FOCUS

THE NEWSLETTER OF THE MATHEMATICAL ASSOCIATION OF AMERICA

VOLUME 6 NUMBER 3 MAY-JUNE 1986

Congressional Strategy for the Mathematical Community

Jennifer Wysong Vance

The Congress has shown a growing interest over the past few years in science and mathematics. Indeed, Congress has been interested in many of the specific priority areas that emerged in the current MAA Long Range Planning process—recruitment of students, supply of college teachers, public understanding of science and mathematics, and the collegiate curriculum.

Congressional interest in these issues is important not only because it suggests future possible roles for the MAA in congressional relations, but also because it may signal the beginning of a shift in the way science and mathematics policy is developed in this country.

Goals of the Mathematical Community

It is easy to identify specific goals of the mathematical community that directly support major policy priorities of Congress—scientific advancement, increased economic productivity, and a secure national defense. The impact of mathematical research on society, the significance of mathematics education at all levels of training, and the general education of the citizenry bear directly on these Congressional goals.

To support these goals, the mathematical community needs to document for Congress the consequences of the present crisis in training new mathematicians, the importance of recent developments in mathematics—especially those that bear on scientific computation—and the risks associated with continued under-funding of mathematics research and mathematics education.

Goals of the Congress

Whereas in the past the Executive Branch (e.g., primarily the National Science Foundation) has been responsible for establishing priorities within the general science budget, recent changes in the Congressional process may alter the tradition whereby Congress has deferred in budget allocations to the scientific community. Serious budget deficits, which resulted in the passage of the Gramm-Rudman-Hollings amendment, may have a dramatic impact both on total funding for science and mathematics and on the way the budget decisions are made. *(continued on page 2)*

At the beginning of Mathematics Awareness Week, Senator Pete Domenici (R-NM), Alfred Willcox, MAA Executive Director, and Joseph Caravella, NCTM Director of Membership Services discuss the Mathematics Exhibit at the Smithsonian Museum.

MAA Annual Report Featured in Center Section

The special "focus" in the Center Section of this issue is the Annual Report of MAA activities and accomplishments for 1985. In addition to this report, two activities to be held in conjunction with the International Congress are described on page xvi, and an intriguing calculus problem appears on page xv.

Employment Advertisements

If you are looking for a job be sure to check the employment ads which start on page xiii of the Center Section. Advertisers will also find the rates and the deadline for the September issue on that page.

Preregistration Deadline for ICM-86 is May 15.

Strategy *(continued from page 1)*

Members of Congress are growing more interested in the technical aspects of science policy as they seek new ways to lower unemployment, restore the balance of international trade, improve the education of students, and revitalize the industrial work force. At the same time there has been a breakdown in the peer review system, with repeated direct appeals to Congress by individual universities for support of specific scientific projects.

The mathematics community may be surprised to learn of the very strong interest within the Congress in mathematics and science education. Close to $150 million has been appropriated to the Department of Education for a mathematics and science education program directed across the spectrum from the elementary to the postsecondary level. Needs in mathematics are specially cited in the fiscal year 1986 Department of Defense appropriations report where it concerns the University Research Initiative—a new $100 million program to create science and technology centers. And, more generally, there is increasing interest in collegiate mathematics and science education both within Congress and at the National Science Foundation.

Dealing with Congress

Strong relationships with key Congressional staff—both in committees and in Members' personal offices—are very important for building a base of informed understanding necessary for effective action. Unfortunately, the tenure of Congressional staff is often short, so constant renewal of contact is required to maintain continuity.

The Congressional process itself is also very important. One must know the rules that govern the operation of the House and the Senate, the authorization, appropriation and budget processes, and the ad hoc political nuances that affect legislative issues. Misunderstanding the Congressional process can create significant obstacles to achieving one's goals.

Another very important factor is the role and cohesiveness of the mathematics community. Recent examples, particularly in the area of astronomy, have shown that the Congress responds well to field-initiated consensus and ordering of priorities. A few years ago the astronomers provided the Congress with a report in which they documented policy and project priorities, thus enabling the Congress to better understand the importance of various projects and the relationship among them.

Congress is able to devote only a small amount of time to understanding any particular issue. The clearer the mathematical community can paint the global picture, the better Congress will understand the consensus of mathematicians. These understandings will help enable Congress to resist pork-barrel requests that distort the balance of funding and undermine sound national policy.

The David Report, *Renewing U.S. Mathematics; Critical Resources for the Future*, is an excellent document that continues to be effectively used with Congress to expand their understanding of the history of mathematics research funding. Other shorter and more specific reports need to be written to clarify funding needs and priorities within and among various branches of mathematics and mathematics education.

The Legislative Process

If one seeks to exert influence within the legislative process, it is important to understand some of the general patterns of activity on Capitol Hill. At the risk of being oversimplistic, the following observations provide a framework for understanding specific strategies.

First, Washington is a town driven by information and misinformation. Those able to carefully articulate their case in precise and easily understandable terms are most likely to be understood—an important contribution to success in reaching their objectives.

Second, the Federal budget deficit is the single most important issue affecting the way Congress views policy. Congress is no longer thinking about the New Deal or the Great Society. Now it is primarily concerned with the ordering of priorities against a background of fiscal restraint.

Third, although political "deals" continue to be part of the Congressional process, legislative decisions will increasingly come under sharper fiscal and intellectual scrutiny.

Last, and most important, the legislative agenda is often crisis driven. What may be subject to careful deliberation

(continued on page 7)

FOCUS (ISSN 0731-2040) is published by the Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036, six times a year: January-February, March-April, May-June, September, October, November-December.

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Readers are invited to submit articles, announcements, or Letters to the Editor for possible publication in *FOCUS*. All materials should be sent to the Editor at the MAA Headquarters in Washington, D.C.

The annual subscription price for *FOCUS* to individual members of the Association is $1, included as a part of the annual dues. Annual dues for regular members (exclusive of annual subscription prices for MAA journals) are $22. Student, unemployed, emeritus, and family members receive a 50% discount; new members receive a 30% discount for the first two years of membership.

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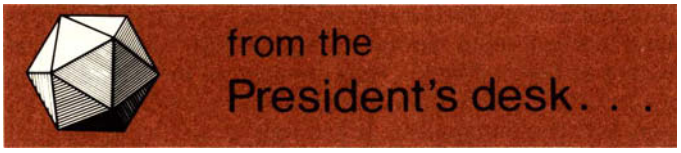
Second-class postage paid at Washington, D.C. and additional mailing offices.

Postmaster: Send address changes to Membership/Subscriptions Department, Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

Printed in the United States of America.



Lynn Arthur Steen, St. Olaf College

Understanding the Public

Leaders of the mathematics community frequently express concern about inadequate public understanding of mathematics. Increased support for public information was cited eight years ago in the MAA planning conference, PRIME-80, as a priority for the 1980's; it was reaffirmed again last summer by the Board of Governors in their discussion of long range objectives.

MAA, AMS, and SIAM now jointly support a Director of Federal Relations (Kenneth Hoffman), and part-time consultants on Congressional affairs (Jennifer Vance) and public information (Kathleen Holmay). The MAA Public Information Officers in each Section offer opportunities for grass-roots communication, and the CBMS Congressional Science Fellow offers an inside link to Congress. This year these efforts produced National Mathematics Awareness Week (April 14-20), complete with a public service TV announcement on behalf of mathematics.

Important as these activities are, they represent primarily one side of the social contract that undergirds public support for science and mathematics: they help mathematicians talk to the public, but do little to encourage us to listen to the public.

The relative independence enjoyed by university scientists in the conduct of research is based on continued public participation in the social contract first articulated by Vannevar Bush at the end of World War II in "Science—The Endless Frontier." In return for promises of long term benefits to society, university science was assured financial support for research motivated more by the investigator's curiosity than by externally-imposed goals.

Yet a recent report on "Science and the Public" from the NSF Advisory Council warns that this social contract is beginning to erode, that lay attitudes about science are beginning to change from benign neglect to rigorous scrutiny. The public is not only anxious about the potential harm from scientific enterprises, but also views the nation's loss of technological superiority as a failure by scientists to deliver on their promises.

The ties that link mathematics to the social contract between science and society are both complex and fragile. On the one hand mathematics enjoys in the public eye a Hardy-like distance from immediate science-based hazards (chemical spills, nuclear accidents). On the other hand, its research is so arcane and its benefits so remote that mathematics is almost invisible in public dialogue about science and society. Yet since such a high percentage of support for mathematics comes from public funds, we bear special responsibility for public accountability. Mathematics also has the most to lose if the social contract breaks down.

Communication is a two-way process. Although mathematicians must reserve the right to decide what is good mathematics, the public will contiue to ask what mathematics is good for. If we listen to the public, we will discover great misunderstanding about very basic propositions—that mathematics is fundamental to science, that mathematics is continually being created, that mathematics is not just a branch of computer science.

Misunderstanding is inevitable since most mathematics is invisible to the public. But mathematicians and mathematics teachers—MAA members—need not be invisible.

By listening to the public we, as individuals, can begin a dialogue that will help non-mathematicians understand better the increasingly important role of mathematics in society.

Changes Reported in Operation of AHSME and AJHSME

Approximately 1% of the 360,000 students who took the American High School Mathematics Examination (AHSME) qualified to take the American Invitational Mathematics Examination (AIME). The number of students who qualified for the AIME by making scores of 100 or above is four times the number who qualified last year. (The AHSME has intentionally been made somewhat easier on the first half, and also the scoring system was changed—see below.) On the other hand, despite two perfect papers, very high scores (above 125) appear to be rarer. Complete results will appear in June in the 1986 AHSME/AIME National Summary, available from the address below. Colleges could find this summary useful for recruiting purposes. Reports on the later exams (AIME, USAMO, IMO) will appear in future issues of FOCUS.

For many years, the scoring system on the 30-question multiple choice AHSME was: $30 + 4\times$ (# right) - (# wrong). This year it was changed to: $5\times$(# right) + $2\times$(# unanswered). Readers might wish to compare the two systems mathematically and see if they can generate all the pro and con arguments which the Committee on the American Mathematics Competitions (CAMC) generated in deciding to switch to this new and unique system.

The American Junior High School Mathematics Examination (AJHSME) was given for the first time on December 10, 1985. See FOCUS, November-December 1984, for details. However, since that report, it was decided to reduce the AJHSME to 25 questions in 40 minutes, so that it could be given conveniently in a single class period. This large-enrollment CAMC exam is being centrally scored, and the complete nationwide data (see below) will be invaluable to educational researchers. Detailed individual and statistical information is available in the AJHSME National Summary.

For either Summary ($3.00 each) and copies of exams and solutions (50¢ per pair), write to:

Professor Walter E. Mientka, CAMC Executive Director, Department of Mathematics, University of Nebraska, Lincoln, Nebraska 68588-0322. Minimum order $5.00 + 20% for first class mailing.

WASHINGTON OUTLOOK . . .

Kenneth M. Hoffman

Increasing Awareness

A long-term effort to increase awareness of the importance of mathematics and the needs of our community began with the activities surrounding preparation of the David Report, 1981-84. Subsequently, two important mechanisms for providing national leadership were put in place by the National Research Council at the instigation of our community: the Board on Mathematical Sciences and the Mathematical Sciences Education Board. These Boards are already developing and amplifying priorities and directions in mathematics research and education.

Since last fall, our ability to increase awareness in Washington and around the country has been further enhanced by decisions of the Joint Policy Board for Mathematics (JPBM) to retain the services of Kathleen Holmay as public information consultant and Jennifer Vance as general counsel, specializing in congressional matters. The addition of these two professionals to our team has given us both a stronger presence in Washington and a national capability which we have never had.

