me involved in their math projects! So the early 1980s were the high point of my MAA activity. I had already become chair of the MAA Contests Committee in 1981. CUPM and Martha Siegel's discrete math panel followed in 1982 or so. Also, I was on the Executive Committee of the EPADEL section and I ran one of the section meetings. A local mentor was the former section secretary, David Rosen, a senior colleague and former teacher of mine at Swarthmore.

In 1986, and again in 1989, I became a father. My wife Fran Stier has a "real" job (she is an anthropologist turned actuary), and part of the deal when we got married in 1982 was that I would use the flexibility of the academic life to do a lot of the child care – taking kids to doctors for instance. So once we had kids I had to cut back on travel, which made involvement in the MAA more difficult. I was asked twice to be an associate editor of the Monthly, and once if I would be a candidate for editor; I was also asked to be on the ballot for vice president. I declined all these invitations, but I did serve on the editorial boards for the MAA Notes and then Classroom Resources, since I could do the work at home and it was sporadic. Now that my kids are grown, I'm traveling more and becoming more active in the MAA again. Right now I'm editor-elect for the Notes series.

Another mentor was Andy Gleason, just because he was so accessible and wise whenever I saw him at meetings. I first met him when he visited Exeter, and later worked with him through the New Liberal Arts program at Sloan.

What can you tell me about your work with the high school exams?

When I became chair of the Committee on High School Competitions, there were only two exams, the broad based AHSME (American High School Mathematics Examination) and the very selective USAMO (USA Mathematical Olympiad). A new intermediate exam, the AIME (American Invitational Mathematics Examination), was created on my watch. I wasn't initially enthusiastic about AIME, because I didn't want to dilute my efforts from my main goal, which was to maintain the high quality of the existing exams – interesting and challenging questions, unambiguously stated. But when the committee voted for a new exam, I went to work wholeheartedly on it. Also begun during my tenure was the junior high exam AJHSME (American Junior High School Mathematics Examination); today the AJHSME and AHSME have morphed into three exams, the AMC 8, 10 and 12.

I love writing problems, but I am most proud of diversifying the membership of the problem-writing groups for the exams. We developed a structure where appointees first served on "panels" that contributed by mail, and if they worked out really well, they moved to the committees that met in person.

To me, the primary purpose of the contests program is to stimulate interest in mathematics; winning the contests is important but secondary. However, when I arrived the USAMO was run by Sam Greitzer, whose primary goal was for the USA to win the IMO (International Mathematics Olympiad). He basically regarded both the AHSME and USAMO as means towards that end. Although we generally got along well (and he could be a delightfully crusty old guy), I'm sure he regarded me as a meddling interloper. When she appointed me, I asked MAA president Dorothy Bernstein whether she really wanted me to try to promote my view of the purpose of the contests. She said yes. Various MAA presidents, and then-secretary Dave Roselle, supported me.

Another thing I am proud of was getting the scoring system changed on the multiple-choice AHSME. Previously, unanswered questions got 0 and wrong answers got negative scores. This had two bad effects. First, students could get demoralizing negative total scores. Second, since there was no danger in a low score (it wouldn't keep you out of college) and considerable attention to a high score, there was a lot of random guessing. With 400,000 participants each year, occasionally there were very high scores by chance. (Alas, there were sometimes high scores by cheating, and it was my job to investigate this, but sometimes it just seemed they were random.) So I proposed a new system where right answers got 5 points, wrong answers got 0, and blanks got 2. In other words, we encouraged students to leave the answer for a question blank if they couldn't eliminate several of the 5 choices, and we explained why. There was real opposition to this proposal – how could we award points for doing nothing, and don't we want to encourage students to guess? – but eventually it passed the committee. The system, and some of the wording I introduced to explain it, pretty much survive to this day.

What about the early history of the USAMO?   What was it like working with Sam Greitzer, George Berzsenyi, Murray Klamkin, Nura Turner, Walter Mientka, and others?

I've already commented on my relations with Sam Greitzer. I got along fine with Murray Klamkin. Greitzer and Nura Turner were key people for getting the U.S. to participate in the IMO, although they didn't get along at all. Berzsenyi was a Hungarian émigré who had a wonderful experience as a kid with the Hungarian exams and worked hard to get the U.S. system to be more like the Hungarian system. He was a key mover in getting the AIME started, and, independently of the MAA and single-handedly, began the USAMTS (USA Mathematical Talent Search, an untimed, multi-round write-in competition). We worked well together, although he was very determined and there was no such thing as a short phone conversation with him (or with Sam Greitzer). I also worked very well with Walter Mientka, the Executive Director of all the exams. In fact, it was Walter who recommended that I be appointed chair of the Program. The Chair was in charge of problem writing and exam policies. The Executive Director handled all administration. Of course, there was no clear boundary, so Walter and I consulted all the time (before email!).

Contest work attracted people with strong personalities, but I think I learned to get along with them and get the job done.

What accomplishments working with the MAA are you especially proud of?

First, there's my work with the contests. Then there's my work on discrete mathematics, including presenting some national and regional minicourses. Other key folks were Tony Ralston and Martha Siegel, with whom I worked producing the Siegel report on discrete mathematics in the early 1980s. I'm also pleased with my work on CUPM and CCIME, the Committee on Computers in Mathematics Education.

I am also pleased with some of my expository articles, such as "The King Chicken Theorems" in *Mathematics Magazine*, for which I received the 1981 Allendoerfer Award for expository writing. I am grateful that the MAA encourages expository writing and, of course, it's nice to get recognition via awards.

Do you happen to have a list of your MAA activities?

Oh, I'm glad you asked. Here it is:

Editorial Board, Classroom Resources series (monograph selection and editing), 99--06.

Editorial Board, MAA Notes series, 93--98. Associate Editor 06; Editor 07--10.

Editorial Board, MAA Online Illustrative Resources (a developing resource for the new MAA curricular recommendations), 04--06.

Council on Competitions (1/91--97);
Council's Committee on Local and Regional Competitions (97--),
Co-organizer of contributed paper session for this committee, national meetings Jan. 99.

Chairman, MAA Committee on the American Mathematics Competitions, 81--87; member 78--87, Panelist 87--91.

Committee on Computers in Math Education (CCIME), mid 1980s and again in 91--94

Executive Committee, Eastern PA and Del. Section, MAA (83--85).

Committee on the Undergraduate Program in Mathematics (82--86) and its Panel on Discrete Mathematics.

Planning Committee for the National Study of Resources for Collegiate Mathematics (1985).

Associate Editor, FOCUS (newsletter of the MAA), 1982--87; numerous articles on competitions.

Speaker, Visiting Lecturer Program (78?--86).

Speaker on Panel on Effecting Change, MAA national meeting, Phoenix, Jan 04.

MAA NSF-funded Interactive Mathematics Text Workshop, July 93, Towson MD (one week);
Advanced Workshop July 94, Dearborn MI (two weeks).
Primarily based on using Mathematica, from which I developed various discrete math materials, some of which I have used with my classes.

Presented minicourse on Discrete Algorithmic
Mathematics at national and regional MAA and NCTM meetings,
most recently MAA Eastern PA summer course, June~92 (one week),
and NCTM Mid Atlantic regional, Dec~89 (one day course).

1981 Allendoerfer Award of the MAA for expository writing, for "The King Chicken Theorems" in Mathematics Magazine.