ALAN TUCKER
January 6, 2009
(interviewed by Kenneth A. Ross)

In view of the family that you born into, it seems inevitable that you, and your brother Tom, would go into mathematics. How did your father influence your interest in mathematics? Indeed, how did growing up in the world of mathematics shape your views of the world? More specifically, how did your father's role as a department chairman and leader in national mathematics organizations affect you?

I was born in 1943. Family friends told me later that when I was 3 years old, I said I wanted to be a mathematician when I grew up. As a teenager listening to dinner conversations, I decided that I wanted to be a mathematics department chair when I grew up like my father A. W. Tucker, who was the math chair at Princeton. Both sides of my family had produced math chairs; all were also very active in the larger mathematics community. My mother's father David Curtiss had been the math chair at Northwestern University. He was an MAA President in the 1930s and authored the second Carus Monograph, *Analytic Functions of a Complex Variable.* My mother's brother John Curtiss was math chair at the University of Miami Mathematics Dept. and he earlier served as the AMS Executive Director; he was also the founding president of the Association for Computing Machinery (ACM). My father was President of the MAA and First Vice-President of the AMS. In 1960, my mother remarried Ed Beckenbach who had been UCLA math chair and was very active in the MAA..

When my father started teaching at Princeton in 1934, the department chair Solomon Lefschetz told my father to join the MAA, implying that it was expected of anyone who taught collegiate mathematics. My father stressed that undergraduate teaching was the primary job of a university mathematician, not research. For example, when Lefshetz retired, the department voted to offer the famous endowed professorship Lefshetz had held to the algebraist Emil Artin. The professorship specified that the holder would only teach graduate research seminars; no regular classes (Lefshetz had physical disabilities that made regular teaching very difficult for him.). Artin refused the professorship, until its terms were changed so that he could continue with the Honors Calculus class he loved to teach. Indeed, when important visitors came to Princeton, they would be invited to sit in on Artin's calculus class. Besides valuing teaching, the old-time mathematicians at Princeton, like Artin and Willi Feller, were members of the university's undergraduate community in the sense that they attended football games and student rallies.

When my father was department chair he still taught two courses a semester. Further, he assigned himself to be the professor in charge of freshmen calculus one semester each year. In addition, he had a busy research program. Years later when I was a department chair, I questioned how he found the time to

oversee freshman calculus with all his other duties. He responded sternly, “Don’t you understand; the most important thing a mathematics department does is teach freshman calculus, and so as chair, it was my duty to lead that effort.” My father wasn’t that out of step with the values of the time. The Provost at Princeton used to teach two courses a semester. Sadly, today the norm at top private universities is for no tenured faculty to teach freshman calculus.

(There were many important initiatives in which my father helped play a leadership role: He headed the College Board Commission on Mathematics that was a reaction to Sputnik and the need for the U.S. to train more scientists, mathematicians and engineers; he was one of a small group of scientific leaders who advised Alfred Sloan on establishing the Sloan Fellows program; he was the mathematician on the Presidential Advisory Committee that picked the first rounds of National Medal of Science winners – he negotiated no mathematics winner in the first year in order to give Lefschetz and Morse the Medal at the same time the next year, because the tensions between these two would be aggravated if one of them got it before the other.)

Did you influence your brother’s interest in mathematics? Or vice-versa? Were other members of your family influential?

The major influence on both Tom and me was the example of our father. My father was low key about his work and even discouraged careers in mathematics, fearing that his own success would overshadow us and be a psychological burden. On the other hand, our mother would not hear of her sons considering any other career than being a mathematician. She was a math major in college and loved to hang around with mathematicians. She continued to attend sectional and national mathematics meetings long after her second husband died. Tom and I have a sister who has been professionally successful, but stayed far away from mathematics. This gender bias was corrected in the next generation—my two daughters were mathematics majors and one is now a successful researcher in computational biology.

Our father got Tom involved in the AP Calculus program where he rose to be Chief Reader. With his calculus expertise, Tom was named chair of the MAA Committee on Calculus Reform and the First Two Years (CRAFTY), which played a major role in the calculus reform movement. I was the First Vice-President of the MAA in 1989-1990, and Tom followed me in that position in 1991-92.

Tell me about your career.

I have spent my academic career in the Department of Applied Mathematics and Statistics at SUNY at Stony Brook. I came to Stony Brook in 1970, the year the department was created. I quickly became the Undergraduate Program Director and shaped its major into a decision-science type of applied math major,

emphasizing statistics and operations research, rather than differential equations and other physical-science-related mathematics. For decades, 5% or more of Stony Brook Bachelor's graduates have been applied math majors, the highest percentage of math graduates (pure or applied) of any U.S. public university. As noted earlier, since I was a teenager, I wanted to be a mathematics department chair. I was my department's chair from 1978 to 1989. I was succeeded as chair by James Glimm (a National Medal of Science recipient and a recent AMS President). I have spent the past twenty years as Glimm's deputy chair rather like my father who spent decades as Lefschetz's deputy chair before becoming chair himself.

I love working with Jim Glimm. I am in awe of Glimm's intellect. Together we have made the Stony Brook Applied Math highly successful by all measures of academic and educational excellence. One example I like is that our department has more scholarships given by its alumni than any other department on campus.