This was vividly demonstrated in the planning and development of National Mathematics Awareness Week, April 14-20. In a few short weeks, our new consultant-representatives devised and implemented strategies for producing a spectrum of events, centered about the two main thrusts of the Week: congressional sponsorship and participation; and public observation of the fractal-space public service announcement which appeared on about 200 television stations around the country. These thrusts brought us the highest degrees of congressional and public visibility our field has yet attained.

These are accomplishments of which our community can be proud, especially because of the participation of many mathematicians who wrote their representatives in Congress and planned supportive local events on very short notice. It is important, however, not to view these as isolated events. They are initial steps in long-term strategies planned to heighten awareness on Capitol Hill and throughout the country. If the efforts continue to get the kind of support from the mathematics community which they received in March and April, we will be able to carry out our long-range plans and make a significant difference in how our field and its needs are perceived.

With Mathematics Awareness Week behind us, it seems a good time to review how we're doing elsewhere on our awareness scorecard:

Executive Branch

Awareness of the need to rebuild our research funding was exhibited in February by Erich Bloch, Director of the National Science Foundation (NSF), as he went to Congress for authorization to reprogram, so that NSF's Mathematical Sciences Division would be exempt from the FY1986 cuts made under the Gramm-Rudman-Hollings Budget Reduction Act. The picture was not so rosy at the Department of Defense, where mathematical sciences funding took a pretty good pounding because of Gramm-Rudman. The DOD agencies continue to present moving targets as far as effective action from the outside is concerned.

Congress

On February 26, Dr. Edward E. David, Jr. testified before the Science, Research and Technology Subcommittee of the House Committee on Science and Technology and presented an update of the David Report as part of the NSF budget authorization hearings. He placed particular emphasis on the need to move mathematics more to the center of science policy considerations in Congress, and he noted that the manpower situation in the mathematical sciences is worse now than it was two years ago, as the field faces an escalating shortage of talent. In the question and answer period, he expressed grave concern that big science and big projects may push out support for the individual researcher, on whose creativity the future of science depends. Dr. David's was the first testimony before Congress on the overall needs of mathematics since the time of the American Revolution. It will be followed by several more appearances which Jennifer Vance is arranging for this spring.

The Public

A major symposium on "Mathematics in Modern Science" will be held at the national Academy of Sciences in Washington on May 12, the first day of National Science Week. Organized and sponsored by the Board on Mathematical Sciences, the symposium will feature three Nobel Laureates in science: Allan Cormack (Medicine), Steven Weinberg (Physics), and Herbert Hauptman (Chemistry), who will talk about the significance of mathematics for their sciences. The moderator will be I.M. Singer. You will see publicity for this event, as well as for other events and accomplishments of our community, amplified through the work of Kathleen Holmay.

The Mathematical Community

As we venture further into the worlds of congressional and public affairs with the aim of increasing awareness, we need to be aware that we will be the group most enlightened in the process. And that is as it should be. We must change because our field and its place in the scheme of things are changing. We have entered an era in which the power of mathematics will surpass anything in history thus far, principally because of the coming together of pure and applied mathematics, indeed, of all the major branches of the discipline. Our field is forming into a giant mathematical laser, to be trained on the basic problems of mathematics and engineering science. It is a time for reaching out—for letting our various publics know that massive changes, especially in education, will be required if the emerging new power of our discipline is to be properly utilized.

FOCUS on 1985 MAA ANNUAL REPORT

President's Message

Last year, on the occasion of the 70th anniversary of the Mathematical Association of America, I had the pleasure of conveying congratulations to six founding members of the Association—individuals who in 1915 participated in the decision to form an Association to promote the interests of mathematics "especially in the collegiate field." One can now describe MAA by impressive numbers: 22,000 members, 29 sections, 3 journals, dozens of books, $2 million budget. Yet the life of the Association resides not in numbers, but in the work and devotion of its members. It is worth remembering that the entire history of the Association has taken place within the lifetimes of our founding members.

Past and present strength enables MAA to plan for a vigorous future. Our long-range planning processs has identified several important themes that we want to emphasize in the years ahead—exposition, curriculum, professional development, and encouragement of youth. Since long-term vigor of collegiate mathematics depends on the support given to mathematics by all members of society, MAA has increased significantly those activities that make mathematics visible beyond the membership of the Association.

The Association was founded in part as a support for *The American Mathematical Monthly*. Ever since, MAA has maintained a distinguished record of exposition in mathematics through books, meetings, minicourses, and journals—now three in number. Through resources such as these that maintain both quality and diversity, the MAA encourages and sustains high standards for collegiate mathematics.

For the future, we must build on this strength in exposition to reach beyond our own organization—to communicate mathematics to scientists, administrators, Congress, corporate and foundation officers, and even the general public.

Lynn A. Steen

For too long mathematics has been a withdrawn culture dominated by creative and dedicated individuals whose work is inwardly-oriented towards the mathematical community itself. But now mathematics is being noticed widely both in the educational and research communities. MAA, therefore, must enlarge its mission to address both the world without as well as the world within.

We have made an important beginning on this new goal. The Association now helps support a Director of Federal Relations and has retained the services of consultants on both public information and Congressional liaison. We work with the Council of Scientific Society Presidents on policy questions of concern to the entire scientific community. This year, for the first time, mathematics has become visible nationally through Mathematics Awareness Week as well as by special mathematics events held in conjunction with National Science Week.

Fifteen years after the beginning of this century our founding members chose to support exposition *of* mathematics as a major means for invigorating collegiate mathematics. Today, fifteen years before the beginning of the next century, we add to that resolve a commitment to support exposition *about* mathematics as a means of reaching also many members of society whose lives are influenced by mathematics and whose decisions in turn influence our lives as mathematicians and mathematics teachers. Perhaps by the turn of the century some future MAA presidents will be able to affirm that the veil of secrecy has been lifted and that mathematics has finally become part of our visible culture.

Report of the Executive Director

Every organization has its unique set of health indicators, like the economic indicators we read about in the daily newspaper. One day's indicator is up—the economy is booming. The next day's indicator is down—the economy is broke. We have learned not to make broad conclusions from any one indicator, but if enough of them point in one direction we begin to believe that the economy is moving.

During 1985 the MAA indicators kept us in suspense. The budget was extremely tight, and financial reports were mixed during the year. We had made a substantial investment in a program of strong membership promotion. The interim statistics were just good enough to raise our hopes.

And, by the end of the year the indicators overwhelmingly pointed in one direction. It was a very good year. For example, in 1985 . . .

- MAA ended the fiscal year "in the black" by a modest margin;
- MAA increased its membership by 2,000 in 1985, following an increase of 1,000 in 1984;

Alfred B. Willcox

- MAA published four excellent books in 1985 and sold the second largest number of volumes in the history of our organization. Sales income was at an all-time high;
- MAA journals were, by general agreement, of higher quality than in any earlier year; the number of subscriptions continued to grow;
- MAA members contributed generously to our organization. 1,250 members contributed to the Greater MAA Fund, and of the members who paid their 1986 dues in 1985, 42.6% added a voluntary dues supplement to help support special projects and new initiatives to strengthen mathematics and increase public awareness of mathematics;
- MAA had greater visibility in Washington, as President Steen testified orally and in writing to Congressional Hearings and the National Science Board and as MAA, through the Joint Policy Board for Mathematics (JPBM), helped establish a new post, Director of Federal Relations. The

"Mathematics tells us what we have never known or even suspected about notable phenomena and in some instances even contradicts perception. It is the essence of our knowledge of the physical world. It not only transcends perception but outclasses it."

Morris Kline

DFR has been influential in the establishment of the Board on Mathematical Sciences and the Mathematical Sciences Education Board of the National Research Council, has closely monitored federal legislation affecting mathematics, and was a leader in organizing the first-ever National Mathematics Awareness Week scheduled for April, 1986;

- MAA participated, again through JPBM, in retaining the services of a public information specialist to help us present mathematics more effectively to the general public;
- MAA organized impressive ceremonies at the National Academy of Sciences and at the U.S. Department of State at which seven organizations honored the winners of the 14th USA Mathematical Olympiad, then trained a US team that won second place honors at the 1985 International Mathematical Olympiad, held in Helsinki, Finland; and
- MAA and Oklahoma State University completed the last three of a set of six multi-media instructional modules that bring real-life industrial applications into the college classroom and began work on six similar modules for high schools.

If each of these indicators is scaled from -5 to 5, with zero indicating a so-so year, then my calculation, which must remain my private subjective evaluation, is that

1985 was a four star year!

Publications Program

One of the most important activities of the Mathematical Association of America is its publications program. The Association's list of publications currently contains 109 titles, which include 91 books devoted to topics in mathematics, 2 library lists, 2 bibliographies, 6 books on the content and teaching of mathematics, 2 journal indices, and six miscellaneous titles covering areas such as professional opportunities in the mathematical sciences, two Putnam problem books, and the reports of two mathematical congresses. MAA publications provide something for everyone interested in mathematics, from the high school student to the college teacher.

In 1985 the MAA published four new books. These were:

Studies in Numerical Analysis, MAA Studies in Mathematics, Vol. 24, edited by Gene Golub.

Mathematical Gems III, Dolciani Mathematical Expositions, Vol. 9, by Ross Honsberger.

American Perspectives on the Fifth International Congress on Mathematical Education (ICME 5), edited by Warren Page (MAA Notes #5)

Random Walks and Electric Networks, Carus Mathematical Monograph, Vol. 22, by J. Laurie Snell and Peter Doyle.

1985 was a banner year for the sales of MAA publications. Income from publication sales was $391,000 in 1985, a 21% increase from the previous all-time high of $319,000 in 1984.

Membership

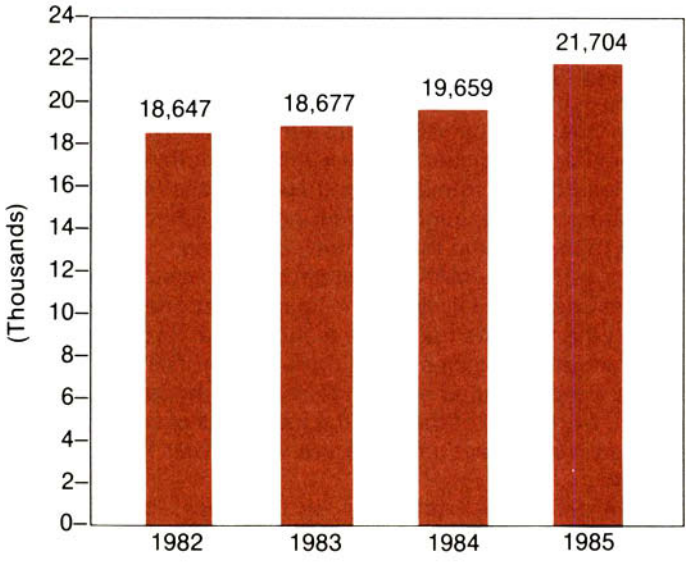
Individual MAA membership reached an all-time high of 21,704 as of December 31, 1985. This is an increase of 2,045, or 10.4%, over 1984. Membership recruitment has been enhanced during the last few years with the help of Marketing General, Inc. who, by the end of 1985, had supervised four general membership and one non-member subscriber mailings.

The demographic breakdown of individual membership as of the end of 1985 was:

Students	3,332
High school teachers	912
College, university faculty	11,173
Government, industry	3,294
Retired or unemployed	1,671
Other	1,322
	21,704

In addition, there were 519 institutional members. These included high schools, junior and community colleges, four-year colleges and universities, and 16 special Corporate Members. There were also 152 Life Members.

M.A.A. Membership
1982–1985



Number of Members on December 31

"In precisely the same way that a novelist invents characters, dialogues, and situations of which he is both author and master, the mathematician devises at will the postulates upon which he bases his mathematical systems."
E.T. Bell

The 15-member MAA Committee on Publications is chaired by Alan C. Tucker, SUNY at Stony Brook.

