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(interviewed by Kenneth A. Ross)

Where did you grow up?

I grew up in New York City. In junior high school and high school in upper Manhattan, my favorite subjects were math and art. I originally thought of becoming an artist. Later, I considered engineering, so my school counselor encouraged me to transfer to Theodore Roosevelt High School in the Bronx. Only after I got there, did I realize that the counselor was directing me toward becoming a railroad engineer!

What did your parents do?

I was a first-generation American. My mother was Polish, and my father was Russian. Neither had a full high school education. My father was very progressive and creative, and he had one or two patented inventions. English and Yiddish were the languages at home.

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

They didn't know much about mathematics, but they knew that a good education was important. They always encouraged learning, in school and everywhere else.

When did you get interested in mathematics, and what were the circumstances?

I always liked mathematics, but the first course that excited me was plane geometry. On the first day of class, an older, stern, and very intimidating teacher, Miss Miller, came in with a piece of chalk tied to one end of a string. No one dared to offer an answer to her posed geometry questions until I volunteered a conjecture. It turned out to be correct and she praised me lavishly. So I became receptive to learning more. I found the proofs boring but was fascinated by the properties of geometric figures. I remember studying geometry for the New York Regents exam, while fishing for flounder. I thought I didn't do well on the Regent because my square root calculations in a 10-point problem didn't match up exactly. In retrospect, I was rational but the numbers involved were irrational. Happily, I got a 100 on the Regents. At Roosevelt, I also liked my advanced algebra course, which was an amalgam of different topics.

Where did you go from high school?

Hunter College (now Lehman College) of CUNY. I took two years of pre-engineering, and then switched to being a math major so that I could take more courses in areas I found especially interesting (psychology, philosophy, English literature). Becoming a math major was one of the best decisions I've ever made. I took lots of math, physics, and humanities courses. Probability was the most interesting math course. I took modern algebra with Mary Dolciani, who was a terrific, caring teacher and wonderful person. I'm not sure whether it was the algebra or Miss Dolciani that captivated me more. She motivated her students to attend local MAA meetings and join the MAA. I remember being impressed by a group theory talk by Wilhelm Magnus in which he used colored chalk to help visualize key relations.

After graduating from Lehman in 1961, I took a few courses at Brooklyn Polytechnic Institute, which became Polytechnic University of New York, and is now the NYU School of Engineering. In 1963, I began full time teaching (15 hours per week) at New York City Community College, and I obtained a Master's Degree from Polytech in 1965; my major was mathematics and my minor was aerospace. While still teaching full time, I earned my Ph.D. at Polytech in 1972.

With whom did you do your thesis work?

At Polytech, I was especially interested in functional analysis, topology, and measure theory, and my hope was to do a thesis that would incorporate all three areas. So I asked George Bachman if he'd be my advisor. Bachman was a legend at Poly because of his impressive expertise in many areas of mathematics and for his friendly, encouraging ways with his students. He was beloved by all of his 62 Ph.D. students. Professor Bachman died in 2006**.** In addition to sponsoring an annual award in his name at Polytech, a large number of his Ph.D. students meet periodically to recall our experiences and present papers in his honor.

As exemplified by your book, *Topological Uniform Structures*, our research interests had a big overlap. Can you tell us about your research and how your book came about?

My dissertation investigated projective and inductive limit topologies generated by linear transformations from vector spaces to topological vector spaces, and then from vector-valued measure spaces to Hausdorff topological vector spaces. This led to further research involving measure-induced seminormed topologies on Banach algebras, B* Algebras, and semisimple A* algebras. The research prepared me to continue publishing in these and related areas – as, for example, in topological groups and abstract harmonic analysis.

Topological Uniform Structures was a natural overarching theme for my earlier work, and writing it served as a stimulus to continue doing further related

research. In that volume, I attempted to give a thorough and fully detailed account of topologies compatible with increasingly enriched algebraic structures. It treated uniform spaces, topological groups, topological vector spaces, topological algebras, and abstract harmonic analysis. My intent in the future is to publish a monograph *Proximity, Uniformity, Topology* based on some of the more specialized material not included in *Topological Uniform Structures*.

