FOCUS

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In this Issue

The Mathematical Association of America
1529 Eighteenth Street, NW
Washington, DC 20036

Olympiad Winners Honored in Washington

Eight winners of the U.S.A. Mathematical Olympiad were honored at an awards ceremony at the National Academy of Sciences in Washington, DC on June 12.

L to R: Jay Chyung, Andrei Gnepp, Christopher Chang, Graig Helfgott, MAA President Ken Ross, Aleksandr Khazanov, Samit Dasgupta, Jacob Lurie, and Josh Nichols-Barrer.

Chosen as first place winner from nearly 550,000 students, Aleksandr Khazanov, a senior at Stuyvesant High School in New York, became one of six members of the U.S. International Mathematical Olympiad (IMO) team. Last summer, Khazanov was a member of the U.S. IMO team which received a perfect score for the first time in IMO history. Khazanov will enter Penn State in the fall to study mathematics. He plans to be a college mathematics instructor. He says his father taught him mathematics since he was age nine. "By showing me interesting combinatorics problems rather than belaboring arithmetic, he induced in me a vigorous interest in mathematics."

Top USAMO winners include Jacob Lurie and Samit Dasgupta, junior and senior, respectively, at Montgomery Blair High School in Silver Spring, Maryland; Christopher Chang, a junior at Henry M. Gunn High School in Palo Alto, California; Jay Chyung, a senior at West High School in Iowa City, Iowa; Andrei Gnepp, a senior at Hawken School in Gates Mills, Ohio; Josh Nichols-Barrer, a sophomore at Newton South High School in Newton Center, Massachusetts; and Craig R. Helfgott, a senior at Ramaz Upper School in New York City.

Along with Khazanov, this is the second consecutive year Lurie and Chang have won the USAMO. Lurie also received a perfect score at the IMO last summer. These three individuals plus Chyung, Gnepp, and Nichols-Barrer made up the six-member IMO team; Dasgupta and Helfgott were alternates. After four weeks of intensive training at the Illinois Academy of Math and Sciences in Aurora, they represented the U.S. in Toronto, Canada, competing with teams from over seventy countries. The IMO took place July 13–15. A report of the competition will appear in the October FOCUS.

AWM Announces 1995 Schafer Prize Winner

Ruth Britto-Pacumio, a junior at the Massachusetts Institute of Technology, is the winner of the sixth annual Alice T. Schafer Mathematics Prize. The Schafer Prize is awarded to an undergraduate woman in recognition of excellence in mathematics and is sponsored by the Association for Women in Mathematics (AWM). Ms. Britto-Pacumio will receive a cash prize of $1000.

See *Schafer Prize* on page 3

MAA National Election Did you receive a ballot?

The MAA is conducting its biennial national election. Due to a mailing problem, ballots to a few zip code areas were not delivered. Ballots have been remailed to members in these areas.

We want to give every member an opportunity to vote. If you have not yet received a ballot, please notify us immediately. You can contact the MAA toll free at 1-800-331-1622. A new ballot will be sent to you. Because of the possibility that there are still members who have not received ballots, election results will not be announced until October.

FOCUS

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Editorial

Congratulations

One thing that struck me as I was putting together this issue of FOCUS was that, as a profession, we seem to like giving awards for achievements. The two front page articles are about awards ceremonies, and in the pages that follow you will find several more announcements of awards. We give awards to students for their performance as students and to faculty for their performance as teachers.

The awards reported in FOCUS are just the tip of the iceberg, the national awards. For most of us, the college or university where we work has its own range of awards for students and professors, and often for graduate student instructors as well. That's a lot of awards.

This plethora of academic awards is, I believe, a particularly American phenomenon. I spent most of my academic career to date in my native England where, although a few university departments have prizes for the best undergraduate students, it would never occur to anyone to give awards to an instructor for outstanding performance in the classroom. The unspoken assumption is that you don't give an award to someone for simply doing their job well. At least, I assume that is the assumption—being an unspoken assumption, no one ever spoke about it, so I cannot know for sure if there is a rationale for not giving teaching awards or if the very idea simply never occurred to anyone.

It's an interesting question. Should we give awards to people for doing well the job for which they are employed and paid? I am sure the existence of an award does not itself lead to better performance. People excel because they want to succeed, not because they are trying to win a prize. The real reward for a semester's good teaching comes at the semester's end, when we look back on what we have accomplished and grade the papers, and maybe receive thanks from a few of our students. So why give awards?

Anyone who has spent time at both British and American colleges and universities cannot fail to have noticed that, overall, the standard of teaching in America is far higher than in Britain. (I deliberately used 'overall' because, as always when human performance is concerned, there are plenty of individuals who buck the trend.) In Britain the student at a university is still by and large regarded as a bit of a nuisance, someone who gets in the way of the real work of the day. Though you will certainly find similar attitudes in the USA, my own observations tell me that by and large the climate on this side of the Atlantic is very different. And awards are, I think, an important part of the picture.

There are surely so many excellent college and university teachers around that most of them cannot possibly ever win an award. But the very existence of those awards makes a clear and highly visible statement as to what we, as a profession, think is important. They affirm what we are about. Awards are not re-wards. They are not incentives. They are a way of saying "This is what we value and what we strive to achieve." And as such, they are very valuable.

So I give my hearty congratulations to all those awards winners whose names you will find in this FOCUS. And I give equally hearty congratulations to all those who did not win an award, but who nevertheless did an excellent job.

—Keith Devlin

The above opinions are those of the FOCUS editor and do not necessarily represent the official view of the MAA.

Letter to the Editor

To the Editor:

I reply to the lovely article by David Gale in the April FOCUS about Nash's game theory equilibrium theorem. I'm glad you allowed the article to include a proof, so readers could see how, with the right setup, Nash could use the better known Brouwer fixed point theorem. However, just as Gale had a quibble with Devlin, I have a quibble with Gale. It concerns his comments (last paragraph) on Nash's role in defining game equilibrium. I think Gale underrates Nash's contribution.

First let me seem to agree with Gale. When I first learned game theory (from Kuhn and Tucker—Tucker was my thesis advisor in 1972), and for some time afterwards (when I looked only at game theory materials written by mathematicians), I found the theorem referred to as Nash's theorem and the definition referred to merely as 'equilibrium.' But later I found that economists almost universally refer to the definition as 'Nash equilibrium.' This seemed very strange to me. The concept is, as Gale says, so natural; surely it was around before Nash.

So about a year ago I asked Al Tucker if Nash had indeed defined the equilibrium concept as well as proved the theorem. Al said he believed Nash had. They are both in his thesis, he said.

Gale's article seems to agree that Nash defined the concept, but then it says that the concept had been around long before (indeed in the economics literature—didn't Cournot use it?). Consequently, Gale seems to regard Nash's (re)definition of it as a minor event.

This is where I disagree. Mathematicians place too much importance on the theorems people prove, and not enough on the definitions they devise. (The relative importance we ascribe is clear: theorems often have people's names attached; definitions rarely do.) Yet it is definitions that give us the concepts that make thinking effective and make the theorems possible. Often, especially in applications, it is enough to have the concepts to make headway. For instance, I suspect the most important things students can take from a calculus course are a thorough and intuitive understanding of the definitions of derivative and integral, not the theorems about them.

If we mathematicians gave more credit for definitions, maybe their importance would be appreciated more. Here is a question I tempt people with. Who invented the modern definition of derivative for functions of many variables (i.e., f' is the linear transformation T so that $f(x+h) - f(x) - T(x)h$ is $o(h)$). This definition is a tremendous conceptual (and notational) advance over what came before, but most mathematicians don't even know who is responsible.

Fine, I imagine Gale saying, definitions deserve credit. But then the right people deserve the credit, and Nash is not the right person here. Someone else was first, or perhaps many people. But this is no different than the situation with theorems. To name an example from a related area, Kuhn and Tucker did not invent the Kuhn–Tucker theorem. (Kuhn and Tucker eventually discovered that it appeared twelve years earlier in a Master's thesis written at Chicago by one William Karush.) But they rightly get the credit for they were the first to *prove it in a context that made its significance clear.*

Similarly Nash was the first to define his equilibrium in a way that made its broad importance clear—he first put it on the map for the general theory of non-cooperative games. As natural as the idea is mathematically, it had not been stated in this generality, and it wasn't obvious to all at first that it was appropriate in this context. (It wasn't obvious to von Neumann—see the article on Tucker in the same April issue of FOCUS.) But it *was* appropriate. The definition and theorem together caught on (as Gale notes). And so it is appropriate that this equilibrium be called Nash equilibrium. And it is appropriate that we give him credit for it.

Stephen B. Maurer
Professor of Mathematics
Swarthmore College
Swarthmore, Pennsylvania

Schafer Prize from page 1

The Schafer Prize was established in 1990 by the executive committee of the AWM and is named for AWM former president and one of its founding members, Alice T. Schafer, who has contributed a great deal to women in mathematics throughout her career. The criteria for selection include, but are not limited to, the quality of the nominees' performances in mathematics courses and special programs, an exhibition of real interest in mathematics, the ability to do independent work, and, if applicable, performance in mathematical competitions.

In addition to the winner, Wung-Kum Fong (University of California, Berkeley), Nancy Heinschel (University of California, Davis), and Jessica Wachter (Harvard University) were declared runners-up and will each receive $150. Two Honorable Mention citations were awarded to Tara E. Brendle (Haverford College) and Karen Shuman (Agnes Scott College). The prize presentation will be held on August 5, 1995 in conjunction with the opening banquet at the MathFest in Burlington, Vermont.

"The selection committee was extremely impressed with the quality of the nominees this year," stated Linda P. Rothschild (University of California, San Diego), chair of the 1995 Schafer Prize Committee. "The selection of these six talented, determined young women was difficult among the many others who also deserve recognition." Serving on the committee with Rothschild were Ruth Charney (Ohio State University) and Lesley Sibner (Polytechnic University).

Founded in 1971, AWM was established to encourage women to study and have active careers in the mathematical sciences. Equal opportunity and the equal treatment of women in the mathematical sciences are promoted. There are more than 4000 members, both women and men, from the United States and around the world, representing all parts of the mathematical community.

The Alice T. Schafer Mathematics Prize is funded by an endowment with continuing contributions coming from AWM members and others. The AWM seeks additional contributions to help ensure the long-term viability of the prize. Checks made payable to "ATS Prize Fund" may be sent to AWM, 4114 Computer and Space Sciences Building, University of Maryland, College Park, MD 20741.

Review of *Arcadia*, a play by Tom Stoppard

Blair Brown and Victor Garber on stage

Mark Saul

Mathematicians living within striking distance of Broadway cannot stay away from Tom Stoppard's new play *Arcadia*. When I went, I met two mathematical acquaintances in the audience, neither of whom knew the other was there. We all knew that the content of the play was vaguely mathematical, but what unfolded on stage surprised each of us.

First of all, despite the advertisements, and even the playbill, it is *not* a play about a brilliant young woman who proves Fermat's Last Theorem. Nor is it a feminist version of *Breaking the Code* (the play about Alan Turing, which ran on Broadway several years ago). In that play, for example, there's one specific moment where Alan Turing "solves the problem" of building a computer. The moment was dramatically staged, and swept one along emotionally. Yet on a rational plane, it's hard to believe that Turing's breakthrough came all at once, or even that he "invented" the computer. It is not likely that there was an epiphany here, like Hamilton's insight with quarternions.

Nor is there any in *Arcadia*. The mathematics is part of a more general discussion. What is the play about? Well, it's good theater, so this question cannot be answered while standing on one leg. It concerns a British noble family and their estate. The action switches back and forth from 1809 to the present, sometimes within a scene, so that characters from both eras are sometimes together on stage (but don't interact).

The characters in 1809 are busy rethinking the Enlightenment. The formal garden is being torn up (by a newly invented steam-powered back-hoe) to make way for an English romantic garden complete with fake ruins and a "hermitage." Lord Byron is a central character in the action (but never appears on stage). And the young woman who is a mathematical genius, and who mentions Fermat only once or twice, is thinking very deeply about fractals, nonlinear systems, and "iterated algorithms."

The critics have been touting the connection with Fermat's Last Theorem. This is a red herring, designed, I think, to (a) capitalize on the recent news about Wiles and (b) tell less about the plot of the drama. There also might be (c) some misunderstanding about the mathematics. In any case, I think I can write about some interesting ideas of the play without spoiling the experience of seeing it. Stop reading if you don't trust me.

The modern characters are busy, for various reasons of their own, unearthing the details of the lives of their predecessors (or, in some cases, ancestors). In the process, they discuss the history of ideas and of culture. So Stoppard is not talking about mathematics at all. Our subject gets "impleaded" into the argument, perhaps because we've made a hit with the public in settling Fermat. Would the Riemann hypothesis have occasioned a drama? Perhaps one day we'll find out.

Stoppard's play is "about" two things. First, it is a discussion of the relationship of the romantic era of the early 1800s to the Enlightenment that preceded it. Part of this interpretation, at least as old as Hegel, is not original, but seems to me to hold up well. It is given vivid color through the experiences of the two sets of characters. Because the author is so in control of his medium, the result is very lifelike—not at all a colorized version of an old idea.

In an unusual reversal, Stoppard seems to view the end of rationality and the beginning of romanticism as a fall from innocence. A rationalist can dream naively of writing an equation for the motion of every particle in the universe. Stoppard implies that letting go of this dream and facing the chaos of reality is a fall from grace. It is this connection that leads to the personal issues of his characters, and the action of the drama. The opening curtain, for example, is a lavishly decorated scene of Arcadia as Paradise, with a woman handing a man an apple. As the curtain rises and the lights go down, the apple scene remains briefly lit, an indication of what is about to be played out. Is knowledge the fruit of rationality or of its opposite?

Stoppard's second point is more original and more controversial. He is clearly drawing a parallel between the beginning of the romantic era and the intellectual climate of today. Since we are living in our own intellectual climate, we are all uniquely unqualified to discuss it. But that has never stopped us: What We Are Like is a common theme of modern literature.

Is the argument valid? Has the computer, for example, sparked a revolution from Newtonian, or Cartesian, determinism to other ways of analyzing nature? It is certainly true, from where I sit, that a belief in the exact predictive power of science is a characteristic of our era. We have a deep and abiding belief that the scientific method will give us mastery over our environment. Genetics, materials science, modern physics, have all given us a lot of this mastery. Will research into social issues, for example education, evolve similarly? Or will we move to other approaches, other "paradigms," in investigating social phenomena? Can the social uses of science, the fruits of rationality, be made susceptible to rational inquiry?

The play raises other questions more specific to mathematical thought. Does the investigation of non-linear systems constitute a revolution? Raymond Wilder says that there are no revolutions in mathematics because progress in math lacks the essential revolutionary characteristic of rejecting what has gone before. Is this correct?

More generally, how valid are parallels, including Stoppard's own, between the

history of mathematics and the history of other aspects of culture? Stoppard's young genius is supposed to have filled a notebook with diagrams zooming in on some fractal. She saw this as a new way of using mathematics to analyze nature. She asks, "If an equation can describe the curve of a bell, then surely it can describe the curve of a bluebell" (although Gauss's major work on statistics came only in the 1840s). Her work, for a variety of reasons, never sees the light of day. But we in the audience know this already. Why was it not rediscovered by others at the time? If the end of determinism was part of the end of the Enlightenment, does the mathematics of the time reflect it? The lives of Galois and Abel are certainly excellent romantic stories, and could even be mistaken for opera plots. But what about their mathematics? It seems to me that the major mathematical results of the romantic era went counter to any "romantic" trends. Cauchy and Gauss, the giants of the era, were busy tightening the screws on the mechanisms of analysis, not gushing romantically about new fields of mathematics. And their life stories are strictly for insomniacs.