Our publications program began in 1921 with a series of gifts from Mrs. Mary Hegeler Carus which made possible the establishment of a series of expository books. This first MAA series was entitled, the Carus Mathematical Monographs. Twenty-two volumes have been published in this series, 18 of which are still in print. The goal of the books in this series is to make topics in pure and applied mathematics accessible to the student and teacher, and also to nonspecialists and scientsts in other fields. A random sampling of titles reveals areas such as irrational numbers, calculus of variations, combinatorics, projective geometry, and error-correcting codes.

In 1962 the MAA established a second series of expository books, the MAA Studies in Mathematics. These books cover almost every area of mathematics, and are suitable reading at the undergraduate as well as graduate level. Each volume is a collection of articles in a particular field of mathematics research, edited by a well-known specialist in the field. Twenty-four volumes have been published; 22 are still in print. The areas of mathematics selected for this series are areas at the frontiers of mathematics research when they are published.

Mary P. Dolciani, a long-time MAA member, endowed the Dolciani Mathematical Expositions in 1972. These books are designed to appeal to a broad audience. The volumes, selected for their clear, informal style, and stimulating mathematical content, deal with topics in elementary combinatorics, number theory and geometry.

The New Mathematical Library was bought in 1975 by the Association from Random House Publishers. This excellent series of paperback books provides supplementary material to high school teachers, talented high school students and undergraduates. This series boasts a list of authors who enjoy international acclaim.

In 1976, Carol R. Brink endowed a series in honor of her late husband, Raymond W. Brink, nineteenth president of the MAA (1941-42). This series is entitled, The Raymond W. Brink Selected Mathematical Papers. It contains volumes in the areas of precalculus mathematics, calculus, algebra and geometry.

In addition to these major series, the MAA also publishes the MAA Notes, which have become a vehicle for disseminating educational information of interest to MAA members, several books and pamphlets on the content and teaching of mathematics, as well as practical information in the way of library lists, bibliographies and indices.

MAA Journals

The MAA publishes three well-respected and influential mathematics journals: *The American Mathematical Monthly, Mathematics Magazine* and the *College Mathematics Journal.*

The American Mathematical Monthly has been published by the MAA since 1915. It was originally started in 1894. It contains a range of material, expository and historical, short notes, elementary and advanced problems, and book reviews.

Mathematics Magazine, published five times per year, provides lively and appealing exposition that supplements undergraduate mathematics and stimulates student investigation. Historical material is especially of interest, as are anecdotes and articles that link the various branches of mathematics. The magazine was started in 1926 and the MAA took over its publication in 1960.

The *College Mathematics Journal* is also published five times a year and is aimed at the student and teacher of the first two years of college. It emphasizes philosophy, problem-solving, applications, and, most especially, computer-related articles and papers. It began publication in 1970.

The success of these journals is evident in the subscription figures for 1984 and 1985. Subscriptions were up by 5%, 13% and 15% respectively.

	Individual Members		Institutional Members		Non-Member Subscribers		Total	
	1984	1985	1984	1985	1984	1985	1984	1985
The American Mathematical Monthly	14,435	15,223	493	517	2,622	2,603	17,550	18,343
Mathematics Magazine	7,567	8,895	493	517	2,207	2,241	10,267	11,653
College Mathematics Journal	5,971	7,054	493	517	1,088	1,111	7,552	8,682

American Mathematics Competitions

Over 360,00 students and 5800 schools participated in the American High School Mathematics Examination (AHSME), given in February, 1985. Considerable excitement was generated because scores of 100 and above, which qualify a student to go on to the American Invitational Mathematics Examination (AIME), were much more frequent this year—there were approximately 3500 AIME qualifiers, 4 times as many as last year. Despite the two perfect papers, very high scores (above 125) appear to be rarer. Jeremy Kahn of Hunter HS in New York City, and Jeffrey Powell of Chillichothe HS in Chillicothe OH, by scoring 150s, have become the 25th and 26th participants in the 37-year history of the American High School Mathematics Examination to obtain perfect scores. Jeremy is an 11th grader who has already served on the US International Mathematical Olympiad team 3 times. Jeffrey is the AHSME's first perfect sibling: his brother William scored 150 in 1984.

". . . the purposes and consequences of mathematics are of serious concern for the growth and health of society and therefore are a proper and necessary part of the workaday intellectual baggage that must be carried about by every educated and effective participant in civilized life."

H. L. Resnikoff
R. O. Wells, Jr.

American Junior High School Mathematics Examination

One hundred and forty thousand students in grade 8 and below, evenly split between boys and girls, participated in the first AJHSME in December, 1985. Sixty-six students received perfect scores of 25 (one point per right answer); 148 obtained scores of 24; the mean score was 8.98. Feedback on the test questions has been very positive. Teachers reported that questions were interesting, instructive about what kids at this level should be learning, and challenging without being discouraging.

Mathematical Olympiads

Eight U. S. students earned Olympiad medals in the Fourteenth USA Mathematical Olympiad (USAMO) in which 64 students competed in a challenging examination to test ingenuity as well as mathematical background. The USAMO competitors were the top performers in the American High School Mathematics Examination (AHSME) and the American Invitational Mathematics Examination (AIME) which were held in high schools throughout the United States and Canada in February and March 1985.

The eight USAMO winners were: Joseph G. Keane, Pittsburgh, PA; Waldemar P. Horwat, Hoffman Estates, IL; John A. Overdeck, Columbia, MD; Yeh Ching-Tung, Saratoga, CA; Bjorn M. Poonen, Winchester, MA; Zinkoo Han, Brooklyn, NY; Jeremy A. Kahn, New York, NY; and John P. Dalbec, Youngstown, OH. The winners were honored in June in Washington, D.C. in ceremonies at the National Academy of Sciences and the U. S. Department of State.

The eight winners and sixteen other high-scoring students subsequently participated in an intensive three-week seminar at the U. S. Military Academy at West Point. The purpose of that seminar was to train a U. S. team of six students for the 1985 International Mathematical Olympiad (IMO) which was held in Helsinki, Finland in July. Students finally named to the U. S. team were: David Grabiner, Claremont, CA; Waldemar Horwat, Hoffman Estates, IL; Jeremy Kahn, New York, NY; Joseph Keane, Pittsburgh, PA; David Moews, Willimantic, CT; and Bjorn Poonen, Winchester, MA.

The team captured second place in the 26th International Mathematical Olympiad. Romania took first place, but the U. S. team bested the Soviet Union, which placed sixth in this annual competition between students from more than 30 nations. The judges also award individual first, second and third prizes to deserving team members. Two U. S. team members received first prizes, and their teammates all received second prizes.

These Mathematical Olympiad activities are sponsored by seven national associations in the mathematical sciences with administration conducted by the MAA. Financial support is provided by both public and private agencies: IBM, the Army Research Office, the Office of Naval Research, and Hewlett-Packard.

National Survey of Undergraduate Mathematics and Computer Science

The Association was awarded a grant of $112,134 in July from the National Science Foundation to conduct a national survey of undergraduate mathematical and computer sciences programs in universities and four-year and two-year colleges. The survey is under the auspices of the Conference Board of the Mathematical Sciences (CBMS) which has sponsored similar surveys at 5-year intervals since 1966.

The survey is collecting, analyzing, and reporting data on courses, enrollments, faculty characteristics, teaching formats, and organizational structures of mathematical and computer sciences departments for the Fall semester, 1985. Two related questionnaires are being used, one for four-year colleges and universities and the second for two-year colleges. The survey is also seeking current information about the evolving relationships of computer sciences and mathematical sciences programs. A third part of the survey asks questions about remedial mathematics.

Dr. Richard D. Anderson, Boyd Professor Emeritus of Mathematics, Louisiana State University at Baton Rouge, is the executive director for the survey. Dr. Donald J. Albers, Chair, Department of Mathematics and Computer Sciences, Menlo College, CA, chairs the Survey Committee composed of eight professional mathematicians, statisticians and computer scientists. A published report is expected in 1986.

Women and Mathematics (WAM)

Women and Mathematics is a secondary school lectureship program sponsored by the MAA in which women who are pursuing careers which demand sound preparation in mathematics speak about their work and the role that mathematics plays in it. WAM completed its tenth year of operation in 1985.

WAM now covers 13 regions of the country: Baltimore/Washington; Boston; Central Ohio; Chicago Area; Connecticut; Greater Seattle Area; Kansas City; New York/New Jersey; Northern California, Oregon, Salt Lake City; South Florida; and Southern California.

In 1985 over 200 school visits were made. Speakers talked with approximately 23,000 students, 1,700 teachers and 900 counselors, parents and other adults. By conservative estimates, the total participation in WAM in the first ten years is about 171,000: 154,000 students, and 17,300 teachers, counselors, parents and other adults, with over 1,650 school visits.

During 1984-85 WAM received grants totaling $26,500 from the George I. Alden Trust, the General Electric Foundation, the John Hancock Mutual Life Insurance Company, International Busines Machines and the Tektronix Foundation.

Carole Lacampagne, University of Michigan-Flint, is the National Director of WAM.

"I am proud to be a teacher.—Teaching is an ephemeral subject. It is like playing the violin. The piece is over and it is gone. The student is taught, and the teaching is gone."

Paul Halmos

National Study of Collegiate Mathematics Resources

The Alfred P. Sloan Foundation made a grant of $18,950 to the MAA to direct the planning for a comprehensive national study of resources for collegiate mathematics education.

This planning effort is a continuation of the work of the Joint Policy Board for Mathematics' (JBPM) Committee on the Status of the Profession. This committee is sponsored by the MAA with the support of the American Mathematical Society (AMS) and the Society for Industrial and Applied Mathematics (SIAM).

The ultimate goal of the study is a public document that will:

(1) enhance public understanding of mathematics education,
(2) increase public awareness of the resources needed in our colleges and universities if we are to have a mathematically literate public and enough mathematically trained scientists, engineers, and technologists to guarantee our nation's prosperity and security,
(3) establish minimum levels of present and future resources for collegiate mathematics,
(4) give a design for renewal of present and future resources for collegiate mathematics and its teaching, and
(5) identify opportunities for cooperation among segments of the mathematical community and among academic institutions, business, and government for strengthening these critical resources for the future.

The chairman of the planning committee is Dr. Bernard L. Madison, Professor and Chairman, Department of Mathematical Sciences, University of Arkansas. A draft of the proposed national study will be ready in early 1986.

National Meetings

A total of 2466 mathematicians registered for the January, 1985 Joint Mathematics Meetings at Anaheim, California, including 417 for the ten minicourses offered by the MAA. The August Joint Meetings at Laramie, Wyoming attracted 758 mathematicians, including 154 for the five Minicourses. The 34th Earle Raymond Hedrick Lectures were given at the August Meeting by Arthur M. Jaffe of Harvard University.

Section Activities

Approximately 5,000 mathematicians registered for 35 Section Meetings held in the 1984-1985 academic year. These meetings provided an opportunity for 350 faculty members to describe their research or discuss pedagogical issues. In addition, 120 invited addresses and 25 panel discussions were included among the programs. Sixteen Sections reported having Student Paper Sessions with as many as 18 students presenting papers at a single meeting—more than 75 overall. Occasionally a Section met jointly with the American Mathematical Society, the National Council of Teachers of Mathematics or the Society of Industrial and Applied Mathematics.

Several Sections include micro-courses (usually two-hours) as a part of their programs and a few Sections recognize students who have done well in the ASHME or Putnam competitions. Many Sections have committees that meet during Section Meetings. Clearly, Section activities center around their annual or semi-annual meetings.

The extent to which Sections function other than at meetings varies considerably. Most Sections publish a newsletter. Twelve Sections sponsor a Visiting Lecturer/Consultant Bureau for high schools, serving as many as 140 schools, with a median of approximately 25. Summer Short Courses are popular in a number of Sections.