Glimm also pushed me to get more involved in funded educational activities. My first successful effort was a doctoral fellowship program of the Department of Education called, Graduate Assistance in Areas of National Need. I have obtained seven 3-year GAANN grants. Subsequently I have directed three 7-figure NSF grants, most recently a $3M grant to the MAA titled Preparing Mathematicians to Educate Teachers (PMET), which ran dozens of summer workshops for math faculty who teach future teachers. PMET also played a critical role in the NCTM report, Curriculum Focal Points, that was hailed by opponents of the NCTM Standards as "the end of the math wars."

Much of my professional life has been centered on Stony Brook and the MAA, but this has led to other areas. For example, I served on several NSF advisory committees and have been involved in a large number of curriculum projects nationally as a consultant or advisory board member.

Were there other influential individuals outside the family who inspired your interest in mathematics?

Certainly my stepfather, Ed Beckenbach, was an influence, but then he was also "family." He chaired the MAA Committee on Publications for many years. I served on that committee for a dozen years, taking over as chair when he died in 1982.

It seems that you've always liked finite and discrete mathematics. Do you have anything to add to this observation?

My father started out in differential geometry, but his interests moved to combinatorial topology, game theory and graph theory. My interests were primarily in graph theory, and Tom's were in low-dimensional topology. I really believe that my interest in discrete mathematics was a genetic inheritance rather

than a result of influences from my father as I grew up. Since I was a little child, I have been fascinated with maps and schedules. As an 8-year-old, I would plan imaginary train trips around the country.

You were heavily involved in many aspects of the MAA for a long time, but there seem to be two primary interests: publications and education. Which first pulled you into MAA circles?

It was natural for me to look forward to being active in the MAA. My first MAA committee assignment in 1974 was on the Committee on Publications. I was appointed by President Victor Klee, who knew me from my research on problems of interest to him, and my step-father Ed Beckenbach, who was chair of this committee. But education and CUPM were my real love.

CUPM, the Committee on the Undergraduate Program, was created in the 1950s. My father played a major role with Bill Duren and Bailey Price in getting it started. The collegiate mathematics program then had become very dated with its focus on classical analysis. CUPM attempted to modernize the mathematics major with topics like abstract algebra, linear algebra and real analysis. When I joined CUPM, it had moved into the area of creating supplementary modules, because this was the only type of collegiate education effort that NSF would fund at that time. Then NSF stopped funding modules and CUPM was at sea. In March 1977, soon after I joined CUPM, MAA Secretary Henry Alder organized a special meeting about CUPM's future. One result was that I was asked to chair a new CUPM panel to revisit the math major recommendations of the 1972 CUPM report, *General Curriculum in Mathematics for Colleges*. At this time, the number of freshman interested in a mathematics major had plummeted to 1% from 5% a decade earlier. In the 1960s, mathematics was popular for its useful role in the industrial and military technologies of the Cold War. In the early 1970s, the mathematics major had become more theoretical and divorced from applications, which was actually an attraction for students who hated the Vietnam War and the military-industrial complex. However, when these theory-oriented math majors graduated, they found it hard to get hired, and so the reputation of a math major collapsed. In addition, the math major was facing competition from the new computer science major. My committee's 1981 report, *Recommendations for a General Mathematical Sciences Program*, outlined an inclusive vision of the mathematical sciences that is still reflected in most math programs today. [Interviewer's comment: This report was often referred to as the "Tucker report."] At this point, I was steeped in MAA activities.

What accomplishments in the MAA are you especially proud of?

A project that I'm proud of was my work on the 2002 CBMS report, *The Mathematical Education of Teachers*. This was primarily joint work with Jim Lewis of the University of Nebraska and Roger Howe of Yale. Also the 1981 *Recommendations for a General Mathematical Sciences Program*, mentioned

above. There were a lot of controversial issues in both reports, but I was able to enter into constructive dialogues with critics over early drafts so that the final reports were generally well received.

What is your best memory of your work in the MAA? Your worst?

My best memories are the scores of wonderful friendships I have made with people I have met through MAA committee work. My worst memories are times I got into conflicts with the MAA Washington staff over budget issues in MAA grants I directed. Through a lack of good communication, I sometimes unfairly lost my temper at staff.

What changes have you seen in the MAA since you first became involved?

The MAA programs at meetings are now much more elaborate and include more on education. There are now MAA contributed paper sessions and minicourses at meetings.

There was a culture shift as peers my age were leaving the MAA and focusing their energies on their research. This was sad to see, given my childhood experiences where top mathematicians were deeply involved in the MAA as well as the AMS.

What personalities have stood out in the mathematical community, both in the MAA and in the community at large?

Beyond my family, Jim Glimm has been a major influence, as noted above. He has very good people skills. He has been a very good role model, although his intellectual capabilities are out of my league.

In the MAA, I especially respected Don Bushaw and Bill Lucas, who were chairs of CUPM in the 1970s and 1980s. They were not very visible to the general membership of the MAA, but they did a huge amount for CUPM.

I also learned a lot from Jerry Porter. He appears gruff sometimes, but he really cares. It was Jerry who got me onto the MAA's Investment Committee, which had been the fiefdom of Henry Alder and Harley Flanders. I helped Jerry re-structure MAA investment policy. Another MAA hero of mine was Don Kreider with whom I served on many committees.

Tell me about your involvement in the New York Metro section.

I've attended many of the meetings. I was most active in the section in the 1990s. I was the section chair, and I was active at the "Delegate Assembly," which was a committee of department representatives in our section. However, to be honest, my MAA ties are much stronger at the national level.

Thanks for the far-reaching informative conversation. Both your mathematical life and your family's are very interesting.