The play speaks to the mathematician in other ways, too. The metaphor of mathematics as a contrast to more fleshly human endeavors is brought up right at the beginning. The young genius asks her young tutor to explain the phrase "carnal embrace," and he tries to put her off with a counter-question about algebra. Now perhaps it is because I deal chiefly with adolescents, but the view of mathematical efforts as a sublimation of sexual expression seems to me both obvious and under exploited. Or is this why they do not seek Fields medalists among people over forty?

But the play has a lot of serious things to say. The dialogue crackles, the acting is superb, the stagecraft is riveting. It did miss, for me, an emotional pull. While the central questions of the play are central questions of my intellectual life, I did not get caught up in the closely related personal problems of the characters. But others who viewed it with me did, so maybe I wasn't in the mood. If you're in striking distance of Broadway, this is a memorable and exciting evening of theater.

Mark Saul is a computer coordinator at the Bronxville Schools in New York.

SECTION AWARDS FOR

Donato De Felice
Allegheny Mountain
Duquesne University

Herbert S. Wilf
Eastern Pennsylvania and Delaware
University of Pennsylvania

Donovan R. Lichtenberg
Florida
University of Southern Florida

Linda R. Sons
Illinois
Northern Illinois University

Carl C. Cowen, Jr.
Indiana
Purdue University

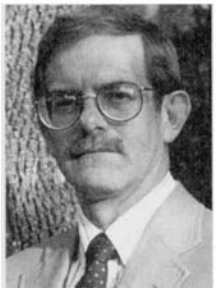
Gerald Lieblich
Metropolitan New York
CUNY-Bronx Community College

Sidney W. Graham
Michigan
Michigan Technological University

Seigfried Haenisch
New Jersey
Trenton State College

Clayton M. Knoshaug
North Central
Bemidji State University

Thomas F. Banchoff
Northeastern
Brown University



Thomas Rishel
Seaway
Cornell University

Sylvia T. Bozeman
Southeastern
Spelman College

Kuen Hung Lee
Southern California
Los Angeles Trade–Technical College

Henry L. Alder

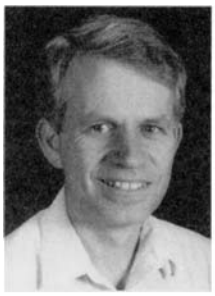
It is a great pleasure to feature on these pages the 1995 recipients of the Awards for Distinguished Teaching who received the awards at the spring meetings of the sections.

The Committee on Awards for Distinguished College or University Teaching of Mathematics is now in the process of nominating at most three of these distinguished teachers for the national Deborah and Franklin Tepper Haimo Awards for Distinguished College or University Teaching of Mathematics. The Board of Governors will act on these nominations at its meeting on August 5, 1995, in Burlington, Vermont.

The committee has been greatly impressed with the outstanding quality of this year's awardees. This has made it a great pleasure to read the files on these awardees, but also makes the task of nominating the national recipients of the awards most difficult. The committee wishes that there were some way for all members of the Association to share in the pleasure of reading the folders on this year's section awardees to learn of the wide variety of highly successful teaching efforts in which these talented teachers are involved. The MAA has every right to be proud to have among its members so many dedicated and imaginative teachers.

Fortunately there is a way for the membership of the Association to find out more about these teachers: the national awardees make presentations on their successes as teachers during the annual meetings at which their awards are conferred. These sessions have become one of the highlights of the meetings, as is evidenced by the many highly complimentary comments

DISTINGUISHED TEACHING



Wayne W. Barrett
Intermountain
Brigham Young University

Elgin H. Johnston
Iowa
Iowa State University

W. Wiley Williams
Kentucky
University of Louisville

Steve Ligh
Louisiana–Mississippi
Southeastern Louisiana University

I-Lok Chang
Maryland–DC–Virginia
American University

Edward M. Landesman
Northern California
University of California – Santa Cruz

Aparna W. Higgins
Ohio
University of Dayton

James R. Choike
Oklahoma–Arkansas
Oklahoma State University

Richard Koch
Pacific Northwest
University of Oregon

William D. Emerson
Rocky Mountain
Metropolitan State College

William Daniel Kaigh
Southwestern
University of Texas–El Paso

Frank Jones
Texas
Rice University

Richard L. Christensen
Wisconsin
University of Wisconsin Ctrs. – Marshfield

received on these presentations and the steadily increasing attendance at these events. Because of the very favorable reaction by the audiences, these presentations are now reprinted, at least in summary form, in FOCUS. You might wish to note now that the national awardees will make their presentations at the Joint Annual Meetings in Orlando, Florida, Friday, January 12, 1996, at 3:20 P.M.

The fact that twenty-three of the twenty-nine sections have notified the national office of the selection of a section awardee speaks well for the support by the sections of the national effort to identify, reward, and honor this nation's outstanding college teachers of mathematics. It appears that a few additional sections have chosen a section awardee without, for a variety of reasons, notifying the national office of their choices. The national committee wishes to commend the sections' efforts in establishing procedures for nominating and selecting carefully the award winning teachers.

The procedures adopted last year to simplify the requirements for documenting evidence of success in teaching and encouraging renominations of teachers who did not receive the Section Award has been well received by the sections. Indeed all comments, without exception, were positive.

Accordingly, the committee, at its meeting on January 7, 1995 in San Francisco, decided to continue these procedures so that the rules for the 1996 awards and the nomination form will be identical to those in effect this year. This means that those wishing to make nominations for next year's awards can initiate the process now.

See *Section Awards* on page 8

Congratulations to the Newly Elected Members of the MAA Board of Governors

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Gerald E. Bergum
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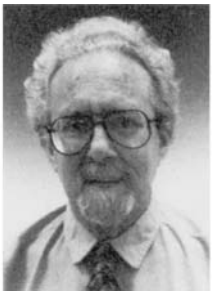

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Drake University
Iowa Section Governor

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Sam Houston State University
Texas Section Governor

John W. Petro
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York University
Governor At-Large, Canadian Membership

Carolyn Connell Tucker
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Intermountain Section Governor

Ann E. Watkins
California State University – Northridge
Southern California Section Governor

Section Awards from page 7

The national committee urges all members of the Association to think of worthy candidates for these awards and nominate them to the appropriate section committee. Even if your candidate should not be selected as a recipient of the award, remember that a nomination by itself is a distinct honor and also that there is now a simple procedure in place allowing a candidate to be nominated again if not selected the first time. The larger the pool of outstanding nominations, the easier it will be to maintain the high standards for these awards so successfully established by the first four sets of awardees.

Call for Nominations for Section Distinguished Teaching Awards

Nominations for the 1996 Section Distinguished Teaching Awards should be submitted to your appropriate section officers this fall in accordance with your section's procedures and deadlines.

Nomination forms will be sent no later than early October from your section secretary to your department chair and possibly others, such as your department's MAA representative. If your department chair has not received this form by October 16, check with your section secretary or appropriate section officer.

Henry L. Alder is a professor in the Department of Mathematics at the University of California, Davis and chair of the Committee on Awards for Distinguished College or University Teaching of Mathematics.

Interview with Ken Ross

Donald Albers

Ken Ross Takes the Reigns

In January of 1995, Professor Kenneth A. Ross of the University of Oregon became President of the MAA. Ross served the MAA for several years as Secretary and Associate Secretary. He has arranged so many national meetings that he claims, "I can do it in my sleep."

While still a graduate student, he co-authored with Ed Hewitt the modern classic *Abstract Harmonic Analysis*. Since then, he has written two other highly successful books, *Elementary Analysis: The Theory of Calculus* and *Discrete Mathematics* with Charles Wright.

Ross says that he was on his way to becoming a military brat until, at age 10, he met Edith, a magical stepmother, who took him under her wing and changed his life.

As President, Ross hopes to foster the work of the Young Mathematicians' Network and to provide support for mathematics education reform. He adds, however, that his agenda is growing. The interview that follows took place at MAA headquarters in February of 1995.

Military School

DON ALBERS: What do you remember about your early childhood in Utah?

KEN ROSS: Not much. My memories up to age 10 are very limited.

ALBERS: How about elementary school?

ROSS: In the third grade I got all unsatisfactory grades, although I should have only gotten unsatisfactory deportment because I wouldn't sit still in my seat. So for that and other reasons, including family problems, I got sent off to military school in Los Angeles, which I started in the middle of the year, on January 10, 1945. The first day was memorable in that I thought they had some unfair rules. They had a rule that you couldn't leave campus for the first two weeks. On the eleventh day, which was a Sunday, my ninth birthday occurred, and I had to stay on campus. That was a bad experience.

ALBERS: But you stayed on campus.

ROSS: I didn't have a choice.

ALBERS: Did military school get any better?

ROSS: Well, I pretty much hated that school for a year and a half. And then my folks switched me to another military school in the San Fernando Valley for two years that I liked quite a bit. I made up for being inept in sports by being a good score keeper. When I was in the fifth and sixth grade in military school, even though the school went up to the twelfth grade, I was the score keeper for games. I liked that because the other schools' score keepers were usually math teachers. I was a little twerp who could keep score as well as the next guy.

Love at First Sight

ALBERS: At age 10, your luck really changed.

ROSS: My whole life changed starting July 1st, 1946, when I met my stepmother, Edith. Without her, I would probably have been a military brat. If I'd stayed in military school until the twelfth grade, I would have been trained to go into the military.

ALBERS: What do you remember of that first meeting with your stepmother?

ROSS: I saw this beautiful, tall blonde. It was sort of love at first sight, I guess. I was a cute little 10-year-old and looked like I was seven, in a little military uniform, and said, "Yes, ma'am," and "Yes, sir." And she was 25, which I now realize is pretty young. She took over this 10-year-old and we became buddies at once. We were closer in age than she and my dad, who was 50.

ALBERS: A 15 year spread in age versus 25 years.

ROSS: Yep. I obeyed her and I recognized her authority, but we were buddies and we used to have water fights and things like that, and wrestle until I got too rough. One Sunday we were out driving and we stopped for gas. My stepmother and I were fighting over the funny papers in the front seat and the station attendant said to my dad, "It's okay, don't worry about it; my kids fight too."

We talked a lot, too. Fortunately this was

March 11, 1945, after two months in military school.

in the era before the dishwasher, and so we had a lot of time together washing and drying dishes. My father was older, busy making money and providing.

ALBERS: And she had time for Ken.

ROSS: She had time. Edith had no children other than me. She tried to make me normal and she did succeed, partially. Military school, even a good one, is not a perfect environment for bringing up somebody to be normal. After military school I went to the toughest junior high school in Salt Lake and I was quickly branded because it took me a few weeks to stop saying, "Yes, ma'am," and "Yes, sir," to the teachers. I was little and vulnerable, and Edith wanted me to be normal and wear a polo shirt, go to dances, etc.

ALBERS: You seem to have shaken off "Yes, ma'am," and "Yes, sir."

ROSS: Yes, sir! I guess she saw someone worth saving. I wasn't in real trouble, and I wasn't an unhappy kid. But I certainly had no idea where I was going, and I had very little in the way of interpersonal skills. In military school, I was on my own and I didn't need the usual interpersonal skills.

ALBERS: But the two of you talked a lot and played a lot.

ROSS: Yes.

The End of Monopoly

ALBERS: You played games together, too?

ROSS: Oh, yes. Except my dad had to stop us playing Monopoly because we would end up not speaking to each other.


President Ross at 4 or 5.

We would be absolutely, rigidly unreasonable and unfair once one of us got the advantage; we'd just go for the kill.

ALBERS: Both of you.

ROSS: Yes. So we didn't play Monopoly for a long time. I had to wait until I had a daughter.

ALBERS: That was a long wait! At what grade did the change occur, i.e., going from military school to stepmother to public school?

ROSS: Eighth grade. Although the kids didn't believe that I belonged in that school. When I arrived, they told me where the elementary school was located because I was little; they said I couldn't possibly be more than a fifth grader. I was probably the smallest kid in every school I went to, and usually smaller than the smallest girl, or at least no bigger.

ALBERS: That doesn't seem to have produced any serious harm.

ROSS: True, but I did have to adjust.

Getting Home Alive

ALBERS: How did you do in public school?

ROSS: I survived. Fortunately, I lived across the street from school so I could get home in one piece.

ALBERS: Were the students actually tough on you physically?

ROSS: They would have been, I think. But I could go out the door, race across Highways 89, 91, and 40, and be in my dad's business in about a minute.

ALBERS: What was his business?

ROSS: Wholesale television, radios, record players, refrigerators, freezers, ranges, etc.

ALBERS: Did you help around the business?

ROSS: Yes. I worked in the shipping department. I spent at least one summer painting the outside of the building. When I was 16, I spent the summer doing cost accounting, which was sort of interesting. My dad fired one woman in accounting, and I ended up training a new woman.

ALBERS: Did that lead to an appreciation for mathematics?

ROSS: No. When I was a kid, the thing I liked the most was maps.

ALBERS: Maps?

ROSS: Maps. I also loved the numbers that went with maps. I memorized the populations of all the towns in Utah over 2500 and useful facts like that.

Casino, Anyone?

ALBERS: Do you have any other special memories of high school? You said that in school you would run across the street to avoid getting beaten up.

ROSS: In junior high. Right. In high school, they were more civilized; the big kids would make sure that the dumb tenth graders didn't beat up on us little kids.

ALBERS: Were there other interests in high school that you pursued?


Ken as a teenager. ("Note that, unlike Jerry Alexanderson, I've outgrown bow ties.")

ROSS: I tried to get a card club going. I got another guy interested. It was just the two of us, so it didn't go far. My dad was a great card player, and my interest came from him. When I was a little kid taking train trips home by myself, I would wander the aisles looking for people to play cards with. And I mean real cards—not Fish!

ALBERS: I didn't think card-playing was big in Utah.

ROSS: Well, it was in our family and with my folks' friends.

ALBERS: Did you have any teachers in high school who had a big impact on you?

ROSS: My geometry and algebra teacher in high school was pretty unpopular with most kids, but I liked her. I got along with her. Her name was Charlotte Schroeder. She is the first person who pointed out to me that I'm sort of ambidextrous. One day, after I got through doing a problem on the board, she asked, "Do you know what you did?" And I said, "No." She said, "Well, you drew a square with two hands."

ALBERS: So are you ambidextrous?

ROSS: Yes, nature made me left-handed and I was forced to be right-handed, and so I print left-handed and I write right-handed and do the blackboard with both hands.

In 1959, when I went to Yale with Ed Hewitt, I was asked to give a talk in the seminar. I don't know whether I was brave or stupid, but I did it. In the audience were Felix Browder, Walter Rudin, Shizuo Kakutani, Phil Curtis, and Hewitt.

ALBERS: Tough audience!

ROSS: Yes. I'd been writing on the board about two minutes when I heard "mumble, mumble, mumble," so I stopped and said, "Is anything wrong?" Kakutani was talking to somebody and there was all this mumbling. They didn't respond so I went on and the rest of the talk went fine. After the talk, over coffee and cookies, Mary Ellen Rudin told me what the fuss was. I had switched hands. Instinctively, very early, I learned not to stand in front of what I write. So I would put things up on the board with one hand and then I'd get out of the way and switch hands.

Heaven

ALBERS: Where did you go to college?