Placement Test Program

Since 1977 the MAA has sponsored a college Placement Test Program (PTP). In 1985 the PTP had 295 subscriptions. Of that number, 223 were renewals and 72 were new subscribers. Currently, there are six levels of collegiate examinations: Arithmetic and Basic Skills, Basic Algebra, Advanced Algebra, Algebra (combination of Basic and Advanced), Trigonometry and Elementary Functions, and Calculus Readiness; and a High School Exam. Planning was begun in 1985 for a series of calculator-based placement tests.

The Committee on Placement Examinations, chaired by John Kenelly, Clemson University, increased by two members last year. Another expansion of the program was the addition of PTP Representatives selected for each of the 29 MAA Sections. This effort was initiated to assist collegiate institutions wishing to establish placement test programs or make existing programs more efficient.

MAA Committees

Much of the work of the MAA, both nationally and within sections, is accomplished by committees. At the national level, almost 400 mathematicians voluntarily serve on MAA committees. In response to changing needs, President Lynn A. Steen established several new committees and chairmen in 1985: Membership Committee (Samuel W. Hahn, South Dakota School of Mines and Technology); Committee on Accreditation (David P. Roselle, Virginia Polytechnic Institute); Committee on Management of MAA Publications (Henry L. Alder, University of California at Davis); Planning Committee for National Study of Resources for Collegiate Mathematics (Bernard Madison, University of Arkansas); Committee on Redesigning MAA Publications (Lynn Steen, St. Olaf College); Committee on Student Chapters (Howard Anton, Drexel University); and the Committee to Review the Visiting Lecturer Program (John D. Neff, Georgia Tech).

"It is clear that originally mathematicians arose as a part of the everyday life of man, and if there is validity in the biological principle of the "survival of the fittest," the persistence of the human race probably is not unrelated to the development in man of mathematical concepts."

Carl B. Boyer

In conjunction with NCTM President Joe Crosswhite, President Steen appointed an MAA/NCTM Committee on College Entrance Requirements in Mathematics (Jeremy Kilpatrick, University of Georgia). Some committees have been merged or restructured. The Committee on Computers in Mathematics Education (CCIME) has absorbed the duties and some of the members of the CUPM-CCIME Panel on Curricular Aspects of Computers in the Classroom and the CTUM-CCIME Panel on Computers and Technology in Mathematics Instruction. The Committee on Mathematical Education of Teachers (COMET) is now a standing Committee, rather than a subcommittee of CUPM. The Advisory Committee on the Archives of American Mathematics and the Committee on Archival Holdings in Mathematics have been merged into the Committee on the Archives of American Mathematics. Detailed reports from many MAA Committees are contained in the January-February 1986 issue of FOCUS.

MAA Prizes and Awards

At the Annual Meeting held in Anaheim, California, three individuals received special recognition: Everett Pitcher, Professor Emeritus of Lehigh University, was presented with the Award for Distinguished Service to Mathematics; Charles Robert Hadlock, of Arthur D. Little, Inc., was awarded the $500 MAA Book Prize for his 1978 Carus Monograph, *Field Theory and its Classical Problems*; and Carl Pomerance, University of Georgia, was presented with the Chauvenet Prize for his paper "Recent Developments in Primality Testing," which was published in the *Mathematical Intelligencer*, 8 (1981) 97-105.

Excellence in expository writing was recognized at the Summer Meeting in Laramie, Wyoming: Carl B. Allendoerfer Awards for articles in *Mathematics Magazine* were given to: Philip D. Straffin, Jr. of Beloit College and Bernard Grofman of the University of California-Irvine for their article, "Parliamentary Coalitions: A Tour of Models," November 1984, pp. 259-274. Fredrick S. Gass of Miami University for his article, "Constructive Ordinal Notation Systems," May 1984, pp. 131-141.

The Lester R. Ford Awards for articles which appear in *The American Mathematical Monthly* were presented to: Donald G. Saari of Northwestern University and John B. Urenko of Pennsylvania State University for their article, "Newton's Method, Circle Maps, and Chaotic Motion," January 1984, pp. 3-17.

John D. Dixon of Carleton University in Ottawa for his article "Factorization and Primality Tests," June-July 1984, pp. 333-352.

The George Polya Awards for articles in *the College Mathematics Journal* were given to: Anthony Barcellos, a member of the Commission on State Finance, California, for his article "The Fractal Geometry of Mandelbrot," March 1984, pp. 98-114. Kay W. Dundas of Hutchinson Community College for his article, "To Build a Better Box," January 1984, pp. 30-36.

For outstanding contributions to the work of their Sections, Certificates of Meritorius Service were presented to Earle F. Myers, University of Pittsburgh, Professor Emeritus, (Allegheny Section); Dorothy L. Bernstein, Brown University (retired), (Maryland-DCVirginia Section); C. Edmund Burgess, University of Utah, (Intermountain Section); John M. Jobe, Oklahoma State University, (Oklahoma-Arkansas Section); and Emory P. Starke, Rutgers University (retired), (New Jersey Section.)

William Lowell Putnam Competition

In a possible replay of their overall mathematical ranking, the first three schools on the 1985 William Lowell Putnam Examination, in order, were Harvard, Princeton and Berkeley. Rounding out the top five were Rice and Walterloo. The five honorable mention teams, in alphabetical order, were Cal Tech, Rensselaer, Rutgers (at New Brunswick), Washington University (St Louis) and Yale. Of these, all but Rice, Walterloo, Rensselaer and Rutgers were among the top ten last year as well.

The five highest scoring individuals, in alphabetical order, were: Martin Hildebrand, Williams College; Evertt Howe, Cal Tech; Douglas Jungreis, Harvard; Bjor Poonen, Harvard; and Keith Ramsay, Chicago. Poonen, as a high school student last year, was a winner of the USA Mathematical Olympiad. One of the next five highest ranking individuals, Waldemar Horwat of MIT, was also a USAMO winner in 1985.

The Putnam, held in December, was taken by 2,079 students at 348 institutions in Canada and the United States. As always, contestants had six hours for 12 questions, worth 10 points each. This year, the high score was 108, the next best 100. Sixty points (only half credit!) would have ranked a contestant 61st.

Blacks and Mathematics (BAM)

1984-85 stands out as the largest BAM effort to date. BAM had activities in ten regions, an increase of three regions over the previous year. The new regions are Baton Rouge, LA; Miami, FL; and Newark, NJ.

A total of 38 schools were visited, 3,576 students heard lectures and saw demonstrations by 56 speakers. In addition, 138 mathematics teachers attended the presentations.

BAM Day Mathematics Festivals were conducted in some regions. These bring together students (elementary, middle school, high school, and college), teachers, counselors, and parents. Another program innovation was field trips. Other regions are exploring the possibility of including such trips in their annual programs.

A grant of $137,965 late in 1984 from the Minority Institutions Science Improvement Program of the U. S. Department of Education supports through August 1986 the work of this special MAA project. John W. Alexander, Jr., Wentworth Institute of Technology, is the National Director of BAM.

"In every specific natural science there can be found only so much science proper as there is mathematics present in it."
Immanuel Kant

Visiting Lecturers and Consultants Program

Lecturers well-versed in a variety of mathematical topics, and consultants who are specialists in helping mathematics departments solve some of their problems, are available through the MAA. These lecturers and consultants are available to both two-year and four-year public and private colleges and universities in the United States and Canada. Lecturers are also available to MAA Sections and to other professional organizations that wish to secure a speaker.

The list of lecturers and consultants includes more than 100 mathematicians with a range of interests in elementary and advanced mathematics, including knowledge of computing, problems of the developing colleges, applied mathematics, statistics, mathematics for two-year colleges, and many other areas.

The Visiting Lecturers and Consultants Program provided partial or full subsidies for thirteen visits during 1985. In addition to subsidized visits, our lecturers and consultants reported making 62 visits without VLC program subsidy. Some panelists also reported that they have been contacted by institutions or students and asked for advise as a result of being listed in the brochure. Thus a new benefit to the mathematical community from our program may be emerging: the program brochure is being used as a source for information about mathematicians with various types of expertise.

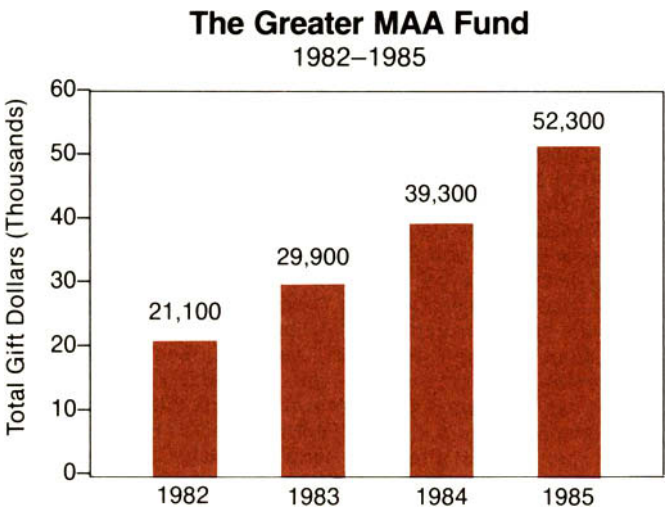
TEAM Project to be Followed by AIM

Over 1200 colleges and universities have ordered one or more of the six learning modules in applied mathematics that have been produced as a result of the project Teaching Experiential Applied Mathematics (TEAM). The goal of TEAM is to assist the mathematical community in introducing a realistic component in applied mathematics into the curriculum. Each learning module is a blend of television, written materials for the student, written materials for the teacher, and the microcomputer, all coordinated to take the student to an on-site industrial setting for a real world problem as it actually occurred in industry. TEAM was funded by a three-year, $300,000 grant from the U.S. Department of Education, Fund for the Improvement of Postsecondary Education (FIPSE), and is under the direction of professors John Jobe and Jeanne Agnew, both of Oklahoma State University.

Jobe and Agnew are also directing a similar project for the MAA, Applications in Mathematics (AIM). AIM will result in the production of six learning models, similar in format to those produced for TEAM, but appropriate for use in high schools. It is expected that more than 5000 high schools will utilize these modules.

AIM is funded with a three-year grant of $742,000 from the National Science Foundation. It is expected to be completed by August 1988.

Learning modules for TEAM are available from the MAA office in Washington; three modules from AIM are expected to be available in January, 1987.



The 1985 Honor Roll of Donors The Greater MAA Fund

Twelve hundred and fifty MAA members and other persons expressed their support for the purposes and programs of the MAA during its 70th year by making gifts to the 1985 Greater MAA Fund. Their generous gifts totaled $52,280. The average gift was $42.30, and total gifts increased 33% over 1984. The 1985 Fund total was two-and-one-half times the first annual fund drive in 1982.

The officers of the Association express their very deep appreciation for these gifts. The names of all donors, except a few who wish to remain anonymous, are listed below by the special giving categories of the Fund.

"Rather than being remembered as the first woman this or that, I would prefer to be remembered as a mathematician should, simply for the theorems I have proved and the problems I have solved."
Julia Robinson

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"Mathematics is terribly individual. Any mathematical act, whether of creation or apprehension, takes place in the deepest recesses of the individual mind. Mathematical thoughts must nevertheless be communicated to other individuals and assimilated into the body of general knowledge."

Oswald Veblen

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Abraham Robinson

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"If science is viewed as an industrial establishment, then mathematics is an associated power plant which feeds a certain kind of indispensable energy into the establishment."

Saloman Bochner

Report of the Treasurer

At the end of 1985, a successful year by all measures, the MAA remained in a strong financial position. Record book sales income and contributions helped earn a modest surplus, and long-range plans were initiated to begin building operating reserves, which in recent years have not kept up with inflation and the increasing responsibilities of the Association.

During the past two years the affairs of the Association have branched out in a new direction: activities designed to create support for mathematics in the long run but are not in themselves mathematical.

The seeds were sown several years ago when we began our support of a Congressional Fellow.

Next, in 1981, we inaugurated FOCUS. In 1983 we introduced the Greater MAA Fund, and we hired a marketing firm to help with membership, book sales, and journal subscriptions.

