FOCUS

THE NEWSLETTER OF THE MATHEMATICAL ASSOCIATION OF AMERICA

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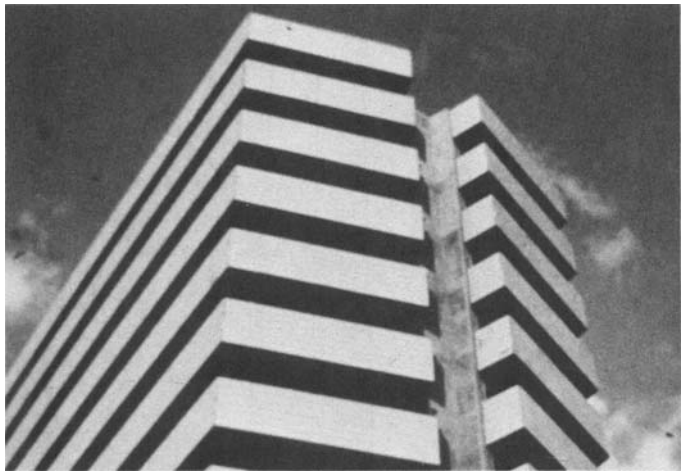
Reflections on a Visit to South Africa

Peter Hilton

Towards the end of 1978 I was approached by the South African Mathematical Society (SAMS) about the possibility of making a lecture tour in South Africa in the summer of 1981. There ensued a series of involved and somewhat delicate negotiations designed, on my part, to ensure that such a visit would take place under conditions which would satisfy my scruples. In a letter published in the *AMS Notices*, I explained that these conditions would enable me to visit all the universities of South Africa and to speak freely with faculty and students of all races. I, in turn, offered a wide selection of lecture topics divided into four categories: research talks, survey talks, undergraduate talks, and talks on problems of mathematical education.

As it turned out, my tour of South Africa lasted just over two months and I visited every university in the country except the University of Port Elizabeth. I also visited the Council for Scientific and Industrial Research (CSIR) in Pretoria and the University of the Transkei. (The Transkei is recognized by the Republic of South Africa, alone, as an independent country; it is the homeland of the Xhosa people.)

I lectured at a rate of over six lectures a week to highly varied audiences. I paid a very substantial visit to Soweto,



A modernistic structure on the campus of the University of South Africa.

engaging in discussions with school principals and teachers, with students, and with educational administrators. At the invitation of the Mathematical Association of South Africa (MASA), I gave a number of lectures at a meeting of teachers of science and mathematics in Cape Town. I was also delighted to attend and speak at a topology symposium at the University of Cape Town. This symposium was organized by my ex-student Professor Keith Hardie, now a leading South African mathematician, to mark the occasion of my first visit to his country.

My wife was able to accompany me for the second half of my visit and gave lecture-demonstrations to faculty and students of drama departments at a number of universities.

Impressions of Mathematics and Mathematical Education in South Africa

Much good work at the research level is going on. For example, excellent work is being done in applied mathematics at the National Research Institute of the Mathematical Sciences of CSIR—non-associative algebraic systems related to the many-body problem, use of spline functions in quantum-mechanical scattering problems, numerical solutions of random search problems, control theory, fluid dynamics, weather-forecasting, etc. The University of Cape Town is among the active centers of research in pure mathematics in the country.

But the situation with regard to the teaching of mathematics should cause concern. The pre-college curriculum is very traditional and is dominated by the nation-wide matriculation examination which is used for university entrance. The syllabus shows no evidence that the computer has been

(continued on page 2)

Meeting Program Inside

The center section of this issue contains the program and housing and preregistration forms for the **MAA Annual Meeting** which will be held January 14-17, 1982 in Cincinnati, Ohio.

South Africa *(continued from page 1)*

invented. There is no probability, no statistics, and very little of approximation, estimation, or numerical methods. The university undergraduate curriculum is modeled on the old Cambridge patterns. Almost everywhere there are separate departments of pure mathematics (often called simply 'mathematics'!) and applied mathematics, and often there are separate bachelor's degree programs in pure and applied mathematics.

There are appalling staffing problems at all levels. There is a desperate shortage of university teachers of mathematics. In the black schools there is an even more acute problem, where it is by no means uncommon to find teachers teaching at a grade level which they did not themselves reach as students.

The standard of attainment of students is highly variable and there is a very severe problem of the level at which students are admitted to university. This problem varies with color, being most serious among the black students, but it is universal. It is compounded by the almost entirely rigid adherence to the three-year degree program.

A word should be said about the University of South Africa (UNISA) which conducts courses somewhat along the lines of the Open University in the United Kingdom and the Fernuniversität in West Germany. There is a huge enrollment—currently, I believe, around 80,000—equipment is very modern and impressive, and the whole enterprise must be judged a success. UNISA is fully integrated and contributes substantially to the education of non-whites.

Impressions of Social and Cultural Life in South Africa

Apartheid is a monstrous system, pursued by the South African government with relentless determination and lunatic logic. However, it is opposed by very many people concerned with education at all levels, from university professors to dedicated whites endeavoring to raise the quality of education in Soweto. I found no mathematicians to defend the system, though some offered excuses and extenuation. Such dire events as the treatment of the Nyanga squatters by the government and police clearly caused the whites acute embarrassment and, in many cases, deep distress. But even such treatment was defended, or rather excused, and the government's actions explained in terms of the 'universal threat' of Soviet subversion.

The typical attitude to the black of the Afrikaner I met may be characterized as benevolent paternalism—he is kind, generous, and honest. But while he may recognize that apartheid policies are not working, he does not necessarily recognize that they are morally wrong and does not always understand how offensive they are to the liberal conscience.

Among those policies, one should explicitly mention that of giving the black his 'homeland.' In practice this leads to the creation of pockets of territory ('inland archipelagoes') designated as belonging to the members of a given tribe. When such a homeland becomes 'independent,' the members of the tribe in question become citizens of that homeland (the homelands are Transkei, Bophutha Tswana, Venda and, in December, Ciskei) and technically aliens in South Africa. But no serious attempt seems to be made to ensure the economic viability of these homelands. In fact, Bophutha Tswana's one asset is Sun City with its casino, public

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BAM Wins Federal Grant

The MAA's *Blacks and Mathematics* (BAM) Program has been awarded a grant of approximately $103,000 to continue, improve, and extend its activities over the next two years. The grant is from the Department of Education through its Minority Institutions Science Improvement Program (MISIP).

The goal of the BAM program is to increase the number of Black students who take high school level courses in mathematics beyond the ninth grade in order to make accessible to them career options where employment opportunities are more promising. To achieve this goal, Black scientists are called upon to talk to students about how and where mathematics is used in their work and to provide career information relative to the duties and responsibilities of their jobs.

BAM has been in operation in Atlanta, Houston, and Washington, D.C. since 1977. In 1980, Hartford and Metropolitan Detroit were added. Under the MISIP grant the program is to be expanded to include cities in Louisiana and California. It is anticipated that BAM will reach about 50,000 students during the next two years.

The National Director of BAM is Gloria F. Gilmer of the National Institute of Education. Joella Gipson of Wayne State University is the Principal Investigator for the MISIP grant and Assistant Coordinator of the Metropolitan Detroit Region. The other Regional Coordinators are Della Bell of Texas Southern University, Henry Gore of Morehouse College, James Donaldson of Howard University assisted by Adentran Abeboye, also of Howard University, and John Alexander of Connecticut Mutual Life Insurance Company.

Readers who would like more information about BAM should write to: Dr. Gloria F. Gilmer, National Institute of Education, 1200 Nineteenth Street, N.W., Washington, D.C. 20208.

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Calling All Martin Gardner Fans

Martin Gardner fans are in for a treat at the MAA Annual Meeting in Cincinnati. A special three-hour session dedicated to the mathematics of Martin Gardner is scheduled for January 17, 1982 from 1:00 p.m. to 4:00 p.m. This session will feature three avid Gardner fans talking on topics which have been featured in Gardner's writings:

- Elwyn R. Berlekamp, University of California at Berkeley, on "The Game of Dots and Boxes"
- N. G. deBruijn, Technical University of Eindhoven, Netherlands, on "Algebraic Theory of Penrose's Non-Periodic Tilings of the Plane"
- David A. Klarner, State University of New York at Binghamton, on "My Life Among the Polyominoes."

(Klarner is the Editor of the recently published book *The Mathematical Gardner,* Wadsworth International.) Presiding at the session will be Doris W. Shattschneider of Moravian College, Editor of *Mathematics Magazine.*

As surely everyone knows, Gardner is the author of the *Scientific American* column "Mathematical Games," where he has written on topics ranging from brain teasing puzzles and paradoxes to problems at the frontier of mathematical research. Gardner has earned the respect of mathematicians throughout the world for the clarity and zest with which he writes about mathematics and for his unique ability to make complex mathematical ideas accessible to a wide and varied readership.

What is less widely known about Gardner is that he has never taken a college mathematics course. In an interview with Anthony Barcellos for *The Two-Year College Mathematics Journal* (September 1979), Gardner claimed that his lack of formal mathematical training has worked to his advantage: "If I can't understand what I'm writing about, why my readers can't either."

Gardner has also served the mathematical community in another significant way — as the focal point of an extensive mathematical grapevine. Gardner's grapevine originally arose out of his need to gather ideas and check manuscripts for "Mathematical Games." But it rapidly expanded to dimensions far surpassing his own professional needs because of his habit of putting his many correspondents in touch with one another.