ROSS: When I was sixteen, I went to the University of Utah, and I wasn't the big five-foot-two-inch hulk you see before you now. There were exactly two women on campus that were small enough to be of interest. One of them turned out to be a senior and quickly vanished from my life, but the other one was still around when I was a junior. A friend of mine set me up with my first date, a blind date. When I went to pick her up, there she was — the very one that I'd been noticing on campus for two years. I thought I'd died and gone to heaven. She was 4 foot 11 and looked great in high heels.

Around the table at a birthday party: Ken, Ruth, Jeanie Neven, and daughters Laurel, and Emily.

ALBERS: When did your mathematical interests expand a bit?

ROSS: There was always somebody better than me in school, certainly through high school and in college. So I didn't think of myself as a math student. Furthermore, I had a half-brother in physics who said there was no future in math, and who said all you could do with it is teach. He was a good physicist, and so I thought I'd probably go into physics. I went through a whole sequence of majors. My dad had a business, so first I was a business major. But I hung around with a crowd that thought business was for lowlifes. So I switched into chemical engineering because I had a friend in chemical engineering. Then a teacher told me I should be in pure science, so I was a chemistry major for a while because I liked freshman chemistry. Then I was a physics major and, as a senior, I wrote to five graduate schools in math and five graduate schools in physics.

Between my junior and senior years, I went down to UCLA to visit, on a job assignment, following a teacher down there. While I was there, I met a graduate student, John Selfridge.

"Maybe You Should be a Mathematician"

ALBERS: John Selfridge.

ROSS: One night over dinner with Selfridge, and another guy named Ken Ralston, I mentioned that I had just bought a book on number theory and on page 5 there was a little footnote about an unsolved problem involving prime numbers, and Ralston said, "Well, you're sitting across from the person who solved it — John Selfridge."

I mentioned to Selfridge that my dad had never finished high school, but that he was quite good at math. He used it, including algebra, and he knew little tricks like casting out nines. My dad knew that if there was an addition error which was a multiple of nine, then the first thing to do was to look for a transposition. The fact that if you transposed the digits the error will be a multiple of nine seemed like magic to my dad. Selfridge did not know about casting out nines at that time.

ALBERS: Amazing.

ROSS: So he went to the blackboard and after a few minutes he showed me a proof. He created a proof on the spot. My dad always thought casting out nines was magic. I went home and told my dad that it wasn't magic anymore, that this guy Selfridge had proved it. That evening with Selfridge was the start of a nice relationship. At the end of my visit to UCLA, I went home to Salt Lake, and my half-brother just happened to be there. Incidentally, I never lived with him, and I didn't even know he existed until I was ten. It turns out we're very similar in personality. I said, "I've got this neat book." He opened it up, thumbed through it, and said condescendingly, "Well, maybe you should be a mathematician." The book was *Introduction To Number Theory* by Hardy and Wright. And that was my release. After that, I was no longer, in my mind, a physics major.

ALBERS: So your brother's influence was nontrivial.

ROSS: Certainly, in the sense that I wasn't going to go into math when there was no future, except teaching.

ALBERS: Look what you ended up doing — teaching!

ROSS: I knew I wanted to go into math— *not* teaching though. I applied to UCLA for grad school because I had spent a summer there; in fact, it was the summer where all kinds of big names were on campus — I was rubbing elbows with Thompkins, George Forsythe, Mina Rees, and all these people who were big names in numerical analysis and computer science. I took a four-week course in which, after four hard weeks, if you had learned it and I hadn't because it was too complicated, one knew how to divide on the computer. I was hoping to go into computing at UCLA. Where would I be now? I would have been right there on the ground floor. But in retrospect, I made the mistake of applying too soon. I sent the application in October, and when I never heard from them, I didn't have the sense to write and ask them about it. I ended up going to the University of Washington. I went to University of Washington on the grounds that, since the University of Utah had an applied math department and University of Washington was a lot bigger than the University of Utah, surely they would have applied math. But they didn't. I've just sort of stumbled into everything.

"I'm Going to Have to Think"

ALBERS: Did you have any memorable undergraduate teachers?

ROSS: I am a better teacher because of my own early difficulties with mathematics. When I got to analytic geometry, I failed the first exam. It turned out to be a blessing. It was a blessing that I didn't just get a C+ or something. It shocked me and my response was very intelligent, for a change. I essentially said to myself, "Oh God, I'm going to have to think." Math had been all automatic up to that point. Algebra was absolutely intuitive and trivial, but suddenly I had failed this exam. My teacher, Ferdinand Biesele, liked me and encouraged me, and I got a C on the second exam, and an A on the final. But when I saw how he graded the final, he'd missed all my mistakes. Two teachers graded it and all the points taken off were by the other teacher. I saw that I definitely shouldn't get an A. But I got an A in the course, and ended up being his grader the next term.

ALBERS: Lucky for you.

ROSS: I was good at grading. I don't think I would have had the nerve to think about being a math major if I hadn't been encouraged by Biesele. At Utah, I also was taken under the wing of an applied mathematician named Charles Thorne. He's the one who took me with him to UCLA.

ALBERS: So at the end of that summer, you went back to Utah to finish your senior year.

ROSS: Yes. At Utah I was sort of a pet student, but not a really good student in the sense that in math and physics, I either got a low A or a high B every time. I finally got philosophical about it. I'd feel bad about those B+'s that could have been A-'s, but then I would remind myself that I had A-'s that could have been B+'s. And besides, you didn't complain in those days. I was one of two math majors.

I ended up teaching a course when I was a senior. The oldest faculty member had to stop teaching suddenly during the second week of the term, so I taught my own course winter and spring term as a senior. I was 19 when I first went into the classroom.

ALBERS: What did you teach?

ROSS: College algebra and then trig.

ALBERS: Did you like teaching right away?

ROSS: The first four weeks or so of teaching algebra were horrible. Finally I went to see a graduate student named Hal Moore. I said, "I know what's right or wrong but I can't explain why." And he said, "Well, didn't you give them the field axioms?" The next day I went to class, and without using those words, said, "Here's what everything relies on." I had no serious trouble after that.

At the time, I didn't think teaching was my calling. I thought I'd go off and be an applied mathematician and work for the Navy or something.

"What's an Ideal?"

ALBERS: Who were your important teachers in graduate school?

ROSS: I quickly came under the influence of Vic Klee. In my second term at Washington, I took a course in topology from him. And I did well, especially on the final. I had two final exams on the same day. The first was in an undergraduate algebra course given by Richard Pierce, and I had been doing essentially perfect work in there. After all, it was an undergraduate course and I was a graduate student. When it came to studying for the final, one of my classmates and I decided to spend a half-hour on group theory and a half-hour on ring theory, figuring that would be enough since it was an easy course. So we spent a half-hour on group theory, and there was nothing that we didn't already know. I said, "Should we do the ring theory?" We both replied, "Nah."

L to R: Jeanie Neven, Laurel, Emily, and Ken.

It was a three-hour final, and after 45 minutes I had done everything I could do, which was 55 percent of the exam. I couldn't do the other 45 percent. So I sat there and spent the whole next hour trying to figure out a key definition. I finally went up with the exam in my hand and I said, in a very soft voice to Pierce in this very quiet room, "Could I ask a question in exchange for some points?" He responded, very softly to his star student, "What can I do for you?" And I whispered, "What's an ideal?" And he said, in a very loud voice, "WHAT'S AN IDEAL?" Every head popped up in that room and I panicked. I threw the exam down, missed the table, picked it up off the floor, laid it on the table, walked out and avoided Pierce for three or four weeks.

In the afternoon, I had my topology exam from Klee. By then I was sick. I had to walk out of the exam a couple of times. I was absolutely a mess because of the fiasco in the morning. But I was flying high. There were fourteen "prove" or "disprove" questions, and I did ten of them. No one else did more than five problems, so I made a big impression on Klee. I thought I was going to work with Klee. He and I got along just great. He's a really nice person. Klee was going to be away my second year, so he asked Ed Hewitt to put me on his grant even though he didn't know me at all. Klee was going to be in Denmark during my third year, and I ended up working with Ed Hewitt.

Hewitt and Ross

ALBERS: Hewitt and Ross and your two volumes on abstract harmonic analysis are, of course, inextricably linked together, and are modern-day classics. Ed Hewitt was a very colorful fellow in the minds of many. Can you remember your first impressions of him and what it was like to work with him?

ROSS: I certainly was not aware of him my first year in graduate school at Washington until the math picnic. In those days Hewitt was an MAA lecturer, and he gave some lectures at the University of Utah. Everyone at Utah asked him how I was doing and he'd never heard of me. So at the math picnic he came over to the table where I was, looked right at me, and said, "Is Ken Ross around here?"

After Klee talked to him, Hewitt called me in and asked, "Would you like to be my note-taker and be on my grant?" and I said, "Yes."

The very first lecture or two were on set theory. He was somewhat sketchy and I really fleshed them out and started a numbering system. I started out on the right foot and I was among Hewitt's chosen after a week. From then on, I could do no wrong. By the way, in those days Hewitt was known as Big Ed. He was intimidating and a very demanding teacher.

In the Fast Lane with Big Ed

ROSS: In the spring of 1959 Hewitt went to Yale. It was a special year of functional analysis at Yale. Rudin was there, Bert Yood from Oregon was there, as was Phil Curtis from UCLA. I asked Hewitt if I could tag along with him. I was on an NSF fellowship, so I didn't have any teaching duties. I hardly taught at all until I became a faculty member. Anyway, Hewitt invited me to go with him in his Mercedes 300SL, so I drove across the country with Hewitt in 1959. One day we went 130 miles per hour.

ALBERS: Wow!

ROSS: That was in Wyoming. We crossed Wyoming in the morning. We had break-

fast near the Idaho border and we had lunch in Nebraska. We did not mess around. "The Fast Lane With Big Ed" has a special meaning for me.

Before I went to Yale, Hewitt gave me a problem that I wasn't making much progress on. Later he gave me another one. I was rooming with Karl Stromberg, my friend and former fellow graduate student, who was at Yale for the year. Every time I'd make some progress, Stromberg would ask another question. That summer I gave Hewitt an 80-page manuscript, and he said, "Well, this is a thesis." I said, "Oh, how nice." I was surprised, but Stromberg said it was obvious to him, because I had been answering all the questions that he peppered me with. Stromberg just knew the right questions.

Earlier that year, before I wrote my thesis, Hewitt asked me if I'd be an editorial assistant on his book on abstract harmonic analysis. I was thrilled to death because I would learn a lot of mathematics from Hewitt and get paid a lot more than as a graduate student. I had no idea that the book would become Hewitt and Ross. One of the things about Hewitt was that he could be anything. Like Lyndon Johnson, anything you say about him is true — sometimes: S.O.B., petty, mean, generous, kind. For example, when people from Eastern Europe would drop by with monetary problems, Hewitt would just pull a checkbook out of his desk and write them a check. But if you went to his office on the wrong day and wanted to borrow a pencil, he'd tell you that that's the tool of his trade and ask if you would go visit an auto mechanic and ask to borrow his tools, and give you a lecture and just be an S.O.B.

Half the Work, Half the Credit

On one of his generous days, when the book was completed, he said, "Well, you did half the work, you ought to get half the credit." Without that joint authorship, Hewitt and Ross, I wouldn't be here today. I probably wouldn't have had the jobs that I've had. He was sometimes horrible to work with on Volume 1. I hasten to add that on Volume 2 it was a different story. On Volume 1, I was truly the junior author. And so while he was not very much fun some of the time — there was a month where I worked at night to avoid him — he was generous in many ways.

ALBERS: And at the end, especially generous.

ROSS: And I was really coauthor on Volume 2. In Volume 1 there are 26 sections and three appendices. I essentially wrote the appendices and two other sections. So I truly was a junior author. My job was to rewrite, to make it more beautiful, more clear, more smooth, and correct. And it all came out. But he could have reasonably regarded me as an editorial assistant.

I was very careful and very hardworking. I knew how to write. No one ever taught me. That's amazing, but I started writing notes for Hewitt and I knew how to write. I don't know why. I impressed Hewitt more than he should have been, because I was a reliable, responsible note-taker and did pretty well. I did well in his class, but I certainly wasn't any better than Stromberg or Wis Comfort.

ALBERS: And you knew how to set up a numbering system.

ROSS: Yes.

ALBERS: Were your writing talents present in high school?

ROSS: Not that I know of. And I certainly couldn't write in other subjects. My handwriting was so bad that I didn't do very well in English.

ALBERS: But you knew what good mathematical writing was. You recognized it.

ROSS: Instinctively, so far as I can tell. I had read Natanson's *Theory of Functions of a Real Variable* before working with Hewitt. Natanson really made sense to me. Klee thought that I wrote very sophisticated proofs in topology the year before, as a matter of fact. What he really meant was succinct.

"I Just Start Writing"

ALBERS: Well, how do you write, then? How do you sit down and organize and write today?

ROSS: Well, mostly I don't work as hard as Paul Halmos makes it sound. He says it's hard work and requires great organization — I just start writing. If it's really complicated, I'll have some sections in mind, but I just write.

ALBERS: You don't outline.

Ken and Ruth Ross

ROSS: I outline a book by section, but otherwise I just use a "What do they need to know?" approach. I often organize talks in reverse, and write that way also, in the sense that, "Here's the goal. Now, what do you need to know to understand it?" I don't want to overstate it, but I don't think I ever found writing hard. Maybe it's because initially I was taking notes from the blackboard, and Hewitt, knowing that I was there, left them to be beautified by me.

I guess I was lucky because I learned how to write, given that someone else had already done a draft. Hewitt wrote most of the chapters, but he didn't write them elegantly. He wrote them very fast and he just made sure they were correct. He was a dogged, hardworking person who didn't have the patience to beautify. I spent a lot of time trying to see what the real point was. I cleaned up the notation. I was always following behind, cleaning up.

ALBERS: That's a great mental image.

ROSS: So I think it's an overstatement to say that I knew how to write. I knew how to write, but I wasn't writing from scratch. This is a revelation for me today. I practiced rewriting for years, until I wrote my own book on analysis.

ALBERS: That book was not done that way.

ROSS: No, but it was based on a course that had been given several times. I did outline that one. The book has six chapters. I wrote four chapters in note form and used them as a text in our required course. Then I sent them to Walter Kaufman-Buhler at Springer–Verlag. In my cover letter, I said, "This is what I've got, and this is all I'm going to do unless

you publish it. I'm not going to send it to any other publisher." I figured that if Springer didn't want it, no other publisher should want it. When they gave me the go-ahead, I sat down and wrote the other two chapters and fleshed out the book. That took about three weeks.

ALBERS: That's pretty fast.

ROSS: But it had all been thought through.

ALBERS: I'm impressed.

ROSS: But I was nervous. I had never written a book all by myself. I was nervous because I glossed over the foundations. I don't think I tell lies, but I really didn't want the students to get bogged down, so I glossed over the foundations and kept going. I was real nervous, but people accepted it from me. They might not have accepted it from someone they had never heard of. There are places in the book where I didn't want to tell the whole truth.

ALBERS: You and Charlie Wright have written a book on discrete math, which is really at some distance from analysis.

ROSS: Which is why I got a coauthor.

ALBERS: The big question is, "Why do you write?"

