

FOCUS

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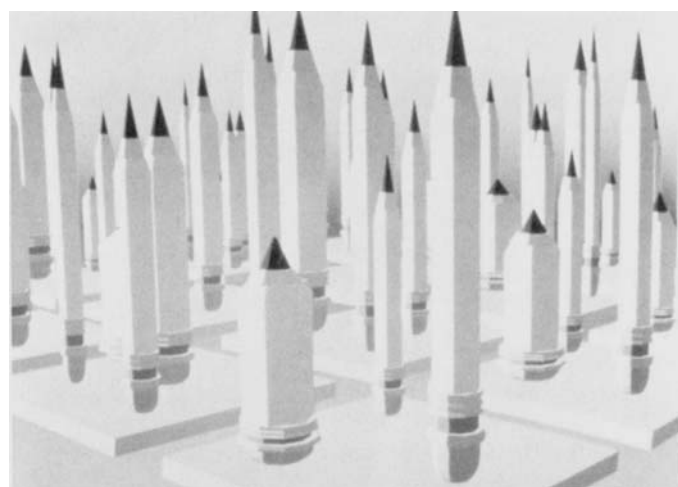
MARCH-APRIL 1984

Recommends Doubling Support

NRC Committee Finds State of Mathematical Research "Alarming"

In a dramatic presentation last January at the Joint Mathematics Meetings in Louisville, Kentucky, Edward E. David, Jr., former Science Advisor to the President of the United States and President of Exxon Research and Engineering, expressed astonishment and alarm at the state of affairs in mathematics research in the United States today and recommended doubling Federal support for mathematical research over the next few years.

For the past two-and-one-half years, the ad hoc Committee on Resources for the Mathematical Sciences of the National Research Council (NRC), of which David is Chairman, has been taking a close look at support levels for mathematics and has found "distortions and omissions in mathematics support of such a magnitude that it was difficult . . . to understand how they came about." The committee sees this situation "all the more astonishing given today's earnest, if somewhat quixotic, calls for 're-industrialization,' more technological innovation, and better education in science and mathematics."



"Pencil City," a computer-generated graphic created by Cranston-Csuri Productions. Cranston-Csuri computer-generated graphics will be featured in the thirty half-hour television programs being produced by VisUMAP (Visual Mathematics Applications Project). See "VisUMAP Update" on page 6 of this issue.

In the view of the committee, the present state of affairs is a consequence of a flawed public perception that "mathematics voyages in such splendid isolation that society can afford not to pay passage in times of budget stringency" and of inadequate appreciation of the benefits that mathematics confers—"too few people recognize that the 'high technology' that is so celebrated today is essentially *mathematical* technology."

David issued an eloquent plea for unified action by the mathematical community to restore the correct perception of mathematics as an essential contributor to science and technology, stating, "It is not outsiders, but mathematicians themselves who are the key to renewing the vitality of mathematical research."

The Committee found that "while no field associated with science and engineering has advanced further, no major field has lost as large a fraction of its federal research support in the last decade and a half." The most recent figures indicate that while the level of support for other sciences (continued on page 2)

A Message from the Chairman of the Newsletter Editorial Committee

FOCUS is now three years old. These three years have been exciting ones for those of us who have served on the Newsletter Editorial Committee, as we have worked together to help make *FOCUS* an effective communication tool for the Association.

We feel that it is now time to review the many decisions that we have made over the past three years and to see if there are ways in which *FOCUS* could be made to serve the needs of the MAA community even better.

Won't you please take a few minutes to write to me with your suggestions and comments? I will share your thoughts with the committee and with the *FOCUS* Editor. I look forward to hearing from you.

Ronald M. Davis
Department of Mathematics
Northern Virginia Community
College
Alexandria, VA 22311

Research (continued from page 1)

grew by more than fifty percent during the decade of the 1970's, support for mathematicians remained level in real dollars. By 1981, although there were no more physicists than mathematicians, there were some 60 postdoctoral positions in mathematics supported by the Federal government, compared to some 1200 in physics and some 2500 in chemistry.

In its report, which is in the final stages of preparation at the National Research Council, the committee is expected to call for massive new programs increasing Federal support for mathematics research from \$78 million to \$175 million. The bulk of the additional support would be packaged in a program called the "National Graduate and Postdoctoral Training Plan in the Mathematical Sciences" which would serve to (1) attract talented young people into mathematics research at the universities and support their work, and (2) protect the nation's "base effort" in the field by supporting *established* mathematicians. The plan calls for building up from the present level of support to:

- Grants to 1000 graduate students to support fifteen months of uninterrupted research on doctoral dissertations and two preceding summers of preparatory research.
- Two-year postdoctoral positions for a large fraction of the 800 Ph.D.'s in the mathematical sciences produced each year.
- 400 postdoctoral research grants for young investigators.
- Grants in support of 2600 established mathematical scientists, not only to conduct their own research, but also to provide training for Ph.D.'s and postdoctoral students.