In preparation for his retirement, for the past year Gardner has been alternating his "Mathematical Games" column with a column written by Douglas Hofstader, Pulitzer Prize winning author of *Gödel, Escher, and Bach: An Eternal Golden Braid.* The title of Hofstader's column, "Metamagical Themas" is an anagram of "Mathematical Games." Gardner's last column will appear in the December 1981 issue of *Scientific American.*

At the 1976 Summer Meeting of the MAA in Toronto, the Board of Governors honored Martin Gardner for his many contributions to the public appreciation of mathematics by electing him an honorary Life Member.

Anderson Honored in Prague

In ceremonies in Prague in late August, Richard D. Anderson, President of the MAA, was presented the Bolzano Medal by the President of the Czechoslovak Academy of Sciences. The gold medal, awarded by the Academy to six mathematicians from various countries for their contributions to the mathematical sciences, commemorated the 200th anniversary of the birth of Bernard Bolzano, a native of Prague and illustrious logician, mathematician, and philosopher of science. The citation, read at the awards ceremony, cited Anderson's research in infinite dimensional topology as well as his service to the mathematical sciences.

A Footnote on the van der Waerden Conjecture

Donald E. Knuth of Stanford University reports that a surprising development has occurred with respect to the van der Waerden Conjecture: apparently somebody else now has a valid claim to proving it before Egorychev. Egorychev's result was anticipated a year earlier by D. I. Falikman whose elegant proof appears in *Matematicheskie Zametki* 29 (June 1981), 931-938. Falikman's paper, which was received for publication on May 14, 1979, establishes the minimal value of doubly stochastic permanents but does not show that this value is uniquely attained.

A brief announcement about the proof of the van der Waerden Conjecture appeared in the June 1981 issue of FOCUS. A complete report is scheduled to appear in the December 1981 issue of the American Mathematical Monthly.

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Policy on "Letters to the Editor" Adopted

At its meeting last August in Pittsburgh, the MAA Newsletter Editorial Committee adopted the following policy on "Letters to the Editor" of *FOCUS:*

Letters to the Editor are always welcome and, as space permits, will be accepted for publication in FOCUS according to these criteria:

- *Letters should deal with issues directly relevant to MAA concerns.*
- *Letters should be as concise as possible.*
- *Letters will be edited to eliminate redundancy and to reduce length as needed.*
- *Letters of complaint or rebuttal concerning reviews published in the Association's journals will not be published in FOCUS.*
- *Letters are subject to review by a subcommittee of the Newsletter Editorial Committee.*
- *Especially well-written letters on substantive issues may be printed as "Guest Editorials."*

Do a Good Deed—Recruit a Member!

Who first introduced you to the MAA—a teacher, a colleague, a friend? Aren't you glad they did! Now you can do a good deed for your students, colleagues, or friends by providing them with information about the MAA, by talking to them about what your membership has meant to you, or by inviting them to attend a sectional or national meeting.

To spread the word about the benefits of membership in the MAA, the September-October issue of *FOCUS,* which contains a Special Membership Supplement, was mailed to all members of AMS and SIAM. Extra copies were mailed to the more than 2000 MAA Representatives on campuses in the United States and Canada for distribution to colleagues who do not belong to either of these organizations. Department Chairmen and MAA Representatives also received these MAA materials: *MAA Information Booklet, Program of Visiting Lecturers and Consultants,* and application forms for individual and Academic membership.

If you know potential MAA members who should receive any of these materials, contact your Department Chairman, your MAA Representative, or the MAA Washington Office (1529 Eighteenth Street, N.W., Washington, D.C. 20036).

Let's work together to keep the MAA strong!

Dues are Due

Members' 1982 dues notices were mailed in mid-October. Dues are payable on or before January 1, 1982, but we suggest that members send their payments well before that date. Not only are dues deductible but, with tax rates declining in 1981-83, members can realize *actual tax savings* by paying before January 1.

Highlights of Summer MAA Board Meeting

Resolution of Concern on Science Education Budget Cuts

The following resolution was approved unanimously by the Board of Governors at its meeting on August 16, 1981 at the University of Pittsburgh: "The Board of Governors of the Mathematical Association of America expressed its grave concern over the proposed cuts in funding for science education. President Anderson is instructed to convey this concern to the appropriate members of Congress and the Reagan Administration."

Mathematics Magazine Membership Option

The Board approved a new membership option starting in 1983 in which members may select *Mathematics Magazine* as their only MAA journal. Thus, members may opt to receive any one of the MAA journals or any combination of journals. All members will continue to receive *FOCUS* as a privilege of membership.

Hedrick Lecturer Elected

The Board elected Professor James W. Cannon of the University of Wisconsin as the Earle Raymond Hedrick Lecturer for 1982. Professor Cannon will present a series of three lectures on "Lower Dimensional Topology" at the 1982 Summer Meeting.

Grants for MAA Programs Approved

The following grants were approved by the Board:

- $6000 from Connecticut Mutual Life Insurance Company to support the Hartford Region of *Blacks and Mathematics* (BAM).
- $9500 from IBM to support the Awards Ceremony for the 1981 USA Mathematical Olympiad.
- $10,900 from the National Science Foundation for the completion of "Mathematics at Work in Society" (MAWIS).
- $1000 from the Polaroid Corporation for the support of the Boston Region of *Women and Mathematics* (WAM).

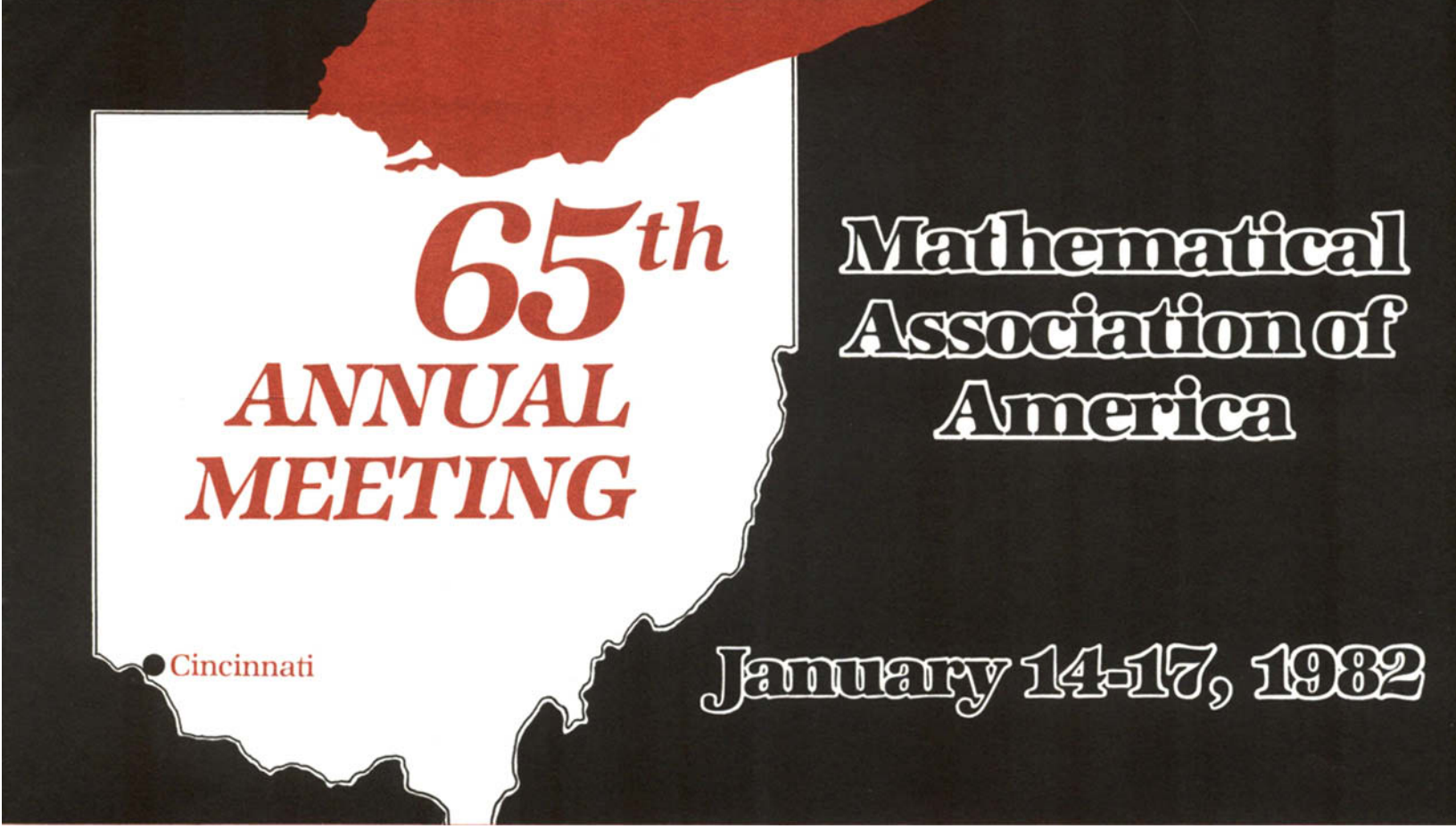
Resolution of Appreciation for WAM Director

The Board voted a resolution of appreciation for Eileen Poiani of St. Peter's College for her outstanding service as WAM Director during the period 1975-81. (The new WAM Director is Carole B. Lacampagne of Bergen Community College.)