ROSS: Oh, both of those books came out of courses. In the case of the analysis course, there was one book which was out of print and the author, who is an old friend of mine, on advice of his lawyer in Canada, wouldn't let me use a photocopy. So I had to create notes. And then the notes turned into a book. Our administrative assistant said, "If we're going to keep having this be a required course" — which it has become around the country, an analysis course between calculus and hard senior analysis — "If it's going to be a required course, there ought to be a book available for it." So I said, "I'll write one." He didn't believe me. For the discrete math book, I and six or eight other authors-to-be in 1980 were all appalled at what was out there, so we all cranked up and had books out in 1983, 1984, or 1985. Both of my books were in response to perceived needs.

ALBERS: Both have sold pretty well, too.

ROSS: Especially the analysis book. It has had essentially constant sales now for fifteen years.

ALBERS: That's great.

ROSS: Without the second editions, third editions, and all the pain of revisions.

ALBERS: Just more printings.

ROSS: Yes.

Rochester to Oregon

ALBERS: How important do you think that Hewitt and Ross has been to you? It certainly is a classic.

ROSS: Well, I don't know — would Leonard Gillman have hired me at the University of Rochester? Probably not. Gillman just called me out of the clear blue and offered me a job. When I accepted, he had to go to his dean and make sure it was okay, but those were the good old days.

Gillman has been crucial in my career because he was a friend of Hewitt's. Actually, I met Gillman and Meyer Jerison in the same sentence. Hewitt introduced us. The only time Gillman ever got mad at me was when I announced that I was leaving Rochester, and I wouldn't talk about it; I wouldn't bargain with him.

ALBERS: You missed the west.

ROSS: Yes, and remember, I was married to a lady who grew up in Seattle. She had never been east of Potlatch, Idaho, until we went to Rochester. I spent the summer of 1963 in Eugene working with Stromberg and got an offer from Oregon. When I saw the possibility of going to Oregon and being with Stromberg, there was nothing Gillman could do.

ALBERS: Were you married during graduate school?

ROSS: No. I got engaged about three or four days before I left Seattle. I went to Rochester for a semester and then I flew back to Seattle at Christmas and got married. Hewitt and I had our blow-up two weeks before the marriage. A real blow-up, not just a tiff. We weren't speaking to each other after the end of Volume 1.

ALBERS: That sounds serious.

ROSS: We didn't get back together until 1965. When we had finished Volume 1, I insisted on going through the entire manuscript again. He thought that I wasn't going fast enough, and that I was delaying the book. I delayed the book about nine months; I went over every sentence again. And I found all kinds of little mistakes. The real merit of that book is that it's accurate. Even though he was the brains behind it, it wouldn't have been the classic you can depend on if I hadn't made that nine-month review. With Len Gillman's help, I had to persuade him that, "You're smart enough, but you're not patient enough." And I had to give lots of examples of mistakes that I found that he would have missed. I just checked every darned detail.

Running Meetings —"I can do it in my Sleep"

ALBERS: You can now, at the tender age of 59, look back over lots of nice things in your life — research, writing good books, and lots of service to two organizations, AMS and MAA. If you were to look back, what are the one or two things that have mattered the most?

ROSS: In many ways, the most important thing has been service to my department. I've been something of a grind all my life. I've done a lot more than my share of department duties. I supervised 15 dissertations. I look back and I see my imprint on lots of things in the department — the graduate qualifying exams, the teaching evaluation forms, etc.

I like to do things and feel like I'm doing them well. The thing I feel I did best for the MAA and the AMS was to arrange meetings. I did that for twenty years. I believe I've organized more than 60 meetings.

ALBERS: I find the thought of running a national meeting absolutely daunting.

ROSS: I can do it in my sleep. I'm wandering from your question, but I feel I've done well and worked hard. Do I like what I'm doing? Yes. Okay, do I wish I was working a little less a week? Darn right. I work seven days a week, but it's the only way I can keep up.

ALBERS: You feel that you've done a service for your department. Certainly you've done a service for the Association. What drives your service?

ROSS: Oh, I suppose Freud or someone would say it's because I'm small and that I didn't always have a very nurturing fam-

ily. That's the psychobabble answer. How do little kids survive? I was definitely a survivor, and my way of surviving was to behave and please. I think that translates into adult service, and over-achieving.

Regrets

I thought you were going to ask, what are my regrets in life. I have very few. They are very minor. If I had it to do over again, I wouldn't have quit my piano lessons when I was twelve. Of course, my whole life would have been different without Hewitt, but I really loved probability all along. I should have gone into probability.

ALBERS: As a student it's easy to miss probability.

ROSS: Well, it's the old mistake one makes when you're young and in a hurry. I would have had to take an extra year to stop and take a series of courses in probability in order to do research in that area. It wasn't one of the big three — algebra, analysis, and topology.

President Ross

ALBERS: You are now president of the MAA, the organization devoted to promoting collegiate mathematics. It's clear that you have a big interest in undergraduates, as well as graduate students. One could say your interest in the educational aspects of mathematics has been strong for most of your life.

ROSS: In a nonprofessional way, yes. And it may pose an interesting problem for me as president. I have to fight that. I'm task-oriented. I see a problem and I want to solve it. I don't think about it and I don't ask questions. Here's an example that's in my brain right now: the teaching evaluation forms at Oregon. I tried to figure out sensible questions people could interpret, students would understand, and colleagues would approve of. I kept circulating them by my colleagues until I concluded that we had a nice set of questions. But a professional might have asked, "What is the goal?" Now that I know more about the teaching side of the MAA and assessment and so on, there are all kinds of questions that I could have thought of. But I just never think that way. I organized meetings for twenty years. That's what I'm good at. And I didn't have to make judgments. I just had to be organized and responsive. But as president I'm still task-oriented and I have to remind myself, "I can get other people to do the tasks."

Presidential Goals

ALBERS: You're very early in your presidency, and you still seem to be buoyant about it all. You only have two years.

ROSS: Yes.

ALBERS: In your first message, in FOCUS, you indicated that you're going to work on communicating to people what a president does, which is a good idea. Beyond that, you've laid out some particular goals. High on your list is improving communication between the young mathematicians, who are certainly having a lot of difficulty on the job front these days, and with the rest of the community.

ROSS: Yes, but the Young Mathematicians' Network has taken care of a big part of my goal. So I'm more in a position of listening and passing information on than being a communicator.

ALBERS: What other things do you want to accomplish as president?

ROSS: My goals keep growing as I react to what I learn is going on. An earlier one was to increase effectiveness of the MAA's Board of Governors. I see at least two more goals that I haven't got very clear in my mind yet. One is to be helpful, supportive, and on the frontline for mathematics education reform. The broad mathematical community, as well as the general public, needs to see the value of the changes in education at all levels. The two main thrusts are, of course, the *NCTM Standards* and its effect on K—12, and calculus reform broadly interpreted to include precalculus, linear algebra, abstract algebra, and differential equations at the college level. And I am convinced that their futures are linked.

ALBERS: Go on.

ROSS: I think they're linked only tenuously in a technical sense, but very closely in the sense that I predict they're both going to be a big success or they're both going to be dying in five years. And they're both under some attack. So we need to be paying attention to the concerns of the people who are opposed to change — convert them when they're convertible, not only convert them but listen and adapt when necessary and desirable. This is an area that needs attention.

The other goal is professional development and, again, I don't know that I will do very much, but I'd like to at least publicize it and be supportive. So my agenda is growing.

ALBERS: Thanks very much for taking time to chat about your life and goals. By the way, Ken, what's an ideal?

CBMS Statement

The members of the Conference Board of the Mathematical Sciences, composed of the fourteen presidents of the mathematical sciences organizations in the United States, support and endorse the following statement:

A strong mathematics education for every child is at the very basis of the nation's need for a competent work force and an informed society, now and in the future. To enable all students to acquire a strong mathematics education is the prime objective of the mathematics education reform movement, which was generated at the grass roots level and propelled by the National Council of Teachers of Mathematics' Standards.

The thrust of this movement is to promote a core of serious mathematics for every student at the primary and secondary levels as well as to lay a solid foundation for continuing the study of mathematics at the post-secondary level. The reform efforts seek to improve student learning by building on the strengths of the past, incorporating modern technology, and engaging students actively in the learning process, always keeping in mind the needs and aspirations of students.

Therefore, these reform efforts deserve support by society at large as well as the mathematics community in particular.

1995 Edyth May Sliffe Award Winners

Walter E. Mientka

Since the acceptance by the Mathematical Association of America of the bequest of the Sliffe estate in 1988, 166 high school teachers have been honored as winners of the Edyth May Sliffe Award for Distinguished High School Mathematics Teaching.

The award winners are selected according to directives in Ms. Sliffe's will, in which she stated that the MAA is "to give awards to high school mathematics teachers whose teams do well on the American High School Mathematics Examination (AHSME)."

Specific procedures not mentioned in her will for selecting the winners were determined by the MAA Edyth May Sliffe Awards Committee. They include soliciting recommendations from the three team members of each of the top sixty schools in the 1995 AHSME.

The list of the 1995 winners is given below. They receive a cash award, an elaborate MAA certificate, a one-year membership in the MAA, and a Sliffe lapel pin. The MAA is pleased to recognize these outstanding teachers.

Ms. Dawn Anderson, St. Charles High School, St. Charles, IL

Dr. John Beam, Bellaire High School, Houston, TX

Ms. Rosemary Benedict, Hopkins School, New Haven, CT

Mr. Joseph Bettina, Adlai E. Stevenson High School, Lincolnshire, IL

Mr. Dan Butler, Mounds View High School, Arden Hills, MN

Mr. Steven R. Conrad, Roslyn High School, Roslyn Heights, NY

Mr. Frank Griffin, Cate School, Carpinteria, CA

Br. Christian Jones, Christian Brothers Academy, Lincroft, NJ

Mr. Peter Kelley, Saint Albans School, Washington, DC

Mr. Charles Koppelman, Wilde Lake High School, Clarksville, MD

Ms. Susan Kornstein, Rye Country Day School, Rye, NY

Mr. Michael Marcketti, West High School, Iowa City, IA

Mrs. Mary J. Neff, J.P. Taravella High School, Coral Springs, FL

Mr. Michael Park, Iolani School, Honolulu, HI

Mr. Richard Rothenberg, Stuyvesant High School, New York, NY

Mr. Richard Rukin, Evanston Township High School, Evanston, IL

Mr. James Trudeau, Homewood–Flossmoor High School, Flossmoor, IL

Dr. Alice Underwood, Texas Academy of Math/Science, Denton, TX

Mr. Ronald Vavrinek, Illinois Mathematics and Science Academy, Aurora, IL

Ms. Ruth Zucker, Detroit Country Day School, Beverly Hills, MI

Mr. John Barsby, St. Johns–Ravenscourt, Winnipeg, Manitoba, Canada

Mr. George Kyritsis, Woburn Collegiate Institute, Scarborough, Ontario, Canada

Mr. C. G. (Kip) Sumner, Upper Canada College, Toronto, Ontario, Canada

Walter E. Mientka is a professor of mathematics at the University of Nebraska and the executive director of the American Mathematics Competitions.

Contributed Paper Sessions

The MAA Committee on Sessions of Contributed Papers selects topics and organizers for contributed paper sessions at national meetings. The committee would be delighted to hear from MAA members who would like to organize such a session or who have suggestions for topics. All that is required is a title, name(s) and address(es) of organizer(s), and a short two- or three-sentence description.

Planning is now underway for the August 1996 summer meeting in Seattle, WA and the January 1997 meeting in San Diego. The deadline for receipt of proposals for the 1996 summer meeting is December 1, 1995; deadline for receipt of proposals for the San Diego meeting is January 1, 1996 (January 12, 1996 if by e-mail or in person at the Orlando meeting). Information should be sent to the chair of the committee, Elizabeth Teles, 11501 Chantilly Ln, Mitchellville, MD 20721; (703) 306-1668 (work) or (301) 262-9586 (home); fax: (703) 306-0445; e-mail: eteles@nsf.gov.

Funding Informal Science Programs for Youth-Serving Organizations

This one-and-a-half day, hands-on workshop is sponsored by the Science Linkages in the Community Institute, a project of the American Association for the Advancement of Science and the DeWitt Wallace–Reader's Digest Fund.

September 7 & 8	**St. Louis, MO**
October 13 & 14	**Dallas, TX**
November 16 & 17	**New Orleans, LA**
December 7 & 8	**San Francisco, CA**

The cost is $190 for registration, reception, and meals. For more information, contact Stephanie Jensen at (800) 351-7542.

Board on Mathematical Sciences Department Chairs Colloquium

Tenth Anniversary Meeting

October 20–21, 1995, Arlington, VA

"Managing While Science and Education Evolve" highlights include

- keynote address by George E. Brown, Jr., ranking minority member of the Committee on Science, U.S. House of Representatives
- sessions on the view from Harvard, the University of Michigan, Stanford, and the University of Texas at Austin
- the American Association for Higher Education's project on evolving assessment of faculty teaching
- an administrator's view of mathematical sciences departments
- mathematical sciences employment opportunities, successes encouraging underrepresented groups, federal research and education programs, statistics departments and statistics within other departments
- successes in undergraduate and calculus reform programs
- the annual employment survey

Workshops focus on information for new and future chairs; prototype interdisciplinary initiatives; changing school mathematics: challenges and opportunities; concerns and professional roles of new faculty: lessons from Project NExT; assessment in Ph.D.-granting departments; and removing barriers to student success. The goal of this colloquium is to provide department chairs, chair candidates, and department leaders with timely, practical information to help as the mathematical sciences adjust and adapt in education and research to the manifold changes taking place and on the horizon. The registration fee is $160. More information, including that for registration, is available from Board on Mathematical Sciences, National Research Council, NAS 315, 2101 Constitution Ave NW, Washington, DC 20418; (202) 334-2421; fax: (202) 334-1684; e-mail: bms@nas.edu.

Mathematics Awareness Week a Success

The Joint Policy Board for Mathematics (the American Mathematical Society, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics) would like to thank the sponsors of Mathematics Awareness Week 1995: the U.S. Army Research Office, Oxford University Press (with offices in New York and London), and Springer–Verlag (*Textbooks in Mathematical Sciences* (TIMS), a new undergraduate text series).

Please send news clippings from your Mathematics Awareness Week activities to 1529 18th St NW, Washington, DC 20036.

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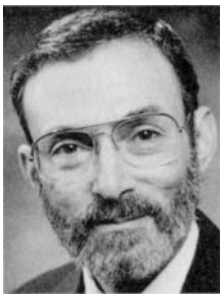
MAA 1994 Annual Report

President's Report



Taking a Closer Look: Our Membership, Our Mission

Ken Ross

As I write this in May, I've been President of the MAA for a little over four months. This has been a very busy time. I will mention some of the high points in this report. My predecessor, Don Kreider, accomplished a great deal and much of my energy is devoted to carrying on activities that were initiated during his tenure. Don had the pleasure of seeing, during his watch, the spectacular performance of the U.S. Olympiad team last summer in Hong Kong. Recall that our six-member team made history by all having perfect papers. While nothing is yet definite, we expect that the U.S. will host the International Mathematical Olympiad in the year 2001.

At this point the officers are taking a very close look at what the MAA is doing and what the MAA is about. We are looking at how we can best serve our members in the context of our mission, which is the furtherance of collegiate mathematics, interpreted very broadly. Most of my remarks below can be viewed as an elaboration on this theme.

Much of what the MAA does can be classified as professional or faculty development. This includes minicourses and workshops at national and sectional meetings, special publications that focus on pedagogy and classroom experiences, publication of reports and studies of current practices, etc. However, we haven't analyzed the overall structure of our professional development efforts, nor have we determined services that members may want that we aren't providing. A major initiative is to focus on faculty development and to make a more concerted effort to tailor our membership services to our membership needs. And we plan to replicate successful programs like our NExT project, which has been a powerful source of development and networking for college teachers who are new to the profession.