In addition, the committee is expected to recommend a major new initiative in the mathematics of computing, requiring an annual investment of some \$15 million.

Although considerations of *level* of support tended to overwhelm other considerations, the committee did note that there are many imbalances in *existing* Federal support: fundamental research is too heavily concentrated at the National Science Foundation (NSF); support at NSF is too narrow, missing much of the interface between science and technology; the Department of Energy needs to direct more resources to the *mathematical* side of the interface between mathematics and scientific computation; and the Department of Defense should broaden the scope of its support for mathematics research to include more core mathematics.

To illustrate and underscore the importance of mathematical research in industry today, David included in his talk at the Louisville meeting descriptions of some of the mathematical research currently underway at Exxon in the areas of random processes and probability, numerical analysis, and non-linear phenomena.

In his closing remarks, David called upon the mathematical community and its professional organizations to accept the challenge of convincing society at large that mathematical research and improved mathematical education are vital to the nation's welfare: "The importance of mathematics is not self-evident, and many movers and shakers have not thought seriously about it. But, together, mathematicians can deal successfully with such challenges. The economic and social climate are ripe for doing so. I am confident that you can do so. I would believe no less of a community whose achievements have made American mathematics the envy of the world."

Hoffman to Serve as "Washington Presence" for Mathematics Societies



The MAA, together with the American Mathematical Society (AMS) and the Society for Industrial and Applied Mathematics (SIAM), has recently announced the appointment of Professor Kenneth Hoffman of the Massachusetts Institute of Technology (MIT) to the position of Executive Secretary for National Affairs. This is a new, part-time position created

by the three societies in an effort to facilitate the exchange of information between the mathematical community and government.

Hoffman will be responsible for collecting and disseminating information and data on research and education in the mathematical sciences, coordinating relations between the mathematical community and Federal and State agencies, and monitoring legislation affecting the mathematical sciences. He will continue to serve as a member of the Mathematics Department at MIT, commuting regularly to Wash-



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Chairman of the MAA Newsletter Editorial Committee: Ronald M. Davis, Northern Virginia Community College.

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

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ington, D.C. to carry out his duties as Executive Secretary for National Affairs.

For the past two-and-one-half years, Hoffman has served as the Executive Director of the National Research Council's Committee on Resources for the Mathematical Sciences. (See "NRC Committee Finds State of Mathematical Research 'Alarming'" on page 1 of this issue.) He is a leading university administrator as well as one of the world's foremost experts on function algebras. He served as chairman of the Mathematics Department at MIT from 1971 through 1979, and, for the past six years, has served as chairman of a committee on relations between MIT and the intelligence agencies of the Federal government. He is a former member of the Councils of both American Association for the Advancement of Science and the American Mathematical Society. Currently, Hoffman is on the Advisory Board of the Office of Mathematical Sciences of the National Research Council and is chairman of the Committee on Science Policy of the AMS.

MAA Gives Special Recognition to the Women's Movement in Mathematics

The Board of Governors of the MAA has issued a special citation "in honor of those who have furthered the progress of mathematics by enhancing significantly the status of women in mathematics." The citation, approved by the Board at its January meeting in Louisville and read publicly on January 26 at the Annual Business Meeting of the MAA, reads as follows:

History will record the 1970's as the decade of Women's Rights, a time when a liberating movement captured the imagination and stirred the conscience of the Western World. Led by a dedicated group of women and men, the movement succeeded in awakening the expectations of women for social, political, and economic equality and prodded a culture based on justice, but often bound by unreasoning tradition, to take the first significant steps toward equal rights for women.

The struggle is not over: the Women's Movement has not achieved all of its goals. But the achievements have been so great and the benefits to society so obvious that it is right to pause to acknowledge and honor the many women who have blazed the trail.

The Women's Movement in mathematics has been especially strong. Many women—and more than a few men—have worked hard and effectively to convince women that they have potential for excellence in mathematics and that they should receive recognition and rewards commensurate with their achievements. Organizations have been created for the vigorous pursuit of these goals, such as the Women and Mathematics program of the Mathematical Association of America, and the Association for Women in Mathematics.

