

FOCUS

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Prospects for Mathematics Funding Brighten

William H. Pell

"... We know now that the post-sputnik emphasis on math and science should not have been abandoned."—Senator Lawton Chiles (D,FL) in a speech before the Chief State School Officers and National Association of State Boards of Education.

After more than a decade of large cutbacks in the support of science education and of meager increases in the funding of basic research in the mathematical sciences, the Federal government, in its FY 1984 budget request to the Congress, has proposed new funding for improving the teaching of mathematics, science, and engineering and surprisingly large increases in the support of research in mathematical and computer sciences.

The sudden about-face of the Administration with respect to science education comes as a surprise, following as it does a decade of discontinued programs and decreased

funding which culminated last year in the abolition of the NSF Directorate of Engineering and Science Education.

The increases for the support of research, on the other hand, are not without presage. Both of the preceding Reagan budgets, as well as the final Carter budget, were somewhat more generous in funding research than was generally the case during most of the seventies. It is true, however, that funds for the support of research in the mathematical sciences did increase throughout that decade, but rarely at a rate sufficient to counter inflation.

Science Education Bills Before Congress

The Administration's new commitment to science education is relatively modest, but what is enormously encouraging is that interest in a strong new commitment to upgrading the caliber of teaching and the performance of students in the sciences at all levels of the educational spectrum is not limited to the Executive Branch. Congress also appears greatly alarmed over the increasingly inadequate educational product of our schools and the serious and growing shortage of qualified teachers.

Concern over these educational problems surfaced in the last session of the 97th Congress when more than two dozen bills dealing with science education were introduced. (continued on page 2)



A summer scene on the campus of the State University of New York at Albany, site of the MAA Summer Meeting. The pool in the foreground is bordered by the Lecture Centers where meeting sessions will be held.

Meeting Program Inside

The center section of this issue contains the program and housing and preregistration forms for the **MAA Summer Meeting** which will be held August 8-11, 1983 at the State University of New York at Albany. **Note: These are the only preregistration and housing forms that will be mailed to MAA members for this meeting.**

The meeting will feature the Earle Raymond Hedrick Lectures by Elias M. Stein of Princeton University, six mini-courses, three contributed paper sessions, and many other attractive meeting events. See the program for complete information.

Prospects (continued from page 1)

However, because of a large amount of essential business, Congress was unable to devote sufficient attention to any of these bills and none were enacted. Many of these, or modifications thereof, have now been introduced in the first session of the 98th Congress and it seems almost certain that unless science education becomes the innocent victim of an unrelated Congressional brawl, some sort of science education bill will become law during this session.

The front-running bill is H.R. 1310, "The Emergency Mathematics and Science Education and Jobs Act and the National Engineering and Science Personnel and Jobs Creation Act of 1983." This bill, which passed the House on March 2, incorporates the substantive provisions of bills introduced last year by Representatives Carl Perkins (D,KY) and Don Fuqua (D,FL). It authorizes \$425 million: \$295 million to the Department of Education (ED) and \$130 million to NSF. Of the ED funds, \$250 million would go to the states as grants based on school-age population and could be used flexibly for planning, training, and improvement of science education; the rest would be disbursed at the post-secondary level for teacher scholarships and summer institutes for teachers. The NSF money would provide grants to colleges and universities (competitively) to upgrade teaching in mathematics, science, and foreign languages. Grants would require matching funds.

Roughly a dozen bills that focus tightly on science education have been introduced in the Senate. There is some feeling that S.530, Senator Claiborne Pell's (D,RI) "Education for Economic Security Act," is somewhat ahead of the pack, since it has numerous Democratic co-sponsors and the support of Senator Robert Stafford (R,VT). This measure would provide \$400 million annually to educational institutions to upgrade education in mathematics, science, computer instruction, foreign languages, and vocational instruction. Funds would be disbursed by state educational agencies.

Movement of any bill through the Senate is likely to be fraught with considerable difficulty for several reasons: overlapping jurisdiction over NSF by committees and subcommittees, the desire of sponsors of bills to espouse a popular cause, and the blurry lines of authority between NSF and ED.

Increases in Funding for Research

The increases in the Administration's FY 1984 budget request for basic research in mathematics, the physical sciences, and engineering seem to reflect a strong effort to concentrate resources in areas of research which undergird high-tech industry and long-term defense needs. The NSF will be the major beneficiary of the largess, if authorized and appropriated, in both the mathematical and computer sciences. Since that agency is almost the sole supporter of core (pure) mathematics, the result will be a strong infusion for core mathematics. Computer science does about as well as the mathematical sciences at NSF (21.5% increase over FY 1983 for mathematics; 19.1% for computer research).

Increases in funding for the mathematical sciences at other Federal agencies are uneven and hardly enough to counter inflation. The largest increases are generally for computer science-related activities, but even these are not often over 10%.

The budget process for NSF is proceeding apace. At this time, the outlook seems favorable for the NSF budget to sail through intact or even with a sizable addition resulting from

the passage of science education legislation.

Summary

One may therefore say that the prospects for Federal support of research and science education in FY 1984 are roughly as follows: a strong increase in the funding of research in the mathematical and computer sciences at NSF, but little change at other agencies; reinstatement of relatively major funding at NSF and ED for programs to strengthen instruction in mathematics and computer science.

William H. Pell is the former Head of the Mathematical Sciences Section of the National Science Foundation. The information in this article was current as of April 1, 1983.

Additions to the 1982 Greater MAA Fund List

The following names should be added to the list of contributors to the *Greater MAA Fund* that appeared in the March-April 1983 issue of *FOCUS*: **Grand Benefactors** Anonymous in memory of Norman Steenrod; **Grand Patrons** Ivan Niven; **Sponsors** Marilyn Zweng; **Contributing Members** Phillip Bender, Leon Luey; **Sustaining Members** Willie Green, Antonio Ieno.



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Ronald M. Davis, Northern Virginia Community College.

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Congress Approves NSF 83 Science Education Plan

The National Science Foundation's plan for spending the \$15 million that is in its FY 1983 budget for science and mathematics education has just been approved by Congress. The plan calls for (1) \$12 million for the development of materials and models for the continuing professional development of teachers and the improvement of their instruction, and (2) \$3 million for a teacher incentives program. Funds may be carried over into FY 1984.

The first component of the plan will support, on a nationally competitive basis, development of:

- models and demonstrations of innovative training programs for teachers focused on scientific and technological content, and models and demonstrations of new technologies for use in teaching;
- materials, audio and visual aids, computer programs, software, and systems for science and mathematics teachers to use in improving their instruction.

The teacher incentives component of the NSF plan includes Presidential Awards for Science and Mathematics Teaching Excellence and Teacher Honors Workshops. The Presidential Awards will provide recognition to approximately one hundred outstanding teachers annually—about half in mathematics and half in science. The Teacher Honors Workshops will help bring approximately seven hundred key selected teachers up-to-date in current science and mathematics.

Program guidelines are expected to be available in early June. There will be no immediate deadline for submission of proposals. Guidelines may be obtained by sending a self-addressed mailing label to: NSF Office of Scientific and Engineering Personnel and Education, 1800 G Street, N.W., Washington, D.C. 20550.

Speakers for ICME-5 Sought

The organizers of the Fifth International Congress on Mathematical Education (ICME-5) which will be held at the University of Adelaide, Australia, August 24-30, 1984, are seeking names of potential speakers and contributors. Like the 1980 Congress, which was held in Berkeley, California, ICME-5 will deal with all levels of mathematical education from early childhood through postsecondary instruction.

Anyone wishing to submit a name for consideration should write immediately for more information to: Professor Donald Hill, Mathematics Department, Florida A&M University, Tallahassee, FL 32307.

“Math Archive in Disarray”

Several years ago the Association entered in an agreement with the University of Texas under which the archives of the Association would be housed and cared for at the University's Humanities Research Center (HRC), a world-famous collection center where historical works are preserved with great care in temperature- and humidity-controlled rooms. At the time, HRC expressed interest in acquiring additional mathematical material of archival value. A number of mathematicians responded by contributing their personal collections, including correspondence with other mathematicians.

Things went along smoothly until about a year ago when Decherd Turner, the newly appointed director of HRC, suddenly dismissed Albert Lewis, the curator in charge of the

International Congress Rescheduled for August 83

The International Congress of Mathematicians, postponed from August 1982, will be held at the Palace of Culture, Warsaw, Poland, August 16-24, 1983. Details about the program and travel and housing information appeared in the February 1983 issue of the *Notices of the American Mathematical Society*. Copies of the *Third Announcement* may be obtained from: Organizing Committee, Institute of Mathematics of the Polish Academy of Sciences, Sniadeckich 8, P.O. Box 137, 00-950, Warsaw, Poland.

The deadline for registration for the Congress is May 31, 1983.

mathematical collections, with no warning whatsoever to the Association. It turned out that Turner is opposed to the idea of a mathematical archive at HRC and he chose this way of informing the MAA of his feelings. Since that time, other University officers have been trying to devise a workable scheme to keep the archive at the University, not necessarily at HRC.

The problem recently attained national prominence with the publication of an article by Gina Kolata in *Science*, February 25, 1983, p. 940, under the title quoted above. The reader may wish to consult this article for further details.

Visiting Lecturers and Consultants Program Offered for 30th Year

The MAA is pleased to announce that, for the 30th consecutive year, it will be offering to two- and four-year colleges and universities in the U.S. and Canada the services of over 100 visiting mathematicians through its Program of Visiting Lecturers and Consultants. Complete information on the program is contained in the 1982-84 program brochure. Copies of this brochure were mailed to all mathematics department chairmen in September 1982 and will be mailed again in September 1983. Additional copies may be obtained from: Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

A limited number of subsidies for institutions that are unable to pay the full cost of a visit are available through the Walter B. Ford Fund. Applications for a subsidized visit may be obtained from the MAA at the address above. For subsidized visits during the period September 1983-January 1984, applications must be submitted by July 1, 1983. Applicants will be notified of the decision of the Committee on Visiting Lecturers and Consultants by August 15, 1983. For the period February 1984-August 1984, the corresponding dates are December 1, 1983 and February 1, 1984. Applications for subsidized visits should be submitted to the regional representatives listed in the program brochure except for Region III (Eastern and Central U.S. and Canada). The new representative for this region is: Professor Eric C. Nummela, Science and Engineering Division, New England College, Henniker, NH 03242.

All arrangements for unsubsidized visits are made directly with the lecturer or consultant. Addresses of the lecturers and consultants are given in the program brochure.



from the Executive Director's desk . . .

State of the Association— Strong, Challenged

Overall, the year 1982 was a good year for the Association, producing a modest budget surplus, steady and loyal membership, and stronger membership services and programs. The outlook for 1983, however, looks somewhat less secure as a result of economic pressures being felt by all nonprofit organizations.

The MAA is being squeezed in an economic vise as, on the one hand, the recession causes income—particularly from the sale of books and journals—to fall seriously short of budget expectations and, on the other hand, cost-cutting by the Federal government sharply increases expenses. Notable among these increases are postal costs which nearly doubled in two years due to cuts in postal subsidies for nonprofit organizations. Furthermore, the Administration, seeking to reduce Federal support of education, has greatly reduced grants for mathematics and science education, forcing the MAA to fund, wholly or partially, a number of projects that have been subsidized in the past. (There is some basis for optimism in this regard in the news about the science education bills now before Congress.)