No matter how fast we move in the electronics arena, it seems that the possibilities are outrunning us. We already have a lot of information about the MAA available on gopher and on the WorldWide Web. In the future, individuals will be able to join the MAA and maintain their membership electronically. Some publications will be available electronically, and there will be other services we haven't even thought of yet.

In the past few years we have substantially expanded our services to undergraduates. The primary vehicle has been student chapters across the country. I am pleased to report that I am the coordinator for the student chapter at the University of Oregon. The new and very successful publication *Math Horizons* is aimed at undergraduates, but it has a much wider audience. It's time for us to target some services for our graduate students. By the time you read this we will have a Task Force on Graduate Students that will be studying ways in which we can better serve graduate students and prepare them for life after graduate school.

The MAA has been a leader in education with our efforts to work toward the goal of equal opportunities in mathematics for all Americans. Our SUMMA (Strengthening Underrepresented Minority Mathematics Achievement) program seeks to increase the representation of minorities in the fields of mathematics, science, and engineering, and to improve the mathematics education of minorities. These efforts require the greatest vigilance and persistence because the problems are a reflection of much bigger problems in the larger society.

The most visible work of the MAA is, of course, our fine publications. In addition to our outstanding journals of expository papers, we have a wide and expanding list of fascinating books. As I mentioned above, we also publish many notes and documents to assist the profession. I want to single out the *Guidelines for Programs and Departments in Undergraduate Mathematical Sciences*, published in February 1993. I urge any department that is reexamining its role in education (aren't we all?) to use these guidelines. They are also pertinent when departments are assessed by outside reviewers. Another publication, *UME Trends*, is widely read and deserves your support.

Our national and sectional meetings provide another service to our members. I urge you to attend the joint AMS–MAA meeting in Orlando next January. This is, incidentally, the tenth anniversary of the famous Tulane Conference which provoked the mathematics community to take a serious look at how we teach calculus. The MathFest in August 1996 will be in beautiful Seattle. The nature of our summer meetings after 1996 is under study at this time. We want to be sure that our meetings serve our members in the best possible way.

When I was elected MAA President, my first major concern was the job market in mathematics. I am almost a "charter member" of the YMN (Young Mathematicians' Network) and I have been in touch with several people in YMN. I am by no means unique, and I believe that the YMN is generally heartened by the response of the mathematics establishment. In January the MAA Board of Governors adopted a resolution on "Supportive Practices and Ethics in the Employment of Young Mathematicians" similar to resolutions adopted by the AMS and other organizations. See page 12 of the February 1995 FOCUS. And watch for my coauthored article "Myths in Math" coming up in the October issue. My friendship with my coauthor, Charles Mannix, started when we were both contributors to early issues of the YMN e-mail newsletter, *Concerns of Young Mathematicians*.

An important part of the President's job is to work with our sibling organizations and also to work with other scientific organizations and governmental bodies. I will just mention one event that may turn out to be pivotal for mathematics education. CBMS (Conference Board of the Mathematical Sciences) is an organization of

fourteen mathematical associations. At a meeting in May, CBMS took a major step by approving a serious investigation, with outside funding, of the feasibility of the creation of a CBMS Education Partnership Council. The hope is that this council would initiate projects and take positions on education on behalf of the supporting organizations. If this works, then mathematics would have a single voice on education comparable to that of the other sciences, like chemistry and physics. While all the CBMS organizations' roles would be important, this council would be especially valuable to the MAA and NCTM (National Council of Teachers of Mathematics), the organizations that are on the frontline of various reform efforts.

In March I was fortunate to be able to visit with Oregon Senator Mark Hatfield for about half an hour. He is a friend of education in general, and mathematics education in particular. MAA Executive Director Marcia Sward and I also made a very pleasant visit to the home of Helaman Ferguson, the widely known mathematician and sculptor. We saw his entire operation, which was fascinating. In particular he showed us the fine piece that the MAA commissioned as a gift to NCTM in commemoration of NCTM's seventy-fifth birthday. This piece was presented to NCTM at its huge April meeting in Boston.

In fact this is a year of anniversaries. This is the fiftieth anniversary of the Canadian Mathematical Society, which was celebrated in Toronto in June. In early April I visited a meeting of the Texas Section at Baylor University in Waco. This was a splendid occasion at which they were celebrating the section's seventy-fifth anniversary and Baylor's one hundred fiftieth anniversary. Also this year my own Pacific Northwest Section is celebrating its fiftieth anniversary.

I feel that I've only scratched the surface of all the activities that go on in the MAA. We are blessed with an MAA staff in Washington and hundreds of volunteer mathematicians throughout the country who are dedicated to and work very hard for the MAA. Noteworthy members of both groups are the Visiting Mathematicians who work for a year at the MAA headquarters. Each has brought special skills to the enterprise and left an everlasting imprint on the organization.

From the Executive Director's Desk

The Changing Face of the MAA

Marcia Sward

As the world around us changes at an ever increasing rate, there is comfort in thinking of the MAA as something of a fixed point. After all, the Board of Governors recently reaffirmed, almost word-for-word, the historic mission of the MAA: to advance the mathematical sciences, especially at the collegiate level. In our programs, meetings, and services, we also find much that is familiar and comfortable—our joint national meetings with the American Mathematical Society, our three journals and FOCUS, our sections and their activities. However, looking more deeply into today's MAA, we see quite a different picture—an organization that is carefully scrutinizing itself, and is significantly reshaping its programs to ensure a strong future effectiveness and success. So while the MAA of today is founded strongly on the mission and programs of the MAA of yesterday, and while the traditions of the past are still deeply honored, the MAA is not the same organization that it was even a few years ago. Here are some examples of the changing face of the MAA.

Math Horizons

Launched in 1994, *Math Horizons* now boasts over 22,000 subscribers, more subscribers than any of our three journals. Of these 22,000, about 1000 are individual. The rest are taken out in bulk by mathematics departments and distributed to interested students. Of course, it's the quality and relevancy of the content, provided by Editor Don Albers and his cadre of eager authors and advisors, that really has made *Horizons* a smash hit. Students and faculty tell us that *Horizons* is filling a real need, providing them with a rich array of information about careers and graduate programs, intriguing mathematics—sometimes old and sometimes new—and humor, puzzles, and personal profiles of successful mathematicians. We are eager to get *Horizons* in the hands of many more students and faculty because we believe so deeply that every college student who is interested in mathematics deserves to have access to *Horizons*. If you are in a department that does not yet subscribe to *Horizons*, please find a way to make it happen. Your students will thank you, and you will feel great about it!

Electronic Services

MAA electronic services have also taken off during the past year. We now can boast of our own gopher, World Wide Web page, and several electronic discussion groups. We see electronic communication as a powerful new means of reaching virtually everyone who is interested in collegiate-level mathematics and who wants to learn more mathematics, chat with colleagues about the teaching and learning of mathematics, network about job opportunities, etc. We are intrigued by the vast new opportunities for professional development via the Internet, and will be experimenting in the coming years with new forms of minicourses, dialogue groups, etc., seeking to find the most effective ways of serving the needs of our members and our community.

Teaching Awards

In recent years, the MAA has successfully launched a program of awards for distinguished teaching of mathematics which is bringing regional and national recognition of excellence to the teaching of mathematics. We are all deeply grateful to Deborah Tepper Haimo for endowing these awards. This year, we extended our awards program in another direction. Together with the AMS and SIAM, we established a joint award for student research, the Morgan Prize, which has been generously endowed by Brennie and Frank Morgan, parents of award-winner Frank Morgan of Williams College. It will be exciting to see the impact of this award, not just on the winners, but in encouraging and validating the research efforts of undergraduate students.

Externally-Funded Projects

SUMMA (Strengthening Underrepre-

sented Minority Mathematics Achievement), founded in 1991, has successfully expanded the number of mathematics-based intervention projects in the country from fifty in 1992 to a recent 129, with another twenty-seven in the planning stages. Through these programs, over 30,000 minority youngsters have been involved in mathematics activities outside of school. SUMMA recently received funding for development of an archival record of minority mathematicians and for a survey of minority mathematics graduate students. The results of the survey will help shape the first phase of a graduate student mentoring program. And last, but not least, SUMMA is cooperating with North Carolina A&T University and Texas Instruments in a project titled "Collegiate Curriculum Reform and Community Action: Opening the Way," which is providing faculty from HBCUs (Historically Black Colleges and Universities) with training and support in integrating the use of calculators in their classroom teaching. The MAA's Project NExT is proving to be a winner. Through it, 66 young mathematics faculty have been networked with one another and with senior mathematicians, and are developing a broad view of the roles and responsibilities of faculty members and the issues of concern of the mathematics community. Clearly one of the greatest benefits of Project NExT will be the leadership skills that participants are honing, and from which we will all benefit in the future. All total, the MAA boasts of 30 externally funded projects, including the Interactive Mathematics Text Project (IMTP), Case Studies of Undergraduate Mathematics Programs, Statistical Thinking and Teaching Statistics, Cooperative Learning in Undergraduate Mathematics Education, and the Institute in the History of Mathematics and Its Use in Teaching. Our list of generous sponsors who make these project possible includes the National Science Foundation, Carnegie Corporation of New York, Exxon Education Foundation, Alfred P. Sloan Foundation, IBM International Foundation, Department of Energy, Bamberger Memorial Foundation, and Texas Instruments.

Competitions

The big news in 1994 was the spectacular win of our team in the International Mathematical Olympiad, with a history-making set of perfect papers. Congratulations go to the team's three coaches, Anne Hudson, Titu Andreescu, and Paul Zeitz, and to Walter Mientka, who served as leader of the U.S. delegation. During his presidency, Donald Kreider launched a joint effort with the National Council of Teachers of Mathematics (NCTM) to seek new opportunities for greater coordination among existing competitions and propose alternative models for new competitions or competition-like activities. This task force will make its recommendations to the MAA and NCTM by December 1995. Support for the USA Mathematical Olympiad and our participation in the IMO is provided by the Army Research Office, Office of Naval Research, Hewlett-Packard Corporation, Microsoft Inc., and the Matilda Wilson Foundation.

Journals, Books, and Reports

During the past year, we have published 14 books ranging from *A Radical Approach to Real Analysis*, *All the Math that's Fit to Print*, and *Algebra and Tiling*. We are delighted that so many outstanding authors want the MAA to be their publisher. We are moving more and more toward electronic manuscripts, and are pleased with the decrease in time-to-publication as well as reduced costs. Our journals are still our most popular publications, thanks to the dedicated work of the editors and authors. And FOCUS continues, under Keith Devlin's capable leadership, to bring us the latest news in the world of mathematics. The ACRE (Assessing the Calculus Reform Effort) Report, released last January in San Francisco, has provided the mathematics community with concrete evidence of the success of the calculus reform efforts on many campuses, as well as the long road ahead. *Guidelines for Programs and Departments in Undergraduate Mathematical Sciences* is being utilized by departments to assist in examining their programs. Our career information publications have been widely disseminated through the CBMS organizations and the American Counseling Association.

Collaborative Efforts

Among the various collaborative efforts that the MAA has undertaken with our colleague organizations are: The JPBM report *Recognition and Rewards in the Mathematical Sciences*, released last year, is attracting attention on campuses across the country and helping colleges and universities reexamine their promotion and tenure policies. An outcome of the JPBM report is the establishment of the JPBM Task Force on the Evaluation of Educational Activities of Faculty. This committee is charged with the creation of guidelines to aid mathematical sciences departments in improving their evaluation systems. The task force will work collaboratively with the American Association for Higher Education's project on Peer Evaluation of Teaching. With the downsizing of the Mathematical Sciences Education Board (MSEB), a painful process dictated by lack of funding, the MAA has worked with our colleague organizations to find a way for the professional societies to fill the breach. At its spring 1995 meeting, CBMS voted to plan a CBMS Educational Partnership Council. This is to be an entity representing the broad mathematical sciences community which is focused on coordinating our various educational efforts for greater national impact. Also at its spring 1995 meeting, CBMS held the day-and-a-half Workshop on Minority Participation and Achievement in Mathematics. This workshop grew out of the desire to involve the other CBMS societies more actively in encouraging minority participation in mathematics. The MAA was able to provide much insight and assistance because of the knowledge that we have gained over the past ten years in this area, both in creating a more welcoming organization and in launching intervention programs for minority students.

Planned Giving

In 1994 we launched the Planned Giving Program, and initiated publication of our newest newsletter, *Legacy*. Happily the response has been phenomenal! Over 150 members have indicated that they would be willing to consider a gift from their estates to the MAA. We are in the process of contacting these individuals to discuss with them possibilities for restricted or unrestricted gifts to the MAA. If you would consider leaving some portion of your estate to the MAA, putting some funds now into a trust for the MAA, or designating the MAA on an insurance policy, please feel free to contact me to discuss the possibilities (msward@maa.org). We believe

See *Executive Director* on page 34

MAA Financial Report

Gerald J. Porter, Treasurer

I am pleased to report that 1994 was a good year for the MAA. Financially we finished the year with a balanced budget (see below). The highlight of the year was the outstanding performance of our team in the International Mathematical Olympiad held in Hong Kong. Our congratulations go to the team's coaches, Anne Hudson, Titu Andreescu, and Paul Zeitz; Executive Director of the American Mathematical Competitions, Walter Mientka; the chair of the Advisory Committee, Dick Gibbs; and of course first and foremost to the team itself.

It seems like only yesterday that Marcia Sward succeeded Al Willcox as our executive director, but Marcia's first five years have quickly passed. I am pleased to report that the Board of Governors has voted to renew her appointment for an additional five years. She continues to provide sound administrative management for the Association while simultaneously initiating innovative programs. It is a pleasure to work with her.

As Treasurer, I chair the Committee on Management Oversight and Evaluation (formerly known as Staff and Services). This committee is a subcommittee of the (ad hoc) Personnel Committee which has responsibility for reviewing the structure of the staff in our Washington headquarters. Our current structure evolved from the recommendations of an ad hoc committee chaired by Felix Haas on which I served in 1988. The MAA was a different organization at that time. Our total budget in 1988 was $3.4 million vs. $6.3 in 1994. Grant income was $386,000 vs. $1.7 million in 1994 and our total assets were $3.3 million vs. $6 million in 1994. Because of these changes it is appropriate to review the structure of our staff and our management. We have contracted with Frank B. Manley & Company to assist us with this study. I believe that this study will enable us to structure our staff in a way that provides maximum support for the activities of the Association.

You will see below a table titled "1994 Income and Expense." In this table we present the income and expense for our major programmatic activity. There are a number of other questions that one could ask, such as, "Where does funding for the Board of Governors and the officers come from?" and "What about the financial support for the executive staff?" and so forth. The answer is that these costs are allocated to each of the Association's activities in proportion to the expenses incurred by the activity. Thus, for example, you might question why our publishing efforts ran a deficit of $342,000. Didn't we sell enough books? The answer is that if you look at the direct costs of publishing the books and the cost of the publications department, then that cost was about the same as the income received for our books. But when you add the allocated costs of $314,000 the result is a deficit of $342,000. About 50% of dues income is used to pay for allocated costs on publications and other activities that are not paid by outside funding agencies. In 1994 total dues income was $2.2 million and unreimbursed allocated costs were $1.2 million. The other 50% of the dues pays for journal subscriptions.