In 1984 we began our support of a Director of Federal Relations of the AMS-MAA-SIAM Joint Policy Board of Mathematics (original title: Executive Secretary for National Affairs); subsequently, we added a public relations consultant and a government relations consultant.

In 1984 we also established an MAA development office.

Leonard Gillman

Expenditures for these activities go for salaries, travel, telephone, supplies, art work, printing, and mailing. The 1986 budget for FOCUS is $76,000; for marketing, $61,000; for government and public relations (including a Congressional Fellow), $41,000; and for the MAA development office (including the Greater MAA Fund), $112,000.

Altogether, the budget for government and public relations and information and development comes to $290,000. The total MAA budget is $2,400,000; thus these activities represent 12% of the total.

The Association's financial records have been audited by G. P. Graham and Company, Certified Public Accountants. The complete audited financial statements, from which the following summary balance sheet and income and expense graphs are excerpted, are available to interested persons upon request from the Executive Director, The Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

The Mathematical Association of America

BALANCE SHEET
(Consolidated)
December 31, 1985

ASSETS

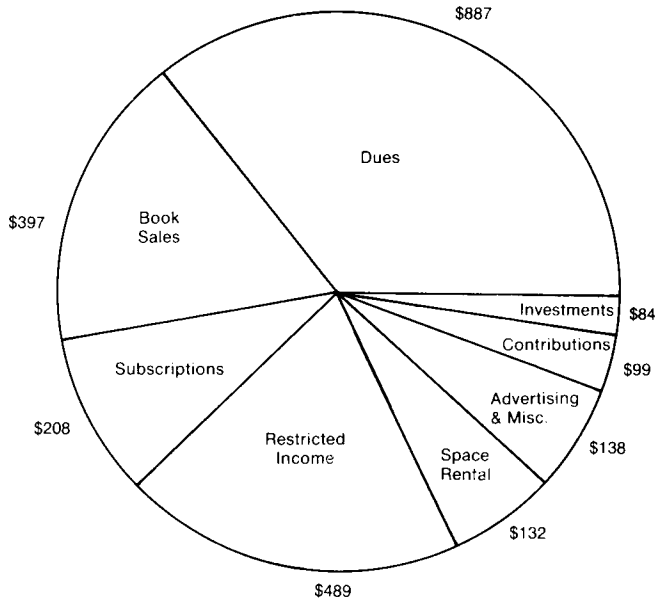
Current Assets	
Cash	$ 143,846
Liquid Assets	229,937
Accounts Receivable	276,020
Publications Inventory	150,987
Prepaid Expenses	64,627
Total Current Assets	865,417
Non-Current Assets	
Investments (at cost)	$ 393,922
Furniture and Equipment	351,135
Building (at cost)	816,455
Building Improvements (cost)	131,443
Accumulated Depreciation	(269,921)
Deferred Development Costs	63,466
Total Non-Current Assets	1,486,500
TOTAL ASSETS	2,351,917

LIABILITIES AND FUND BALANCES

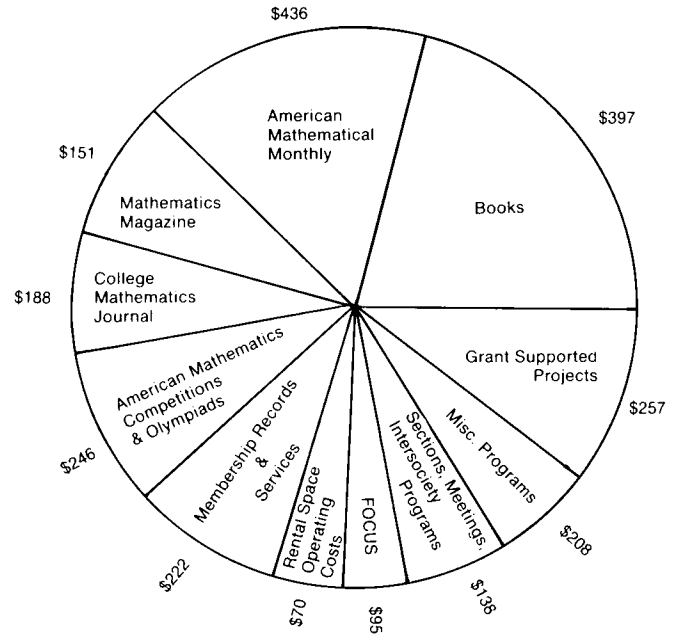
Current Liabilities	
Accounts Payable	$ 87,792
Notes Payable	1,105
Accrued Royalties	31,774
Other Accrued Liabilities	133,605
Prepaid Dues and Subscriptions	860,303
Total Current Liabilities	1,114,579
Long-Term Liabilities	
Mortgage Payable	$ 313,103
Unexpended Grant Receipts	57,856
Total Long-Term Liabilities	370,959
Total Liabilities	1,485,538
Fund Balances	
Unrestricted Fund Balances	$ 358,293
Restricted Fund Balances	399,884
Endowment	108,202
Total Fund Balances	866,379
TOTAL LIABILITIES & FUND BALANCES	$2,351,917

The Mathematical Association of America
REVENUE AND EXPENDITURES, 1985
(in thousands)

Revenue—$2,434



Expenditures—$2,408



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The deadline for submission in the September issue is August 1.

DEPARTMENT OF MATHEMATICS
TEXAS A&M UNIVERSITY

The Department of Mathematics at Texas A&M University hopes to fill several positions at all ranks beginning the Fall semester, 1986. While applications are invited in all areas of mathematics, candidates in applied mathematics, partial differential equations or numerical analysis are particularly encouraged to apply. Please send curriculum vitae and have at least three letters of recommendation sent to Prof. H.E. Lacey, Head, Department of Mathematics, Texas A&M University, College Station, TX 77843. Texas A&M University is an equal opportunity/affirmative action employer.

UNION COLLEGE, SCHENECTADY, NY 12308. We expect one to three temporary assistant professorships (one or two years). Excellence in teaching and interest in scholarly activity required. Teaching load is five courses per year; salary negotiable. Please sent vita and three letters to A.D. Taylor, Chairman, Department of Mathematics, at above address.

Faculty Position in Computer Science
Augusta College
Augusta, Georgia 30910

Tenure track position in computer science available September 1986. Master's degree in computer science required, doctorate preferred. Primary duties will be teaching undergraduate computer science courses and, on occasion, lower division service courses in mathematics. Some graduate teaching is possible. The normal teaching load is three courses (15 hours) per quarter. The department offers the B.S. degree in computer science with 300 majors. Salary is competitive. Send resume, transcripts, and three letters of recommendation to Dr. Bill Bompart, Chairman, Department of Mathematics and Computer Science, Augusta College, Augusta, Georgia 30910.

Maryville College
Department of Mathematics/Computer Science

Junior-level position on tenure track, beginning late August, 1986. Teaching duties primarily in computer science, with occasional courses in mathematics. Doctoral preparation (computer science or mathematics) preferred; M.S. considered. Commitment to superior teaching in an undergraduate college of arts and sciences essential. Send resume, transcripts, and names of three references to Dr. William Dent, Chairman, Department of Mathematics/Computer Science, Maryville College, Maryville, Tennessee 37801. Materials must be received by 4/1/86 to be assured consideration. An EO employer.

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MATHEMATICAL SCIENCES DEPARTMENT
SWEET BRIAR COLLEGE
SWEET BRIAR, VA 24595

Applications are invited for a temporary one-year position starting in Fall 1986 at the assistant professor or instructor level. Strong Commitment to teaching undergraduate mathematics and/or computer science is required. Ph.D. preferred. Three course load per semester. Send curriculum vitae and three letters of recommendation to: Dr. J.M. Elkins, Chairman. Equal Opportunity, Affirmative Action Employer.

Chairperson: The University of Arkansas at Little Rock College of Sciences invites applications for the position of Chairperson of the Department of Mathematics and Statistics, available July 1, 1986. This position carries a 12-month appointment. The Department of Mathematics and Statistics consists of twelve full-time faculty members and offers BA and BS degrees and an MS in Applied Mathematics. The chairperson will be expected to facilitate the interaction of the faculty with the University of Arkansas Medical Sciences campus, the University of Arkansas—Graduate Institute of Technology, and regional governmental and private research and development organizations. Candidates with a strong record of research in an area of specialization within any field of mathematics or statistics are encouraged to apply. Applicants should have an earned doctorate or equivalent, strong record of teaching, research, service, and significant managerial experience or evidence of leadership potential. The position requires administrative skill and the ability to work effectively with people. Rank and salary will be commensurate with qualifications. Letters of application should include a curriculum vitae, and names, addresses, and telephone numbers of at least three references. Applications and nominations will be accepted until a suitable candidate is chosen, and should be addressed to:

Dr. Robert Franke
Chair, Search Committee and
Dean, College of Sciences
University of Arkansas at Little Rock
33rd and University Avenue
Little Rock, AR 72204

The University of Arkansas at Little Rock is an equal opportunity, affirmative action employer and encourages applications from women and minorities.

The University of Michigan-Dearborn expects to have one or more visiting positions available during the academic year 1986-87. Applicants from a variety of research interests, including areas of pure or applied mathematics, or computer science. Teaching load 9 credit hours per semester undergraduate level. Ph.D. in mathematics or a related area by September, 1986. The Department anticipates several tenure track positions for 1987-88. Send resume and three letters of recommendation to Dr. Stephen J. Milles, Chairman. Closing date for application is May 31, 1986 or until position fills. "UM-D is an equal opportunity educator and employer and specifically invites and encourages applications from women and minorities."

Department of Mathematics and Computer Science

The department has tenure track positions available beginning Fall, 1986. Positions are available in both Mathematics and Computer Science. It is expected that appointments will be made at the Assistant Professor level. The current range of salaries in the California State University system is $23,796–$49,320. Candidates should hold a Ph.D. in Computer Science or Mathematics and have a commitment to excellence in teaching, willingness and ability to participate in curriculum development, and competence and potential to engage in significant professional activities, including research and publication. CSU, Hayward is located in the hills above, and overlooking, the eastern shore of the San Francisco Bay. More than 12,000 students attend this university, which has outstanding programs in arts, letters, science, and business. The Department of Mathematics and Computer Science enrolls nearly 1300 majors in its three degree programs: B.S. in Computer Science, B.S. in Mathematics, and M.S. in Mathematics. An M.S. in Computer Science is being planned. Interested applicants should send a resume and the names of three references to:

William R. Nico, Chair
Department of Mathematics and Computer Science
California State University, Hayward
Hayward, CA 94542

Applications will be accepted as long as positions remain available. California State University, Hayward, is an Equal Opportunity/Affirmative Action employer and encourages applications from women and men of all ethnic backgrounds and physical abilities.

CHICAGO STATE UNIVERSITY

Mathematics Tenure Track Positions Primary responsibility is teaching Undergraduate Mathematics courses. PhD in Mathematics required. Desired specializations are Applied Mathematics, Statistics, Analysis and Operations Research. Applications will be received until positions are filled. Starting date is August 18, 1986. To apply send a current resume and the names of three references to Dr. Don Bunt, Chair, Department of Mathematics and Computer Science, 95th St. at King Drive, Chicago, IL 60628. Chicago State University is an Equal Opportunity/Affirmative Action Employer.

AUGSBURG COLLEGE

Minneapolis, MN 55454 Dedicated to quality teaching in liberal arts, church-related college near heart of dynamic city? Tenure-track positions start 9/86, 2/87. Selection for second begins 10/1/86. Send resume and reference list to Larry Copes, Chair, Mathematics Department. Augsburg is EOE.