Program plans for this year, approved by the Board of Governors at its January meeting, reflect an optimistic view of the future of the Association, but a cautious view of its budget. Current estimates are that the 1982 surplus in the

In Memoriam

The MAA has been informed of the deaths of these individuals: **Jeanne E. Brocavich** of Waldorf, Maryland, an MAA member for 4 years; **B. P. Bussel** of Holyoke, Massachusetts, an MAA member for 27 years; **John C. Currie** of Decatur, Georgia, an MAA member for 43 years; **Martha E. Edwards** of Portsmouth, Virginia, an MAA member for 31 years; **Sumner G. Evans** of Asbury Park, New Jersey, an MAA member for 30 years; **Alvin Hausner** of Teaneck, New Jersey, an MAA member for 23 years; **Mark H. Ingraham** of Madison, Wisconsin, an MAA member for 63 years; **Dora E. Kearney** of Seattle, Washington, an MAA member for 57 years; **Donald O. Koehler** of Oxford, Ohio, an MAA member for 14 years; **A. J. Lohwater** of Cleveland, Ohio, an MAA member for 14 years; **Gerald F. McDonald** of East Northport, New York, an MAA member for 3 years; **W. R. McEwen** of Duluth, Minnesota, an MAA member for 45 years; **Malcolm F. Smiley** of Menands, New York, an MAA member for 42 years; **John H. Staib** of Philadelphia, Pennsylvania, an MAA member for 22 years; **Jerry S. Townsend** of Augusta, Georgia, an MAA member for 17 years.

MAA budget will no more than offset an anticipated deficit in 1983.

In a spirit of cautious optimism, the Board approved a 10% increase in dues beginning in 1984, while expressing confidence that a combination of strong marketing efforts, expected U.S. economic recovery, the already-evident decrease in the national inflation rate, and the strong support of a loyal membership will moderate dues increases in future years and lead to an even stronger and more vigorous MAA. The officers and staff pledge to work diligently to that end.

A. B. Willcox

MAA Election Results

At its meeting in Denver last January, the MAA Board of Governors elected a Second Vice-President and two Governors-at-Large: **Second Vice-President** Donald J. Albers, Menlo College; **Governors-at-Large** Andrew C-F Liu, University of Alberta, Canada, representing the constituency "Canadian Members of the Association"; Eleanor Green Jones, Norfolk State University, representing the constituency "Traditionally Minority Institutions."

This spring eleven MAA Sections held elections for Governors to serve from July 1983 through June 1986. The results of these elections are as follows: **Eastern Pennsylvania & Delaware** Howard Anton, Drexel University; **Florida** Donald M. Hill, Florida A & M University; **Illinois** John D. Bradburn, Elgin Community College; **Intermountain** Don H. Tucker, University of Utah; **Iowa** Donald V. Meyer, Central College; **Louisiana-Mississippi** Carole B. Ottinger, Mississippi University for Women; **Maryland-DC-Virginia** John M. Smith, George Mason University; **Michigan** George F. Feeman, Oakland University; **North Central** Sylvan Burgstahler, University of Minnesota, Duluth; **Southern California** John W. McGhee, Jr., California State University, Northridge; **Texas** James C. Bradford, Abilene Christian University.

Sloan Awards Grant to Clarkson Retraining Institute

The Clarkson Institute for Retraining in Computer Science, which opens this summer under the auspices of the Joint ACM/MAA Committee on Retraining for Computer Science, has been awarded a grant of \$216,000 from the Alfred P. Sloan Foundation. The grant will pay tuition and living expenses for the Institute's first class and will fund the activities of the Joint Committee for 1983-84.

A total of 161 faculty members interested in learning to teach computer science applied for the 30 openings in the first class, even before it was known whether funding would be available to cover the \$6100 fee.

The Institute program will consist of two eight week sessions of intensive study over two summers and a large project to be completed at the participant's home institution during the intervening academic year. Faculty for the Institute will include computer scientists from the University of California-Berkeley, Carnegie-Mellon University, Cornell University, Dartmouth College, Massachusetts Institute of Technology, and Pennsylvania State University.

Information about future plans for the Institute may be obtained from: Professor Ed Dubinsky, Director, Clarkson Institute for Retraining in Computer Science, Clarkson College, Potsdam, NY 13676.

Mathematical Association of America

63rd SUMMER MEETING

August 8-11, 1983

Albany

The Sixty-Third Summer Meeting of the Mathematical Association of America will be held on the campus of the **State University of New York, Center at Albany**, from Monday, August 8 through Thursday, August 11, in conjunction with meetings of the American Mathematical Society, the Association for Women in Mathematics, and Pi Mu Epsilon.

Sessions of the Association will be held on each of the days of the meeting. This meeting will be the second to feature simultaneous sessions of the MAA and AMS. The officers of the MAA and AMS have initiated this experiment in the hope of obtaining greater program diversity as well as a decrease from a five-day to a four-day meeting.

MAA contributed paper sessions will be held on Monday and Wednesday mornings. Papers will be presented on: *The Undergraduate Mathematics Curriculum*; *The Use of Computers in Undergraduate Mathematics Instruction*; *Classroom Notes*.

The **Board of Governors** will meet at 9:00 a.m. on Sunday. This meeting is open to all members of the Association.

There will be six MAA **mini-courses**. Registration information is contained in this program.

Elias Stein of Princeton University will deliver the **32nd Earle Raymond Hedrick Lectures**. The Lectures, to be given at 11:00 a.m. on Tuesday, Wednesday, and Thursday, will give an introduction to some of the main themes that have motivated Fourier Analysis. These Lectures are entitled *Some ideas in the development of Fourier Analysis* and will be organized under the following headings:

1. Early History: From D'Alembert to Fourier

2. Dirichlet, Riemann, and Cantor
3. Fourier Analysis and Number Theory via Reciprocity Theorems
4. Fourier Analysis and the Theory of Sets
5. Lebesgue Integration and the Rise of Real Variable Theory
6. The Influence of Complex Function Theory
7. Higher Symmetries and Group Representatives
8. Fourier Analysis Returns to its Roots: Applications to Partial Differential Equations.

The **Section Officers Annual Meeting** will be held from 2:30-4:30 p.m. on Tuesday, August 9.

At the **Business Meeting** of the Association, 4:30 p.m. on Tuesday, the Carl B. Allendoerfer, Lester R. Ford, and George Pólya Awards for expository writing will be presented.

On Tuesday evening, the **Committee on the Exchange of Information in Mathematics** will sponsor an evening session, *The MAA Newsletters: A dialogue among editors*, featuring FOCUS Editor, Marcia P. Sward. Various MAA Section Newsletter Editors and Public Information Officers will also participate in the session.

On Wednesday evening, the Association will sponsor its eighth annual **Twenty-Five Year Member Banquet**. The dinner will be held at 7:00 p.m. and will be preceded by a social hour from 6:00 p.m.-7:00 p.m. Please note that all tickets for this banquet must be purchased through preregistration, since a guarantee must be given to the caterer much earlier than usual.

The **MAA Film Program** will be held from 7:00 p.m.-9:33 p.m. on Wednesday.

The dates and times of other MAA meeting events are listed inside this program.

Preregistration and Housing

Preregistration. Preregistration for these meetings must be completed by July 1, 1983. All those wishing to preregister must complete the form which appears in this program and submit it along with the appropriate preregistration fee(s) to the Mathematics Meetings Housing Bureau in Providence by July 1.

Preregistration for the meeting and full payment of room/board charges is a requirement in order to obtain confirmed residence hall accommodations at SUNYA through the Mathematics Meetings Housing Bureau as outlined below.

Checks for preregistration fee(s), housing payments and fees for social events should be made payable to the AMS. Canadian checks must be marked for payment in U.S. funds. Those who preregister for the AMS Short Course and/or Joint Mathematics Meetings pay fees which are 30 percent lower than those who register at the meetings. The preregistration fees are as follows:

AMS Short Course	
Student/Unemployed	\$ 5
All others	\$25
Joint Mathematics Meetings	
Member of AMS, MAA, IIME	\$38
Emeritus Member of AMS, MAA	\$ 9
Nonmember	\$58
Student/Unemployed	\$ 9
MAA Minicourses #1 through #6	\$20 each

DO NOT SUBMIT MINICOURSE FEE(S) WITH PREREGISTRATION FORM.

There is 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 his or her latest position.

The emeritus status refers to any person who has been a member of the AMS or MAA for twenty years or more, and is retired on account of age from his or her latest position.

A \$4 charge will be imposed for all invoices prepared when preregistration forms are submitted without accompanying check(s) for the preregistration fee(s) or are accompanied by an amount insufficient to cover the total payments due. Preregistration forms received well before the deadline of July 1 which are not accompanied by correct payment will be returned to the participant with a request for resubmission with full payment.

A 50 percent refund of the preregistration fee(s) will be made for all cancellations received in Providence no later than August 5, 1983. No refunds will be granted for cancellations received after that date, or to persons who do not attend the meetings.

The only exception to this rule is someone who preregisters for the Joint Mathematics Meetings only in order to attend an MAA Minicourse, and is too late to obtain a slot in the Minicourse. In this case, full refund will be made of the

Joint Mathematics Meetings preregistration fee, provided the preregistrant has checked the box on the preregistration form that this was his or her intent. Individuals who preregister for both the Joint Meetings and a Minicourse and who intend to attend the Joint Meetings, even if the Minicourse is not available, should, of course, not check the box on the preregistration form. In this case, the Joint Meetings Preregistration will be processed.

Those who preregister for the AMS Short Course will be able to pick up their badges and other material in Albany after 11:00 a.m. on Saturday, August 6, during the hours the AMS Short Course registration desk is open.

Those who preregister for either the Joint Mathematics Meetings or the MAA Minicourses or both will be able to pick up their badges and other material in Albany after 4:00 p.m. on Sunday, August 7, during the hours the Joint Mathematics Meetings Registration Desk is open.

Summer List of Applicants. The AMS will publish a Summer List of mathematical scientists seeking employment for distribution at the Albany meeting. To be included in the list, applicants should complete the special applicant preregistration form found in this program. The completed form should be mailed with the meeting preregistration form. The deadline for receipt of applicant forms is the same as for the Joint Meetings (July 1, 1983). See the section on Summer List of Applicants for more details.

Mathematics Meetings Housing Bureau. The form for requesting university residence hall accommodations will be found in this program. The use of the services offered by the Mathematics Meetings Housing Bureau requires preregistration for the meetings. Persons desiring confirmed residence hall accommodations should complete the form, or a reasonable facsimile, and send it to the Mathematics Meetings Housing Bureau, Post Office Box 6887, Providence, Rhode Island 02940, so that it will arrive no later than July 1, 1983.

Please read carefully the section on University Housing before completing the form. Forms sent to the wrong address and thus incurring delay in delivery to the Housing Bureau until after the deadline cannot be accepted. All residence hall reservations with full prepayment for room/board will be confirmed by the Housing Bureau. All reservation requests must be received in writing and be processed through the Housing Bureau in Providence. Please do not contact the university directly. Telephone requests will not be accepted.

Housing assignments are made on a first-come, first-served basis. Participants desiring specific types of accommodations are urged to get their housing requests in as early as possible. Housing requests received after the deadline of July 1 most surely cannot be honored.

Participants who are able to do so are urged to share a room whenever possible. This procedure can be economically beneficial. The housing form should be fully completed to ensure proper assignment of rooms. Participants planning to share accommodations should provide the name(s) of the person(s) with whom they plan to occupy a room. Each participant should, however, complete a separate preregistration form. Parties planning to share rooms should send their forms together in the same envelope if possible.