At the end of June, Rhoda Goldstein left the MAA to pursue other interests. During her six years at the MAA she has made a valuable contribution to the Association. As Associate Director for Finance and Administration, she has supervised the renovation of our headquarters and the installation of a new computer system. On a day-to-day basis she has provided firm financial control. The General Fund has been in balance four out of the last five years and during that time has accumulated a surplus of $218,000. On a personal level she has provided me with the information that I need as Treasurer and as PI on the Interactive Mathematics Text Project (IMTP). We wish her well and thank her for her dedication and hard work.

Outcomes in 1994

There are several measures of the Association's fiscal health. These include our general operating budget, grant activity, our real estate holding, and our invest-

Consolidated MAA Balance Sheet

	December 31 1993	December 31 1994
Assets		
Current Assets		
Cash	$325,655	$29,269
Liquid Assets	979,437	913,001
Accounts Receivable	841,298	728,491
Publications Inventory	320,317	350,375
Prepaid Expense	142,495	163,630
Total Current Assets	$2,609,202	$2,184,766
Non-current Assets		
Investments (at cost)	$993,593	1,648,000
Furniture and Equipment	1,079,182	1,164,725
Building (at cost)	816,455	816,455
Building Improvements (at cost)	1,171,856	1,180,305
Accumulated Depreciation	(959,438)	(1,131,908)
Deferred Development Costs	127,780	127,336
Total Non-current Assets	$3,229,428	$3,804,913
TOTAL ASSETS	$5,838,630	$5,989,679
Liabilities and Fund Balances		
Current Liabilities		
Accounts Payable	$450,964	$392,331
Accrued Royalties	47,478	55,380
Other Accrued Liabilities	83,646	90,996
Prepaid Dues and Subscriptions	1,967,903	2,117,719
Total Current Liabilities	$2,549,991	$2,656,426
Long-term Liabilities		
Mortgage Payment	$338,577	$254,577
Unexpended Grant Receipts	457,105	554,519
Total Long-term Liabilities	$795,682	$809,096
Total Liabilities	$3,345,673	$3,465,522
Fund Balances		
Unrestricted Fund Balances	$945,961	$975,258
Restricted Fund Balances	954,887	929,758
Endowment	592,109	619,141
Total Fund Balances	$2,492,957	$2,524,157
Total Liabilities and Fund Balances	$5,838,630	$5,989,679

ment fund. We discuss each of these.

General Fund The General Fund is the MAA's unrestricted operating fund. Income to the General Fund comes from members' dues, publication sales, interest on working capital and contributions. Expenses include publications, management, supplies, non-externally funded program support, allocated building expense, and support of sections. General Fund expenditures in 1994 totaled $3.9 million out of total expenditures of $6.4 million.

It is the goal of the Finance Committee that the General Fund be in balance, and in 1994 this was indeed the case. The General Fund wound up the year with a surplus of $4000 compared to a deficit of $35,871 in 1993. Managing the budget is a difficult task since very little is budgeted for contingencies. As a result, in some years we have surpluses while there are deficits in others. For that reason we look at the result over a rolling five-year period.

Year	General Fund Balance (rounded to nearest $1000)
1994	$4000
1993	($36,000)
1992	$97,000
1991	$52,000
1990	$101,000
5 year total	$218,000

As is indicated, over the past five years we have an accumulated balance of $218,000. That balance provides us with a cash flow to enable us to make capital expenditures without bank borrowing. Those capital expenditures are depreciated over time.

Restricted Funds The restricted fund includes externally funded projects and the American Mathematics Competitions (AMC). Grant revenues during 1994 totaled $1,699,000. This includes grants to support SUMMA, *Math Horizons*, calculator workshops, the IMTP, and myriad other projects that support collegiate mathematics education. The AMC is responsible for operating the high school and junior high school mathematics contests as well as the Math Olympiad. During 1994 AMC income totaled $704,000 while expenses totaled $725,000.

Building Fund Several years ago the Fi-

See *Treasurer's Report* on page 24

1994 INCOME AND EXPENSE (Unit = $1000)

BALANCE	ACTIVITY	INCOME	EXPENSE
31	**TOTALS**	6475	6444
(916)	**Journals**	696	1612
(298)	American Mathematical Monthly	357	655
(139)	Mathematics Magazine	120	259
(163)	College Mathematics Journal	95	258
(305)	FOCUS	35	340
(11)	Math Horizons	89	100
(317)	**General Programs and Services**	144	461
(16)	AMS Joint Projects	0	16
(11)	Awards and Contributions	19	30
(24)	Career Information	2	26
(19)	CML/Employment Register	0	19
(16)	Committees & Representatives	5	21
(67)	Government and Public Relations	26	93
(20)	Meetings	30	50
(8)	Minicourses	30	38
(66)	Section Support	2	68
(25)	Student Chapters	25	50
(44)	SUMMA	0	44
(1)	Visiting Lecturers & Consultants	5	6
(342)	**Books and Pamphlets**	932	1274
(7)	Acquisitions	12	19
(9)	Brink Selected Papers	16	25
(15)	Carus Mathematical Monographs	50	65
(12)	Classroom Resources	52	64
(36)	Dolciani Mathematical Expositions	78	114
(5)	MAA Studies in Mathematics	10	15
(9)	Miscellaneous Books	27	36
(34)	New Mathematical Library	132	166
(76)	Notes	202	278
(10)	Placement Tests	43	53
(9)	Reports and Pamphlets	6	15
(93)	Spectrum	233	326
(4)	UME Trends	39	43
(23)	Video Tapes	32	55
(21)	**American Math Competitions**	704	725
25	American High School Examination	407	382
(15)	American Junior High School Exam	183	198
(19)	American Invitational Math Exam	0	19
0	USA Mathematical Olympiad	47	47
(12)	International Math Olympiad	67	79

BALANCE	ACTIVITY	INCOME	EXPENSE
(145)	**Grant Supported Programs**	1560	1705
(1)	Assessment Study in Calculus-NSF	60	61
(3)	Calculator Based Placed Tests-TI	8	11
0	DC Mathematics Coalition	6	6
(4)	Career Information-Dept of Energy	86	90
(1)	Case Studies-Call for Change	22	23
0	Dana Foundation-MSEB	19	19
(1)	Guidelines for Progs & Depts-Exxon	2	3
	Interactive Math Text Project		
(31)	IBM	191	222
(3)	Regional Sites-NSF	12	15
0	Developers Conf-NSF	41	41
0	Workshops-NSF	80	80
(3)	High Schools-NSF	164	167
(3)	Regional Minicourses-IBM	8	11
	Math Horizons		
(6)	Exxon	15	21
(8)	Hewlett Foundation	22	30
0	NSF	17	17
(1)	Sloan	3	4
(5)	Preparing College Teachers-FIPSE	17	22
0	Priming the Pump-NSF	18	18
(17)	Project NExT-Exxon	65	82
(5)	Statistical Thinking & Teaching-NSF	106	111
	SUMMA		
(1)	CCRCA	7	8
(29)	Carnegie	155	184
(2)	NSA	36	38
(5)	Adv Native American Math	20	25
(7)	NSF	241	248
0	AMIT-NSF	4	4
(2)	Teaching Math with Calculators-NSF	119	121
(1)	UME Trends-Calculus Retrosp-NSF	9	10
(6)	Women and Mathematics-IBM/Others	713	
(24)	**Miscellaneous**	47	71
1	Management	27	26
(25)	Miscellaneous	20	45
1,796	**General Income**	2392	596
1,754	Dues	2164	410
46	Contributions	120	74
(4)	Building Fund	108	112

Treasurer's Report from page 23

nance Committee made the decision to separate the Building Fund from the General Fund so that the expenses associated with renovation of our buildings would be isolated from the day-to-day operating budget of the Association. Space costs are allocated to the General Fund as a fixed yearly charge. This allocation together with rental income from our other tenants and contributions constitute income to the Building Fund. Expenses include operating expenses, debt service, capital improvements, and principal payments on our mortgages. Because of the recent renovations on our buildings there is a cumulative deficit in the building fund. As our mortgages are reduced and interest costs decline, that income will be used to reduce and eventually eliminate this deficit. During 1994 our mortgage indebtedness declined from $338,577 to $254,577 while our accumulated deficit in the cash building fund increased from $325,607 to $355,519. Taking advantage of the favorable interest rates, we combined our two mortgages into a new mortgage which we plan to pay off in early 1998.

Next January, John Kenelly will complete his second term as an elected member of the Finance Committee. John has provided leadership in both the Building Fund Drive and the actual renovation of the building. I know that I will think of John every time I enter the building. We all are the beneficiaries of his foresight and hard work for the MAA. Thank you, John.

Investment Fund The MAA Investment Fund includes both restricted and unrestricted endowment funds. The earnings and capital gains from our investments are retained with the exception of funds that are intended to support specific activities such as the Sliffe awards to high school teachers. During 1994 we transferred $53,000 from the Investment Fund to the General Fund to support these designated programs. At the end of 1994 the MAA Investment Fund was valued at $1,507,589, down slightly from the previous year. While this fund can provide some protection against a "rainy day," the total value is only about 25% of one year's budget. As we look to the future, we must find additional resources to increase the Investment Fund. We have begun a program of planned giving as a first step in this direction.

Financial balance sheets and reports indicate that the MAA is able to support the leadership position that we have assumed in collegiate mathematics. However, the true strength of the organization is seen in the committee lists both at the national level and in the sections. Without the dedication and hard work of our members, we would be incapable of advancing collegiate mathematics. In the final analysis, that is the real strength of the organization.

1994 Revenues and Expenditures
(with 1993 for comparison)

	1993	1994
Revenues		
Dues	$2,121,000	$2,164,000
Grant Supported Programs	1,475,000	1,560,000
Book Sales/Pamphlets/Videos/UME Trends	917,000	932,000
Journal Subscriptions/FOCUS/ Math Horizons/Advertising/Royalties	614,000	696,000
Mathematical Competitions	617,000	590,000
Contributions	134,000	166,000
Interest, Dividends, and Capital Gains	120,000	98,000
USAMO and IMO	110,000	114,000
Building Fund Contributions and Rental	141,000	108,000
Miscellaneous	44,000	47,000
TOTAL REVENUES	$6,293,000	$6,475,000
Expenditures		
Membership Recruitment and Retention	$519,000	$410,000
Grant Supported Programs	1,557,000	1,705,000
Books/Pamphlets/Videos/UME Trends	1,184,000	1,274,000
Journals	1,550,000	1,612,000
Mathematical Competitions	606,000	599,000
General Programs and Services	479,000	461,000
Development/Greater MAA Fund	63,000	74,000
USAMO and IMO	110,000	126,000
Building Operations	175,000	112,000
Miscellaneous Programs	58,000	71,000
TOTAL EXPENDITURES	$6,301,000	$6,444,000

Participation of Women

Carole B. Lacampagne, Chair

The Committee on the Participation of Women (CPW) was established by the Board of Governors in January 1987 to foster the participation of women in the mathematical sciences, and especially in activities of the MAA. The committee has sponsored programs at national meetings, published articles and a short book, made recommendations to the Board of Governors, and produced skits on micro-inequities.

During the 1994–95 academic year, CPW sponsored a contributed paper session on "Winning Women into Mathematics" at the summer meetings and a panel discussion on "Recruitment and Retention of Women Faculty" at the January meetings. We also presented our traditional Micro-Inequity Skits at the summer MathFest.

We have served as an advisory group on various MAA-sponsored proposals to promote the participation of women in the mathematical sciences and are on the advisory committee for an Association for Women in Science grant. We have aided in the establishment of the "Programs for Women and Girls in Mathematics," funded by the Tensor Foundation, and several CPW members will be reviewing proposals for Tensor funding at the summer meeting.

Our Taskforce on Statistics on the Participation of Women in the MAA is working in conjunction with the Joint Committee on Women in the Mathematical Sciences to have data on the participation of women made available by the various mathematical societies. Our Taskforce on Skits is looking into the viability of the CPW skits as they are currently constituted, and considering appropriate changes in the skits format.

CPW is working closely with the Women and Mathematics (W&M) program during this time of change in focus and management. We are also represented on the MAA–NCTM Taskforce on Competitions.

SUMMA

William A. Hawkins

The goals of the MAA's SUMMA Program are to increase the participation and representation of minorities in mathematics, science, and engineering, and to improve the mathematics education of minorities. Marcia Sward, the MAA Executive Director, and the MAA Committee on Minority Participation in Mathematics, co-chaired by Robert Megginson of the University of Michigan and David Scott of the University of Puget Sound, oversee the SUMMA Program.

With the assistance of SUMMA, a workshop on minority participation in mathematics was sponsored by the Conference Board of the Mathematical Sciences in May 1995 for CBMS leadership. Discussions between Professors Uri Treisman of the University of Texas at Austin, James Turner of Florida A&M University, and the CBMS have been initiated concerning continuation of research summer schools for minority students at different host universities. SUMMA would assist with recruitment of minority faculty and students.

Minority Participation in the MAA

At the 1995 winter meeting, there were five minority governors (including the first elected by a section) and the first minority vice-president in attendance. The Benjamin Banneker Room in the MAA Dolciani Mathematical Center (the headquarters building) was dedicated May 19 in honor of Benjamin Banneker, a "free man of color" and the first African American mathematician and astronomer. A campaign to name a room after the first Hispanic American to earn a Ph.D. in mathematics remains a possibility.

Projects

The SUMMA Program continues to encourage college and university mathematics faculty to initiate or replicate intervention projects for minority middle and high school students. The Carnegie Corporation of New York has funded a third two-year grant in the amount of $376,000 for this project. Since May 1991, SUMMA has awarded sixty-three small planning grants, totaling $250,000. Grantees have established thirty-five projects on both two- and four-year campuses in twenty-seven states. These projects now serve more than 1325 students, including 1080 minority students. With SUMMA serving as a catalyst and reviewer of proposals, these projects have raised more than $8.5 million in additional public and private support. The fourteen 1995 grant recipients are attending a proposal writing workshop at the Burlington Summer MathFest.

SUMMA has completed the third and final year of a $703,000 NSF grant to network intervention projects directed by mathematics faculty. The SUMMA Consortium (SUMMAC) now has 151 members at institutions in Canada, forty-one states, Puerto Rico, Guam, and the District of Columbia. The SUMMAC projects serve more than 36,000 students, of whom 91% are minorities. SUMMAC proposal writing workshops have now been held in twenty-six of the MAA sections. To assist with SUMMAC activities, Professor Kathleen Sullivan of Seattle University was the visiting mathematician at SUMMA during the spring 1995 quarter.

SUMMAC hosts an e-mail discussion group and publishes the *Directory of Mathematics-based Intervention Projects*, the quarterly SUMMAC newsletter *Forum*, and the *Project Director's Handbook*. The fourth SUMMAC Conference will be held in conjunction with the Orlando winter meeting. Proposals for continuation of SUMMAC have been submitted to the NSF and the Coca-Cola Foundation.

The MAA was a subcontractor on the Collegiate Curriculum Reform and Community Action (CCRCA) pilot project which was funded by NSF and the Hewlett-Packard Company. Completed in early June 1995, the pilot involved twenty-five faculty from nine historically Black colleges and universities (HBCUs). The NSF has funded a second round for this project to provide technical assistance to fully implement calculator-based curricular reform efforts in calculus for nineteen faculty from seven HBCUs, Hispanic-serving institutions, and American Indian colleges. Each participant will receive a classroom set of state-of-the-art graphing calculators purchased by the project at a discount, as well as an overhead projector unit donated by Hewlett-Packard.