Prudential Reinsurance Company. Casualty Reinsurance Actuarial work may be the career change you are looking for. Exceptional opportunity to learn reinsurance and become a casualty actuary. We are seeking people with proven stat/math ability to join a dynamic group of actuaries working in pricing, loss reserving and financial modeling. Actuarial Exams, related experience, and/or advanced degree preferred. Salary range starts at $27,300. Send resume to Personnel Department, Prudential Reinsurance Company, 100 Mulberry Street, Newark, NJ 07102. Adjacent to train station, with indoor parking and easy access to surrounding suburban areas and NYC. An Equal Opportunity Employer.

MERRIMACK COLLEGE
DEPARTMENT OF MATHEMATICS/COMPUTER SCIENCE

Chairperson and two other positions (one in mathematics and one in Computer Science or a combination) available Fall 1986. Merrimack is a small comprehensive college in the process of modernizing its computer facility. For chairperson, a PhD in CS is preferred but a Masters accompanied by appropriate experience will be considered. Rank and salary commensurate with qualifications. For the other positions, a PhD in Math and/or a Masters in CS with teaching experience preferred. Tenure slots available. Send resume, salary requirement and references to: R.E. Ozimkoski, Dept. of Math/CS, Merrimack College, North Andover, MA 01845. An E.O.E.

CORRELL CO.
CHICAGO SUBURB

Correll Co. provides actuarial and administrative services to employee benefit plans. We are seeking an Enrolled Actuary or an MS in Mathematics interested in a career in actuarial service. If interested, call collect (312) 599-5200 to discuss with either Frank Correll or Jim Buchman, or send your resume to:

Correll Co.
9655 S. 78th Avenue
Hickory Hills, Ill. 60457

Linfield College announces two tenure-track assistant professor positions beginning fall 1986. Responsibilities include teaching the following undergraduate courses between the two positions: upper and lower division statistics (including some elementary computer programming), discrete mathematics, modern and linear algebra, and calculus. Seek someone with Ph.D. before September 1986, but will consider ABD status. Require strong commitment to undergraduate teaching and the collegiality of a liberal arts college with continuing interest in professional achievement beyond teaching. Screening begins April 15. Send letter of application, resume, three letters of recommendation (placement dossier acceptable), and transcripts to Kenneth P. Goodrich, Dean of Faculty, Linfield College, McMinnville, Oregon 97128. Applications from women and minority group members encouraged. Equal opportunity/affirmative action employer.

Anticipated Tenure-Track Faculty Position in Mathematics, beginning September 2, 1986. Asst./Assoc. Professor for calculus, discrete structures, differential equations; opportunity to teach in new computer science program, if qualified. Department of Mathematical Sciences provides upper-level courses for students in Meteorology and in Science, sponsors A.S. and B.S. programs in Computer Science under ACM curriculum. College has VAX 11-750 and sufficient micros for unlimited faculty and student use. M.A. and teaching experience; Ph.D. required for higher rank and tenure award. College located in Vermont's beautiful Northeast Kingdom. Competitive salary, excellent fringes. By May 22, 1986 send application letter, resume, three references to Perry Viles, Dean, Lyndon State College, Lyndonville, VT 05851. AA/EOE.

SALISBURY STATE COLLEGE

The Department of Mathematical Sciences at Salisbury State College has at least one temporary position for 1986-87. A master's degree as well as the willingness and the ability to teach applied service courses are required. Those with successful college teaching experience will be given preference. The appointment is for 10 months, and will begin on August 15, 1986. Initial screening will begin on May 15, 1986, and will continue until the position is filled. Salisbury is a small city in a rural area, close to ocean beaches and the Chesapeake Bay. Send resume and three letters of recommendation to:

Search Committee
Department of Mathematical Sciences
Salisbury State College
Salisbury, MD 21801

Equal Opportunity/Affirmative Action Employer

WILLIAM PENN COLLEGE
Oskaloosa, Iowa
Department of Mathematics

Applications are invited for a tenure-track position, beginning Fall semester 1986. M.S. degree is required, Ph.D. preferred. Duties include teaching all levels of undergraduate mathematics. Computer Science background is desirable. Applicants should send a complete vita and three current letters of reference to:

Dr. James D. Spiceland
Academic Dean
William Penn College
Oskaloosa, IA 52577

Nontenure positions starting 9/1/86. Teach 12-14 hours per week of mathematics and/or statistics courses. Annual reappointment based on satisfactory performance. Required: Master's in Math, Stat, CS, or related area. Desired: Doctorate in Math, Stat, or CS; one year college teaching. Academic-year appointment: 9/1/86-5/31/87. Competitive salary. Send resume, official transcripts, and 3 letters of recommendation to Duane E. Anderson (Mathematical Sciences, MG 320; University of Minnesota, Duluth; 10 University Drive; Duluth, MN 55812) by 6/30/86. THE UNIVERSITY OF MINNESOTA IS AN EQUAL OPPORTUNITY EMPLOYER AND SPECIFICALLY INVITES AND ENCOURAGES APPLICATIONS FROM WOMEN AND MINORITIES.

YESHIVA UNIVERSITY

Tenure-track positions in Mathematics and/or Computer Science. Ph.D., college teaching experience, demonstrated research potential and strong commitment to undergraduate teaching required. Rank and salary are competitive and commensurate with qualifications. Resume and three letters of reference to Dean Norman S. Rosenfeld, Yeshiva College, 500 W. 185th St., New York, NY 10033. EO Employer.

MILLSAPS COLLEGE
Jackson, Mississippi 39210

The Department of Mathematics anticipates a tenure-track position beginning Fall 1986 with a possible additional position for Fall 1987. The Ph.D. is required and previous teaching experience preferred. Millsaps is a selective liberal arts college with a student body of approximately 1200. Applicants should have a commitment to excellence in undergraduate teaching and an appreciation for the value of the liberal arts. Rank and salary will be based on qualifications and experience. Outstanding computer facilities are available. Send a resume and three letters of recommendation to: Samuel R. Knox, Chairman, Department of Mathematics.

Mathematics, temporary or tenure track position as Instructor or Assistant Professor of Mathematics, starting September 1986. Master's degree required for temporary position, Ph.D. or ABD required for tenure track. College level teaching experience preferred, commitment to quality

undergraduate education at a liberal arts college essential. Send vita and three letters of reference to Dr. William C. Dunning, Chair, Mathematics Department, Simpson College, Indianola, Iowa 50125-1297. Applications will be accepted until the position is filled. An Affirmative Action/Equal Opportunity Employer. Women and minorities are encouraged to apply.

SUNY COLLEGE AT ONEONTA: Department of Mathematical Sciences, Oneonta, NY 13820. Position in Computer Science, starting September 2, 1986 (pending budgetary approval). Qualifications: Ph.D. in one of the Mathematical Sciences (Mathematics, Statistics, Computer Science) desirable, with excellent teaching credentials. Consideration given to candidates with a Master's degree in Computer Science or equivalent. Duties: Undergraduate instruction in Computer Science (12 hours/semester), related duties and program development in Computer Science including possible leadership role in implementing a Computer Science major. Tenure track position with rank and salary negotiable. Send resume, transcripts and three letters of reference to Chairman, address above. An equal opportunity/affirmative action employer.

MATHEMATICS POSITION
WIDENER UNIVERSITY
CHESTER, PA 19013

The Department of Mathematics invites applications for a tenure-track position at the rank of Assistant Professor, duties to begin September 1, 1986. Applicants should have a Ph.D. in Mathematics and a strong interest in teaching undergraduates. Some preference will be given to candidates whose background would enable them to teach sophomore level discrete mathematics and to interact with the computer science program.

AUSTIN PEAY STATE UNIVERSITY, DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE, CLARKSVILLE, TENNESSEE 37044. Two tenure track positions for Fall 1986. All specialties will be considered (mathematics or computer science). Ph.D. or substantial training beyond M.S. desired. Primarily teaching at undergraduate level with a continuing interest in scholarly activities is expected. Send letter of application, resume, transcripts and three letters of recommendation to Dr. William Stokes, Chairman. APSU is an Equal Opportunity, Affirmative Action Employer.

SOUTHERN ILLINOIS UNIVERSITY
MATH., STAT., & COMPUTER SCIENCE
EDWARDSVILLE, Illinois 62026-1653

SIUE, a state university 20 miles from downtown St. Louis, MO, invites applications for an instructor or assist. prof. in math or math education for fall, 1986. Applicants must have at least a master's degree, preferably a doctorate, in mathematics or mathematics education and are expected to demonstrate superior performance in teaching or the potential for excellence as a teacher. Preference will be given to applicants who could work effectively with area school districts, assist with the implementation of the new reform legislation in Illinois, and serve as a liaison between the Department and relevant local, state and federal agencies. Salary is competitive, based on qualifications and experience. Positions open until filled. Direct inquiries to: Chairperson, MSCS Dept. SIUE is an AA/EEO Employer.

ASSISTANT PROFESSOR OF MATHEMATICS to start September 1, 1986. Ph.D. required, teaching experience desirable. Responsibilities include introductory level courses, statistics, and some upper level courses. Understanding of and commitment to the liberal arts tradition. Tenure track, competitive salary. Send application, curriculum vitae, transcripts, and three letters of reference to: Academic Vice President, Elmira College, Elmira, New York 14901. Applications will be accepted until position filled. E.O.E.

GRAND VALLEY STATE COLLEGE
ALLENDALE, MICHIGAN

Three tenure-track positions in Mathematics and Computer Science Department:

MATHEMATICS: Assistant or Associate Professor—must have Ph.D. with an emphasis in statistics or mathematics education. Preference given to candidates with strong teaching recommendations.

COMPUTER SCIENCE: Assistant or Associate Professor—must have Ph.D. in CS or Information Systems. Preference given to candidates qualified to assist in the development of a graduate program.

COMPUTER SCIENCE: Instructor or Assistant Professor—must have Masters in CS with emphasis in IS or a Masters in a related field with significant applications-oriented industrial-computing experience. For each position, duties include teaching, curriculum development, student advising and professional development. GVSC is located just west of Grand Rapids. Salary: commensurate with experience; good fringe benefits. Send complete resume to: Dr. Donald W. VanderJagt, Chair; Math & CS Department; Grand Valley State College; Allendale, MI 49401. An EO/AA Institution.

Engineering College Faculty

Overseas

Telemedia, Inc., a U.S. based international educational services company, is seeking individuals for assignment to a post-secondary educational institution in Egypt. This is a unique opportunity to be involved in the implementation of a new program leading to a BS degree for local nationals.

The tasks to be performed are challenging and include development of curriculum and testing materials, the design and set-up of new facilities including labs, and instruction in the following technical disciplines:

Department Heads/Professors

- **Computer Engineering**
- **Mathematics**

Requirements include a Ph.D. in a field related to your area of specialty and 5 years' instructional and development experience for teaching posts; 10 years desired for department head positions. Overseas experience is highly desirable.

Extraordinary benefits include furnished accommodations, travel and overseas allowances. For immediate consideration, please send a detailed C.V. to: Joe Eburno, Telemedia, Inc., 310 S. Michigan Ave., Chicago, IL 60604.

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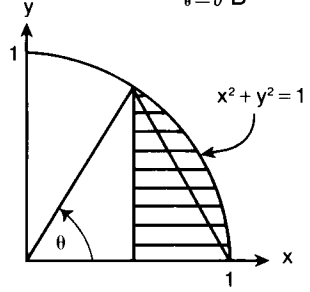
TELEMEDIA, Inc.

Training systems and programs worldwide

In his report on the Tulane Conference on Calculus, which appeared in the March-April issue of *FOCUS*, Paul Zorn referred to the importance of including some open-ended problems in calculus courses. Here is one suggested by Sherman Stein of UC-Davis that sent conferees scurrying for their pencils:

Let A be the area of the shaded curved region, and B the area of the triangle. Find $\lim_{\theta \to 0} \frac{A}{B}$. Guess first.