Please make all changes to or cancellations of residence hall reservations with the Housing Bureau in Providence before July 15, 1983 in order to receive full refund of housing payment. After that date, cancellations should be made with the Housing Bureau in Providence up until August 5, 1983,

at which time a partial refund (amount paid minus one night's room/board) will be made. No cancellations can be made between 5:00 p.m. on August 5 and 4:00 p.m. on Sunday, August 7, after which changes or cancellations may be called in to Mary Coccoli at the Telephone Message Center number in Albany. Changes in reservations may be made at any time by notifying the Housing Bureau.

N.B.: Place your AMS or MAA mailing label on the preregistration/housing form where indicated. If you do not have a label readily available, please supply complete name, address, and AMS or MAA member code.

Minicourses

The MAA is planning six minicourses, as follows:

Minicourse #1: *Pascal for Mathematicians* is being organized by Harley Flanders, Florida Atlantic University, and will be given from 7:30 p.m. to 9:30 p.m. on Monday, August 8, and on Tuesday, August 9. The course is aimed at mathematicians who do not presently (or can barely) program in Pascal, but who have access to Pascal on a microcomputer or larger system. No previous knowledge of Pascal or programming will be assumed. The talks will cover the whole Pascal programming language with emphasis on solving mathematical programming problems. There will be special emphasis on recursion, linked memory allocation, and scientific uses of the unique data structure flexibility of Pascal. A wide range of applications will be demonstrated, including matrix manipulations, integration, differentiation, differential equations, invariant factors of integer matrices, set theory, series inversion, etc. The Minicourse will be conducted in a lecture-demonstration mode. The block structured nature of Pascal makes it particularly flexible for programming intricate mathematical computations, and easier to read than most other popular programming languages. It is becoming the first programming language taught in many colleges and universities, but the emphasis in almost all current courses is on data processing applications. Probably mathematics departments should offer Pascal courses for mathematics, sciences, and engineering students.

Minicourse #2: *Problems from industry for use in the undergraduate classroom* is being organized by Jeanne L. Agnew and Marvin S. Keener, both of Oklahoma State University, and will be given from 8:30 a.m. to 10:30 a.m. on Monday, August 8, and Wednesday, August 10. This Minicourse is based on problems obtained under the direction of the organizers from representatives of industries who were willing to share their expertise in order to help provide the undergraduate student an opportunity to deal with a real-world problem in its raw form. These problems have arisen in the work of the industry presenting them, and can be solved, at least in part, using only undergraduate mathematics. They have been written up by the organizers in a format suitable for classroom use. A catalog of these industrial problems will be available to the participants. The Minicourse will focus on a discussion of selected problems already developed, and on the identification and development of a new problem with the help of an industrial representative.

The cooperating representative will be Dr. Jerry Cline from McDonnell Douglas Astronautics in St. Louis. The first part of the first session will be devoted to a brief description of the creation of the problem collection, and a discussion of several of the problems, their solution, and the ways in which they can be used in the classroom. Each participant will

receive in advance one of the problems to be discussed in detail. Following these discussions, Dr. Cline will present a possible new problem for development, giving its background and the reasons why it is important to McDonnell Douglas. Between sessions the participants will have an opportunity to work on the solution of Dr. Cline's problem. He will be available during this time to discuss it informally with interested participants. If necessary, computing facilities will be available. During the second session, Dr. Cline will present his solution of the problem. Any alternate approaches suggested by the participants will be discussed. Dr. Cline will describe generalizations of this particular problem, and he will also be available to discuss the place of the mathematically trained individual in industry and the curricular needs implied by employment in industry.

Minicourse #3: *An introduction to the mathematical techniques and applications of computer graphics* is being organized by Joan Wyzkoski of Bradley University, and will be given from 8:30 a.m. to 10:30 a.m. on Monday, August 8, and Wednesday, August 10. Graphs and illustrations of geometrical objects are useful tools in the teaching of mathematics. Computer graphics simplifies the production of these teaching aids. This Minicourse will present some of the mathematical techniques used to produce realistic pictures on graphics terminals. Emphasis will be on the use of these techniques to complement mathematics instruction. Some of the topics to be discussed are curve and surface sketching, 2D and 3D transformations, perspective drawing, and hidden line removal. Since personal computers will be available for demonstrations and in-class implementations, programming experience is necessary.

Minicourse #4: *COMAP microcomputer software in mathematics instruction* is being organized by David A. Smith of Duke University, and is being held from 7:30 p.m. to 9:30 p.m. on Monday, August 8, and Tuesday, August 9. It is a Minicourse intended for college teachers. Uses of existing microcomputer software to enhance instruction in full courses in the undergraduate curriculum will be demonstrated. Included will be software for use in single- and multi-variable calculus, differential equations, and topics at the lower division college level. Presentations will be given by mathematicians who have developed the software and have had extensive experience with its use in their courses. It is planned for participants to have the opportunity to work with the software themselves on microcomputers.

Minicourse #5: *Commercial microcomputer software in mathematics instruction* is also being organized by David A. Smith, and will be held from 8:30 a.m. to 10:30 a.m. and 2:00 p.m. to 4:00 p.m. on Tuesday, August 9 and will be identical to Minicourse #4 with the exception that only materials produced by individuals and organizations other than CONDUIT will be demonstrated.

Minicourse #6: *Coloring problems* is being organized by David M. Berman of the University of New Orleans, and has been scheduled for 8:30 a.m. to 10:30 a.m. on Monday, August 8, and Wednesday, August 10. The famous four-color problem has given rise to the study of coloring of graphs in general. This area is rich in results of interest to both pure and applied mathematicians. In this minicourse—which assumes no knowledge of graph theory—the four-color problem, more general coloring problems, some variations on the theme of graph coloring, and some surprising applications will be discussed.

(continued on page vi)

MAA PROGRAM

SUNDAY, August 7

9:00 a.m.-4:00 p.m. **Board of Governors' Meeting**

MONDAY, August 8

8:15 a.m.-8:25 a.m. **Welcome Address**

8:30 a.m.-10:30 a.m. **Minicourse #2:** *Problems from industry for use in the undergraduate classroom*, Jeanne L. Agnew and Marvin S. Keener, Oklahoma State University

8:30 a.m.-10:30 a.m. **Minicourse #3:** *An introduction to the mathematical techniques and applications of computer graphics*, Joan Wyzkoski, Bradley University

8:30 a.m.-10:30 a.m. **Minicourse #6:** *Coloring problems*, David M. Berman, University of New Orleans

8:40 a.m.-noon **Contributed Paper Session:** *The use of computers in undergraduate mathematics instruction*

8:40 a.m.-noon **Contributed Paper Session:** *Classroom Notes*

7:30 p.m.-9:30 p.m. **Minicourse #1:** *Pascal for mathematicians*, Harley Flanders, Florida Atlantic University

7:30 p.m.-9:30 p.m. **Minicourse #4:** *COMAP microcomputer software in mathematics instruction*, David A. Smith, Duke University

TUESDAY, August 9

8:30 a.m.-10:30 a.m. **Minicourse #5:** *Commercial microcomputer software in undergraduate mathematics instruction*, David A. Smith, Duke University

8:40 a.m.-9:40 a.m. **Invited Address:** *Understanding and teaching problem-solving skills*, Alan Schoenfeld, University of Rochester

9:50 a.m. - 10:50 a.m. **Invited Address:** *Have you ever met a polyhedron you did not like?* Branko Grünbaum, University of Washington

11:00 a.m.-noon **Earle Raymond Hedrick Lecture I:** *Some ideas in the development of Fourier Analysis*, Elias M. Stein, Princeton University

2:00 p.m.-4:00 p.m. **Minicourse #5:** *Commercial microcomputer software in undergraduate mathematics instruction*, Second session

2:15 p.m. - 3:15 p.m. **Invited Address:** *Analysis of complex genetic systems*, Richard Lewontin, Harvard University

2:30 p.m.-4:30 p.m. **Section Officers' Meeting**

4:30 p.m.-5:30 p.m. **Business Meeting**

7:30 p.m.-9:30 p.m. **Minicourse #1:** *Pascal for mathematicians*, Second session

7:30 p.m.-9:30 p.m. **Minicourse #4:** *COMAP microcomputer software in mathematics instruction*, Second session

8:00 p.m.-9:00 p.m. **Committee on the Exchange of Information in Mathematics Session:** *The MAA Newsletters: A dialogue among editors*, Marcia P. Sward, MAA

Program Committee: C. E. Burgess, Donald R. Cohen, Vincent F. Cowling (chairman), Ronald L. Graham, William F. Hammond, Peter A. Lindstrom, Theodore Vick.

MAA PROGRAM

WEDNESDAY, August 10

- 8:30 a.m.-10:30 a.m. **Minicourse #2**, *Problems from industry for use in the undergraduate classroom*, Second session
- 8:30 a.m.-10:30 a.m. **Minicourse #3**, *An introduction to the mathematical techniques and applications of computer graphics*, Second session
- 8:30 a.m.-10:30 a.m. **Minicourse #6**, *Coloring problems*, Second session
- 8:40 a.m.-10:50 a.m. **Contributed Paper Session:** *The undergraduate mathematics curriculum*
- 11:00 a.m.-noon **Earle Raymond Hedrick Lecture II:** *Some ideas in the development of Fourier Analysis*
- 1:00 p.m.-1:50 p.m. **Invited Address:** *Theoretical and experimental contributions to the development of a science of vehicular traffic*, Robert Hermann, University of Texas
- 6:00 p.m.-8:30 p.m. **Banquet for Twenty-five Year MAA Members**
- 7:00 p.m.-9:33 p.m. **Film Program**
- 7:00 p.m. *Points of view: Perspective and projection*
- 7:28 p.m. *Dragon fold . . . and other ways to fill space*
- 7:39 p.m. *Caroms*
- 7:52 p.m. *Linear programming*
- 8:04 p.m. *Turning a sphere inside out*
- 8:27 p.m. *Hypothesis testing, inferential statistics, Part II*
- 8:55 p.m. *Journey to the center of a triangle*
- 9:07 p.m. *Symmetry and tessellations*

THURSDAY, August 11

- 8:40 a.m.-9:30 a.m. **Invited Address:** *Some connections between algebra and set theory*, Barbara Osofsky, Rutgers University
- 8:40 a.m.-9:30 a.m. **Invited Address:** *Progress report of the Commission on Precollege Education in Mathematics, Science, and Technology*, Katherine P. Layton, Beverly Hills High School
- 9:40 a.m.-10:30 a.m. **Invited Address:** *Convexity ideas in geometric function theory*, Thomas H. MacGregor, SUNY, Center at Albany
- 11:00 a.m.-noon **Earle Raymond Hedrick Lecture III:** *Some ideas in the development of Fourier Analysis*
- 1:00 p.m.-1:50 p.m. **Invited Address:** *Primality testing*, Carl Pomerance, University of Georgia
- 2:00 p.m.-2:50 p.m. **Invited Address:** *Galois' version of Galois Theory*, Harold M. Edwards, NYU—Courant Institute

Minicourses (continued from page iii)

The Minicourses are open only to persons who have registered for the Joint Mathematics Meetings and paid the Joint Meetings registration fee.

Please note that participants registering for one or more of the Minicourses should not include the registration fee(s) with their preregistration. A reservation will be made for participants who preregister for the Minicourses and a confirmation will be sent once the preregistration has been processed. Minicourses are limited to thirty participants each, except Minicourse #1, which is limited to fifty. Payment of the fee(s) must be made at the meeting registration desk in Albany two hours prior to the beginning of the Minicourse or the reservation will be relinquished to someone on the waiting list. When making payment, the participant should present the confirmation to the cashier. "Standby" reservation confirmations will be issued to participants whose preregistration was received after the Minicourse was filled. These individuals should check with the meeting cashier one hour prior to the Minicourse to see if any openings have occurred.