Mini-Course Committee Formed

In recognition of the value to MAA members of mini-courses and short courses, the Board authorized the formation of a new committee, the Committee on Mini-Courses. The charges to the Committee are:

- To run mini-course(s) at each national MAA meeting. This includes selecting the topics, recruiting the presenters, arranging with the MAA staff for publicity, facilities and expenses, and evaluating the mini-courses.
- To promote mini-courses at MAA section meetings and longer short-courses sponsored by Sections. The Com-



The Sixty-Fifth Annual Meeting of the Mathematical Association of America will be held at the **Convention Center** in **Cincinnati, Ohio,** from Thursday, January 14 through Sunday, January 17, 1982 in conjunction with meetings of the American Mathematical Society, Association for Women in Mathematics, the Conference Board of the Mathematical Sciences, and the Rocky Mountain Mathematics Consortium.

The **Board of Governors** will meet at 9:00 a.m. on Thursday, January 14 in Taft Room at the Westin Hotel. This meeting is open to all members of the Association.

There will be a meeting of the **Section Officers** on Thursday, January 14, from 7:00 p.m.-9:00 p.m. in Taft Room, Westin Hotel. All interested MAA members are invited to attend.

On Thursday evening at 7:00 p.m. in the North Meeting Room of the Center, there will be a presentation on **video tapes:** "Video Tapes for Review and Supplementary Instruction." The materials will be from an NSF CAUSE funded project under the sponsorship of the Ohio Mathematical Association of Two-Year Colleges. The presentation will be made by the Director and Co-Director of the project, John B. Monroe of the Community and Technical College of the University of Akron and Cynthia P. Yang of Miami University-Middletown. The unique feature of the tapes to be shown is that the output of a PLATO computer is used as an "electronic chalkboard."

At 8:00 p.m. on Thursday evening, there will be two presentations on the **CBMS Survey:** "The 1980 CBMS Undergraduate Survey Results: Universities and Four-Year Colleges" by Wendell Fleming of Brown University and "The 1980 CBMS Survey: Two-Year Institutions" by Donald J. Albers. Both presentations will be held in the North Meeting Room of the Center.

At 5:30 p.m. on Friday, there will be an interested-persons **cash bar** at Stouffer's Cincinnati Towers. Members should inquire about the location at the Registration Desk.

The **Annual Business Meeting** of the Association will be held at 10:00 a.m. on Sunday, January 17 in the North Meeting Room of the Center. At this meeting, the twenty-first **Award for Distinguished Service to Mathematics** will be presented. Also at this meeting members of the Association will be asked to approve a proposed amendment to the Bylaws. (See page vi.)

There will be two MAA **Mini-Courses** which will be conducted concurrently on Thursday and Friday evenings, 7:00 p.m.-9:00 p.m.: "Mathematical Models in Political Science" presented by Steven J. Brams of New York University and Philip D. Straffin, Jr. of Beloit College and "The Use of Computers to Teach Mathematics" presented by Klaus E. Eldridge and Donald O. Norris, both of Ohio University. Registration information is on page iii of this program.

On Sunday from 1:00 p.m. to 4:00 p.m., there will be a **special session** dedicated to "The Mathematics of Martin Gardner." Doris W. Schattschneider of Moravian College will preside. Speakers are Elwyn R. Berlekamp of the University of California at Berkeley, N.G. deBruijn of the Technical University at Eindhoven, Netherlands, and David A. Klarner of the State University of New York at Binghamton.

The dates and times of other **MAA invited addresses, panel discussions, and special sessions** are listed on pages iv and v of this program.

Registration

Registration Fees

Meeting preregistration and registration fees only partially cover expenses of holding meetings. All mathematicians who wish to attend sessions are expected to register and should be prepared to show their meeting badge, if so requested. All participants who did not preregister may register at the meeting for the meetings, the AMS Short Course, or the MAA Mini-Courses.

The fees for registration at the meeting are:

Joint Mathematics Meetings	
Member of MAA, AMS	$48
Emeritus Member of MAA, AMS	$12
Nonmember	$74
Student/Unemployed	$12
Employment Register	
Employer	$30
Applicant	No Charge
MAA Mini-Course #1	$15
MAA Mini-Course #2	$15
AMS Short Course	
Student/Unemployed	$10
All Other Participants	$30
One-Day Fee (Second Day Only)	$15

Registration fees may be paid in cash, by personal or travelers' checks, or by Visa or MasterCard credit cards. Canadian checks must be marked for payment in U.S. funds.

There will be no extra charge for members of the families of registered participants, except that all professional mathematicians who wish to attend sessions must register independently. All full-time students currently working toward a degree or diploma qualify for the student registration fees, regardless of income. The unemployed status refers to any person currently unemployed, actively seeking employment, and who is not a student. It is not intended to include persons who have voluntarily resigned or retired from their latest position. Persons who qualify for emeritus membership in either the Association or the Society may register at the emeritus member rate.

Nonmembers who register at the meetings and pay the $74 nonmember registration fee are entitled to a discount of the difference between the member registration fee of $48 and the nonmember registration fee of $74 as a $26 credit against dues in either the MAA or AMS or both, provided they join before February 17, 1982.

Nonmember students who register at the meetings and pay the $12 registration fee are entitled to a discount of the difference between the student preregistration fee of $8 and the registration fee of $12 as a $4 credit against dues in either the MAA or AMS or both, provided they join before February 17, 1982. Nonmembers and nonmember students who thus qualify may join at the meetings, or by mail afterwards up to the deadline.

Registration Dates and Locations

Registration will begin at 4:00 p.m. on January 12 in the North Exhibit Area of the Convention Center. Participants who have preregistered for any of the three activities listed above will be provided with appropriate materials with their preregistration packets.

Registration Desk Hours

Tuesday, January 12	4:00 p.m. to 8:00 p.m.
Wednesday, January 13	8:00 a.m. to 5:00 p.m.
Thursday, January 14 through Saturday, January 16	8:00 a.m. to 4:00 p.m.

Neither the Joint Mathematics Meetings Registration Desk nor the telephone message center will be in operation on Sunday, January 17. There will, however, be information and assistance available from 8:30 a.m. to 1:30 p.m. at a desk set up outside the North Meeting Room of the Convention Center.

Mathematical Sciences Employment Register

The Mathematical Sciences Employment Register, held annually at the Joint Mathematics Meetings in January, provides opportunity for mathematical scientists seeking professional employment to meet employers who have positions to be filled.

The Employment Register at the Cincinnati meeting will take place in the Grand Ballroom of Stouffer's Cincinnati Towers on Thursday, Friday, and Saturday, January 14, 15, and 16, 1982. A short (optional) orientation session will be conducted by the AMS-MAA-SIAM Committee on Employment Opportunities at 9:00 a.m. on Thursday, January 14, to familiarize participants with the operation of the register.

All participants in the Employment Register are required to register for the Joint Meetings. For applicants, there is no additional fee for participation in the Employment Register. For Employers, additional fees for participation in the Employment Register are $20 for preregistration or $30 if paid at the meeting.

Book Sales

Books published by the MAA and AMS will be sold for cash prices somewhat below the usual prices when these same books are sold by mail. These discounts will be available only to registered participants wearing the official meeting badge. Visa and MasterCard credit cards will be accepted for book sale purchases at the meeting. The book sales will be open the same days and hours as the Joint Mathematics Meetings Registration Desk.

Information

Information on the publications and activities of the MAA and AMS may be obtained at the AMS/MAA Information Section of the Registration Desk. Also available at the Registration Desk is information on audio-visual aids, baggage and coat checking, lost and found, check cashing, and local information.

MINI-COURSES

Mathematical Models in Political Science

The Use of Computers to Teach Mathematics

On Thursday and Friday evenings, 7:00 p.m.-9:00 p.m., there will be offered mini-courses on **mathematical modeling** and on **microprocessors in mathematics instruction.** The mini-course on modeling will be presented by Steven J. Brams, Professor of Politics, New York University, and Philip D. Straffin, Jr., Professor of Mathematics, Beloit College. The mini-course on microcomputers will be offered by Klaus E. Eldridge and Donald O. Norris, both of Ohio University.

The mini-courses are open only to persons who have registered for the Joint Mathematics Meetings and paid the registration fee. The mini-courses have separate registration fees of $15 each, and each is limited to 30 participants. Since the mini-courses run concurrently, it will not be possible to register for both.

The modeling course will take a case-study approach in which participants will create and refine their own models. This course will introduce several types of combinatorial, game-theoretic, and axiomatic models which have proved important in modern political science. There will be four semi-independent lectures: "Models of voting power" (Straffin), "More equilibrium concepts for non-zero sum games and their applications" (Brams), "Axiomatic analysis of voting systems" (Straffin), "Mathematical properties of approval voting" (Brams). Suggested readings are Brams' **Paradoxes in Politics,** Free Press, 1976; Brams' **The Presidential Election Game,** Yale University Press, 1978; and Straffin's **Topics in Voting Theory,** Birkhauser, Boston, 1980.

The microcomputer course will include a brief introduction to BASIC and show how computers can be used in a variety of courses. Microcomputers will be available for use by the participants.

The mini-course on modeling will be held in Room 14, Convention Center and the mini-course on microprocessors will be held in Room 15, Convention Center.

Exhibits

The book and educational media exhibits will be located in the North Bay Exhibit Area of the Convention Center, and will be open from Wednesday, January 13, through Saturday, January 16. The exhibits will be open from 1:00 p.m. to 5:00 p.m. on Wednesday, from 9:00 a.m. to 5:00 p.m. on Thursday and Friday, and from 9:00 a.m. to noon on Saturday. All participants are encouraged to visit the exhibits during the meeting.