USCMI Pre-Congress Session of Survey Talks

On August 2, 1986 the United States Commission on Mathematical Instruction will sponsor a series of invited survey talks aimed at enhancing understanding and appreciation of some of the major research-related work which will be discussed at ICM-86. These talks will take place from 2-6 p.m. at Wheeler Auditorium on the campus of the University of California at Berkeley. There is no registration fee for any of the four survey talks at this session.

Highlights of Low Dimensional Topology

Robert D. Edwards (Talk at 2:00 p.m.)

For much of the past four decades activity in low dimensional topology was eclipsed by the striking successes made in the study of higher dimensional manifolds. However, in the past decade there has been equally significant progress made in lower dimensions, with some surprising turns. Highlights include the study of automorphisms of 2-dimensional surfaces, the discovery of new invariants of knots and links in 3-dimensional space, the new relations uncovered between the geometry and topology of 3-manifolds, and the unexpected contrast found in smooth versus non-smooth topology in 4-dimensional space.

The Polynomial-Time Frontier: Recent Developments in Computational Complexity Theory

Richard M. Karp (Talk at 3:00 p.m.)

Computational complexity theory is concerned with the grouping of computational problems into "complexity classes" according to their intrinsic computational difficulty. Among the most important complexity classes are P, the class of problems that can be solved in polynomial time, and NP, the class of problems where a proposed solution can be verified in polynomial time. An essential open question is whether the classes P and NP are equal. While this problem remains unsolved, the efforts to understand and attack it have revolutionized the field. This talk will be a brisk survey of the developments since 1971. It will cover: P, NP, and NP-completeness; new algorithms for problems such as linear programming, graph isomorphism, primality testing and factoring; new concepts, such as randomized algorithms, public-key and encryption systems, computationally secure pseudo-random number generators and interactive proofs; and new techniques for proving lower bounds on the computational complexity of particular problems.

The Physics and Geometry of Estimates in Nonlinear P.D.E.

Clifford Taubes (Talk at 4:00 p.m.)

Solving nonlinear partial differential equations appears to be art rather than science. But a look at partial differential equations through the lenses of physics and geometry can bring order to the workings of the field's great masters.

These lenses of physics and geometry can highlight the fundamental filaments which connect many recent developments in nonlinear partial differential equations (both pure and applied) to the classical works in the subject.

Modular Functions and Number Theory

Andrew P. Ogg (Talk at 5:00 p.m.)

In the simplest case, modular functions are functions on the upper half-plane which are invariant under congruence subgroups of SL(2,**Z**). The theory is very rich: the spaces have a natural meaning as parameter varieties for elliptic curves with additional structure, there is a great deal of structure and machinery which has been developed over many years. In recent years, the application of powerful techniques from algebraic geometry, including reduction modulo p, has been of decisive importance. Number theory is in principle more general and less approachable, but some of its most striking recent results (the Iwasawa conjecture, the class-number problem, . . .) involved showing that problems which did not at first seem so were "modular." Thus we seem to be in the happy situation that the case we know best is not so special after all.

The talk will be a survey of some of the results and conjectures in this area, for a general audience.

For further information, contact the session organizer: Warren Page, New York City Technical College, 300 Jay Street, Brooklyn, New York 11201; (718) 643-3637/2470.

ICMI Sponsoring Discussions During ICM-86

The International Commission on Mathematics Instruction (ICMI) will sponsor several discussions at the International Congress in Berkeley this summer. Discussions will take place from 5-6 p.m., August 3-10, with a different topic covered each day. Among the topics covered will be: Mathematics Education for the 1990's, Mathematics as a Service Subject, a report from the Southeast Asia Mathematics Society, a round-table discussion of the International Mathematics Olympiad, a report from the Mathematical Sciences Education Board, and Mathematics as a Liberal Art.

The complete program for this series will be available at the registration desk in Berkeley.

Mathematics as a Service Subject

The International Commission on Mathematical Instruction (ICMI) has recently issued a discussion document on Mathematics as a Service Subject intended to stimulate responses and reaction papers from around the world. Papers accepted by the planning committee will be distributed worldwide in advance of an international ICMI seminar to be held in Italy in April, 1987.

The discussion document raises issues about why we teach mathematics to students of other disciplines, what mathematics should be taught, and how it should be taught. Tentative positions outlined in the discussion document represent examples of current practice from several countries in different regions of the world.

Members who wish to receive a copy of the discussion document should write to the MAA office, 1529 18th Street, N.W., Washington, D.C. 20036.

MAA Committee on Discrete Mathematics Issues Report

The Report of the MAA Committee on Discrete Mathematics in the First Two Years is now available. For a complimentary copy, write to the MAA, 1529 Eighteenth Street N.W., Washington, D.C. 20036.

Special Features of a High School Lecture Program

Peter Hilton and Jean Pedersen

Giving an invited lecture is a problem under any circumstances. Those who have spoken at national meetings or at departmental colloquia are aware of this; so are those who have been in the audience on such occasions. However, there are special problems in lecturing to high school students, some of which we identify here; and we offer some very practical hints to help the prospective speaker. These remarks may also be useful to those in the schools who are concerned with such lecture programs. For a high school lecture may be anything from an outstanding success to an utter fiasco.

1. Getting the Right Speaker

Unfortunately, the ability and the willingness to give lectures of an expository nature are not rated very highly in some mathematics departments. Thus, there is the real problem of persuading the right people to participate in such a program. Prestige, promotion or tenure, a salary increase, or even an honorarium are unlikely to result from such service. However, institutional support is essential for success, and department heads should encourage suitable speakers and give the program their blessing.

2. Choosing the Right Topic and Style

Broadly speaking, we choose to lecture on topics close to our particular interest. We are right to do so since we have almost certainly been invited to speak because of the audience's interest in that topic. However, with a high school audience one must give the highest priority to their interests; and one must take into account their mathematical level. It should not be thought that these or the following precepts are so obvious that they do not need stating. The topic must be accessible yet exciting.

Paradoxically, the right topic should be neither familiar nor unfamiliar to the audience. It should take the audience in a new direction or offer a new application, but the starting point should be mathematics with which the students can be comfortable.

The style should be informal and relaxed. The development should be natural and not too sophisticated for a high school student. Rigorous proof should be avoided and mathematical argument should be couched in familiar phrases. Dialogue with the audience should be encouraged and the students should feel free to interrupt (politely!) to seek clarification. The speaker should always make it plain why he or she is adopting a particular argument or viewpoint. Briefly, the speaker, instead of "blinding with science," must always be sure to be enlightening.

3. Fulfilling the Overall Purpose

An invited lecture at the university level is almost always addressed to an audience committed to mathematics. True, not all the audience may be committed to the particular topic of the speaker, but no member of the audience is likely to decide against further mathematical activity on the basis of the experience of hearing a mathematical talk. With high school lectures, the situation is very different, since the speaker may not only do considerable good but also irreparable harm. Moreover, the visit to the high school is much more than the occasion for a lecture. Just as important are the opportunities it provides for contact with the students and with their teachers. Thus, the speaker must be aware of the many-faceted purposes of the program and must plan to fulfill all those purposes.

4. Equipping the Speaker

As indicated above, the visiting speaker must have all relevant information and be prepared to give responsible advice. Information about college courses may come from the appropriate MAA office and from one's own institution. Students today need encouragement to study mathematics at the university and may well have been overimpressed by pessimistic estimates of the state of the job market in mathematics-related domains. The speaker must also be open-minded with respect to the various parts of mathematics and with respect to the attractiveness of both pure and applied mathematics. Certainly he or she must have a positive attitude towards the computer, while at the same time being in a position to offer sage advice with respect to allowing one's education to be dominated by computer courses.

5. Introducing the Speaker

It is a tradition that speakers at national meetings and at colloquia are introduced by fulsome praise of their accomplishments, listing all academic achievements. This absurd ritual is quite harmless at this level and at least has the merit of allowing latecomers to take their places without interrupting any significant part of the proceedings. However, such a ceremony is harmful in a high school program intended to encourage bright (not necessarily outstanding) students to take up mathematics. For it widens the perceived gap between student and speaker, inhibiting questions, discussion, and informal contact, reinforcing those powerful tendencies militating against the student perceiving himself (very often herself) as a potential intellectual.

Instead, the opportunity should be seized to point out to the students that the speaker is really only a mature version of themselves, a person who, at the high school, shared the interests, intellectual and otherwise, that they currently have. It is very important to destroy the highly damaging myth of the mathematician as being typically a remote, impractical individual, far removed from the normal cares, concerns and interests or other people.

6. Practical Hints

Our closing remarks consist of extremely practical hints in connection with the actual organization of the visit.

(a) Check with the administration to see that no fire drills or unusual exercise have been scheduled to conflict with the talk.

(continued on page 6)

Lectures *(continued from page 5)*

(b) Ensure that your contact at the school is aware of the arrangements for your visit and can meet you on arrival (or arrange for you to be met).
(c) Obtain directions for getting to the school and for finding your way (in the event of the failure of (b)) to the lecture room. Remember the divergence principle which is particularly appropriate to visiting a school—the closer you are to your destination, the greater number of choices!
(d) Tactfully remind the school personnel of your impending visit, checking on all arrangements that have been made. We suggest that the *Mathematical Intelligencer* run a competition to devise the most suitable form of words to deal with this delicate situation.
(e) Try to have time set aside for informal chats with the teachers. A lunch together might well be suitable. Many teachers bring a box lunch so an offer to bring your own lunch might be very well received.
(f) Contact the classroom teachers involved in the visit in advance of planning your talk so that you ensure that you will pitch it at the right level and that your topic will be of interest to your audience.

(Peter Hilton is a member of the Department of Mathematical Sciences, at SUNY, Binghamton, and Jean Pedersen is in the Department of Mathematics, at the University of Santa Clara.

People in the News

Donald Albers, Chairman of the Department of Mathematics, Menlo College, Atherton, California, was selected as the recipient of the second American Mathematical Association of Two-Year Colleges (AMATYC) Mathematics Excellence Award. The support Albers has given two-year college mathematics has been primarily through his involvement with the MAA where he served for five years as the editor of the *Two-Year College Mathematics Journal*.

Paul R. Halmos, University of Santa Clara, has received an honorary degree from Kalamazoo College, Kalamazoo, Michigan. Dr. Halmos has had a distinguished career as a mathematician, making significant contributions in a number of areas: in algebraic logic; mathematical analysis; and in ergodic theory. As a faculty member at a number of institutions, he has become well known as a teacher, helping a number of students who have gone on to become outstanding mathematicians in their own right. He has received many awards for expository writing: the Chauvenet Prize, the L.R. Ford Award, the George Polya Award, and the Steele Prize for Mathematical Exposition. He has worked as editor for a number of journals, including the *American Mathematical Monthly*.

The following quatrain by Leonard Gillman celebrates the 70th birthday of **Paul Halmos**:

All hail now yon Halmos, Paul Richard in sooth,
Achieving with splendor the root mean square true
(The present occasion attests to this truth)
Of root three by forty and fifty root two.

The library that serves the Graduate School and University Center of the City University of New York was dedicated to **Mina Rees** on November 12. Rees is a prominent mathematician and the founding President of the Graduate School. She was the first recipient of the MAA Award for Distinguished Service to Mathematics in 1962. In 1983 she was awarded the National Academy of Science's Public Welfare Medal, one of the most prestigious honors which the Academy can bestow.

Lester H. Lange, Dean of the School of Science at San Jose State University, has been elected as a Fellow of the California Academy of Sciences. Lange is one of fifteen scientists elected last October to the 132-year-old institution in San Francisco. Lange has authored numerous articles for mathematical journals and is a winner of the MAA's Lester R. Ford Award for "distinguished expository writing in mathematics." In addition to his many duties as Dean of Science, Lange has been instrumental in the formation and direction of Moss Landing Marine Laboratories.