If the only reason for registering for the Joint Meetings is to gain admission to a Minicourse, this should be indicated by checking the appropriate box on the preregistration form. Then, if the Minicourse is full, full refunds can be made of the Joint Mathematics Meetings preregistration fee. Otherwise, the Joint Meetings preregistration will be processed, and then be subject to the 50 percent refund rule.

Book Sales

Books published by the MAA and the AMS will be sold for 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, and are located in the meeting registration area.

Summer List of Applicants

At the direction of the AMS-MAA-SIAM Committee on Employment Opportunities, which is charged with operation of the Employment Register and with the publication *Employment Information in the Mathematical Sciences*, the American Mathematical Society will publish a Summer List of mathematical scientists seeking employment for distribution at the Albany meeting in August 1983.

Copies of the 1983 summer list will be available at the transparencies section of the registration desk for \$2. Following the meeting, they may be purchased from the AMS office in Providence for \$3. This list should prove useful to employers who have last minute openings in the latter part of the summer or in the fall.

The deadline for receipt of applicant forms to appear in this summer list is July 1, 1983.

Instead of an Employment Register at the Summer Meeting in Albany, there will be an opportunity for posting of both applicant résumé forms and employers' announcements of open positions in or near the main meeting registration area. There will be no special rooms set aside for interviews and no provisions will be made for interviews: arrangements will be the responsibility of each employer and applicant. Messages may be left in the message box located in the registration area.

Special applicant and employer forms will be available at the transparencies section of the registration desk both for applicants to post résumés and for employers to post forms announcing positions.

Applicants who submit an applicant form, but do not plan to attend the meeting will appear on the printed list only. There is no provision made for posting résumés for participants who do not attend the meeting.

Exhibits

The book and educational media exhibits will be located in the Lecture Center vestibule and are open from 1:00 p.m. to 5:00 p.m. on Monday, August 8, and from 8:30 a.m. to 4:30 p.m. on Tuesday and Wednesday, August 9-10. All participants are encouraged to visit the exhibits during the meeting.

New from the MAA Studies in Mathematics . . .

Studies in Computer Science

edited by Seymour Pollack
Volume #22, MAA Studies in Mathematics

408 pp. Cloth List: \$29.00 MAA Member: \$22.00

Written by computer scientists for mathematicians, the book presents a readable and balanced discussion of the role of mathematics in computer science and the contribution of computing to mathematics.

Topics included are: *The Development of Computer Science; Programming Languages and Systems, Specifying Formal Languages; Formal Analysis of Computer Programs; Computational Complexity; Computer Science and Artificial Intelligence; The Impact of Computers on Numerical Analysis; Computer Simulation; and Computational Tools for Statistical Data Analysis.*

Order from: **The Mathematical Association of America**
1529 Eighteenth St., N.W.
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copy
at the
meeting and
SAVE 20%**

Meetings of Other Organizations

The **American Mathematical Society** (AMS) will feature four lectures in the Colloquium series by Bertram Kostant of M.I.T., *On the Coxeter element and the structure of the exceptional Lie groups*. Also featured will be eight invited hour addresses and several special sessions.

The AMS will also sponsor a one and one-half day **short course** titled *Population Biology* on Saturday and Sunday, August 6 and 7. The program is under the direction of Simon A. Levin of Cornell University.

Pi Mu Epsilon will hold its annual meeting on Wednesday and Thursday, August 10 and 11. The J. Sutherland Frame Lecture will be given at 8:30 p.m. on Wednesday, August 10.

The **Association for Women in Mathematics** (AWM) will hold a panel discussion on *Grants: Getting them and keeping them* at 9:10 a.m. on Wednesday, August 10. The AWM membership meeting will follow the panel discussion at 10:10 a.m.

Social Events

Lake George Cruise

A cruise on Lake George aboard the Ticonderoga has been arranged for Sunday, August 7. Buses will depart from the Indian Quadrangle at 4:45 p.m. and return to Indian Quadrangle at 10:15 p.m. The buses will be marked "Lake George Cruise." This cruise sails the beautiful island-dotted narrows of Lake George, with live music on board. The cost is \$15 per person for those not on any meal plan, or those on either meal Plans A, C, E, or G. For those on meal Plan B or F, the ticket price is \$8.20. For children up to and including 9 years of age on meal Plan D or H, tickets are \$9.65. (Since children under 10 are offered meals at a reduced rate, the cost of their tickets for the cruise is higher.) This box dinner replaces the regularly scheduled meal for that night for those taking the cruise. Individuals who do not wish to participate in the cruise may still obtain their evening meal in the cafeteria. Since the Lake George Steamboat Company has set a deadline for reservations, this cruise will be offered through pre-registration only. If a sufficient number of pre-registrations is not received by July 1, interested participants will be notified of cancellation and appropriate refunds will be made.

The above prices include the cost of the bus, the cruise, all taxes and gratuities, and a boxed dinner consisting of fried chicken, potato salad, fruit, brownie, soft drink, and relishes.

Picnic

At 6:15 p.m. on Monday, August 8, there will be a picnic outside the Mohawk Tower cafeteria. This meal replaces the regularly scheduled dinner for that night for all participants on meal Plans B, D, F, and H. There is no additional charge for participants on any of these plans for the picnic. For those not on any meal plan as well as those on meal Plan A, C, E, or G, the cost of the picnic ticket is \$7. Because the guarantee must be given to the caterer in advance of the meeting, the picnic will be offered through pre-registration only. The menu will feature barbecued chicken, hot dogs, hamburgers, assorted salads, corn, baked beans, watermelon, brownies, soda, coffee, tea and milk. In case of rain, this event will be moved to the cafeteria.

Beer Party

A beer party will be held at 7:00 p.m. on Tuesday, August 9 outside the Indian Quadrangle. Tickets are \$5.35 per person and must be purchased through pre-registration. In addition to beer, white and red wines, soft drinks, potato chips, pretzels, and peanuts will be served. In case of rain, this event will be moved to the cafeteria.

Banquet for Twenty-Five Year MAA Members

The MAA is planning a banquet for individuals who have been members of the Association for twenty-five years or more. The banquet will take place Wednesday evening, August 10. A cash bar will be operated from 6:00 p.m. to 6:45 p.m. in the Patroon Lounge in the Campus Center. Dinner will be served at 7:00 p.m. in the Patroon Room, one flight up. The menu for the dinner is as follows:

Chilled wedge of Saratoga melon, Iced relishes, Roast prime rib of beef au jus, Rosette potatoes, Fresh green beans with mushrooms, Romaine salad with vinaigrette dressing, Brioche and crescent rolls with butter, Minted chocolate mousse with Chantilly cream, Ladyfingers, Wine, coffee, and tea.

Please note that all tickets for this banquet must be purchased through pre-registration, since a guarantee must be given to the caterer much earlier than usual. For those individuals not on any meal plan, as well as those on meal Plan A and E, the cost of the ticket is \$16.05. There is an additional charge of \$9.25 for participants on Plan B and F who plan to attend the banquet. Interested participants should complete the appropriate section of the pre-registration form. Also, spaces are provided on the pre-registration form for ticket purchasers to indicate their seating preference, if desired.

N.B. These additional amounts must be included when completing the pre-registration/housing form. Tickets for the MAA banquet, picnic, beer party, and cruise are available only through pre-registration due to deadlines set by SUNYA.

Local Information

Albany, the state capitol of New York, is steeped in upper Hudson Valley lore, surrounded by fields and farmlands. The city was originally settled by the Dutch in 1609, as the trading post of Fort Orange.

Some of the attractions in the area are Fort Crailo, a Dutch home and fort built around 1704, where the song *Yankee Doodle* was composed; Schuyler Mansion, built in 1761-1762, housing a beautiful collection of 18th and early 19th century furnishings; historic Cherry Hill, built in 1787, now a museum; and Ten Broeck Mansion, built in 1797-1798. Also within driving distance is the Saragota racetrack. A visit to the Empire State Plaza in downtown Albany is recommended.

It is hoped that the free university bus which runs from the campus to downtown will be operating during the meetings. If so, a special ID will be required. Interested participants are advised to check at the Local Information section of the registration desk.

Registration

Registration at the Meetings

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. The fees for registration at the meetings, which are 30 percent more than the preregistration fees, are listed below:

Joint Mathematics Meetings

Member of MAA, AMS, ΠIME	\$49
Emeritus Member of MAA, AMS	\$12
Nonmember	\$75
Student/Unemployed	\$12

MAA Minicourses #1 through #6

All Participants	\$20 each
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AMS Short Course

Student/Unemployed	\$10
All Other Participants	\$30
One-day Fee (Second Day Only)	\$15

Registration fees may be paid at the meetings in cash, by personal or travelers' checks, or by VISA or MASTERCARD credit cards.

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.

The emeritus status refers to any person who has been a member of the AMS or MAA for twenty years or more, and is retired on account of age from his or her latest position.

Nonmembers who register at the meetings and pay the \$75 nonmember registration fee are entitled to a discount of the difference between the member registration fee of \$49 and the nonmember registration fee of \$75 as a \$26 credit against dues in either the AMS or MAA or both, provided they join before September 11, 1983.

Nonmember students who register at the meetings and pay the \$12 registration fee are also entitled to a discount of the difference between the student preregistration fee of \$9 and the registration fee of \$12 as a \$3 credit against dues in either the AMS or MAA or both, provided they join before September 11, 1983.

Nonmembers and nonmember students who thus qualify may join at the meetings, or by mail afterwards up to the deadline.

Registration Dates and Location

Joint Mathematics Meetings

[and MAA Minicourses (until filled)]

Lecture Center Vestibule	
Sunday, August 7	4:00 p.m. to 8:00 p.m.
Monday, August 8	8:00 a.m. to 4:30 p.m.
Tuesday, August 9 and	8:30 a.m. to 4:30 p.m.
Wednesday, August 10	

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

The Joint Mathematics Meetings Registration Desk will not be open on Thursday, August 11, and the other services provided during the meeting at the registration desk will also no longer be available. There will, however, be a small desk set up where local information will be available and where a staff member will provide limited assistance to participants. No registration or cash transactions will be possible at this desk.

Assistance and Information Desk

Lecture Center Vestibule

Thursday, August 11

8:30 a.m. to 1:30 p.m.

University Housing

Participants requesting housing on campus during the meeting will be assigned to Indian Quadrangle, located in the southeast corner of the uptown campus. Colonial Quadrangle will be used as an overflow dormitory. The check-in desk for Indian Quad is located in the lobby of Mohawk Tower, which can be identified by a weather station on its roof.

Participants desiring confirmed reservations for on-campus housing must preregister and send required payment(s) to the Mathematics Meetings Housing Bureau prior to the July 1, 1983 deadline.

Dormitories at SUNYA are not air-conditioned. There are no cots available in the dormitories. Children aged ten and over will be charged the same rates as adults. Children 9 and under will be charged a reduced rate for room and board (must purchase either Plan C or D). Parents will be allowed to bring portacribs or small cribs for infants and toddlers. These children may stay in the same room with parents at no charge. It is not a requirement that food plans be purchased for children 4 years of age and under.

For additional information regarding families, please write to the Mathematics Meetings Housing Bureau, P.O. Box 6887, Providence, Rhode Island 02940, or call 401-272-9500, extension 239.