Meetings of Other Organizations

The **American Mathematical Society** (AMS) will hold sessions beginning on Wednesday, January 13. That evening the 1982 Gibbs Lecture will be presented by Elliott W. Montroll of the University of Rochester. The Society will also sponsor four Colloquium lectures by Dennis Sullivan.

The sessions of the Society will be preceded by a Short Course, entitled "Computed Tomography," on Monday and Tuesday, January 11 and 12. This Short Course will be under the direction of Lawrence A. Shepp of Bell Telephone Laboratories.

The AMS will present a panel discussion "Mathematics and Applications" at 7:00 p.m. on Thursday, January 14. The purpose is to present a sampling of the broad spectrum of exciting mathematics being done outside mathematics departments. Presentors will include Richard C. DiPrima, Kennan T. Smith, Robert DeHoff, Henry O. Pollak, Joan R. Rosenblatt, and Daniel J. Kleitman.

A meeting of department heads will be held at 4:30 p.m. on Friday, January 15. Wendell H. Fleming and Gail S. Young will speak to the title "Problems Facing Undergraduate and Graduate Programs in Mathematics."

The **Association for Women in Mathematics** (AWM) will sponsor a panel discussion at 11:15 a.m. on Thursday, January 14, to be immediately followed by the AWM Business Meeting.

The third annual AWM Emmy Noether Lecture will be given at 10:00 a.m. on Friday morning, January 15 by Julia Robinson.

The Conference Board of the Mathematical Sciences (CBMS) and the **Rocky Mountain Mathematics Consortium** will cosponsor a symposium on "Mathematics in Natural Resources Management" at 2:00 p.m. on Friday, January 15. The organizer and moderator is Robert W. McKelvey. Speakers are Yakov Haimes, Gordon Munro, Maureen Cropper, and Ralph d'Arge.

The **CBMS Council** will meet from 9:00 a.m. until 4:00 p.m. on Saturday, January 16. This meeting will be held in the Garfield Room of the Westin Hotel.

The **Board of Directors of the Rocky Mountain Mathematics Consortium** will meet at 2:00 p.m. on Thursday, January 14, in the Garfield Room of the Westin Hotel.

The **National Science Foundation** (NSF) will be represented at a booth in the exhibit area. Staff members will provide counsel and information on NSF programs of interest to mathematicians from 9:00 a.m. to 5:00 p.m., Thursday through Saturday, January 14-16.

William G. Rosen of NSF will talk on "The Budgetary Outlook" Wednesday, January 13 from 4:30 p.m. to 5:30 p.m. in the North Meeting Room of the Convention Center.

MAA PROGRAM

THURSDAY, January 14

9:00 a.m.-4:00 p.m.
Taft Room, Westin Hotel
MAA Board of Governors

7:00 p.m.-9:00 p.m.
Room 14, Convention Center
MAA Mini-Course #1: "Mathematical Models in Political Science"

7:00 p.m.-9:00 p.m.
Room 15, Convention Center
MAA Mini-Course #2: "The Use of Computers to Teach Mathematics"

7:00 p.m.-9:00 p.m.
Taft Room, Westin Hotel
MAA Section Officers Meeting

7:00 p.m.-7:50 p.m.
North Meeting Room, Convention Center
"Video Tapes for Review and Supplementary Instruction," **John B. Monroe,** Community and Technical College of the University of Akron and **Cynthia P. Yang,** Miami University-Middletown

8:00 p.m.-9:30 p.m.
North Meeting Room, Convention Center
The CBMS Undergraduate Survey Results "Universities and Four-Year Colleges," **Wendell H. Fleming,** Brown University; "Two-Year Institutions," **Donald J. Albers,** Menlo College

FRIDAY, January 15

9:00 a.m.-9:50 a.m.
North Meeting Room, Convention Center
"Iterated Maps of the Interval," **John W. Milnor,** Princeton University

9:00 a.m.-10:50 a.m.
Room 2, Convention Center
Panel Discussion: "Articulation Efforts Between Universities and Schools"
Presider: **Henry L. Alder,** University of California, Davis
Presentors: **Philip C. Curtis, Jr.,** University of California at Los Angeles; **Joan P. Leitzel,** Ohio State University; **Franklin P. Wilbur,** Syracuse University

10:00 a.m.-10:50 a.m.
North Meeting Room, Convention Center
Panel Discussion: "NSF Research Institutes: Current Status and Expectations"
Presider: **Richard D. Anderson,** Louisiana State University
Presentors: **Calvin C. Moore,** University of California at Berkeley; **William G. Rosen,** National Science Foundation; **Hans F. Weinberger,** University of Minnesota

11:00 a.m.-11:50 a.m.
North Meeting Room, Convention Center
Retiring Presidential Address "Mathematical Expectations," **Dorothy L. Bernstein,** Brown University

5:30 p.m.
Cash Bar, Stouffer's Cincinnati Towers

7:00 p.m.-9:00 p.m.
Room 14, Convention Center
Continuation of MAA Mini-Course #1, "Mathematical Models in Political Science"

7:00 p.m.-9:00 p.m.
Room 15, Convention Center
Continuation of MAA Mini-Course #2, "The Use of Computers to Teach Mathematics"

7:00 p.m.-8:00 p.m.
Room 5, Convention Center
Open Meeting: "Secondary School Lectureship Programs"
Presider: **Donald B. Small,** Colby College

Program Committee: Andrew Sterrett, Jr., Chairman; William H. Beyer, Jessie Ann Engle, J. Douglas Faires, Donald O. Koehler, Alan C. Lazer, Joan P. Leitzel, Edward P. Merkes, James H. Wells, Marion D. Wetzel.

SATURDAY, January 16

9:00 a.m.-9:50 a.m.
North Meeting Room, Convention Center
"What Do I Know? Current States of One's Knowledge in the Mathematical Fields," **Philip J. Davis,** Brown University

9:00 a.m.-9:50 a.m.
Room 2, Convention Center
"Luzitania: The Birth of Soviet Topology," **Douglas E. Cameron,** University of Akron

10:00 a.m.-10:50 a.m.
North Meeting Room, Convention Center
"Answers Needed Yesterday: Computing in an Industrial Research Setting," **Phyllis A. Fox,** Bell Telephone Laboratories

10:00 a.m.-10:50 a.m.
Room 2, Convention Center
"How Computer Animation Changes My Views of Teaching and Research," **Thomas F. Banchoff,** Brown University

11:00 a.m.-11:50 a.m.
North Meeting Room, Convention Center
"A Tales of Lanczos: Large and Inexact Matrix Computations," **Jane K. Cullum,** International Business Machines Corporation

11:00 a.m.-11:50 a.m.
Room 2, Convention Center
"Historical Notes on the Calculus," **V. Frederick Rickey,** Bowling Green State University

7:00 p.m.-10:00 p.m.
North Meeting Room, Convention Center
Special Session: "Computers in the Undergraduate Mathematics Curriculum: Experiments, Project Reports, and the National Consortium on Uses of Computers in Mathematical Sciences Education"

Presider: **Ronald H. Wenger,** University of Delaware

Presentations: "Computer-based Calculus and Stimulation Models for the Study of Sustained Harvest Policies," **John G. Bergman,** University of Delaware; "Intelligent CAI in Pre-Calculus Mathematics," **Eugene A. Herman,** Grinnell College; "Integrating Computing into the Mathematics Curriculum: A Report on the St. Olaf College CAUSE Program," **Lynn A. Steen** and **J. Arthur Seebach,** St. Olaf College

SUNDAY, January 17

9:00 a.m.-9:50 a.m.
North Meeting Room, Convention Center
"Recent Solutions of Problems Posed by J. E. Littlewood and N. N. Lusin," **O. Carruth McGehee,** Louisiana State University

9:00 a.m.-9:50 a.m.
Room 2, Convention Center
"Putting Calculus in its Place—A New Curriculum for the First Two Years of College Mathematics," **Anthony Ralston,** State University of New York at Buffalo

10:00 a.m.-10:50 a.m.
North Meeting Room, Convention Center
Business Meeting of the Association

11:00 a.m.-11:50 a.m.
Room 2, Convention Center
"Mathematics Service Courses Can Be Fun—For Students and For You!," **Ronald M. Davis,** Northern Virginia Community College

11:00 a.m.-11:50 a.m.
North Meeting Room, Convention Center
"Noncomputability in Models of Physical Phenomena—Computable Differential Equations With No Computable Solution," **Marion B. Pour-el,** University of Minnesota, Minneapolis

1:00 p.m.-4:00 p.m.
North Meeting Room, Convention Center
Session Dedicated to the Mathematics of Martin Gardner

Presider: **Doris W. Schattschneider,** Moravian College

1:00 p.m.-1:50 p.m.
"The Game of Dots and Boxes," **Elwyn R. Berlekamp,** University of California at Berkeley

2:00 p.m.-2:50 p.m.
"Algebraic Theory of Penrose's Non-Periodic Tilings of the Plane," **N. G. deBruijn,** Technical University at Eindhoven, Netherlands

3:00 p.m.-3:50 p.m.
"My Life Among the Polyominoes," **David A. Klarner,** State University of New York at Binghamton

Secondhand Book and Journal Exchange

At the Joint Books and Journals display in the exhibit area, notebooks will be available with lists of books on mathematics for sale or being sought. There will be separate notebooks of books for sale and books wanted with names and addresses of the owners (or seekers). The details of the transactions themselves are to be arranged by the participants, and the MAA and AMS will not accept responsibility for settling disputes if arrangements go awry.