How did you get involved in the MAA?

As I mentioned earlier, Mary Dolciani encouraged her students to join the MAA, and I did in 1961. But I was not very involved before 1978 because of the demands of full-time teaching together with study towards the Ph.D. and subsequent research to achieve tenure and promotion. During this period, I became a member of New York State Mathematics Association of Two-Year Colleges (NYSMATYC) and American Association of Two-Year Colleges (AMATYC), and gave a few talks at their meetings.

In 1978, I received a phone call from a stranger that changed my career. Donald J. Albers, who was editor-elect of the *Two-Year College Mathematics Journal*, introduced himself and asked to meet with me when he arrived in New York. We met, and following discussions about the journal, Don invited me to join his newly forming editorial board. I agreed and, during 1979-1983, served as editor of my newly created Classroom Capsules column. In 1984, I was elected editor of *TYCMJ*. As a result, I began to serve on various MAA committees and interact with many of MAA's key persona.

In 1981, the MAA published your edited book *Two-Year College Mathematics Readings*. Were you working on this while editing Classroom Capsules and teaching full time?

Yes, and no, respectively. Once I agreed to edit the Classroom Capsules column, Don Albers began to send me lots of potential capsule articles for consideration. I soon learned that Don had inherited a huge backlog of articles accepted by the previous *TYCMJ* editor. I was at the MAA's publications committee meeting when it decided someone, preferably a TYC person, should be found to edit as many articles as possible for publication in an MAA volume to be called *Two-Year College Mathematics Readings*. Unbenownst to me, it had already been agreed by the committee that I would be their choice. I was stunned when I was named, but after some laughter and kibitzing from the committee I agreed to give it my best shot. With the support of then president Henry Alder, I obtained an Alfred P. Sloan Foundation Grant that provided one semester release time from teaching. The publication of *Readings* was very well received and may have been a factor in my nomination as the next editor of *TYCMJ*.

You received NYSMATYC's 1980-81 Award "for Distinguished Achievement in Mathematics Education" and AMATYC's 1990 Mathematics Excellence Award "for Outstanding Contributions and Dedicated Service to Two-Year College Mathematics Education." Did your work in the two-year college community influence your work in the MAA, or vice-versa?

Each influenced the other. Both influenced, and were influenced by, my activities and service on advisory boards of projects and initiatives of other mathematics organizations.

As a TYC person, I always tried to strengthen common interests and foster interactions among the MAA and TYC organizations. But I also wanted to change the culture and atmosphere in the MAA regarding two-year college faculty. Don Albers and I worked together, and with the Committee on Two-Year Colleges, to enhance the status and participation of TYC members within MAA. I used my editorial positions and committee memberships to involve and create more opportunities for TYC members. I recall, for instance, working with Robert Bumcrot, Fred Hoffman, and John Riedel to initiate minicourses at MAA meetings. I gave the first minicourse. Under my editorship, the name of the *TYCMJ* was changed to *The College Mathematics Journal* to broaden the journal's appeal. The circulation increased dramatically. I hope that I served as an example or role model for what other TYC members can do or aspire to within the MAA. Of course, I was proud to serve as the MAA's Second Vice-President, and to give an MAA invited address.

You served for eighteen years as secretary of the mathematics section of the American Association for the Advancement of Science. What led you to become so deeply involved with the AAAS?