In December 1994, the BIA/MAA Collaborative Task Force completed its work of examining the mathematics programs in BIA institutions and tribal colleges. A project was designed to bring a new vision of mathematics to these settings. A one-year planning proposal will be submitted to the NSF, the Exxon Education Foundation, and several other private foundations. The BIA has committed $10,000 and one-fourth of the time of their director of education for the planning year. The project directors are Joaquin Bustoz of Arizona State University, who will spend the 1995–96 academic year at SUMMA as the visiting mathematician, and Lois Folsom, SUMMA consultant.

The development and publication of an archival record has been given $27,000 in funding by the Sloan Foundation through December 1995. The record will list more than four hundred minority mathematicians who have received Ph.D.s in mathematics or mathematics education. The record and an associated directory will include brief biographical information and pictures. They will be available in hard copy and on the MAA Gopher.

The Sloan Foundation, in collaboration with the National Association of Mathematicians, has also given the MAA a grant of $30,000 to support a survey of minority mathematics graduate students. This survey will locate these students and determine their needs so as to facilitate the design and implementation of a Graduate Mentoring Network.

Funding Being Sought

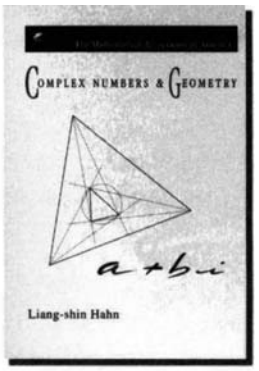
SUMMA is planning a collaboration of minority institutions to focus on the strengths, needs, and concerns of minority mathematics departments which have been successful in nurturing minority mathematical talent. Linking these institutions electronically will facilitate communication between these departments and the larger mathematical community. A proposal for $1.2 million over five years will be submitted to NASA. This project will include the Graduate Mentoring Network, with electronic communication between mentors and minority graduate students.

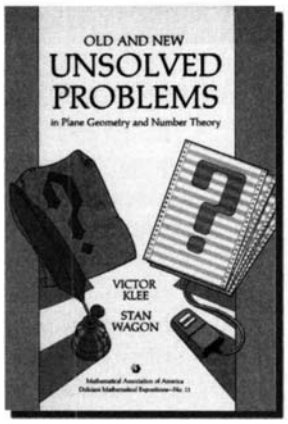
1994 — Best Sellers and New Shoes

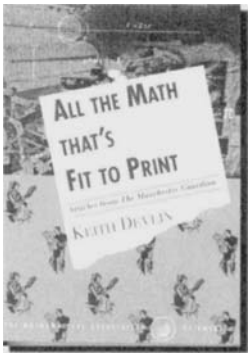
Publications had a good year in 1994, reaching an all-time high in book sales of $792,000. The books program is driven by the Committee on Publications under the dynamic leadership of Jim Daniel of the University of Texas at Austin. Each year the editors of the seven book series of the MAA carefully review dozens of manuscripts and ultimately recommend about fifteen to twenty of the best for publication. The Committee on Publications has proven to be a very fine judge of "book flesh," finding winner after winner over the years. Some of their choices have been spectacularly successful, earning the accolade "BEST SELLER." When we inform authors that their books are best sellers, they usually smile modestly and express surprise. None of them write with the goal of achieving best sellerdom. Rather they write to communicate mathematical ideas to their colleagues, students, and others who share their passion for what E.T. Bell called the Queen of the Sciences. If their books happen to sell enough to buy the baby a new pair of shoes, all the better.

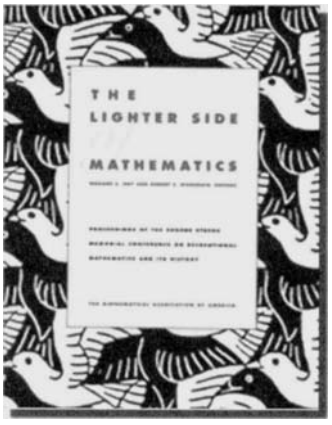
Don Albers

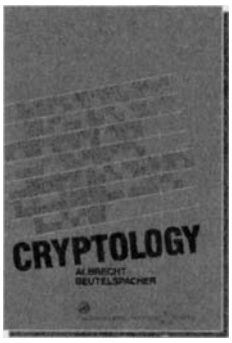
Director of Publications

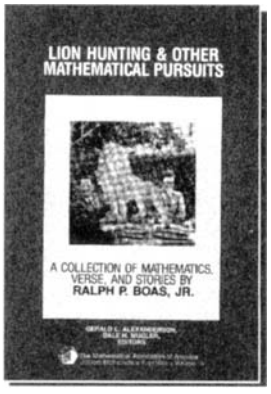




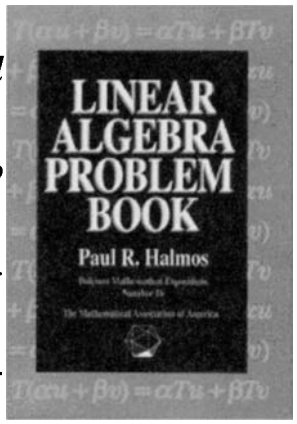








Best Sellers



A Radical Approach to Real Analysis—Bressoud

All the Math That's Fit to Print—Devlin

Complex Analysis: The Geometric Viewpoint—Krantz

Complex Numbers and Geometry—Hahn

Cryptology—Beutelspacher

Essays in Humanistic Mathematics—White

Excursions in Calculus—Young

Exploring Mathematics with Your Computer—Engel

Game Theory and Strategy—Straffin

Journey Into Geometries—Sved

Knot Theory—Livingston

Linear Algebra Problem Book— Halmos

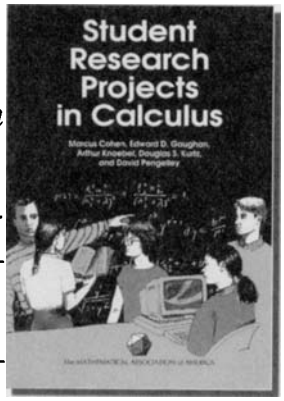
Lion Hunting and Other Mathematical Pursuits—Alexanderson and Mugler

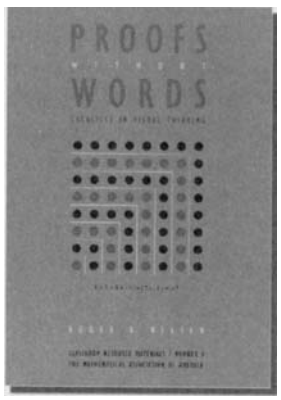
Mathematical Cranks—Dudley

More Mathematical Morsels—Honsberger

Numerical Methods that Work—Acton

Old and New Unsolved Problems in Plane Geometry and Number Theory—Klee and Wagon





Out of the Mouths of Mathematicians—Schmalz

Polyominoes—Martin

Problems for Mathematicians Young and Old— Halmos

Proofs Without Words—Nelsen

Resources for Calculus (in five volumes)—Roberts

Student Research Projects in Calculus—Cohen et al

The Lighter Side of Mathematics—Guy and Woodrow

The Search for E.T. Bell—Reid

The Wohascum County Problem Book—Gilbert et al.

The Words of Mathematics—Schwartzman

Using Writing to Teach Mathematics—Sterrett

Visualization in Teaching and Learning Mathematics—Zimmerman and Cunningham

P.S. If you don't own a copy of all of these best sellers, there's still time to order. Just call **1–800–331–1622**. Help finance a new pair of shoes for the baby or grandbaby.

American Mathematics Competitions

Walter E. Mientka, Executive Director (AMC)

Richard A. Gibbs, Chair

The Committee on the American Mathematics Competitions (CAMC) is the policy-making body of the American Mathematics Competitions (AMC), a program of the MAA also sponsored by the SOA, MAT, NCTM, CAS, ASA, AMATYC, AMS, and the ASPA. The composition of the committee includes at least one representative from each of the sponsors, the chairs of the AMC subcommittees, the executive director of the AMC, and the committee chair.

The AMC administers the AJHSME, AHSME, AIME, and the USAMO. In 1994, over 560,000 junior and senior high school students registered for these examinations. Over 217,000 students from 3103 schools registered for the AJHSME and over 339,000 students from 5372 schools registered for the AHSME. Although the AHSME committee made a decision to try to raise the number of honor roll students, no one expected over 20,000! There were only 3273 in 1993 and never more than 9000 in previous years. Over 12,000 AHSME honor roll students participated in the AIME, an increase of over 9000 from 1993. Selected on the basis of their AHSME and AIME scores, 146 students participated in the USAMO. The eight USAMO winners were honored by the MAA at the annual ceremonies in June (a report on the ceremonies appears in this issue). The top six students comprised our team that participated in the International Mathematical Olympiad (IMO) in Hong Kong. Their performance was truly outstanding. As reported in the October 1994 FOCUS, our team not only defeated sixty-eight other countries, they achieved a perfect score on each of the six questions associated with the nine-hour examination. This was the first time in the thirty-five-year history of the IMO for such an accomplishment by any country!

The CAMC believes that the AJHSME and the AHSME fulfill their role of both encouraging students to participate in a mathematically challenging activity and identifying the top high school mathematics students in the nation. In an effort to increase participation, in 1994 the CAMC voted to provide plaques to recognize the top scoring student in those schools which participate in the AJHSME or AHSME for three consecutive years. In order to hold the line on the costs of the examinations, the CAMC has also begun a campaign to solicit corporate sponsors for the AIME and the USAMO.

The mathematical community of the USA has been invited to host the IMO during the month of July in the year 2001. Hosting the IMO in the USA will provide an opportunity for the largest ever assembly of mathematics educators and gifted students from all over the world to participate in the greatest challenge to their abilities of inquiry and problem solving. (It is estimated that by the year 2001, a total of one hundred countries will want to send a team.) In addition, the IMO will provide for cross-cultural exchanges, contribute to the promotion of friendship and understanding, and create an opportunity for the exchange of information on mathematics syllabi and practice in mathematics education throughout the world.

The members of the CAMC feel that the experience of hosting the IMO and aiding its success will be viewed as a milestone in the history of mathematics in the USA.

Student Chapters

Aparna Higgins, Chair

The Committee on Student Chapters continues to create and support activities at the chapter, section, and national levels for students interested in mathematics. This year, Jane Heckler and Andy Sterrett were joined in anchoring the work of this committee at the MAA's national office by Victor Katz.

There are currently 416 MAA student chapters in the country, with a total paid membership of about three thousand. The committee is grateful to the large number of devoted chapter advisors who form the lifeline of student chapters of the MAA. We acknowledge the immense gift of time and energy that good chapter advisors put into their chapters. We know that their students find mathematics a rewarding and enjoyable subject.

This year the committee focused some attention on dormant chapters. Committee members tried to find the cause of the inactivity by calling many of these institutions. Although many reasons were given, the most frequent one was that the chapter advisor had left or was on sabbatical. We urge all departments to revitalize an inactive MAA student chapter or, where there is no chapter, to form one. Perhaps the most important reward of such an activity is a lifelong affection for, and interest in, mathematics on the part of the members of a student chapter.

In 1994 we established contact with MathCounts, which organizes a contest for eighth graders. For those MAA chapters interested in working with eighth grade students in their surrounding communities, we encourage your participation in offering your services of coaching students for the exam, or assisting MathCounts in other ways. The Committee on Student Chapters is also very pleased to have been one of several groups consulted in setting up the new Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student.

The Committee on Student Chapters stayed in touch with student chapters through *Chapter News*. With Deborah Frantz of Kutztown University as its editor, *Chapter News* continues to provide a forum for all chapters twice yearly. This newsletter is sent to all chapter advisors, and contains ideas for student activities at the chapter level, as well as information on the national meetings, summer research opportunities, and careers in mathematics. The Committee on Student Chapters also provides an opportunity for chapter advisors to meet with each other and share interesting chapter experiences at the national meetings, where the Committee on Student Chapters and Pi Mu Epsilon hold Joint Advisors' Breakfasts. These breakfasts have been very successful. At the San Francisco meetings, over sixty people attended.

The Committee on Student Chapters grate-

See *Student Chapters* on page 30

Visiting Lecturers Program

Ron Barnes, Chair

In the calendar year 1994, the committee solicited new lecturers and rotated off those who had served four years, in accordance with the committee guidelines. The VLP booklet for the 1995–96 academic year is being printed. Jane Heckler and Lisa Johnson of the MAA have coordinated placement of the contents of the booklet onto the MAA Gopher. The gopher version adds biographical information on lecturers to the standard content of the printed booklet. An announcement on accessing the booklet from gopher appeared in the June issue of FOCUS, page 17. For the first time, the booklet was entered on a computer disk, which will make it much easier to update future editions.

The 1994 booklet contained 187 lecturers, including twenty-nine new ones added in 1994. For the calendar year 1994, of the 187 lecturers listed, sixty reported no talks given; twenty-seven reported giving a total of fifty-six talks plus "several presentations." In addition, two speakers noted multiple invitations to talk at various high schools and colleges. Several noted that while they gave a number of lectures, they could not attribute them to the MAA booklet. One hundred lecturers did not report on their activities.

Various lecturers made suggestions and/or observations about the program. A desire for advertising the program more widely, including more contacts with groups like AMATYC, NCTM, high schools, and others was mentioned. In response, the committee requested that the booklet be distributed to all MAA student chapter advisors. Contacts with schools and other mathematics organizations are being pursued. The main obstacle seems to be money, according to a number of comments received. It has been suggested that perhaps this issue needs to be addressed.

The 1995–1996 booklet contains 208 lecturers, including sixty-one new ones added. Since forty lecturers rotated off in 1994, the net increase in lecturers was twenty-one. Of the sixty-one new lecturers, twenty-three have indicated that their institutions may be able to provide some funds for their travel costs—a significant increase from previous years' percentages! Three of the five identifiable Latino speakers added this year have indicated that their institutions may be able to provide some travel assistance. Four new states have been added to the list of those supplying lecturers: Idaho (1), Maine (3), Oregon (1), and Tennessee (1). The booklet now includes speakers from forty-two of the fifty states, the District of Columbia, and six Canadian provinces.

At the January 1995 national meetings in San Francisco, Robert Eslinger of Hendrix College joined the committee. Representatives of the visiting lecturers programs of SIAM and COPSS were invited to attend and contribute to the meeting.

At the San Francisco meeting it was decided to submit a proposal for a session by our committee at the 1996 Orlando winter meetings. Deane Arganbright, formerly of Whitworth College and now the new chair of mathematics at the University of New Guinea, agreed to head up this project. A panel discussion on the Visiting Lecturers Programs in the Mathematical Sciences is being developed with representatives from professional societies who administer such programs, successful lecturers, minority lecturer organizations, and colloquium organizers. A survey of mathematical sciences departments is intended to gather information and ideas, and the results of this survey will be included in the program discussion. For further information on this program, please contact Deane Arganbright whose e-mail address is 100353.163@compuserve.com.

The committee would also like to initiate informal get-togethers with interested MAA lecturers at the annual national meetings (and possibly at some of the section meetings) to share ideas and discuss suggestions for improving the program.

The committee welcomes suggestions and comments for improving the program. Nominations for outstanding speakers for the program are encouraged. For additional information, nominations, copies of the 1995–96 VLP booklet, etc., please contact Ron Barnes, Chair, MAA Visiting Lecturer Program, CMS Department, University of Houston–Downtown, 1 Main St, Houston, TX 77002; (713) 221-8553; e-mail: barnes@dt.uh.edu; fax: (713) 221-8086.