It is necessary to charge a small fee to cover the cost of preparing the notebooks. Each person participating is asked to pay $2 for the first page, and $1 for each additional page (one side is one page). Books for sale must be listed on separate pages from books wanted (as many of either per page as one wishes), and the lists made up on 8.5 inch by 11 inch pages.

Please include the information below:

Books Offered: Name, address, telephone, will or will not be at the meeting. Author, title, publisher, year of publication, condition of book (for example slightly used, annotated lightly or heavily, like new), price or books wanted in trade.

Books Wanted: Name, address, telephone, will or will not be at the meeting. Author, title, publisher, edition, price one is willing to pay.

Lists may be sent to the Promotion Department of the Society until January 6, 1982, or may be brought to the meeting. If brought to the meeting, two copies of each page should be supplied so that duplicate notebooks can be maintained.

Please send your lists to: Promotion Department, AMS, Post Office Box 6248, Providence, Rhode Island 02940. Make checks payable to the AMS. If you have any questions call Phcebe Murdock, 401-272-9500, extension 237.

Mail and Telephone Messages

All **mail and telegrams** for persons attending the meetings should be addressed to the participant, % Joint Mathematics Meetings, Greater Cincinnati Convention and Visitors Bureau, 200 West Fifth Street, Cincinnati, Ohio 45202. Mail and telegrams so addressed may be picked up at the mailbox in the registration area during the hours the Registration Desk is open. U.S. mail not picked up will be forwarded after the meeting to the mailing address given on the participant's registration record.

A **telephone message center** will be located in the registration area to receive incoming calls for participants. The center will be open from January 12 through 16 only, during the same hours as the Joint Mathematics Meetings Registration Desk. Messages will be taken and the name of any individual for whom a message has been received will be posted until the message has been picked up at the message center.

Proposed Amendment

(Article IV Paragraph 8)

The Association shall, to the extent allowed by law, indemnify any member or former member of the Board of Governors or any other committee of the Association against expenses (including attorney's fees), judgements, fines and amounts paid in settlement actually and reasonably incurred by such member in connection with the defense of any action, suit, or proceeding in which he or she is made a party by reason of having been a member and having acted in good faith as a member of the Board of Governors or other committee. The Association may purchase and maintain insurance on behalf of such member to provide for indemnifying him or her against such liabilities.

Transparencies

All speakers should prepare transparencies in advance of their talk and, in so doing, should utilize the advice of their colleagues and members of their professional staff. Those speakers who neglect this responsibility will also find minimal necessary materials and copying machines at this section of the Registration Desk. A member of the staff will assist and advise speakers on the best procedures and methods for preparation of their material. There is a modest charge for these materials.

Visual Index

An alphabetical list of registered participants, including local addresses, and arrival and departure dates, is maintained in the registration area.

Entertainment

The Local Arrangements Committee is arranging a cash-bar social at 5:30 p.m. on Friday, January 15. This event will take place at Stouffer's Cincinnati Towers. Details will be available at the meeting.

Suggestions

A log for registration of comments about the meeting is available at the Registration Desk. Participants are encouraged to share suggestions for improvements in the meeting format or services and thus contribute to the success of future meetings.

Travel

In January, Cincinnati is on Eastern Standard Time. There is regular airline service to the Greater Cincinnati International Airport by several major airline carriers.

> Participants should be aware that there are many special air fares available to Cincinnati which are less expensive than the ordinary economy class fares. Most apply only to a limited number of seats on each aircraft, and are available on a first-come, first-served basis, so reservations should be made as early as possible. Also, participants should be aware that airline fares have been increasing every two or three months, so that in order to guarantee receiving a fare quoted on the day the reservation is made, one should purchase the tickets as soon as possible.

The airport in Cincinnati is 13 miles from the city center and the trip takes about 20 minutes. The present cost of the limousine is $5.50 one way, and $9 round-trip. Taxis cost about $13.50 for one to five passengers. All major car rental agencies have desks at the airport.

River Road Station is served by Amtrak with daily trains east to Washington, D.C., and northwest to Chicago.

Cincinnati can be reached via I-75 from Tampa, Atlanta, and Knoxville; via I-74 from Indianapolis; and via I-71 from Louisville.

Local Information

The Cincinnati Art Museum features permanent collections that encompass almost every major civilization over the last 5,000 years. The Cincinnati Zoo features more than 600 species in open natural exhibits. Other points of interest include the Taft Museum, the Krohn Conservatory, the Planetarium and Natural History Museum.

The Cincinnati Symphony and the Cincinnati Ballet will be performing during the meeting period.

The Avon Women's Championship Tennis Tournament will be at the Riverfront Coliseum (C on the map on page viii) in Cincinnati while the mathematics meetings are taking place. The promoters of the tournament (which is sponsored by the Junior League) have agreed to make available to participants a limited number of discount coupons worth $2.50 against the regular prices of tickets for the Friday, January 15, evening matches. These matches are the quarter-final round, and will begin at 6:00 p.m. Ticket prices are $10, $7.50, and $5. Children 12 years of age and under are charged $1.50 less. Players such as Martina Navratilova, Tracy Austin, and Chris Evert Lloyd have participated in previous Avon tournaments held in Cincinnati. Interested parties should inquire at the Local Information section of the Registration Desk.

Taxis presently cost $1.45 for the first mile and 70 cents each additional mile. Queen City Metro operates buses throughout the area. Fares range from 15 cents to 50 cents depending upon distance traveled.

Weather

The mean daily maximum and minimum temperature for January are, respectively, 40°F and 22°F. The evening temperature is below freezing most days in January.

Hotel Accommodations

The rates listed on the Housing Form are subject to a 9 percent city hotel tax if the hotel is in Cincinnati. If the hotel is in Kentucky, the tax is 7.625 percent. The number after the name of the hotel is the number it carries on the map (page viii). The estimated walking distance from the hotel to the Convention Center is given in parentheses following the telephone number. The Greater Cincinnati Convention and Visitors Bureau will provide free shuttle bus service to participants staying at the hotels in Kentucky.

In all cases "single" refers to one person in one bed; "double" refers to two persons in one bed; "twin" refers to two persons in two single beds; and "twin double" refers to two persons in two double beds. A rollaway cot for an extra person can be added to double or twin rooms only.

Stouffer's Cincinnati Towers (1) (Headquarters Hotel), 141 West Sixth Street, Cincinnati, Ohio 45202. Telephone: 513-352-2100 (adjacent to Convention Center).

Cincinnati Club (7), 30 West Garfield Place, Cincinnati, Ohio 45202. Telephone: 513-352-5400 (10 minutes)

Holiday Inn Downtown (5), 800 West 8th Street, Cincinnati, Ohio 45203. Telephone: 513-241-8660 (20 minutes)

Holiday Inn Riverfront (6), Third and Philadelphia, Covington, Kentucky 41011. Telephone: 606-291-4300

Quality Inn-Riverview (2), 666 Fifth Street, Covington, Kentucky 41011. Telephone: 606-491-1200

Terrace Hilton (3), 6 West Sixth Street, Cincinnati, Ohio 45202. Telephone: 513-381-4000

Westin Hotel (4), Fountain Square, Cincinnati, Ohio 45202. Telephone: 513-621-7700 (5 minutes)