Three Leroy P. Steele Prizes were awarded at the American Mathematical Society's Summer Meeting in Laramie, Wyoming. **Michael Spivak** , of Publish or Perish, Inc., received the expository writing award for his books in differential geometry. **Robert Steinberg**, University of California at Los Angeles, received the award for research work of fundamental importance for a series of papers on various aspects of the theory of algebraic groups. The career award, given for "cumulative influence," was presented to **Hassler Whitney**, Professor Emeritus of the Institute for Advanced Study, for his fundamental work in the general theory of geometric problems.

Leopoldo Nachbin, George Eastman Professor at the University of Rochester, has been elected a corresponding member of the Royal Academy of Science, Spain.

Beckenbach Publication Fund Established

The Association is pleased to announce a gift of $25,000 from Alice C. Beckenbach, in memory of her late husband, Edwin F. Beckenbach, to be used to support the publication program of the MAA.

Beckenbach was a well-known mathematician who devoted many years of service to the Association. A brief biography appears in the February 1983 issue of the *Monthly*, in connection with his selection for the Award for Distinguished Service to Mathematics. In particular, Beckenbach was Chairman of the Committee on Publications from 1971 until his death in 1982. During his tenure he guided a significant expansion of the publications program; for instance, it was he who suggested the Dolciani Expositions series and urged the creation of a newsletter such as FOCUS.

In recognition of Beckenbach's many contributions to MAA's publication program, the MAA Book Prize will be designated the Beckenbach Book Prize. In addition to supporting this prize, proceeds from the Beckenbach Publication Fund will also be used to support continuing innovation in the MAA publication program.

Those who wish to contribute to the Beckenbach Publication Fund may do so by sending contributions to the MAA Development Office, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

Sectional Governors' Election Results

Eleven of the twenty-nine MAA Sections have elected new Governors. The Sections and the Governors who were elected to serve terms from July 1, 1986 through June 30, 1989 are: **Eastern Pennsylvania and Delaware** Doris J. Schattschnei-

der, Moravian College; **Florida** Robert Gilmer, Florida State University; **Illinois** John W. Hooker, Southern Illinois University at Carbondale; **Intermountain** Donald W. Robinson, Brigham Young University; **Iowa** A.M. Fink, Iowa State University; **Louisiana-Mississippi** Charles S. Rees, University of New Orleans; **Maryland-DC-Virginia** Bernard A. Fusaro, Salisbury State University; **Michigan** Don R. Lick, Eastern Michigan University; **North Central** Joseph D.E. Konhauser, Macalester College; **Southern California** Robert F. Brown, University of California at Los Angeles; **Texas** Robert A. Northcutt, Southwest Texas State University.

MAA Governors represent their Sections at all meetings of the MAA Board of Governors and report back to the officers and members of the Section the activities of the Association at the national level. Each spring about one-third of the Sections elect new Governors.

In Memoriam

Lorin Berryman, American International School, Vienna, Austria, died August, 1985, at the age of 47. He was an MAA member for 6 years.

Alfred T. Brauer, of Chapel Hill, North Carolina, died December 23, 1985 at the age of 91. He was an MAA member for 42 years.

Joseph Hashisaki, of Bellingham, Washington, died January 2, 1986, at the age of 68. He was an MAA member for 26 years.

John Hyden, Professor Emeritus, Vanderbilt University. He was an MAA member for 51 years.

George Michaelides, University of South Florida, died December 5, 1985. He was an MAA member for 28 years.

Spencer Murray, Professor Emeritus, Mississippi State University, died December, 1985. He was an MAA member for 47 years.

Sister M. O'Donnell, College Misericordia, died at the age of 69. She was an MAA member for 24 years.

Frank Olson, SUNY, Fredonia, died January 1, 1986, at the age of 63. He was an MAA member for 38 years.

Harry Pollard, Purdue University, died November 20, 1985, at the age of 66. He was an MAA member for 39 years.

Carl Rees, Professor Emeritus, University of Delaware, died December 31, 1985, at the age of 89. He was an MAA member for 65 years.

Edgar Rose, of Lakeland, Florida, died January 13, 1986, at the age of 79. He was an MAA member for 27 years.

Word has also been received on the deaths of the following MAA members: **Juna Beal**, Greenwood, Indiana; **C. Eugene Buell**, Flagstaff, Arizona; **Rene F. Dennemeyer**, Poway, California; **William C. Doyle**, Kansas City, Missouri; **Robert Freund**, Ketchum, Idaho; **Emmert Grossman**, Mt. Carmel, Illinois; **Alla Mah**, Albany, Oregon; **Thomas Ostdick**, St. Meinrad, Indiana; and **Mirko Stojakovic**, Beograd, Yugoslavia.

Northeast Section to Sponsor Short Course on Linear Algebra

Professor Alan Tucker, of SUNY, Stony Brook, will give lectures titled "A New Unified Approach to Linear Algebra" at the University of Maine at Orono, June 9–13, 1986.

From the beginning, applications will motivate this approach to linear algebra, whose only prerequisite is a semester of calculus (for most material). Insights gained from numerical analysis and various applications provide a superior way to develop understanding of linear algebra.

The cost of the short course, including course fee, double-occupancy room, and board, is still only $200. For information contact Professor Clayton W. Dodge, Mathematics Department, University of Maine, Orono, ME 04469-0122.

Strategy *(continued)*

over several months in the private sector is often condensed on Capitol Hill to short one-page summaries prepared overnight. It is very important for the mathematics community to develop the contact that will enable it to respond in timely fashion when these crises occur.

Recommendations to the Mathematical Community

MAA's ability to reach its important long-term goals will require consistent effort directed primarily at creating an awareness among policy makers—virtually all of whom are non-mathematicians—of the importance of mathematics to the well-being of the intellectual, scientific, and technological infrastructure of the nation. This means that MAA—its staff, its officers, and all its members must:

- increase its understanding of the Congressional authorization, appropriation, and budget process and the impact these have on mathematics budget and funding;
- help Members of Congress and their staffs understand the importance of mathematics to the well-being of the nation;
- identify several key Members of Congress who have shown particular interest in mathematics and cultivate their support by increasing their understanding of mathematics.

The problems of communicating the role of mathematics to the Congress are formidable. But mathematics itself can carry the day: it is recognized as useful, it is widely supported by everyone interested in educational reform, and it isn't burdened with controversial baggage that would make politicians avoid it. What is needed is for the mathematical community to develop consensus on a legislative program and then present it to Congress.

(Jennifer Vance is an attorney specializing in federal practice in education and science who has been retained by the Joint Policy Board for Mathematics for assistance in dealing with Congressional issues. From 1975 to 1982 she was a Senior Legislative Associate for the House Committee on Education and Labor, and from 1982 to 1985 she worked on science education policy and congressional liaison for the National Science Foundation.)

Bayesian Models and Methods Conference Scheduled for June 2-6

The National Science Foundation-Conference Board of the Mathematical Sciences Regional Conference, entitled "Hierarchical and Empirical Bayesian Models and Methods", will be held June 2-6, 1986, at Bowling Green State University.

A.F.M. Smith, University of Nottingham, will present ten lectures surveying hierarchical and empirical Bayesian methods in statistics. In addition, there will be a few invited lectures by researchers in the general area of hierarchical Bayesian modeling. (Tentative speakers are J. Berger, B. Hoadley, and C. Morris.)

For information write: James H. Albert, Department of Mathematics and Statistics, Bowling Green State University, Bowling Green, Ohio 43403

Mathematics and Statistics Conference to be Held at Miami University

The Fourteenth Annual Mathematics and Statistics Conference at Miami University, Oxford, Ohio, will be held October 3-4, 1986. The theme for this year's conference will be "Discrete Mathematics". Featured speakers will include Ron Graham, AT&T Bell Laboratories; Alan Tucker, SUNY, Stony Brook; and Herbert Wilf, University of Pennsylvania. There will be contributed paper sessions which should be suitable for a diverse audience of mathematicians, statisticians, and students. Abstracts should be sent by June 3, 1986 to Professor Gary G. Gilbert, Department of Mathematics, Miami University, Oxford, Ohio 45056. Information regarding preregistration and housing may also be obtained from Professor Gilbert.

National MAA Meetings

70th Annual Meeting, San Antonio, Texas, January 21-24, 1987.
64th Summer Meeting, August, 1987.
71st Annual Meeting, Atlanta, Georgia, January 6-9, 1988.
72nd Annual Meeting, Phoenix, Arizona, January 11-14, 1989.

Other Meetings

June 1986

2-6. **NSF-CBMS Regional Conference on Hierarchical and Empirical Bayesian Models and Methods**, Bowling Green State University.

2-6. **MAA Maryland-DC-Virginia Section Summer Workshop—Mathematical Modeling**, Salisbury State College.

4-6. **Seventh National Educational Computing Conference**, San Diego, California. Contact: NECC 86, University of San Diego, School of Education, Alcala Park, San Diego, CA 92110.

9-13. **MAA Maryland-DC-Virginia Section Summer Workshop—Discrete Mathematics**, Salisbury State College.

9-13. **Northeast Section Short Course on Linear Algebra**, jointly sponsored with UMO, University of Maine at Orono, Orono, ME 04469-0122. Contact: Clayton W. Dodge, Mathematics Department, University of Maine at Orono.

16-20. **MAA Wisconsin Section Short Course Algorithms of Discrete Mathematics**, Cardinal Stritch College, Milwaukee. Contact: R.J. Mihalek, Department of Mathematical Sciences, P.O. Box 413, Milwaukee, WI 53201; or Barbara Reynolds, Cardinal Stritch College, 6801 North Yates Road, Milwaukee, WI 53217.

19-21. **Pacific Northwest Section Meeting**, Southern Oregon State College, Ashland, Oregon.

30-July 3. **Allegheny Mountain Section Short Course on Codes and Designs**, Allegheny College, Meadville, PA. Contact: David M. Wells, The Pennsylvania State University, 3550 Seventh Street Road, New Kensington, Pennsylvania 15068.

July 1986

9-11. **NSF Workshop on Broadening the Base of Research in Operations Research**, Wellesley College. Contact: Dr. James E. Falk, Associate Program Director, Systems Theory and Operations Research, Division of Electrical, Communications, and System Engineering, National Science Foundation, Washington, D.C. 20550, (202) 357-9618.

16-18. **MAA Ohio Section Short Course—History of Calculus**, Ashland College. Contact: Alan Poorman, Mathematics Department, Ashland College, Ashland, Ohio 44805.

20-25. **Meeting of the Working Group on Advanced Mathematical Thinking** in conjunction with the 9th Annual Meeting of the International Group for the Psychology of Mathematics Education, City University in London. Contact: James J. Kaput, Department of Mathematics, Southeastern Massachusetts University, North Dartmouth, MA 02747; (617) 999-8321.

27-August 2. **The Eugene Strens Memorial Conference on Intuitive and Recreational Mathematics and its History**, The University of Calgary. Contact: Richard K. Guy or Bill Sands, Department of Mathematics & Statistics, The University of Calgary, 2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4.

August 1986

2. **USCMI Pre-Congress Survey Talks**, Berkeley, California (See page xvi of this issue and *FOCUS*, March-April 1986)

3-10. **ICMI Discussions of Educational Issues**, Berkeley, California. Program Available upon registration for ICM-86. See page xvi of this issue.

3-11. **International Congress of Mathematicians**, Berkeley, California. (See *FOCUS*, October 1985, November-December 1985, January-February 1986, and March-April 1986.)

3-11. **Association of Women in Mathematics**, University of California, Berkeley (in conjunction with the International Congress of Mathematicians).

October 1986

3-4. **Fourteenth Annual Mathematics and Statistics Conference**, Miami University, Oxford, Ohio. Contact: Gary G. Gilbert, Department of Mathematics and Statistics, Miami University, Oxford, Ohio 45056.

3-4. **Thirteenth Annual Student Conference of the Ohio Delta Chapter of Pi Mu Epsilon**. Contact: Milton Cox, Department of Mathematics and Statistics, Miami University, Oxford, Ohio 45056.

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