I always loved to go to AAAS meetings; trying to choose which of the many talks and symposia to attend felt like being a kid in a big intellectual candy store. I rarely attended a mathematics symposium and knew very little about AAAS's mathematics section. When Lynn Steen was secretary of the mathematics section, he asked me to join him at a section's business meeting. I did, and I discovered how much collaborative effort was required to run the section and get symposia on the AAAS program. I was also impressed by the caliber of the people present and how they worked together for the common good. Lynn had to resign as secretary because of new commitments. By the end of the business meeting, he had convinced me that I would be an excellent replacement. I agreed to complete his five-year term, and then I continued to be reelected three more terms. The secretary of an AAAS section essentially runs the section and is responsible for its contributions to the AAAS annual meeting's program. As secretary of the math section, I worked with mathematicians and colleagues from many disciplines to cross-pollinate ideas and produce mathematically-related

symposia of contemporary interest. My work was very rewarding and, I believe, an important contribution to communicating the beauty and utility of mathematics to a general scientific audience and the public at large. In some ways, my work on behalf of the various mathematics organizations was an extension of my earlier efforts on behalf of the MAA and the TYC community. It seems that much of my professional career was devoted to helping and encouraging colleagues to communicate and promote mathematics. My tenure as secretary concluded in 2006. And in 2007, I was elected a Fellow of AAAS.

What accomplishments in the MAA are you especially proud of?

I've already mentioned serving as MAA's Second Vice President and giving an MAA invited address. I'm also proud to have received the Pólya Award, with Vedulla N. Murty, for our article "Nearness Relations Among Measures of Central Tendency and Dispersion" in the *TYCMJ*.

I was honored to be elected editor of the *TYCMJ* and felt rewarded by the Journal's well-received innovations and its increased circulation from 6,538 in 1983 to 10,520 by 1989. I'm proud of the two very popular columns I created -- *Classroom Capsules*, which I edited for thirteen years, and *Media Highlights*, which I edited for 25 years and have been asked to continue by the Journal's editor-elect. I also take pride in having mentored and helped so many colleagues to publish their works in *The College Mathematics Journal*.

I'm likewise proud of the vitality and sustained growth of the MAA's NOTES Series under my five-year stewardship, and my subsequent appointment as MAA's Senior Consulting Acquisitions Editor.

Are there any mathematics accomplishments that you are especially proud of?

I am particularly proud of my book *Topological Uniform Structures*. Of all my published articles, there are three that gave me special pride.

"A Nonmeasurable Subset of the Reals" (*Bollettino U, M, I.* 5 (1972) 453 – 454) was my first publication. I produced this set while studying for my Ph. D. oral exams. I recall being informed in the editor's acceptance letter that the first nonmeasurable subset of the reals was discovered by Vitale in 1905.

"Compactness and Closedness in Locally Compact Hausdorff Spaces" (*American Math. Monthly* 92 (1985) 504 – 506) was my correction to an error in the proof of the Pontryagin Duality Theorem in a number of classical texts such as Naimark's *Normed Rings* and Rudin's *Fourier Analysis on Groups*.

"The Formula for Arc Length Does Measure Arc Length" (*TYC Math Readings* MAA (1982) 111 – 114) fills a logical gap in the development of the formula for arc length – a gap that had eluded many in the mathematics community.

Do you have any mathematically-related personal experiences that stand out in your memory?

Three that most stand out are personal triumphs tinged with some sadness.

To be eligible to begin a dissertation at Polytech, one had to pass a committee's oral exam. The morning session covered real and complex analysis, and linear and modern algebra; the afternoon, for those who survived the morning, focused on three areas of the candidate's choice. On passing the orals and being congratulated by the committee, I left Polytech feeling exhilarated and as I walked to the subway and thought "If only dad could know," I began to cry.

Although I was expecting to receive the Pólya Award at the MAA's summer meeting, then MAA President Ivan Niven had to accept the award on my behalf. I had to leave the meeting early to prepare a eulogy and attend the funeral of my mother who had unexpectedly passed away on the day before.

The editor at Wiley Interscience sent my preliminary materials for *Topological Uniform Structures* to two well-known mathematicians. One reviewer said, "He's only an assistant professor at a community college. Why are you wasting your time?" The other reviewer, Paul Sally, encouraged the work, and the volume was born.

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

Don Albers stands out for me as a friend and co-conspirator in changing the MAA's environment. He's done an outstanding job in developing and modernizing the Association's book publishing program.

I always admired Lynn Steen's writing, articulateness, and diplomacy; the latter two drew me into that rewarding, absorbing state at AAAS.

