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(interviewed by Kenneth A. Ross)

When did you get interested in mathematics?
In my early teens, I was an avid follower of major league baseball statistics. I played with a local sandlot team and during the games kept a tally of who did what. After each game, I revised the hitting and pitching stats and had them ready for the next game. I resolved to be a mathematics teacher while in high school.

What were the circumstances?
In my senior year, I took a quartet of mathematics courses: trigonometry, solid geometry, discrete mathematics, and pre-calculus, with nine other students. The teacher, Mary Etta Stine, was working on her Masters' degree evenings at American University. She passed on to us her enthusiasm for mathematics as well as some of her experiences. She later served on the Board of the National Council of Teachers of Mathematics. At graduation, I was awarded the mathematics medal (not because I was the best in the group, but because I was the most tenacious). I was very surprised and appreciative, considering that in my sophomore year I struggled in her algebra II course.

Did you ever consider fields other than mathematics as a vocation?
In high school, after I expressed interest in becoming a lawyer, my father made arrangements for me to spend a week in Judge Colasanto's courtroom in Alexandria, Virginia. I learned that the wheels of justice moved slower than I could have ever imagined. It appeared to me that most of the time lawyers just hung around just outside the courtroom doing nothing. That wasn't the way Perry Mason worked or the way I wanted to spend my life.

What was the special attraction of mathematics?
When I expressed interest in mathematics, my father and I visited the home of a research mathematician in the Washington, D.C. area. The moment I saw his den with walls filled with mathematics books, I was hooked.

Where did you grow up?
I was born in Fall River, Massachusetts, as was Lizzie Borden and Emeril Lagasse. When I was six months old, we moved to Harrison in Westchester County, New York. We later moved to Rye and then Yonkers. When I was seven, we moved to Virginia, when the Eastern Area Office of the American Red Cross, where my father worked, moved its headquarters from New York City to Alexandria, Virginia.

Where did you go to school?
I began (K-1) at P.S. 5 in Yonkers. I spent grades 2 thru 8 at Saint Mary's Parochial School in Alexandria. However, due to the failing health of my

grandparents, I was home-schooled part of the time in Fall River in grades 3 and 7. The historian Joseph Ellis, was two grades behind me at St. Mary's. I spent my freshman year in high school at Mount Vernon High School in Fairfax County. My English literature class, where I first encountered Shakespeare's *Julius Caesar* and Coleridge's *Rime of the Ancient Mariner*, was held in a Quonset hut complete with a pot-belly stove. I attended grades 10-12 at the brand new Groveton High School in Fairfax County.

What did your parents do?
My mother was a registered nurse in the Alexandria Public Health Department. Her specialty was identifying carriers of tuberculosis. My father served as the Director of First Aid and Water Safety for the Red Cross. Much of his time in the summer was spent visiting aquatic schools in the Midwest and New England, where water safety instructors were being trained. I traveled with him on several of his trips. He also ran leadership conferences. I traveled with him to one such conference at Miami University in Ohio. There I had the good fortune to acquire a copy of McShane's translation of Courant's *Calculus* from the college bookstore. Besides working for the Red Cross my father taught business administration courses evenings at Southeastern University in Washington, D.C.

Did they influence your interest in mathematics? If yes, how?
They did by being very supportive and understanding.

How about siblings? Did they influence your mathematical development? How?
I have a sister but she was not interested in mathematics. She attended George Washington University (as I did for summer courses in German and English literature). Before retiring, she was an award winning fifth grade teacher in Marietta, Georgia.

You attended the Universities of Virginia and Massachusetts. What was it like?
I majored in mathematics at the University of Virginia. My department advisor was Eugene Paige. The chair, Gordon T. Whyburn, gave me my first academic position – grading homework problems for Truman Botts and Nate Martin. My most memorable course at Virginia was in triangle and circle geometry taught by Ben Zion Linfield. My main mentors at Virginia were all Deans of the College of Arts and Sciences at one time or another, T. Braxton Woody, William Duren, and Irby B. Cauthen. I would not have made it through the program without their encouragement and sound advice. At the University of Massachusetts I was fortunate to have had Esayas Kundert, from the ETH, as an advisor and mentor. With him, we learned algebra out of van der Waerden and complex analysis out of Cartan. He started each lecture by writing at the upper left corner of the board and invariably ended fifty minutes later at the lower right corner with scarcely an erasure. He began the two-semester algebra course with the rudiments of group theory, proceeded through ring theory and field extensions, and ended in May by

establishing the unsolvability of the three classical problems of antiquity. It was an amazing course. I was a TA during the day and tutored the UMass football team at night. While I was there, I met my wife, Terry.

I noticed that you got your Ph.D. at the University of Oklahoma. What did you work in, and who was your thesis advisor?