Women have achieved prominence in research, teaching, writing, and editorial responsibilities, and have risen to the highest levels of leadership in mathematical organizations. Public recognition for these achievements has inspired other women to make full use of their abilities, in mathematics as in all affairs, with pride and confidence. The Board of Governors of the Mathematical Association of America recognizes and honors their many contributions.

Following the reading of the Citation at the Business Meeting, Professor Julia Robinson, President of the American Mathematical Society, and Professor Linda P. Rothschild, President of the Association for Women in Mathematics, accepted the Citation on behalf of those honored.

The Citation will be on permanent display in the Dolciani Mathematical Center in Washington, D.C., Headquarters of the MAA.

News from the National Science Foundation

Organizational Change

The Division of Mathematical and Computer Sciences of the National Science Foundation (NSF) has been reorganized into two separate divisions: the Division of Mathematical Sciences and the Division of Computer Research.

Outreach Service

NSF has established an Outreach Service, encouraging NSF staff members on official business to give orientations about NSF funding opportunities at colleges and universities, particularly those that are not among the leading recipients of NSF funds. The Outreach Service will respond to written requests for NSF speakers by attempting to match up staff who will be traveling in the vicinity of the requesting institution. Interested persons should contact Dr. Joseph Danek, Director of Special Programs, Division of Research Initiation and Improvement, or Mr. Patrick Olmert, Program Review Section (202-357-9726).

Director of Precollege Education Division Appointed

Professor Lillian McDermott of the Physics Department of the University of Washington, Seattle, has been appointed as the Director of the Division of Precollege Education in Science and Mathematics of the NSF Directorate for Science and Engineering Education.

Ford and Chauvenet Awards for Expository Writing Announced

Three articles appearing in the *American Mathematical Monthly* during 1982 have been selected for the **1983 Lester R. Ford Awards**. They are:

- "Genius and Biographers: The Fictionalization of Evariste Galois," pp. 84-106, February 1982, by **Tony Rothman** of the University of Texas.
- "Radon Inversion—Variations on a Theme," pp. 377-384, June-July 1982, by **Robert S. Strichartz** of Cornell University.
- "The Fixed Point Property and Cartesian Products," pp. 654-678, November 1982, by **Robert F. Brown** of the University of California at Los Angeles.

Each Lester R. Ford Award recipient received a check for \$100.

The 1983 Chauvenet Prize, awarded "for a noteworthy paper of an expository or survey nature published in English that comes within the range of profitable reading for members of the Association," has been given to **R. Arthur Knoebel** of New Mexico State University for his paper "Exponentials Reiterated," pp. 235-252, in the April 1981 issue of the *American Mathematical Monthly*. President Ivan Niven presented Professor Knoebel with a check for \$500 at the Business Meeting in Louisville last January.

A summary of the recommendations in "New Goals for Mathematical Sciences Education," a report from the Conference Board of the Mathematical Sciences, will appear in the May-June issue of *FOCUS*.



from the Executive Director's desk . . .

"I wouldn't join any organization that would have me as a member . . ."

—Groucho Marx

Dear MAA Members:

Some of you recently found yourselves contemplating the irrepressible Groucho's sardonic comment. You were the "lucky" MAA members who received a notice of your nomination, "because of your interest and experience in mathematics," to become members of MAA at a most attractive dues rate for the first year. Your reactions, judging from the letters we have received, ranged from surprise through amusement, to bemusement and even consternation. "Why me?" was a frequent comment. "This was a waste of money and shows what can go wrong with mass mailings," was another. "Please correct your records; you misspelled my name," popped up in various forms in your letters. One of you wrote, "I've been a member for 50 years, but thanks for your invitation—it makes me feel young again."

There was a degree of misunderstanding in many of these notes. Many of you seemed to assume that the letters were addressed from the MAA membership records and that any misspellings or wrong addresses needed to be corrected.

MAA Seeking Projects Officer

The Mathematical Association of America has an opening for a Projects Officer in its headquarters in Washington, D.C., beginning September 1, 1984 or as soon as possible thereafter. The duties of the Projects Officer will include helping the Association identify and find funding for projects for the improvement of mathematics education at the collegiate and other levels, assisting the Executive and Associate Directors in providing staff liaison with project personnel, and collecting and disseminating information about educational projects in mathematics throughout the United States. Graduate training and teaching experience in mathematics are desirable. Salary will be commensurate with the experience and training of the candidate.

Applicants should send a curriculum vitae and should also arrange to have three letters of recommendation sent directly to:

Dr. Alfred B. Willcox, Executive Director
Mathematical Association of America
1529 Eighteenth Street, N.W.
Washington, D.C. 20036.

The Mathematical Association of America is an Equal Opportunity Employer.