Child Care

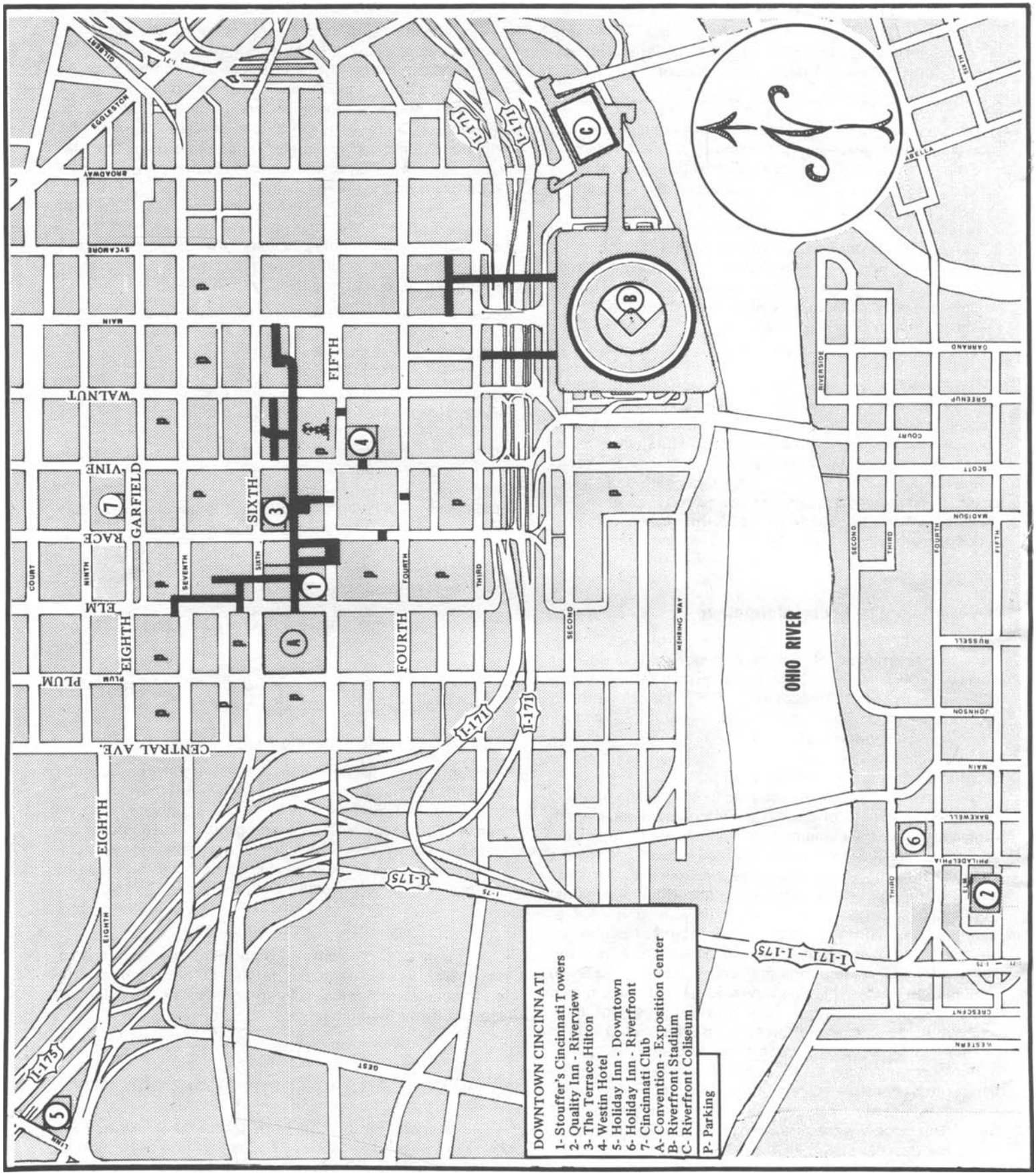
Arrangements for child care in hotel rooms may be made by calling Family Care, Inc., Rock-a-bye Sitters Registry, at 513-721-7440 from 9:00 a.m. to 5:00 p.m., Monday through Friday. Contacts could be made prior to evenings or the weekend for service at those times. At the Stouffer's Cincinnati Towers, arrangements for child care can be made by calling the hotel's Hospitality Center at 513-352-2134.

Parking

Throughout the downtown area there are numerous inexpensive parking garages operated by the city or the department stores. Additional long-term parking is available at the Riverfront Stadium lot.

Local Arrangements Committee

The members of the Local Arrangements Committee are Frank T. Birtel (ex officio), S. Elwood Bohn, Thomas J. Bruggeman, Milton D. Cox, Robert M. Dieffenbach, Richard G. Laatsch, William J. Larkin, III, William J. LeVeque (ex officio), Maita Levine (publicity director), H. David Lipsich, Edward P. Merkes (chairman), Raymond H. Rolwing, and David P. Roselle (ex officio).



Please note that the heavy black lines represent the "SKYWALK", a system of covered walkways one floor above city traffic, connecting some of the hotels with the Cincinnati Convention & Exposition Center, area theaters, and restaurants.

PREREGISTRATION AND HOUSING FORM, CINCINNATI, OHIO

AMS Short Course
January 11–12, 1982

Joint Mathematics Meetings
January 13–17, 1982

MAA Minicourses
January 14–15, 1982

MUST BE RECEIVED IN PROVIDENCE NO LATER THAN DECEMBER 15, 1981
(For applicants wishing to participate in the Employment Register, the deadline is December 1.)

Please complete this form and return it with your payment to
MATHEMATICS MEETINGS HOUSING BUREAU
P. O. Box 6887, Providence, Rhode Island 02940, Telephone: (401) 272-9500, Ext. 239

PREREGISTRATION: Deadline for receipt of preregistration fee(s) is December 15, 1981.
HOUSING BUREAU SERVICES: Participants desiring to obtain confirmed reservations for hotel accommodations MUST PREREGISTER BY THE DEADLINE OF DECEMBER 15.
CANCELLATIONS: To cancel a confirmed hotel reservation, please write to the Mathematics Meetings Housing Bureau at the above address, or call the telephone number above, prior to January 8. Also note that 50% only of preregistration fee(s) is refundable if notification is received in Providence on or before January 8.

Please affix AMS or MAA mailing label here.
If none, complete 1–3 below.

	REGISTRATION FEES	
	Preregistration (by mail prior to 12/15)	At Meeting
JOINT MATHEMATICS MEETINGS		
Member of AMS, MAA	$34	$48
*Student, Unemployed, or Emeritus	$ 8	$12
Nonmember	$52	$74
AMS SHORT COURSE		
Member/Nonmember	$25	$30
*Student or Unemployed	$ 5	$10
MAA MINICOURSE #1	$15	$15
MAA MINICOURSE #2	$15	$15
EMPLOYMENT REGISTER		
Employer Fee	$20	$30

*All full-time students currently working toward a degree or diploma qualify for the student registration fees, regardless of income. The unemployed status refers to any person currently unemployed, actively seeking employment, and who is not a student. It is not intended to include persons who have voluntarily resigned from their latest position. Persons who qualify for emeritus membership in either the AMS or MAA may register at the emeritus rate.

PREREGISTRATION SECTION: Please check the function(s) for which you are preregistering:

Joint Mathematics Meetings [ ]
AMS Short Course [ ]
MAA Minicourse #1 [ ]
MAA Minicourse #2 [ ]
(please do not register for both)

Employment Register – Applicant (no charge) [ ]
NOTE: Applicants who wish to be included in the special issue of EIMS must submit applicant forms with preregistration form and fee BY DECEMBER 1.
Employment Register – Employer (fee $20) [ ]
Please be sure to complete and return herewith the appropriate Employment Register form (see pages_____and_____.)

1) _____
NAME (Please print) surname first middle

2) AMS member code_____or MAA member code_____

3) _____
ADDRESS number and street city state zip code

4)_____
ADDRESS FOR CONFIRMATION OF ROOM RESERVATION IF OTHER THAN ABOVE

5) Employing institution_____Unemployed [ ]

6) I am a student at_____(7) Name of spouse_____
(List if accompanying to meeting)

8) Accompanying children (number)_____(names, ages, sexes)_____

9) Member of AMS [ ], MAA [ ], NONMEMBER [ ] (Member discount applies only to members of AMS or MAA.)
Member of other organizations: AWM [ ], MAG [ ], NAM [ ]

10) Joint Meetings fee enclosed $_____
11) AMS Short Course fee enclosed $_____
12) Employer fee enclosed $_____
13) MAA Minicourse fee enclosed $_____

14) TOTAL AMOUNT ENCLOSED FOR 10 THROUGH 13 $_____ (Please make all checks payable to AMS.)

A $4 charge will be imposed for all invoices prepared when preregistration/housing forms are submitted without accompanying check(s) for preregistration fee(s), or are accompanied by an insufficient amount.

[ ] Check here if you will not require a room.

PLEASE BE SURE TO COMPLETE THE HOUSING SECTION ON NEXT PAGE IF YOU WILL REQUIRE A ROOM.

PREREGISTRATION AND HOUSING FORM, CINCINNATI, OHIO

Housing Section **January 1982**

Please indicate at least five choices in order of preference by writing 1, 2, 3, etc., in spaces at left on form and by circling the requested type of room and rate. If the rate requested is no longer available, you will be assigned a room at the same hotel at the next available rate. However, if all rooms in that category are filled, room assignment will be made at the next hotel ranked. If not all hotels are ranked, and all rooms have been filled at the ranked hotels, the assignment will be made at an unranked hotel with the next lowest rate.

1) Name _____ Full Address _____ (for confirmation)

2) Will arrive (date) _____ (hour) _____ a.m./p.m. and depart (date) _____ (hour) _____ a.m./p.m.

3) Please secure accommodations as ranked below:

[Confirmation will be sent only to individual submitting form.]

Order of choice	Name of Hotel (Numbers in parentheses indicate location on map shown on page viii.)	Single $	Double $	Twin $	Twin Double $	Triple $	Quad $	Suite(s) $
	Cincinnati Club (7)	30, 31, 33, 34, 36, 41, 42	39, 40, 42, 43, 45, 50, 51	39, 40, 42, 43, 45, 50, 51	N/A	46, 47, 49, 50, 52, 57, 58	N/A	N/A
	Holiday Inn – Downtown (5)	37, 41, 43	47	N/A	47	53	59	
	Holiday Inn – Riverfront (6)	36, 39, 42	45	N/A	45	51	57	
	Quality Inn – Riverview (2)	45	55	55	55	60	65	
	Stouffer's (1)	39	49	49	49	55	61	86–240
	Terrace Hilton (3)	45	N/A	57	57	69	N/A	
	Westin (4)	55	N/A	N/A	55	70	85	200–650

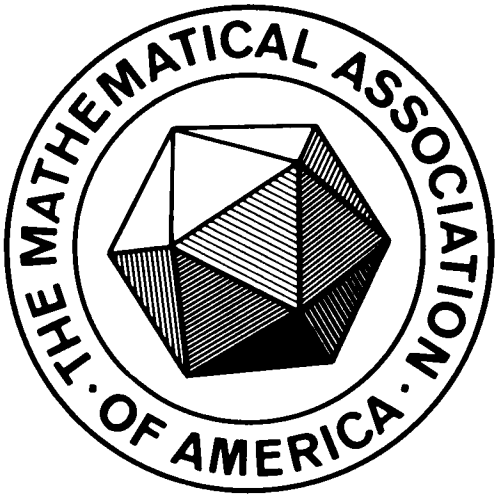
4) List other room occupants, if sharing with other than spouse

FULL NAME — Arrival date and hour — Departure date and hour

_____

_____

_____



Visit the MAA Booksale While You Are at the Meeting . . .