Richard Guy always amazes me with his energy, and his excitement in what he is mathematically involved with. I hope to have his energy and excitement when I'm his age.

Paul Sally is an exemplary model of an outstanding mathematician who is dedicated to improving mathematics instruction. He has the gravitas to make

improvements happen. There are others, of course, but few have Paul's spunk and outgoing nature.

I was touched at a meeting when Murray Klamkin received MAA's Distinguished Service to Mathematics Award and became tearful. He was a terrific mathematician and a kind, gentle person. We became friends toward the latter part of his career. We worked on some problems together and published one jointly. He loved to watch ballroom dancing, and I had been trained as a ballroom dance instructor, so we discussed dance as well as mathematics when we got together.

I liked Gian-Carlo Rota's colorfulness and joie de vivre. At an AAAS math section's reception, unbeknownst to me he kept ordering more food. After he left, the caterer presented me an enormous bill "for all the food that Italian guy ordered." I refused to pay it since only I had the authority to order food based on the section's budget. The caterer honored our prearranged budget. Later that evening I met Gian-Carlo and he apologized, mistakenly thinking that as chair of the math section he also could order food. Ah, but it was a grand reception!

You have more than thirty-five years experience teaching courses at different levels to varied student populations. What do you feel has had significant impact on the teaching and learning of mathematics?

Technology, of course, has influenced all aspects of mathematics and mathematics instruction. My experiences with computer algebra systems (CASs) began in 1988, in The People's Republic of China, where I gave talks that demonstrated how the HP-22S could be effective for teaching and learning mathematics. Soon after, as part of an NSF-funded team, I began to give faculty workshops on the instructional uses of *Derive*. Today, it's easy for one to feel overwhelmed by, or a bit lost among, the myriad, rapidly evolving technologies for individual study and classroom use. While it is clearly beneficial for students to experience different systems, that should not preclude them from becoming proficient in the use of one system. I've visited math departments where each semester of a course sequence different faculty use different technologies, and some use none at all.

I've always been an advocate of incorporating educational technologies in mathematics instruction. But I have concerns about some of the uses and abuses of technology that I've seen. Too often, the use of technology is an antidote for the headache of having to think. Many of the issues I address just appeared in "The Influence of Technology on Mathematics Instruction: Concerns and Challenges" (*CBMS Issues in Mathematics Education* 14 (2007), 97 – 116). Given that future teaching faculty will be much more involved with the technology, Ph.D. programs should include a required course on the educational uses of technologies, or at least offer such a course in lieu of a language exam.

Of great significance to mathematics instruction is the resolution of conflicting perceptions and strong opinions about teaching amongst teachers, mathematics education researchers, and mathematicians. In an article with Mark Saul, “In Our Opinion: Collaboration and Respect,” (*Notices of the AMS* 45:6 (1988) 685), we lament the groups’ divisive claims to leadership expertise, and argue for the synergistic gains in appreciating each group’s special knowledge and experience. The recently growing accommodation amongst these groups is welcome and vital to improving our country’s undergraduate mathematics education. I’m bullish and excited about the future of mathematics instruction.

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

First and foremost, there’s more camaraderie and opportunities for all members to be involved. Project NExT, for example, is a wonderful program for mentoring new Ph.D. s. and nurturing the newest generation of mathematicians and math educators. Their involvements with MAA have energized the Association. Minicourses are very popular. Special interest groups enable more focused attention to specific areas and issues of concern. Publications, such as *Math Horizons*, *Spectrum*, and the *NOTES* series provide additional resources for the Association’s members. The MAA’s website is chock full of interesting articles and information.

I’m glad to see that the MAA has begun to promote guided, group travel to mathematically relevant places. What is still needed, and long overdue, are ways to meaningfully involve senior and retiring mathematicians in MAA meetings and activities. Perhaps there will soon be a seniors’ Special Interest Group.

Well, maybe you’re just the guy to jumpstart such a Special Interest Group. Thanks for a very interesting interview.