My courses at the University of Virginia were mainly in analysis and applied mathematics, at UMass in algebra. I wanted to get back to the study of geometry. There were two geometers at Oklahoma: Nathan Altshiller-Court, author of *College Geometry,* and C. Eugene Springer, a Rhodes Scholar. I did take a marvelous course on geometry and analysis of projective spaces from Springer. By the time I arrived at OU (University of Oklahoma), Altschiller-Court had retired and was in failing health. David C. Kay, a geometer who later became my advisor, came to OU the same time as I. There were a number of excellent teachers at OU, several of whom had done their graduate work at the University of Chicago. Kay was an excellent mentor. He was a student of L.M. Kelly at Michigan State, who was a student of L.B. Blumenthal at the University of Missouri, who was a student of Frank Morley at Johns Hopkins. Frank Morley was educated at Cambridge University. My thesis was in combinatorial topology, specifically in (m,n)-convexity. While at OU, my wife Terry was chair of the "Cosets", a social group that organized activities for spouses. The most memorable character at OU by far was the department chair, Richard V. Andree. Each year, he and his wife, Josephine, invited the graduate students to his home for dinner. When he hired more teaching assistants than allocated, he would pay them out his own pocket until the dean came around. He made sure that the teaching assistants were given mentoring and support and provided a marvelous atmosphere for us to hone our teaching skills and do research.

How did you get involved in the MAA?

In a number theory course at UMass the teacher, Arthur Anderson, posed a problem from the *Monthly* asking if we could prove that six was the only square-free perfect number. I was able to solve it. Even though my name appeared in print as "also solved by," the experience gave me a lot of confidence. I joined the MAA and subscribed to the *Monthly*.

Did you receive mentoring in the MAA at the early stages of your career? By whom?

Several people in the mathematics department at the University of Virginia were very active in the MAA. Besides serving on many important committees, E.J. McShane and W.L. Duren were past presidents of the MAA. E.E. Floyd gave the Hedrick Lectures in 1964 the same year that McShane won the MAA Distinguished Service Award. They were dynamic participants in the MAA and in department colloquia at UVa. After graduate school, the biannual meetings of the Northeastern Section provided attendees with excellent talks and a forum for networking. Those meetings were instrumental in promoting many a career as a teacher and mathematician.

What accomplishments in the MAA are you especially proud of?
That is easy - following Ken Ross and Don von Osdol as Associate Secretary. With the splendid help of people like Hope Daly, Donna Salter, Robin Aguiar, Diane Saxe, Penny Pina, Wayne Drady, Bryan Lane, and Michael Pearson the MAA put on great programs. Most attendees hardly ever noticed the challenges behind the scenes. I also had the pleasure to chair the committee that published the magnificent MAA Women in Mathematics Poster.

Are there any efforts of yours in the MAA that you are disappointed with?
One of the main responsibilities of the MAA Associate Secretary is to make it easier for people to attend meetings, give their talks, organize and run their sessions, and so on. As the meetings grew larger, there were times when it was impossible to accomplish all those things even for one who loves meetings as I do.

What changes have you seen in the MAA since you first became involved?
National meetings have grown with respect to activities and attendees. General contributed paper sessions, invited paper sessions, SIGMAA activities, and more student activities have been added to the program attracting many more participants. Thanks to the staff, the overall organization is much tighter and more efficient.

I know you've been active in the AMS as well as the MAA. What should I know about your AMS activities?
I was a visiting mathematician in the AMS Meetings Department in the summer and fall of 1992. For many years thereafter I organized the graduate student reception (Math Chats) at the January meetings. I served on the AMS Short Course Committee for many years where I met a number of research mathematicians. I have co-organized about a dozen special sessions in the history and philosophy of mathematics at several AMS sectional meetings with a colleague, Shawn McMurran, and with a number of international colleagues at joint international meetings in France, Italy, New Zealand, and Brazil.

You've been very active in your section, and you've received the section's teaching award and also the section's Distinguished Service Award. What are some highlights or activities you are especially proud of?
I attended my first Northeastern Section meetings in the fall of 1969 at Wheaton College. Phil Davis gave a brilliant lecture on complex analysis. The lectures and networking provided at the biannual meetings energized me mathematically and pedagogically. I served as local and program organizer for several Section meetings. In the process I was able to invite, meet, listen to, and get to know many mathematicians. I would have met Grace Hopper if she hadn’t fallen and broken her hip two weeks before our meeting. I also have enjoyed serving as the Section archivist/historian.

Have you been active in any other mathematics organizations? Any foreign organizations?
I served a term on the Council of the Canadian Society for History and Philosophy of Mathematics, a term as its president, and seven years as editor of its *Proceedings.* I have been a visiting scholar at Wolfson College, Cambridge on a number of occasions.