Save 20% off both the member and list prices by buying at the meeting.

If you are not already an MAA member, JOIN NOW and purchase your MAA books for member's prices, less 20%. Application forms are available at the MAA Booksale.

Look for these recently published MAA books.

New Mathematical Library #28
THE MATHEMATICS OF GAMES AND GAMBLING
by Edward W. Packel

List: ~~$8.75~~ MAA Member: ~~$7.00~~
List: $7.00 MAA Member: $5.60

Dolciani Mathematical Expositions #5
GREAT MOMENTS IN MATHEMATICS BEFORE 1650
by Howard Eves

List: ~~$22.00~~ MAA Member: ~~$17.00~~
List $17.60 MAA Member: $13.60

THE WILLIAM LOWELL PUTNAM MATHEMATICAL COMPETITION: PROBLEMS AND SOLUTIONS, 1938-1964
Compiled by A. M. Gleason, R. E. Greenwood, and L. M. Kelly

List: ~~$35.00~~ MAA Member: ~~$26.00~~
List: $28.00 MAA Member: $20.80

A BASIC LIBRARY LIST FOR TWO-YEAR COLLEGES
Prepared by the Committee on Basic Library Lists

List: ~~$8.00~~ MAA Member: ~~$6.00~~
List: $6.40 MAA Member: $4.80

RECOMMENDATIONS FOR A GENERAL MATHEMATICAL SCIENCES PROGRAM
Prepared by the Committee on the Undergraduate Program in Mathematics

Price: ~~$3.50~~
Price: $2.80

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mittee will be responsible for compiling lists of possible courses and encouraging Sections to put on mini- and short-courses by verbal encouragement, by identifying potential courses, and by administering possible MAA subsidies.

Meeting Sites Approved

The Board approved meeting on the campus of SUNY at Albany, August 8-12, 1983. With this addition, the dates and sites of future joint AMS-MAA meetings are:

Cincinnati, Ohio	January 13-17, 1982
Toronto, Canada	August 23-27, 1982
Denver, Colorado	January 5-9, 1983
SUNY at Albany	August 8-12, 1983
Louisville, Kentucky	January 25-29, 1984
Anaheim, California	January 9-13, 1985
San Antonio, Texas	January 21-25, 1987

MAA Elections Underway

Early in October, ballots for election of a new MAA President-Elect and First Vice-President were mailed to all MAA members. The nominee for President-Elect is Ivan Niven of the University of Oregon. The Vice-Presidential candidates are Ronald L. Graham of Bell Telephone Laboratories and Leon A. Henkin of the University of California, Berkeley. Biographical data on the MAA activities of these candidates were included with the ballots. Write-in votes will be accepted.

In order to be included in the final tally, ballots must either be postmarked not later than December 31, 1981 or handed to MAA Secretary David P. Roselle before the Annual Business Meeting in Cincinnati at 10:00 a.m. on January 17, 1982. The results of the election will be announced at the Business Meeting.

CUPM Makes Recommendations on Minimal Competencies

Many colleges and universities have recently been examining their policies with regard to general education and core curricula. This activity has been sustained by deep concern about the quality of graduates' knowledge of the fundamental disciplines, including mathematics.

To assist in these efforts, early in 1978 the Committee on the Undergraduate Program in Mathematics (CUPM) formed a Panel on Minimal Competencies. The primary task of the Panel was to answer the question: What should every college graduate know of mathematics? This question was raised again at the PRIME-80 Conference held by the MAA in Spring 1978 where the following recommendations were adopted:

- New efforts should be made to define, or redefine, the essential mathematical skills that are needed by every citizen.
- Every college graduate should have some minimal knowledge of the mathematical sciences.

As its work progressed, the Panel reached the conclusion that an explicit and detailed answer to this question would almost certainly be unrealistic, in view of the great diversity of the missions and traditions of American institutions of higher education. Nevertheless, the Panel did formulate the following general recommendations:

Recommendation A. All college graduates, with rare exceptions, should be expected to have demonstrated reasonable proficiency in the mathematical sciences. Every college or university should therefore formulate, with adequate concreteness, what this "reasonable proficiency" should mean for its students, define how students should demonstrate this proficiency, and establish this demonstration as a degree requirement.

Competence in arithmetic and some facility in making applications in everyday life might be a reasonable graduation requirement for two-year college students in terminal and vocational programs.

Four-year colleges and universities should normally require, perhaps on entrance, not only these but elementary algebra and elementary geometry. They should also expect graduates to understand and be able to use some elementary statistical ideas, to be aware of the place of mathematics in society generally, and to appreciate the nature and societal significance of computing. This applies also to two-year college students in university parallel curricula.

Recommendation B. Whether or not stipulated proficiency is tested by examination, courses should be made available in which it may be acquired. These courses should be taught by effective instructors, and should be designed to be appealing and significant to the students.

Recommendation C. In particular, one or more courses of a remedial nature should be available where there is a need. Such courses, by definition, ordinarily present precollege material, but it should be presented in a way suitable to the clientele. In institutions where it is considered improper or impossible to offer remedial courses, mastery of the mathematics should be assured either by entrance requirements or by referring students to other schools where remedial courses can be taken.

Recommendation D. While almost all undergraduate courses in mathematics should give attention to applications and to historical and philosophical aspects of the subject, there should be one or more courses that concentrate on these aspects while remaining accessible to students with little mathematical background.

Recommendation E. Individual interests often lead students to take a considerable amount of post-secondary mathematics in conventional courses. These students should also be able to take a course of the kind described in Recommendation D, but presupposing more mathematical background.

In addition to these recommendations, the complete Panel report also contains summary information about the results of the surveys conducted by the Panel, comments on the relationship of its work to that of other MAA committees, and suggestions about the implementation of the recommendations. This report is scheduled to appear in a forthcoming issue of the *American Mathematical Monthly.*

The members of the Panel are Gerald L. Alexanderson, University of Santa Clara; Robert J. Bumcrot, Hofstra University; Edwin H. Spanier, University of California, Berkeley; Juanita J. Peterson, Peralta Community College; and Donald W. Bushaw (chairman), Washington State University.

Open Meeting on Secondary School Lectureship Programs

Section Officers and other individuals interested in exploring the possibility of initiating secondary school lectureship programs in their Sections are cordially invited by the MAA Committee on Secondary School Lectures to attend an Open Meeting on Friday, January 15 at the MAA Annual Meeting in Cincinnati, Ohio. The purpose of this meeting is to encourage more MAA Sections to develop secondary school lectureship programs by providing a forum for the exchange of ideas on how to start and run such a program.

Currently, eleven out of the twenty-nine MAA sections report operating secondary school lectureship programs: Allegheny Mountain, Florida, Illinois, Metro New York, Michigan, Missouri, New Jersey, Northern California, Oklahoma-Arkansas, Rocky Mountain, and Texas. These Sections have generally found their secondary school lectureship programs to be a challenging and effective way to encourage high school students to continue their study of mathematics and to consider mathematical careers.

To provide additional assistance to fledgling secondary school lectureship program directors, the Committee is in the process of preparing a Lecture Program Development Kit which it expects to complete by Spring 1982. This kit will contain guidelines on the establishment of a lectureship program, suggestions on day-to-day administration, sample brochures describing a typical program and listing typical lecture topics, sample request forms and report forms, and samples of other routine correspondence connected with the running of a program.

The Committee has also looked outside of the MAA for new ideas on how to run a secondary school lectureship program. Last Spring, questionnaires were mailed to all Chairmen of Departments of Mathematical Sciences in the United States and to some in Canada and Mexico. Responding program coordinators were then asked to supply additional details about their programs. As a result, a large number of individuals who are interested in organizing or participating in lecture programs were identified and detailed information on sixty-five programs was gathered.

Only five statewide lectureship programs, other than those sponsored by MAA Sections, were found. These programs are sponsored by State Academies of Science, State Departments of Education, State Councils of Teachers of Mathematics, etc. The balance of the programs on which information was collected are sponsored by individual colleges or universities and frequently cover relatively small geographical areas. These programs usually operate on severely limited budgets, often counting on the generosity of the host institution for clerical help, and postage, telephone, and printing expenses. Only about half of the programs pay any travel expenses to their speakers. Not surprisingly, program directors cited funding as one of their biggest problems, along with the problem of encouraging secondary schools to take advantage of their programs.

Factors which contributed to the success of the programs included, of course, the ability of the speaker to communicate with his audience, and the choice of lecture topic—students appeared to be most interested in career-oriented talks, talks involving computers, expecially if some "hands-on" experience was provided, and talks with good audio-visual illustrations.

The Committee on Secondary School Lectures is also responsible for the MAA's *Women and Mathematics* (WAM) and *Blacks and Mathematics* (BAM) programs. These programs are specifically designed to encourage women and minorities to consider careers in mathematics.

Members of the Committee are: Donald B. Small (Chairman), Colby College; Edward Z. Andalafte, University of Missouri-St. Louis; Marjorie M. Enneking, Portland State University; Gloria F. Gilmer, National Institute of Education, Washington, D.C.; John M. Jobe, Oklahoma State University; and William K. McNabb, Cluster Coordinator, Skyline Center, Dallas.

from the maa . . .