Beds will be made up in advance for preregistered participants. In addition to bed linen, two towels are provided. A small bar of soap and plastic glass will be provided upon request. Since this may prove to be inadequate, it is advised that participants bring an additional bar of soap as well as a face cloth, if necessary. Each room is equipped with floor lamp, desk, and dresser. No clothes hangers are provided and it is suggested that participants bring their own supply. Bathrooms will be cleaned periodically.

There will be a limited number of rooms available for those without confirmed reservations; however, beds in these rooms will not be made up in advance. Participants arriving without prior reservations will be given a set of bed linens, pillow, and blanket in order to make up their own beds, as well as two towels, and upon request a plastic cup and soap. Again, it is recommended that additional soap, a face cloth, and clothes hangers be brought by the individual. Also, participants are forewarned that there is a \$20 penalty for lost dormitory keys.

There are coin-operated laundry facilities in the tower basement as well as in the basement of each low-rise building. There is a 35 cent charge for the use of washers; dryers are free. Participants are required to supply their own laundry materials.

No pets are allowed in the residence halls. Alcoholic beverages are not prohibited.

Check-in Locations and Times

The check-in desk will be in operation in the lobby of Mohawk Tower, Indian Quad, daily from 9 a.m. to 11 p.m. with the exception of the nights of August 7 and 8 when the desk will remain open to accommodate late comers until 3 a.m.

Room Rates Including Meal Plans*

Note: As of this writing, the State University of New York central administration has yet to approve projected rates for the coming year as listed below. If a change in these rates should occur, notification will be sent to preregistrants who request housing, with either an appropriate refund or request for additional payment.

Plan**	A	A	B	B	E	F
Cost/Person/Day	\$27.60	\$22.60	\$34.40	\$29.40	\$6.60	\$13.40
Single Room	x		x			
Double Room		x		x		
Breakfast	x	x	x	x	x	x
Lunch	x	x	x	x	x	x
Dinner			x	x		x

Food service in the cafeteria will begin with breakfast on Saturday, August 6, and will end with lunch on Thursday, August 11. No food service will be available after lunch on Thursday.

Only prepaid meals will be served in the cafeteria in the basement of Indian Quad. Since dinner will not be available on Thursday, August 11, be sure to include rate for Plans A, C, E, and/or G for the night of August 10. (Plans B, D, F, and H do not apply for that night.) Cafeteria hours of operation are:

Breakfast 7:00 a.m. to 8:30 a.m.

Lunch 11:30 a.m. to 1:00 p.m.

Dinner 5:00 p.m. to 6:30 p.m.

Note: Meals on a cash-as-you go basis are not available in the cafeterias; however, the Campus Center Snack Bar offers a limited menu for cash between the hours of 7:30 a.m. and 1:00 p.m.

*Rooms on campus are not available without a meal plan. Meal plans, A, B, E, and F listed in the table apply to adults and children age 10 years or older. Meals Plan C and D are available for children 9 and under at a cost of \$14.90 (breakfast and lunch) and \$20.25 (all three meals). Plans C and D include housing. Meals plans G (breakfast, lunch) and H (all three meals) are available for 9 years and younger at costs of \$3.90 and \$9.25.

**The above options are available by prepayment only. The following payments must accompany the preregistration/housing form and must be received in Providence by the deadline of July 1, 1983.

- 1.) Preregistration fee(s)
- 2.) Full payment for room/board
- 3.) Fee(s) for tickets (if applicable)

Any form received without an amount sufficient to cover the above items will be returned, which will delay processing of the housing request. Any form received with an amount which is more than required will be processed and an appropriate refund will be issued.

Hotel Accommodations

Blocks of rooms have been set aside for use by participants at the hotels listed below. Participants should make their own reservations early with the Albany Meetings Travel SuperPhone. (See box on page x.) Reservations at these hotels will not be available by calling the hotel directly. The rates listed below are subject to change, and to an 8 percent sales tax.

In all cases, a one night's deposit including the 8 percent tax is required to guarantee a room. This can be charged to a credit card when booking through the Albany Meetings Travel SuperPhone. If an emergency occurs and you find you must cancel your reservation, this must be done prior to 6:00 p.m. on the day of your arrival, or you will be charged for that day. The cut-off date for reservations at all hotels is July 25, 1983. After this date none of the hotels are obligated to provide a room at these special rates.

The estimated walking distance from the hotel to the meetings is given in parentheses following the telephone number. The number after the name of the hotel is the number it carries on the map.

The following codes apply: AC = Air Conditioned; CL = Cocktail Lounge; FP = Free Parking; GR = Game Room; RT = Restaurant; SP = Swimming Pool; SU = Sauna; TV = Television.

RAMADA INN (#1 on the campus map)

1228 Western Avenue

Albany, New York 12203

Telephone: 518-489-2981 (10 minutes)

Single: \$34

Double: \$39

Twin: \$46

Rollaway cot: \$5

Extra person in room: No charge

Code: AC, CL, FP, GR, RT, SP, SU, TV

Free transportation is provided to and from the airport, bus station, and AMTRAK station. Upon arrival, contact the hotel and request transportation.

THRUWAY HOUSE (#2 on campus map)

1375 Washington Avenue

Albany, New York 12206

Telephone: 518-459-3100 (10 minutes)

Single: \$34

Double: \$40

Twin: \$40

Rollaway cot: \$6

Extra person in room: \$6 (18 and over)

Code: AC, CL, FP, RT, SP, TV

Free van service is provided. Contact the hotel upon arrival at the airport.

TRAVELODGE (#3 on campus map)

1230 Western Avenue

Albany, New York 12203

Telephone: 518-489-4423 (10 minutes)

Single: \$29

Double: \$35

Twin: \$38

Rollaway cot: \$4

Extra person in room: No charge

Code: AC, FP, SP, TV

Albany Meetings Travel SuperPhone 800-556-6882

INSTANT... PERSONALIZED... IMMEDIATE CONFIRMATION OF
TRAVEL AND HOTEL RESERVATIONS FOR THE JOINT MATHEMATICS MEETINGS IN
ALBANY, NEW YORK

One free call does it all! No forms to mail and no waiting when you use your major credit card (VISA, MASTERCARD, American Express or air travel card.)

TRAVEL SUPERSERVICE:

- Fly to Albany with **USAIR** the official carrier for the Joint Mathematics Meetings and get 30 percent or more off! No restrictions on reservations purchased at least 14 days in advance. This special offer is available ONLY through Mathematics SuperPhone! Call SuperPhone toll-free today at 800-556-6882 and SAVE!

- Unbiased advice on the most direct, economical air routes.
- Fast, computerized reservation, ticketing, invoicing, itinerary.
- Guaranteed lowest possible air fares for your city.
- Automatic "Fare Check" at regular intervals before your departure to assure the most economical rate. If lower fares develop, your ticket will be automatically rewritten at savings to you.

HOTEL CONFIRMATION:

Along with your travel arrangements, ask for immediate confirmation of your hotel accommodations. All hotels for this meeting must be confirmed through this number.

N.B.: University accommodations must be obtained through the Mathematics Meetings Housing Bureau.

CALL NOW: 800-556-6882 (In Rhode Island and outside the Continental U.S. call 401-884-9500.)

Hours of Operation: 9:00 a.m. to 7:00 p.m. EST, Monday through Thursday, Fridays until 6:00 p.m.

Parking

There is adequate parking for all participants in the lot east of Indian Quad. Temporary parking at the front entrance will be permitted for 10-15 minutes for check-in purposes. There are no parking fees or sticker requirements.

Travel

In August, Albany is on Eastern Standard Time. There is regular airline service to Albany County Airport by several major airline carriers.

The airport in Albany is approximately five miles from campus. The Ramada Inn provides free transportation to and from the airport, bus station and AMTRAK station. Upon arrival call the hotel and request transportation.

Pine Hills Yellow Cab Company, whose airport number is 869-2258, provides both taxis and limousines in its service to the city of Albany and Albany County Airport. The one-way rate from the airport to the campus is \$9.90 for a single passenger, and \$6.40 per person for two or more persons in a taxi. Preregistrants are being asked to supply airline flight arrival dates and times on the preregistration and housing form. If indications are that arrivals will be heavy on a particular flight, Pine Hills Yellow Cab Company will provide limousines at a \$4.90 per person rate. It is approximately a fifteen-minute ride by taxi from the airport to Indian Quad at SUNYA.

All participants using public transportation to reach the campus should instruct the driver to drop them off at the Indian Quad.

Albany is one-half mile from the intersection I-90 (New York Thruway-Mass Pike) and I-87 (New York Thruway and Adirondack Northway). Follow I-90 East and take Exit 2 marked "Washington Avenue, SUNY."

AMTRAK has a station in Rensselaer, 6 miles from campus.

There are connections to Boston, New York City, Montreal, Buffalo, and Chicago. The cost of a cab from the AMTRAK station to the university is \$8 plus \$1 per person extra.

Greyhound and Trailways provide bus service from Boston, New York City, and Buffalo. The station is five miles from campus. The cost of the cab from the bus station to the university is \$7 plus 50 cents per person extra.

USAIR, the official carrier for the Albany meetings, has agreed to offer a 30 percent minimum discount to any participant purchasing tickets on its airline at least 14 days in advance through the Albany Meetings Travel SuperPhone. Other fares will, of course, still be available after the 14 days limitation. All participants are urged to consider this organization for their airline and hotel reservations. This service (which has an 800 number) is described in a box contained elsewhere in this announcement.

August Weather

Normal high	81°F
Normal low	59°F
Record high	99°F
Record low	37°F
Average August rain	2-8 inches
Probability of rain	35%
Average humidity	73%

Local Arrangements Committee

The members of the Local Arrangements Committee are Lindsay N. Childs (publicity director), William W. Fairchild, Richard A. Goldstein (chairman), Timothy L. Lance, Violet Larney, William J. LeVeque (ex officio), David P. Roselle (ex officio), Hugo Rossi (ex officio), B. David Saunders, Edward C. Turner, Nura D. Turner, and Edward S. Thomas.

PREREGISTRATION AND HOUSING FORM, ALBANY, NEW YORK

AMS Short Course
August 6-7, 1983

Joint Mathematics Meetings
August 8-11, 1983

MAA Minicourses
August 8-10, 1983

MUST BE RECEIVED IN PROVIDENCE NO LATER THAN JULY 1, 1983

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

DEADLINES: PREREGISTRATION: July 1, 1983 for preregistration fee(s)

RESIDENCE HALL ROOM PAYMENT: July 1, 1983 (partial refunds only after July 15.)

CANCELLATIONS: Preregistrations may be cancelled until August 5 by writing or calling the Mathematics Meetings Housing Bureau. (See above.) 50% of the preregistration fee(s) will be refunded if notification is received by this date. Confirmed residence hall reservations may be cancelled until July 15 and full payment will be refunded; however, after that date, only partial refunds will be allowed.

CHANGES: Changes in arrival and departure dates must be made with the Mathematics Meetings Housing Bureau by August 5. (See address and number above.) After this date, please call message center number at Albany meeting.

NOTE: All dues and meeting registration fees paid to AMS or MAA by professional mathematicians are tax deductible.

REGISTRATION FEES

	Preregistration (by mail prior to 7/1)	At Meeting
JOINT MATHEMATICS MEETINGS		
Member of AMS, MAA, IIME	\$38	\$49
*Student, Unemployed or Emeritus	\$ 9	\$12
Nonmember	\$58	\$75
AMS Short Course	Please affix AMS or MAA label here.	
Member/nonmember	If none, complete 1-3 below.	\$25
*Student or unemployed		\$ 5
MAA MINICOURSES #1 through #6 (per course)		\$20

*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. The emeritus status refers to any person who has been a member of the AMS or MAA for twenty years or more and is retired on account of age from his or her latest position.