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All committee member terms expire at the end of the annual winter meeting following the year listed, unless otherwise noted.

Student Chapters from page 28

fully acknowledges the continuing support of the Exxon Education Foundation. Part of a grant was used in the academic year 1994–95 as mini-grants to sections to implement programs to attract minority students to participate in section activities and national meetings, to implement programs for students that illustrate applications of mathematics to contemporary society, or to conduct career fairs or otherwise alert students to the wide variety of careers that are open to those with a sound background in mathematics. A total of $8150 was awarded to nine sections. The activities funded by these grants include career conferences for undergraduates and for junior high school students, a minicourse or workshop at a section meeting, and prizes for a mathematics paper writing contest. The Committee on Student Chapters has received a fifth grant from the Exxon Education Foundation, part of which will be used to fund activities at the section level for the academic year 1995–96. Sections have been asked to submit proposals to implement programs or activities described similarly to those mentioned immediately above.

At the past three national winter meetings, Karen Schroeder of Bentley College organized Special Paper Sessions of contributed papers pertaining to activities at the chapter and section levels. Many of the papers describe the activities of sections which have been awarded an Exxon mini-grant.

The Committee on Student Chapters continued to infuse the program for the national meetings with activities appropriate for undergraduate members of the MAA. The Student Lecture at the summer meeting in Minneapolis was delivered by Gail Nelson of Carleton College on "What is *really* in the Cantor Set?" It was a wonderfully crafted exposition of a topic usually not seen by an undergraduate. The Student Workshop was an exciting mix of mathematics and juggling, as two experts in both areas, Joe P. Buhler of Reed College and Ronald L. Graham of AT&T Bell Labs presented "The Theory and Practice of Juggling." At the winter meetings in San Francisco, William W. Dunham of Muhlenberg College presented a spellbinding account of Newton's contribution to "Newton's Method" in a talk titled "Newton's (Original) Method—or—

Though this be method, yet there is madness in't." The ice cream social after the talk encouraged many in the audience to stay and chat informally. Sonja Sandberg of Framingham State College presented an informative and interesting workshop on a use of mathematics in contemporary society titled "Mathematics and the AIDS epidemic."

As always, the Hospitality Center at the national meetings was open and eager to serve students, providing a place for puzzles, contests, information, and respite from the busy pace of the meetings. It was staffed by Richard S. Neal of the University of Oklahoma.

There were fifteen MAA Student Papers at the summer meetings. The sessions were arranged, as usual, by Ronald Barnes of the University of Houston–Downtown. The MAA Committee on Student Chapters continued to award some funds for travel for student paper presenters. For the first time, the prizes for best presentation carried a cash award of $100 each. Ben Fusaro of Salisbury State University worked with the Mathematical Contest in Modeling to get two winning teams from the MCM to present their winning solutions at the sessions.

At the 1995 summer meetings in Burlington, the Committee on Student Chapters continues its tradition of providing exciting programming for undergraduates. The Student Lecture is "Cauchy, Abel, Dirichlet, and the birth of real analysis," by David Bressoud of Macalester College. The Student Workshop is "Mathematics on the Internet," by Dennis DeTurck of the University of Pennsylvania.

The Committee on Student Chapters has worked hard to contact minority institutions directly and to discuss the involvement of their students with mathematics. W. Howard Jones of the University of the District of Columbia and Joanne Darken of the Community College of Philadelphia have organized this effort. Richard Jarvinen of Winona State University headed an effort to bring students from Native American Indian colleges in Minnesota to the MathFest in Minneapolis last summer.

Cooperation between the Committee on Student Chapters and Pi Mu Epsilon continues to grow. Robert Eslinger of Hendrix College acted as the liaison between the two organizations. He will be the MAA Visiting Mathematician for the next academic year, and our committee will have another special friend at MAA headquarters.

Bob Eslinger, Ben Fusaro, and Howard Jones have ended their terms on this committee. We thank them for their wealth of ideas and their gifts of time. We welcome Richard L. Poss of St. Norbert College, who is also president-elect of Pi Mu Epsilon, and Terry L. Herdman of Virginia Polytechnic Institute & State University, who will be SIAM's representative on this committee.

As other groups increase their efforts to involve undergraduates in mathematics activities, the Committee on Student Chapters hopes that they will avail themselves of the many opportunities we already provide. We welcome comments and suggestions on our work. The MAA Committee on Student Chapters is pleased to be of service to undergraduates interested in mathematics and invites all undergraduates to participate in the many activities at the chapter, section, or national levels described in this report.

For additional information on the MAA Committee on Student Chapters, please contact Aparna W. Higgins, Chair, MAA Committee on Student Chapters, Department of Mathematics, University of Dayton, Dayton, OH 45469-2316; (513) 229-2511; fax: (513) 229-2566; e-mail: higgins@udavxb.oca.udayton.edu.

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**Indicates the names of those donors who contributed to a Greater MAA Fund memorial to John Melvin Smith.*

Executive Director from page 21

that through the Planned Giving Program, the MAA will eventually build its endowment base to a level which assures service to the next generation of mathematicians.

Conclusion

The MAA is changing as we seek new ways to provide more and better services to our members, recruit into membership and active participation more people who value collegiate mathematics, and make the case with the public and the government about the importance of quality mathematics education for all. And yet in many ways, the MAA is still the same organization that it was, an organization where professional friendships can blossom, where young people can be encouraged, where excellence in the teaching and writing of collegiate mathematics can be recognized and rewarded, and where, in cooperation with our sibling organizations, we can inform and influence national policies affecting mathematical education at all levels.

New From the MAA

New Mathematical Diversions

Martin Gardner

Mathematical jokes, mathematical magic, and a dose of fun

Offered here are twenty reprints from Martin Gardner's monthly column in *Scientific American*. Gardner tells us that his book is a book of "mathematical jokes," if "joke" is taken in a sense broad enough to include any kind of mathematics that is mixed with a strong element of fun. Readers of this book will be treated to a heavy dose of fun, and it is very possible that they will learn some mathematics along the way.

Martin Gardner instructs us about mathematics as he entertains us with his wit and sense of the absurd. Always the master expositor, the ideas presented in his books have stimulated, challenged and delighted generations of readers. Martin Hollis (in *New Scientist*) says it best when he says of Gardner's work, "Should you ever need to explain subatomic particles to a Stone-age man, send for Martin Gardner...He leaves open questions open, conveys the thrill of the chase and deals flawlessly with hard and simple ideas alike."

Some of the problems you will find here are:

- Group Theory and Braids
- The Games and Puzzles of Lewis Carroll
- The Transcendental Number Pi
- Victor Eigen: Mathemagician
- Polyominoes and Fault-Free Rectangles
- Euler's Spoilers: The Discovery of an Order-10 Graeco-Latin Square
- The 24 Color Squares and the 30 Color Cubes
- Bridg-it and Other Games

Answers are provided for these problems, as well as references for further reading and a bibliography. Martin Gardner's Postscript section provides updates to the problems.

272 pp., Paperbound, 1995

ISBN 0-88385-517-8

MAA Member: $16.50 List: $19.95

Catalog Code: DIVER/FOC

A Practical Guide to Cooperative Learning in Collegiate Mathematics

Nancy L. Hagelgans, Barbara E. Reynolds, SDS, Keith Schwingendorf, Draga Vidakovic, Ed Dubinsky, Mazen Shahin, G. Joseph Wimbish, Jr.

This book will greatly help readers introduce cooperative learning in their own undergraduate mathematics classes. Anyone interested in cooperative learning will find valuable information in this book. The book reflects the extensive experience of the authors as well as that of over forty colleagues who responded to a survey on cooperative learning. Throughout the book cooperative learning is related to educational research results, which are clearly explained in one chapter.

The book includes directions for organizing students into groups as well as complete descriptions of what these groups do once they are formed. Examples of group problems and grouped test questions for various mathematics courses illustrate the work that can be expected of students in cooperative learning groups. The authors present methods for monitoring groups and dealing with problems that may arise in a cooperative learning environment. They also address the question of student assessment. An extensive and annotated bibliography is also included.

192 pp., Paperbound, 1995

ISBN 0-88385-095-8

MAA Member: $14.95 List: $18.95

Catalog Code NTE-37/FOC

New From the MAA

She Does Math

Real-Life Problems from Women on the Job

Marla Parker, Editor

A Classroom Resource For Teachers of grades 9 through the first year of college

She Does Math presents the career histories of 38 professional women and math problems written by them. Each history describes how much math the author took in high school and college; how she chose her field of study; and how she ended up in her current job. Each of the women presents several problems she had to solve in her job.

There are lots of good reasons to buy this book:

- It contains many real-life problems. When students ask you, "Why do I have to learn algebra (or trigonometry or geometry)?" you will find many answers in its pages. Students will welcome seeing the situations from real-world jobs where the math skills you are teaching are actually used.
- It provides your students with strong female role models. Girls need these role models to help them imagine themselves in good, technical jobs. Both girls and boys need these role models to help imagine themselves working professionally with women as managers, colleagues, and subordinates.
- It supplies practical information about the job market to your students. They will learn that they can only compete for these interesting, well-paying jobs by taking mathematics throughout their high school and college years.
- It demonstrates the surprising variety of fields in which mathematics is used. Some examples:

  Archaeology: Learn how archaeologists use mathe matics to study pollen and thus understand the environmental changes that occurred in a North American Indian village a thousand years ago.

  Fish Pathology: Learn how a fish pathologist gives medicine to a large population of fish or helps prevent them from getting the "bends."

  Ophthalmology: Learn how an ophthalmologist helps a patient suffering from double vision by determining the power of prism needed in the patient's eyeglasses to correct the problem.

272 pp., Paper, 1995

ISBN 0-88385-702-2

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- receive career information
- automatically become members in one of the MAA's 29 regional Sections, which sponsor student workshops, student banquets, career conferences, environmental mathematics conferences and student paper sessions

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- write articles about mathematics for the school newspaper, and organize a puzzle contest
- present a campus-wide evening of mathematics for the non-technical major, and, of course
- arrange for speakers with topics from "Bernoulli Boys and the Calculus" to "Mathematics in Congress"

To receive more information on Student Chapters contact: Jane Heckler, MAA, 1529 18th Street, NW, Washington, DC 20036, e-mail: jheckler@maa.org or call 1-800-331-1MAA.

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The Board of Governors of the MAA is asking departments that are considering hiring temporary faculty to one-year positions to convert these to multi-year positions if at all possible. In addition, those departments that plan to hire temporary faculty for the next 5-10 years are urged to work with their administrations to convert these temporary positions to tenure-track positions.

It is our belief that the repeated hiring of temporary faculty not only impedes the career development of the young mathematicians holding these positions, but also increases the work load of permanent faculty. An individual in a one-year position must begin searching for a new job every October. He or she does not have the time and energy, and, indeed, can hardly be expected to contribute to the life of the department and of the institution.

It is our hope that those departments that have been forced to hire temporary faculty on a regular basis will be able to work with their administrators in order to reduce or eliminate this practice.

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Calendar

National MAA Meetings

January 10–13, 1996 Seventy-ninth Annual Meeting, Orlando, FL. Board of Governors Meeting January 9, 1996

January 9–7, 1997 Eightieth Annual Meeting, San Diego, CA. Board of Governors Meeting January 8, 1997

January 7–10, 1998 Eighty-first Annual Meeting, Baltimore, MD. Board of Governors Meeting January 6, 1998

Sectional MAA Meetings

ALLEGHENY MOUNTAIN April 12–13, 1996, Indiana University of Pennsylvania, Indiana, PA

EASTERN PA & DELAWARE November 4, 1995, Penn State University–Ogonta, Abington, PA

April 13, 1996, Millersville University, Millersville, PA

Fall 1996, Delaware State University, Dover, DE

ILLINOIS March 1–2 1996, Monmouth College, Monmouth, IL

INDIANA November 4, 1995, Taylor University, Upland, IN

March 29–30, 1996, Butler University, Indianapolis, IN

October 26, 1996, Rose–Hulman Institute of Technology, Terre Haute, IN

Spring 1997, Franklin College, Franklin, IN

INTERMOUNTAIN April 19–20, 1996, Mesa State College, Grand Junction, CO (joint meeting with Rocky Mountain Section)

IOWA April 26–27, 1996, Cornell College, Mt. Vernon, IA

KANSAS Spring 1996, McPherson College, McPherson, KS

KENTUCKY March 29–30, 1996, Murray State University, Murray, KY

LOUISIANA–MISSISSIPPI March 1–2 1996, Southern University, Baton Rouge, LA

February 28 – March 1, 1997, Millsaps College, Jackson, MS

MICHIGAN May 10–11, 1996, Siena Heights College, Adrian, MI

MISSOURI April 12–13, 1996, Southeast Missouri State Univ., Cape Girardeau, MO

Spring 1997, Missouri Western State College, St. Joseph, MO

Spring 1998, Southwest Missouri State University, Springfield, MO

NEBRASKA-SOUTHEAST SOUTH DAKOTA April 19–20, 1996, Univ. of Nebraska-Kearney, Kearney, NE

NEW JERSEY November 18, 1995, Rutgers University–Busch Macpus, New Brunswick, NJ

NORTH CENTRAL October 20–21, 1995, North Dakota State University, Fargo, ND

April 1996, Hamline University, St. Paul, MN

NORTHEASTERN November 17–18, 1995, Salem State College, Salem, MA

June 7–8, 1995, 1996, Hampshire College, Amherst, MA

November 22–23, 1996, University of Massachusetts–Boston, Boston, MA

NORTHERN CALIFORNIA October 21–22, 1995, Cal Polytech State University, San Luis Obispo, CA (joint meeting with S. California Section)

March 2, 1996, Sonoma State University, Rohnert Park, CA

OKLAHOMA–ARKANSAS March 22–23, 1996, Westark Commuity College, Fort Smith, AR

ROCKY MOUNTAIN April 1996, Mesa State College, Grand Junction, CO (joint meeting with Intermountain Section)

SEAWAY November 3–4, 1995, Skidmore College, Saratoga Springs, NY

March 1996, Elmira College, Elmira, NY

November 8–9, 1996, SUNY College at Geneseo, Geneseo, NY

SOUTHEASTERN April 12–13, 1996, University of Alabama–Huntsville, Huntsville, AL

SOUTHERN CALIFORNIA October 21–22, 1995, Cal Polytech State University, San Luis Obispo, CA (joint meeting with N. California Section)

TEXAS March 28–30, 1996, Texas Tech University, Lubbock, TX

Spring 1997, Texas Lutheran College, Seguin, TX

Spring 1998, Southern Methodist University, Dallas, TX

WISCONSIN April 12–13, 1996, University of Wisconsin-Platteville, Platteville, WI

Other Meetings

September 29–30, 1995 Twenty-third Annual Mathematics and Statistics Conference, Miami University, Oxford, OH; theme: mathematical modeling in undergraduate curriculum; principal speakers: John Casti, Daniel Maki, Philip Straffin. Abstracts for contributed papers and requests for pre-registration and housing information should be sent to Prof. Doug Ward, Dept of Math & Statistics, Miami University, Oxford, OH 45056; (513) 529-5815; fax: (513) 529-3841.

October 12–24, 1995 Seventeenth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA XVII), Columbus, OH. For more information, contact Doug Owens, 253 Arps Hall, The Ohio State University, 1945 North High Street, Columbus, OH 43210-1172; (614) 292-8021;; e-mail: Owens.93@ osu.edu.

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