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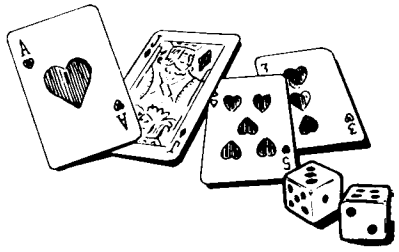

Congressional Science Fellowship Applications Invited

Applications are now being accepted for the 1982-83 Congressional Science Fellowship sponsored by the American Mathematical Society, Mathematical Association of America, and Society for Industrial and Applied Mathematics. The AMS-MAA-SIAM Fellow will spend one year, starting September 1, 1982, working in Washington, D.C. on the staff of a congressman or a congressional committee or in the congressional Office of Technology Assessement. The stipend is $22,000. A small additional amount may be included for relocation and travel expenses. The stipend may be supplemented by sabbatical salary or other employer contribution.

The AMS-MAA-SIAM Fellow will serve along with about thirty Fellows sponsored by other scientific societies under a program coordinated by the AAAS. The AAAS will conduct an intensive two-week orientation and interview procedure during which the Fellows will encounter many facets of Congress, the Executive Branch, and the people and organizations in Washington, D.C. AAAS staff members will assist Fellows in selecting their assignments for the year and will remain in frequent and regular contact with Fellows throughout the year, providing advice and assistance as needed.

Dr. Cheryl G. Tropf, the 1980-81 AMS-MAA-SIAM Fellow, spent her fellowship year as a professional staff member of the Subcommittee on Science, Technology, and Space of the Senate Committee on Commerce, Science, and Transportation. The Subcommittee is chaired by Senator Harrison H. Schmitt (R, N.M.). Dr. Tropf was the lead staff person for the Committee for the National Climate Program, Earthquake Hazards Reduction Program, National Bureau of Standards, and parts of the National Oceanic and Atmospheric Administration. She was also responsible for the oversight area of strategic minerals and materials. Her work involved setting up hearings, focusing the witnesses' testimony, preparing briefing memos and books, and briefing Senator Schmitt. She also drafted reauthorization bills and presented them at Committee executive sessions.

The AMS-MAA-SIAM Fellowship is awarded competitively to a mathematically trained person at the postdoctoral to mid-career level without regard to sex, race, or ethnic group. Selection is made by a panel of the AMS-MAA-SIAM Joint Projects Committee for Mathematics with the cooperation of the AAAS. Candidates should have demonstrated exceptional competence in some area of the mathematical sciences. They should also have a broad scientific and technical background and a strong interest in the uses of the mathematical and other sciences in the solution of societal problems.

Applications for the AMS-MAA-SIAM Fellowship should be sent to: Conference Board of the Mathematical Sciences, 1500 Massachusetts Avenue, N.W., Suite 457-458, Washington, D.C. 20005. Applications should contain a résumé, a summary of the applicant's qualifications for the Fellowship, and a statement of the applicant's reasons for wanting to be a Congressional Science Fellow. The deadline for receipt of applications is February 15, 1982. The applicant should arrange for three letters of recommendation to be sent to the address above, also by February 15. The award will be made by about April 1, 1982.

"People in the News" Coming in January

In January 1982 *FOCUS* will initiate a new column, "People in the News." This column will contain items on honors, awards, elections, and other national or regional recognitions received by MAA members and others in the mathematical community. *FOCUS* readers are encouraged to send items for this column to the *FOCUS* Editor at the MAA Washington Office. Pictures may be submitted and will be considered for publication if space permits.

Due to limitations in space, items about new appointments, promotions, sabbaticals, and retirements will not ordinarily be published in *FOCUS*. Readers may wish to submit items of these types to Section Newsletter Editors for publication in their Section Newsletters.

News of the deaths of members of the mathematics community will be published in *FOCUS* in a section entitled "In Memoriam."

Mathematics Symposia at AAAS Meeting

The Annual Meeting of the American Association for the Advancement of Science (AAAS), to be held January 3-8, 1982 in Washington, D.C., will include two symposia on mathematics-related issues of special interest to MAA members:

The Changing Role of the Mathematical and Computer Sciences in Pre-College Education

Monday, January 4, 9:00 a.m., Capital Hilton, New York Room

Questions to be explored at this symposium include the implications for the school curricula of the availability of low-cost electronic calculators and computers, education for computer literacy, and how arithmetic is changing under the impact of hand-held calculators. The session will be moderated by Truman Botts, Executive Director of the Conference Board of the Mathematical Sciences. The speakers will be Richard D. Anderson, MAA President, Peter J. Denning, President of the Association for Computing Machinery, James T. Fey of the University of Maryland, Stephen E. Fienberg of Carnegie-Mellon University, and Alphonse Buccino of the National Science Foundation.

The Developing Crisis in the Mathematics Classroom: Causes and Some Cures

Monday, January 4, 2:30 p.m., Capital Hilton, New York Room

The speakers will analyze the many causes of the critical shortage in this country of secondary science and mathematics teachers and suggest feasible solutions—in particular, how to attract qualified students to the teaching of mathematics and how to retain them in the profession. Presiding at this symposium will be MAA President Richard D. Anderson. The speakers will be Joan R. Leitzel of Ohio State University, W. Timothy Weaver of Boston University, Zalman P. Usiskin of the University of Chicago, and Harold R. Jacobs of Ulysses S. Grant High School, Van Nuys, California.

The AAAS program will also include over 150 other symposia, many on recent advances in science, medicine, and technology and their applications and significance. There will be nine public lectures dealing with popular aspects of science and a Science Film Festival featuring some 50 of the best recent science films.

For additional information on the AAAS Meeting, see the Pre-Convention Issue of *Science,* October 30, 1981, or write to AAAS Meetings Office, 1776 Massachusetts Avenue, Washington, D.C. 20036.

Caribbean Journal To Begin Publication

Starting in 1982, the University of the West Indies will commence publication of a new quarterly journal, *The Caribbean Journal of Mathematics.* The Editor-in-Chief, Charles Cadogan, has issued a call for papers. For information on submission of manuscripts, authors should write to: Professor Charles Cadogan, Caribbean Journal of Mathematics, University of the West Indies, P.O. Box 64, Barbados, West Indies.

The cost of an annual subscription will be $30 in U.S. funds or the equivalent.

South Africa *(continued from page 2)*

gambling being illegal in South Africa. The policy of returning the blacks to their homelands runs counter to the drive for rapid industrialization. Here is a perfect example of a policy which is generally agreed not to be working, but which is not so universally recognized as wrong.

South Africa is not a police state. It is a functioning democracy, albeit a terribly limited one with the franchise restricted to four million whites in a country of over thirty million inhabitants. There is a vigorous parliamentary opposition led by the Progressive Federal Party (of which that wonderfully courageous woman Helen Suzman is a leading member) and the opposition newspapers publish fearless and trenchant criticism of government policies and practices. I myself was interviewed in the press and on the radio and my most adverse comments were reproduced uncensored.

Some Preliminary Recommendations

A two-month visit does not make me an expert on South Africa, but I must record my belief that current policy among western intellectuals is mistaken. I believe that the policy of boycott is hurting the very people we want to help by encouraging the 'laager' mentality which ignores world opinion and concentrates on what it sees as the crucial issue of short-term survival. The constitutions of both SAMS and MASA specifically exclude any racial (or sex) bias. I advocate that we restore close relations with those organizations and their members in order to help them fight for equal educational opportunities for all the people of South Africa.

I further advocate visits to South Africa by constructive critics. That means, specifically, that I would like to see mathematicians and educators visit South Africa who genuinely want to help our liberal colleagues in that country to achieve change. I do not favor visits by destructive critics, nor by apologists for the regime, nor by those who would ignore the social and political aspects of South African life.

What I have recommended here is clearly not enough, but it would be a start in the right direction.

Acknowledgement

It is both an obligation and a pleasure to acknowledge the kindness and friendliness of everyone with whom I came in contact in South Africa, and the universal and good-natured acceptance of my right to argue and criticize.

Postscript. Professor Jean Pedersen of the University of Santa Clara was invited by MASA to speak at the Cape Town meeting and spent a few weeks in South Africa discussing geometry and the teaching of geometry. She enjoyed spectacular success among mathematics teachers and educators, not least during her presentation to some 150 secondary teachers in Soweto. I have checked my impressions and conclusions against hers and found very substantial agreement.

Deadline for Sabbatical Exchange Listings is December 1

The MAA's Sabbatical Exchange Information Service (SEIS) will be accepting listings for the 1982-83 Directory until December 1, 1981. This service helps faculty members who are interested in no-cost sabbatical exchanges to contact individuals with similar interests at other institutions.

MAA members who want to be listed in the January 1982 SEIS Directory should write to SEIS, Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036, enclosing the following information about themselves:

1. Name
2. Institution
3. Department
4. Address
5. Rank
6. Major field of interest
7. Highest earned degree
8. Names of from one to five courses recently taught
9. Normal teaching load
10. Section of the United States or foreign country preferred for visit
11. Period during which exchange is desired (e.g. all of academic year 1982-83, the first two quarters of 1982-83, the second semester of 1982-83, etc.)
12. Whether this is an "official" sabbatical.

Please type or print legibly to ensure the accuracy of the listing.

SEIS Directories will be sent to all SEIS participants around January 1, 1982. Others who want copies should write to SEIS at the address above. There is no charge for MAA members. Non-members should enclose a check or money order for $5.

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