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

Joint Mathematics Meetings [] AMS Short Course [] MAA Minicourses #1 [] #2 [] #3 [] #4 [] #5 [] #6 []

1) Name (Please print) _____
 Surname First Middle

2) Address _____
 Number and Street City State Zip Code

3) AMS member code _____ MAA member code _____

4) _____
 Address for confirmation of room reservation if other than above

5) Employing institution _____ Emeritus member [] Unemployed []

6) I am a student at _____ 7) Name of spouse _____ 8) Number of Children _____
 (Provide information only if accompanying to meeting)

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

10) Joint Meetings fee enclosed \$ _____ 11) Please reserve a place for me in Minicourse(s) _____
 I will pay appropriate fee(s) at the meetings.

12) AMS Short Course fee enclosed \$ _____ **NOTE:** I am preregistering for the Joint Meetings only in order to attend the MAA Minicourse(s).

13) FULL PAYMENT for residence hall accommodations enclosed \$ _____ (partial refund applies after 7/15/83)

TICKETS

14) Cruise: _____ @ \$15 for those not on any meal plan as well as those on meal Plans A, C, E, or G. \$ _____
 _____ @ \$8.20 for those on meal Plan B or F. \$ _____
 _____ @ \$9.65 for children under 10 on meal Plan D or H. \$ _____

15) Picnic: _____ @ \$7 for those not on any meal plan as well as those on meal Plans A, C, E, or G. \$ _____
 (No charge if on meal Plans B, D, F, or H.)

16) Beer Party: _____ @ \$5.35 \$ _____

17) MAA 25-year Banquet: _____ @ \$16.05 for those not on any meal plan as well as those on meal Plan A or E. \$ _____
 _____ @ \$9.25 for those on meal Plan B or F. \$ _____

I would like to be seated with _____

18) Total amount enclosed for 10 through 17 plus Meal Plans Only (if applicable [see reverse]) \$ _____

NOTE: Make checks payable to AMS; Canadian checks must be marked "In U. S. Funds". *Do not include payment for MAA Minicourses.*

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

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

N. B.! Please be sure to complete the section on next page if you will require housing or meal plans only.

PREREGISTRATION AND HOUSING REQUEST FORM (continued)

UNIVERSITY HOUSING SECTION

Please read sections on housing and room rates in meeting announcements.

Please reserve the following residence hall accommodations and send confirmation to me at address indicated below.

SINGLE OCCUPANCY

- PLAN A - includes breakfast and lunch
PLAN B - includes breakfast, lunch, and dinner

DOUBLE OCCUPANCY - PER PERSON

- PLAN A - includes breakfast and lunch
PLAN B - includes breakfast, lunch, and dinner

CHILDREN'S RATES

The adult rates as listed above apply for children 10 years of age and older. This group must occupy a bed. The following rates in Plan C or D apply to children up to and including the age of 9.

- PLAN C - includes breakfast and lunch
PLAN D - includes breakfast, lunch, and dinner

N. B.!! Since dinner will not be available on Thursday, August 11, be sure to include rate for Plans A, C, E, or G for the night of August 10 only. (Plans B, D, F, or H do not apply for that night.)

I will arrive on _____ at _____ a.m./p.m., and depart on _____ at _____ a.m./p.m.

I will share a double room with _____ who will arrive on _____ at _____ a.m./p.m., and depart on _____ at _____ a.m./p.m.

Please list age(s) and sex(es) of accompanying children _____

ADDRESS FOR CONFIRMATION OF ROOM RESERVATION:

MEAL PLANS ONLY

For adults and children 10 and over (not staying in residence halls, commuters, or those staying in hotels).

- PLAN E - includes breakfast and lunch
PLAN F - includes breakfast, lunch, and dinner

For children 9 years of age and under (not staying in residence halls, etc.):

- PLAN G - includes breakfast and lunch
PLAN H - includes breakfast, lunch, and dinner

N. B.!! Since dinner will not be available on Thursday, August 11, be sure to include rate for Plans A, C, E, or G for the night of August 10 only. (Plans B, D, F, or H do not apply for that night.)

TRAVEL INFORMATION

I plan to arrive by plane on _____ (Airline and Flight Number) scheduled to arrive at Albany airport on _____ (Date) at _____ (Time) a.m./p.m.

I plan to drive to the meeting.

PHONE NUMBER: () _____ (Area Code)

Summer List of Applicants
Mathematical Sciences Employment Register
August 1983 Albany, New York

(Please see instructions on back)

APPLICANT: Name _____
 Mailing address (include zip code) _____

(A) Specialties _____

(B) Career objectives and accomplishments
 ACADEMIC: Research, Teaching
 NON-ACADEMIC: Research and Development, Consulting, Supervision
 Near-term career goals _____

Significant achievements or projects, including role _____

Honors and offices _____
 Other (e.g., paper to be presented at THIS meeting) _____

Selected titles of papers, reports, books, patents _____

(C) Degree	Year	Institution		(D) No. of abstracts, internal reports
_____	_____	_____		_____
				(E) No. of papers accepted

				(F) No. of books and patents

EMPLOYMENT HISTORY:

	Present	Previous	Previous
(G) Employer	_____	_____	_____
Position	_____	_____	_____
(H) Duties	_____	_____	_____
Years	_____ to _____	_____ to _____	_____ to _____

DESIRED POSITION: _____

(I) Duties _____

(J) Available mo. _____ /yr. _____ **Location** _____ **Salary** _____

(K) References (Name and Institution)

(L) Citizenship _____

(M) I plan to attend the Summer Meeting yes no

SUMMARY STRIP

Family Name	First Name	Mailing Address
_____	_____	_____
Address (cont'd.)	Address (cont'd.)	State & Zip Code
_____	_____	_____
(B) Career objectives	(C) Highest Degree	(C) Yr.
_____	_____	_____
	(C) Institution	(D)
	_____	_____
	(E)	(F)
	_____	_____
(H) Present duties	(I) Desired duties	(J) Available mo./yr.
_____	_____	_____/_____
		(L)

Summer List of Applicants

Instructions for Applicant Form

The form. Forms submitted by job applicants who attend the August meetings in Albany will be posted. The first impression a prospective employer has of an applicant may be based on the appearance of this form.

The forms should be carefully typed using a fresh black ribbon. The best results are obtained with a carbon-coated polyethylene film ribbon, but satisfactory results may be obtained using a ribbon made of nylon or other woven fabric if suitable care is exercised. It is important that the keys be clean and make a sharp, clear impression. Use a correcting typewriter or correction tape or fluid if necessary. Submit the original typed version only. Hand lettered forms are acceptable if prepared carefully.

The summary strip. Information provided here will be used to prepare a printed list of applicants for distribution to employers. Please supply all information requested, and confine your characters to the boxes provided. Use the codes below. Circled letters identify corresponding items on the form and the strip.

Address forms to the Mathematics Meetings Housing Bureau, P. O. Box 6887, Providence, RI 02940. The deadline for receipt is July 1, 1983.

Ⓐ Specialties

AL = Algebra	AN = Analysis
BI = Biomathematics	BS = Biostatistics
CB = Combinatorics	CM = Communication
CN = Control	CS = Computer Science
CT = Circuits	DE = Differential Equations
EC = Economics	ED = Mathematical Education
FA = Functional Analysis	FI = Financial Mathematics
FL = Fluid Mechanics	GE = Geometry
HM = History of Math	LO = Logic
MB = Mathematical Biology	ME = Mechanics
MO = Modelling	MP = Mathematical Physics
MS = Management Science	NA = Numerical Analysis
NT = Number Theory	OR = Operations Research
PR = Probability	SA = Systems Analysis
ST = Statistics	TO = Topology

Ⓑ Career Objectives

AR = Academic Research	AT = Academic Teaching
NR = Nonacademic R&D	NC = Nonacad. Consulting
NS = Nonacademic Supervision	

Ⓗ Ⓘ Duties

T = Teaching	U = Undergraduate
G = Graduate	R = Research
C = Consulting	A = Administration
S = Supervision	IND = Industry
GOV = Government	DP = Data Processing

Location

E = East	S = South
C = Central	M = Mountain
W = West	O = Outside U.S.
	I = Indifferent

Ⓛ U.S. Citizenship Status

C = U.S. Citizen	P = Permanent Resident
T = Temporarily in U.S.	N = Non-U.S. Citizen

State University of New York, Center at Albany



● CAMPUS GUIDE

Lecture Center

- 1 Social Science
- 2 Humanities
- 3 Education
- 4 Campus Center
- 5 Physics
- 6 Chemistry
- 7 Biology
- 8 Library
- 9 Theatre-Music
- 10 Earth Science
- 11 Fine Arts
- 12 Administration
- 13 Business