Your Number Theory book sounds like a real winner, and it comes as no surprise that you take an historical approach. What got you so interested in these subjects?
In the 70s and 80s, I attended the annual meetings of the Friends of Irene Adler (a Sherlock Holmes scion society) held at Harvard's Phoenix Club. At the dinner, Dirk Struik normally gave the canonical toast to Professor Moriarty. We became good friends and for many years thereafter I stopped by his home in Belmont on an irregular basis. Over a glass of sherry, we would talk about history, mathematics, and the detective novels, which he read as a youth to perfect his English. On one visit, when he was in his 90s, I found him studying Portuguese in order to review a book on the history of Brazilian mathematics. In those meetings with him I learned a lot about history and mathematics from a remarkable person. In the1980s, I was told by Jim McGovern, Associate Vice President of Academic Affairs at Providence College, that my next sabbatical leave would not be approved unless I agreed to spend it at Cambridge University. It took me a while and a rejected application to realize that he was serious. A month before we departed for England, Ivan Niven came to Providence to give an address at our Section meeting. Terry and I invited him to dine with us. During the evening, my sabbatical leave came up for discussion. Ivan gave us the name of a friend of his in the Department of Pure Mathematics and Mathematical Statistics who turned out to be the chair of the department. When we arrived in Cambridge in early January 1985, the only seminar in session was Béla Bollabás' combinatorial seminar which I joined. I gave a talk the next month. Over eight months I met a number of remarkable combinatorialists and graph theorists. My combinatorial lecture dealt with my thesis as it applied to graph theory. After the talk, the consensus of the group was that I would make a good historian. I also sat in on several astronomy classes that were taught by Sir Martin Ryle, a former Astronomer Royal. Each weekday all members of the department gathered for coffee in the morning and tea in the afternoon in the department combination room (a place). I enjoyed the company of Bollabás, John Thompson, John Conway, Richard Pinch, Alan Baker, J.C. Adams, J.S. Cassels, and Tom Whiteside. For several summers thereafter on visits to Cambridge, I had many long afternoon discussions with Whiteside, an expert historian, who whetted my appetite for the history of mathematics. The Bollobás' were very gracious to us. They made sure that we enjoyed our stay in Cambridge. During the Easter Term, Terry and I took an architectural course offered by Mac Dowdy. Once a week, we would tour a castle, cathedral, mill, manor, etc., and invariably ended each excursion in a pub where it was our assignment to find out what the building was used for before it was a pub. McGovern was right - spending my sabbatical in

Cambridge proved to be a remarkable and rewarding experience. It changed all our lives. When we returned to the States, Terry enrolled in an advertising design program, at the Rhode Island School of Design, which she completed. Our daughters, Virginia and Alexandra, who had attended Coleridge Community College in Cambridge, in order to keep up their level of education and worldly view, enrolled, respectively, in Moses Brown and Wheeler, private schools in Providence.

What personalities have stood out in the mathematical community, in the MAA and elsewhere?

In the spring of 1993, I attended a celebration of Paul Erdős's 80th birthday in Cambridge. I had a rental car and volunteered to drive Erdős to various events at the conference. While chauffeuring Erdős around, we talked about a lot of things but rarely mathematics – which is no surprise. However, early at the conference, he sat down beside me and asked what I was working on. I told him about decimal-Columbian numbers (Kaprekar's self numbers) and some of the results my students had discovered. A few days later, he sat down beside me and told me quite seriously that he thought that they were very interesting but not very important.

While working on a project on women in mathematics at Girton College, the archivist, Kate Perry, insisted I meet Dame Mary Cartwright. Kate sent me first to Lady Bertha Jeffries where at her home I was served tea and biscuits and given precise instructions on how to address and behave in Dame Mary's presence. On one occasion, Lady Bertha, Terry, and I went to the Ascension Parish Burial Ground in Cambridge where we located Charlottes Scott's grave. I visited Dame Mary on four occasions, twice at her apartment in Sherlock Close and twice at the Midfield Nursing Home near Girton College. She was an extraordinary mathematician. I felt honored to be in her presence as she related some of her experiences to me – most notably, being a student of G.H. Hardy and working with J.E. Littlewood, both of whom were on her dissertation committee.

In the summer of 1970, I returned to the University of Oklahoma to finish up my thesis. While I was there the algebraist and avid golfer, Israel Herstein, came to give a week-long seminar. I volunteered to pick him up each morning, drive him to the golf course, play nine-holes of golf, and get him back in time for the seminar. It was an interesting experience to say the least. My handicap at the time was 10 and his was – well, much higher. In spite of our athletic differences, we had a good time and I made sure that he showed up for his seminar on time. Terry and I invited him for dinner where we learned quite a bit about his life, his mathematics, and his travels.

I saw Isaac Milner, seventh Lucasian Professor of Mathematics at Cambridge, who served in that position from 1798 to 1820. At a dinner held at Gonville and Caius College, the librarian at Queens' College sat across from me. When she learned of my interest in Lucasian Professors, she asked if I would like to see

Milner. We met the next morning in the old college chapel. She moved a small table, lifted a grate from the floor, gave me a torch, and told me that he was down there. I went down a small ladder, maneuvered around a large heating unit noting a pervasive unfamiliar, unpleasant odor. I soon found myself in front of three rooms. There was a coffin in each room, Milner' and two benefactors of the College. I went in each room and looked in each coffin but could not see very much. When I had finished copying the inscription on Milner's coffin I went up and related my experience to her. She told me that many years ago there was a great flood. When staff went down to investigate, they found the coffins tipped over and body parts floating around. Being unable to distinguish the ownership of the parts they put them in the coffins at random. Thus in truth, I can only say that I have seen part of Isaac Milner. Which part is anyone's guess?

Thank you for a very interesting interview.