Colonial Quadrangle

T Livingston Tower

Indian Quadrangle

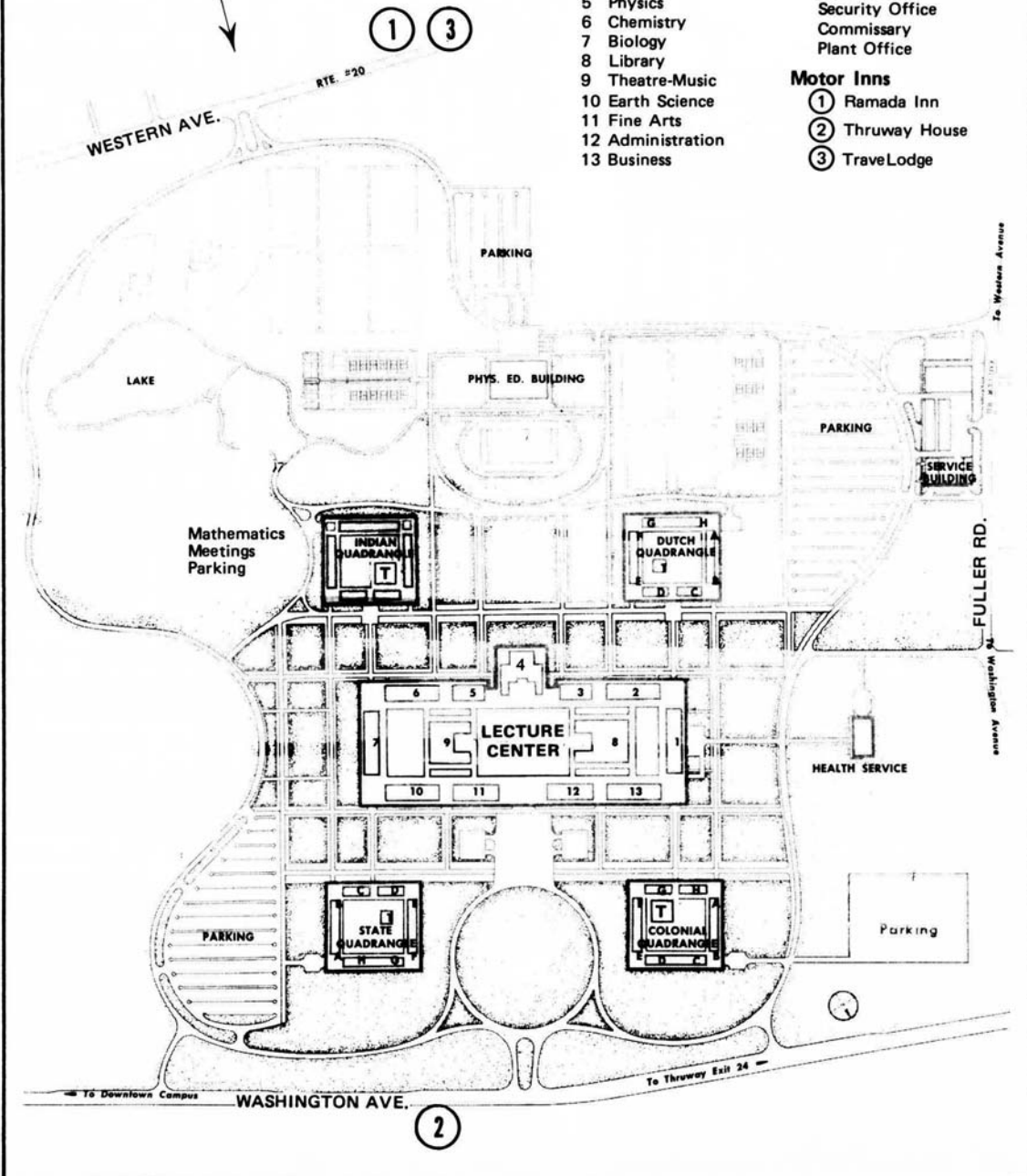
T Mohawk Tower

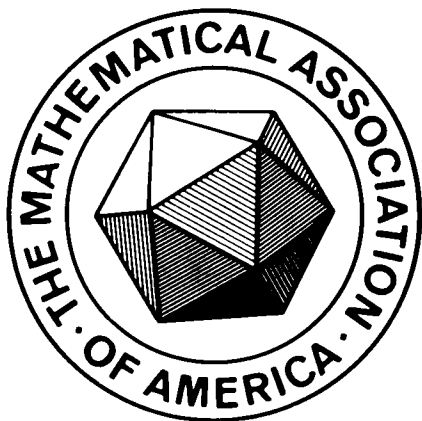
Service Buildings

Motor Pool
Security Office
Commissary
Plant Office

Motor Inns

- ① Ramada Inn
- ② Thruway House
- ③ Travelodge





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

New Mathematical Library #29
*Contest Problem Book IV, Annual High
School Mathematics Examinations 1973-82*

MAA Studies in Mathematics #22
Studies in Computer Science
edited by Seymour Pollack

A Report Prepared by CUPM
*Recommendations for a General
Mathematical Sciences Program*

Two-Year College Mathematics Readings
edited by Warren Page

MAA Notes #1
*Problem Solving in the Mathematics
Curriculum* by Alan Schoenfeld

Dolciani Mathematical Expositions, Volumes 5, 6, and 7
Great Moments in Mathematics Before 1650, by Howard Eves
Great Moments in Mathematics After 1650, by Howard Eves
Maxima and Minima Without Calculus, by Ivan Niven

MAA Launches New Notes Series

A new paperback series has joined the MAA family of publications. The series, called *MAA NOTES*, is meant to be an inexpensive vehicle for publishing lecture notes and for disseminating curriculum reports and other information produced by committees of the Association.

The first volume in the *MAA NOTES* series has been published and is now available for purchase from the MAA Headquarters. (See the advertisement on this page.) Entitled "Problem Solving in the Mathematics Curriculum: A Report, Recommendations, and an Annotated Bibliography," the volume is a report of the MAA Committee on the Teaching of Undergraduate Mathematics. This 140-page report, written for the Committee by Alan H. Schoenfeld, includes suggestions and a very thorough bibliography for implementing the Committee's recommendation that "problem solving courses at various levels of sophistication be developed . . . that foster an alert and questioning attitude in students and that actively engage students in the process of doing mathematics."

The MAA Committee on Publications intends to maintain a healthy balance in *MAA NOTES* between stimulating reports such as the above and lecture notes of special interest to MAA members. To this end, the Committee will consider lecture notes from MAA-sponsored short courses and unsolicited manuscripts of exceptional merit for publication in the series.

The other MAA publication series are, in order of their establishment:

- The Carus Mathematical Monographs
- MAA Studies in Mathematics
- New Mathematical Library
- Brink Selected Papers
- Dolciani Mathematical Expositions.

Descriptions of these series and lists of volumes in print are sent to all MAA members each April and are featured regularly in MAA journals.

Mathematics Appreciation Courses: The Report of a CUPM Panel

Many colleges and universities offer "mathematics appreciation" courses for students with majors in education, humanities, art and certain of the social sciences. In 1977, the Committee on the Undergraduate Program in Mathematics (CUPM) established a Panel to consider the content of these courses. Formation of this Panel was prompted by concern that in a large number of institutions, mathematics appreciation courses are given low priority for assignment of staff, are frequently taught perfunctorily, and lack a clear set of objectives. The Panel was asked to develop a set of recommendations on how such courses may be organized and taught effectively. The complete report of the Panel, which includes an extensive bibliography, appears in the January 1983 *American Mathematical Monthly*. Reprints are available for \$1 from the Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

Because students often take a mathematics appreciation course as their last formal contact with mathematics, the Panel strongly advises that such courses be taught in a way that the students become aware that mathematics is a vital, on-going discipline and develop a feeling for the historical and contemporary role of mathematics as well as its place

in the context of other human intellectual developments. What an enormous challenge!

Rather than prescribe a specific content or teaching strategy for such courses, the Panel provides a relatively complete framework for institutions to develop their own offerings by identifying possible themes for mathematics appreciation courses—the role of *mathematics* in history and the role of *history* in mathematics, the verbalization and reasoning necessary to understand symbolism, the recent emergence of several new mathematical sciences, and the increased importance of mathematical modeling. The mathematics appreciation course, like other liberal arts courses, should stress the fundamental elements of the discipline.

The Panel emphasizes that "a mathematics appreciation course cannot fulfill its goal if it degenerates into the teaching of arithmetic computations or pre-algebra skills, or if is limited to a topic such as consumer mathematics."

Information on Non-traditional Remediation Programs Sought


A new subpanel of the Committee on the Undergraduate Program in Mathematics (CUPM) is seeking information on programs in remediation for students at colleges and universities. Of particular interest are programs which utilize approaches to remediation different from the traditional algebra-geometry-trigonometry blocking which emulates high school programs of study. Anyone with information about such programs is requested to send, by July 1, 1983, a description of the program, course outlines, and any other relevant course materials and the name of a contact person to: Remediation Panel, % Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

NEW . . . From the MAA

**PROBLEM SOLVING
IN THE
MATHEMATICS CURRICULUM**

A Report, Recommendations, and
An Annotated Bibliography

Alan H. Schoenfeld



MAA Notes Number 1

140 pp. Paperbound \$5.00

Order from:
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1529 Eighteenth Street, N.W.
Washington, D.C. 20036

Harvard Wins Putnam

Three undergraduates from Harvard University won first place for their school in the 43rd William Lowell Putnam Mathematical Competition held on December 4, 1982. They were Benji N. Fisher, Michael J. Larsen, and Michael Raship. The latter two were also on the Harvard team last year when it placed third.

The next four winning schools, in rank order, and their teams, are: **University of Waterloo**—David W. Ash, W. Ross Brown, Herbert J. Fichtner; **California Institute of Technology**—Bradley W. Brock, Scott R. Johnson, Zinovy B. Reichstein; **Yale University**—Alan S. Edelman, Paul N. Feldman, Nathaniel E. Glasser; and **Princeton University**—Gregg N. Patruno, David P. Roberts, Daniel J. Scales.

The five highest ranking individuals are designated Putnam Fellows. In alphabetical order they are: David W. Ash, University of Waterloo; Eric D. Carlson, Michigan State University; Noam D. Elkies, Columbia University; Brian R. Hunt, University of Maryland-College Park; and Edward A. Shpiz, Washington University-St. Louis.

Two of the three members of the Harvard team and four of the five Putnam Fellows were winners of the USA Mathematical Olympiad for secondary school students within the last three years.

The first-place school receives an award of \$5000 and each of its team members receives \$250. Each Putnam Fellow receives \$500. There are lesser awards for the next four schools and their teams, and for the next 5 individuals (this year 6 because of a tie).

A total of 2024 students from 348 colleges and universities in Canada and the United States participated in the competition. There were teams from 249 schools. A more detailed report in the 1982 Putnam Competition will appear in a forthcoming issue of the *American Mathematical Monthly*.

Awards Presented at Denver Meeting

Philip J. Davis of Brown University and R. Arthur Knoebel of New Mexico State University are the recipients of the MAA's **Lester R. Ford Awards** for outstanding expository articles appearing in the *American Mathematical Monthly* in 1981. Professor Davis was honored for his article "Are There Coincidences in Mathematics?" (May 1981, pp. 311-320). The article "Exponentials Reiterated" (April 1981, pp. 235-252) won the honor for Professor Knoebel. Each author was presented with a check for \$100 at the MAA Business Meeting in Denver last January.

The **MAA Certificate of Merit** was presented at the Denver Business Meeting to Hope Daly, Director of the Meetings Arrangements Section of the Providence Office of the American Mathematical Society. Ms. Daly was recognized for her own and her staff's loyal and dedicated service to the Association for nearly a decade in the complex task of organizing the Joint Mathematical Meetings. Ms. Daly was presented with a check for \$200.

WAM Wins Four Grants

The MAA has received four grants for continuing support of the *Women and Mathematics* (WAM) Secondary School Lectureship Program:

- \$12,500 from the IBM Corporation
- \$4000 from the George I. Alden Trust
- \$1000 from the Polaroid Foundation
- \$1000 from the John Hancock Mutual Life Insurance Company.

WAM arranges for women pursuing professional careers in fields which require sound preparation in mathematics to go into junior and senior high schools and encourage students—especially young women—to continue their study of mathematics. Each speaker gives a prepared talk to several mathematics classes. The topics of these talks vary widely depending on the background and interests of the speaker. Most speakers also meet informally with small groups of students to discuss the students' career goals.

Representatives of WAM also go outside of the classroom setting to spread the message that it is important for young women to study mathematics. They make presentations at meeting of educational organizations, in-service workshops for teachers, Parent-Teacher Association meetings and other interested groups.

WAM is active in ten regions of the United States: Boston, Central Ohio, Chicago, Connecticut, Greater Seattle, New York/New Jersey, Oregon, Northern California, South Florida, and Southern California. For more information about WAM, write to: Professor Carole B. Lacampagne, WAM National Director, Department of Mathematics, University of Michigan-Flint, Flint, MI 48503.

THE MATHEMATICAL ASSOCIATION OF AMERICA

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People in the News

Paul R. Garabedian of the Courant Institute of New York University has received the George David Birkhoff Prize. The prize, given at five-year intervals for outstanding work in applied mathematics, is awarded jointly by the Society for Industrial and Applied Mathematics and the American Mathematical Society.

Professor Garabedian received the recognition for his important contributions to partial differential equations, to the mathematical analysis of transonic flow and airfoil design, and to the development and application of scientific computing to problems of fluid dynamics and plasma physics.

R. Tyrell Rockafellar of the University of Washington and **Michael J.D. Powell** of Cambridge University have been named as the first recipients of the George B. Dantzig Prize. The prize, awarded jointly by the Society for Industrial and Applied Mathematics and the Mathematical Programming Society, honors outstanding contributions to the field of mathematical programming. Rockafellar was cited for his contributions to the theory of nonlinear optimization and Powell for his work in the numerical optimization of nonlinear functions.



Hassler Whitney of the Princeton Institute for Advanced Study and **Mark Grigor'evich Krein** of the Institute for Physical Chemistry of the Ukrainian S.S.R. Academy of Sciences were jointly awarded the 1982 Wolf Foundation Prize in Mathematics. The Wolf Prize, established in Israel in 1975, is given for recognized achievement in promoting science and art for the benefit of mankind. Professor Whitney was honored for his work in algebraic and differential topology and his contributions to differential geometry. Professor Krein was recognized for his work in functional analysis and its applications.

Young People in the News

Forty talented high school students received recognition in the 42nd annual Westinghouse Science Talent Search. The first place winner, **Paul Ming** of New York's Bronx High School of Science, did a research project in advanced number theory. **Michael Hyman** of Ellicott City, Maryland, the second place winner, designed and built a three-dimensional graphics system for microcomputers as his project. Five young women were among the top ten finalists. Mathematics or computer-related topics were involved in virtually all projects submitted for judging.

Rees Gift Supports History Project

The Association is pleased to announce a gift of \$7,500 from Mina S. Rees to be used for the preparation of a history of the Institute for Numerical Analysis (INA) from 1948 until 1953.

The INA was, in a sense, an outgrowth of the substantial contributions of mathematicians to the World War II effort. Created to develop the mathematics which would soon be needed by the powerful computers of the next generation, the INA provided a focus for research in numerical analysis during the early post-War years. It was located at the University of California-Los Angeles but was administratively

attached to the National Bureau of Standards. It came to an untimely end in 1953, a victim of the bitter attacks on the NBS during the McCarthy years. But during its short happy life it awakened significant and lasting interest in numerical analysis by research mathematicians after nearly a century of neglect.

This project is a part of the efforts of the MAA Committee on World War II History to locate and preserve historical accounts of the contributions of mathematicians to the WW II effort and the influence of these activities on mathematics and society since those years.

Dr. Rees, a member of the Committee on World War II History, is President Emerita of the Graduate School and University Center of the City University of New York. She was the first recipient of the MAA Award for Distinguished Service to Mathematics in 1962. On April 25, 1983, she was awarded the National Academy of Sciences' Public Welfare Medal, one of the most prestigious honors which the Academy can bestow.

Scores Rise on AHSME

On March 1, 1983, over 400,000 high school students in the United States and Canada took the 34th annual American High School Mathematics Examination (AHSME). From unofficial but nearly complete results, it is clear that scores rose dramatically. Over 1000 students achieved National Honor Roll scores (100 points or more out of 150) compared to 221 students last year out of 418,000. Over 1800 students, by scoring 95 or above, qualified for the American Invitational Mathematics Examination (AIME), the new qualifying examination for the USA Mathematical Olympiad (USAMO).

It was the intention of the MAA Committee on High School Contests, which writes and administers these examinations, that this year's AHSME be somewhat easier than before. It is hoped that the higher scores will increase enthusiasm and future participation.

This year the highest school score received to date is 398 at Stuyvesant High School in New York City. (A school's score is the sum of its top three student scores.) Second and third are Grissom High School and the Randolph School, both in Huntsville, Alabama, with 386 and 384, respectively.

Traditional strongholds of the AHSME—the metro areas of New York City, District of Columbia, Chicago, Boston, and Toronto—continued strong. Clearly, Alabama, where AHSME scores have been increasing for several years, has also emerged as a powerhouse. This is no doubt related to the intense mathematics league activity state-wide in Alabama over the last few years. Other regions should take note!

The AIME was administered on March 22. The top 50 or so on the AIME will take the USAMO on May 3. This will be followed by the International Mathematical Olympiad in Paris in July. Results of these three examinations will be reported in the September-October 1983 issue of *FOCUS*.

Editorial Manager

The Mathematical Association of America has an opening for an Editorial Manager at its headquarters in Washington D.C. beginning July 1, 1983 or as soon as possible thereafter.

Applicants should send a curriculum vitae and should arrange to have three letters of recommendation sent to: Dr. Marcia P. Sward, Associate Director, Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

The Mathematical Association of America is an equal opportunity employer.

Calendar

National MAA Meetings

63rd Summer Meeting, SUNY at Albany, New York, August 8-11, 1983.
67th Annual Meeting, Louisville, Kentucky, January 27-29, 1984.

68th Annual Meeting, Anaheim, California, January 11-13, 1985.
70th Annual Meeting, San Antonio, Texas, January 23-25, 1987.

Sectional MAA Meetings

Metropolitan New York St. John's University, Jamaica, New York, May 7, 1983.
Michigan Oakland Community College, Auburn Heights, Michigan, May 6-7, 1983.

Northeastern Bowdoin College, Brunswick, Maine, June 17-18, 1983.
Pacific Northwest University of Idaho, Moscow, Idaho, June 16-18, 1983.

Other Meetings

MAY 1983

30-June 3. **NSF-CBMS Conference on Stochastic Differential Equations in Infinite Dimensional Spaces and Their Applications**, Louisiana State University. Lecturer: Kiyosi Ito. Contact: James R. Dorroh or Hui-Hsiun Kuo, Department of Mathematics, Louisiana State University, Baton Rouge, LA 70803.

JUNE 1983

6-8. **National Educational Computing Conference (NECC 83)**, Baltimore, Maryland. Host: Towson State University. Contact: Doris K. Lidtke, General Chairman, NECC 83, Department of Mathematics and Computer Science, Towson State University, Baltimore, MD 21204.

6-8. **Society for Industrial and Applied Mathematics Meeting**, Denver, Colorado. Contact: SIAM, Suite 1405, 117 South 17th Street, Philadelphia, PA 19103.

13-17. **MAA Maryland-DC-Virginia Section Summer Workshop—Microcomputer Graphics**, Salisbury State College, Salisbury, Maryland (See *FOCUS*, March-April 1983.)

13-17. **MAA North Central Section Short Course—Modern Computer Science for Mathematicians**, University of Minnesota-Duluth. (See *FOCUS*, March-April 1983.)

13-17. **MAA Northeast Section Short Course—Computational Complexity**, University of Maine-Orono. (See *FOCUS*, March-April 1983.)

13-17. **MAA Ohio Section Short Course—Data Structures**, Denison University, Granville, Ohio. (See *FOCUS*, November-December 1982.)

16-18. **MAA Ohio Section Short Course—An Introduction to Factoring and Primality Testing**, Kent State University, Kent, Ohio. (See *FOCUS*, January-February 1983.)

16-18. **MAA Pacific Northwest Section Short Course—Computer Graphics in Mathematics Instruction**, University of Idaho, Moscow, Idaho. (See *FOCUS*, March-April 1983.)

20-22. **International Seminar on Misconceptions in Science and Mathematics**, Cornell University. Contact: Dr. Hugh Helm, Department of Education, Stone Hall, Cornell University, Ithaca, NY 14853. (607-256-2267).

20-24. **MAA Maryland-DC-Virginia Section Summer Workshop—Linear Algebra and the Microcomputer**, Salisbury State College, Salisbury, Maryland. (See *FOCUS*, March-April 1983.)

20-24. **NSF-CBMS Conference on Complexity Theory and Its Applications**, Worcester Polytechnic Institute. Lecturer: D. J. Kleitman. Contact: Paul W. Davis, Mathematical Sciences Department, Worcester Polytechnic Institute, Worcester, MA 01609.

27-July 1. **NSF-CBMS Conference on Intersection Theory in Algebraic Geometry**, George Mason University. Lecturer: William Fulton. Contact: R. M. Ephraim, Mathematical Sciences Department, George Mason University, Fairfax, VA 22030.

JULY 1983

12-15. **International Conference on the Teaching of Mathematical Modeling**, Exeter University, England. Contact: Ms. S. Williams, Conference Secretary, University of Exeter, St. Luke's, Exeter EX1 2LU.

18-22. **NSF-CBMS Conference on Theory and Application of Sequential Nonparametrics**, University of Iowa, Iowa City. Lecturer: Prunab K. Sen. Contact: Robert V. Hogg: Department of Mathematics, University of Iowa, Iowa City, IA 52242.

25-29. **NSF-CBMS Conference on Combinatorics of Iterated Rational Mappings**, University of Minnesota-Duluth. Lecturer: William Thurston. Contact:

Mark Luker, Mathematical Sciences Department, University of Minnesota-Duluth, Duluth, MN 55812.

25-August 2. **History of Mathematics Summer Seminar for Teachers of Mathematics**, University of Toronto. Participants will explore ways in which the history of mathematics can enrich both the undergraduate and upper-level secondary mathematics curriculum. Contact: History of Mathematics Summer Seminar, Institute for the History and Philosophy of Science and Technology, University of Toronto, Toronto, Canada M5S 1K7. (416-978-7391).

AUGUST 1983

1-5. **NSF-CBMS Conference on Yang-Mills Theory and the Topology of 4-Manifolds**, University of California-Santa Barbara. Lecturer: H. Blaine Lawson. Contact: M. G. Scharlemann, Department of Mathematics, University of California-Santa Barbara, Santa Barbara, CA 93106.

6-7. **American Mathematical Society Short Course—Population Biology**, Albany, New York. Contact: AMS, P.O. Box 6248, Providence, RI 02940.

8-12. **American Mathematical Society Summer Meeting**, Albany, New York. Contact: AMS, P.O. Box 6248, Providence, RI 02940.

8-12. **Meeting of the Association for Women in Mathematics**, Albany, New York. Contact: AWM, Women's Research Center, Wellesley College, 828 Washington Street, Wellesley, MA 02181.

8-12. **NSF-CBMS Conference on Representation Theory and Harmonic Analysis on Reductive Groups over p-adic Fields**, University of Chicago. Lecturer: Roger Howe. Contact: P. J. Sally, Jr., Department of Mathematics, University of Chicago, Chicago, IL 60637.

8-13. **NSF-CBMS Conference on Quasitriangularity and Analyticity in Operator Algebras**, Texas Tech University. Lecturer: William Arveson. Contact: Gareth J. Ashton, Department of Mathematics, Texas Tech University, Lubbock, TX 79409.

16-24. **International Congress of Mathematicians**, Warsaw, Poland. (See "International Congress Rescheduled for August 83" on page 3 of this issue.)

SEPTEMBER 1983

23-24. **Eleventh Annual Mathematics and Statistics Conference—Operations Research and Mathematics as Applied in Business**. Speakers: William Lucas, Harvey Wagner, Tom Shriber. Contributed papers relating to the general theme and appropriate for a general audience of mathematicians are welcome. Send abstracts by June 1 to: Stan Payne, Department of Mathematics and Statistics, Miami University, Oxford, OH 45056. Information concerning preregistration, housing, etc., will be available from this address after July 15.

23-24. **Annual Student Conference of the Ohio Delta Chapter of Pi Mu Epsilon**, Miami University. Contributed papers from undergraduate and graduate students are welcome. Send abstracts to: Milton Cox, Department of Mathematics and Statistics, Miami University, Oxford, OH 45056.

OCTOBER 1983

14-16. **Annual Meeting of the Dozenal Society of America**, Nassau Community College. Contact: Professor Gene Zirkel, Department of Mathematics, Nassau Community College, Garden City, NY 11530. (516-222-7611 or 516-669-0273).

24-26. **Association for Computing Machinery Annual Conference**, Sheraton Centre Hotel, New York City. Contact: Thomas A. D'Auria, ACM '83 Conference Chairman, Assistant Commission, City of New York, Computer Service Center, 111 8th Avenue, 11th Floor, New York, NY 10011. (212-620-5055).

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