Others seemed to believe that the invitation contained a subtle message that the status of your membership was shaky or worse.

Neither assumption was correct. The invitations were intended for individuals on a list of experienced mathematicians which MAA acquired from a firm which specializes in mailings of this sort. The names and addresses had supposedly been checked by sophisticated computer techniques against the MAA membership list and purged of duplications. Obviously the computer sieve was too coarse, allowing the names of some MAA members to remain on the invitation list.

To all of you who received this invitation, including the many who did not write to us and therefore did not receive an explanatory note from me—our sincere apologies for the inconvenience. You may not realize that the MAA must elect more than a thousand new members each year just to maintain a stable membership level. You probably do understand that a growing membership helps keep individual dues down. In order to grow we must bring MAA and its membership benefits to the attention of large numbers of prospective members each year, and one of the best methods of accomplishing this is through direct mail invitations.

Thus, you can see that this type of solicitation is in the best interests of all MAA members and, in fact, contributes to the ability of the MAA to carry out its charter. We make every effort to ensure that each letter goes to a person who is not already an MAA member. We cannot guarantee 100% accuracy in this effort, but we usually come close. This time we missed by a mile.

Thank you for your patience. Groucho didn't really mean it, you know.

A.B. Willcox

Highlights of the Board of Governors' Louisville Meeting

Barrett Elected to Finance Committee

Lida K. Barrett of Northern Illinois University was elected to the Finance Committee by the Board. She replaces G. Baley Price who has completed five consecutive terms (of four years each) on this committee.

Jones and Ralston Elected as Governors-at-Large

Anthony Ralston of the State University of New York, Center at Buffalo, and Mary Harley Jones, Mathematics Curriculum Coordinator of Fairfax County, Virginia, were elected by the Board as Governors-at-Large. They represent the constituencies of Computer Science and Secondary School Teachers, respectively.

Recipients of Certificate for Meritorious Service Announced

The Certificate for Meritorious Service will be offered for the first time at the Summer Meetings at Eugene, Oregon. The recipients and the sections which they represent are:

Indiana Section Gerhard N. Wollan, Purdue University (retired)

Louisiana-Mississippi Section Paul K. Rees, Louisiana State University (retired)

Nebraska Section Henry M. Cox, University of Nebraska (retired)

Ohio Section Samuel W. Hahn, Wittenberg University

Southeastern Section John D. Neff, Georgia Institute of Technology.

January 1988 Meeting Site Approved

The Board approved the site of Atlanta, Georgia, for the January 1988 meeting. The schedule of future meetings is as follows:

| | |
|------------------------|---------------------|
| University of Oregon | August 16-19, 1984 |
| Anaheim, California | January 11-13, 1985 |
| New Orleans, Louisiana | January 9-11, 1986 |
| San Antonio, Texas | January 23-25, 1987 |
| Atlanta, Georgia | January 8-10, 1988 |

Summer Meetings Discussed

The Board discussed a resolution from the Council of the American Mathematical Society (AMS) stating that the Council is in favor of the cancellation of all summer meetings after 1984 or 1985. It was made clear by the AMS that this resolution did not represent final action and that there would be further discussion and consideration of alternatives before final action is taken.

The reasons for the AMS resolution are two-fold: (1) the AMS consistently loses money on summer meetings, and (2) the AMS Council feels that summer meetings no longer comprise a major or essential part of the Society's scientific effort in view of the increasing number of summer research conferences. In contrast, the MAA Board of Governors feels that summer meetings are very important to the Association.

The Board instructed the MAA officers to ask the Society to meet jointly with the MAA in the summers of 1984 and 1985, as planned. With regard to 1986, there will be no summer meeting of either the MAA or the AMS because of the meeting of the International Congress of Mathematicians in Berkeley in August 1986. (It has been standard practice to schedule no summer meeting when the International Congress meets in North America.)

In 1988, the AMS will celebrate its Centennial Anniversary. The MAA has agreed to cooperate in every way to help make this occasion a success. This might or might not include a joint summer meeting with the AMS.

A committee has been formed to investigate whether the MAA should meet without the AMS, should the AMS decide to terminate its participation in the Joint Summer Meetings in the summers of 1987, 1989, and subsequent summers, and to consider other alternatives that would preserve those aspects of the MAA summer meetings that are so important to the Association. Suggestions and opinions should be addressed to the MAA Secretary, Professor Kenneth Ross, Department of Mathematics, University of Oregon, Eugene, OR 97403.

Board Approves Citation for Women in Mathematics

The Board approved a special citation "in honor of those who have furthered the progress of mathematics by enhancing significantly the status of women in mathematics." For the statement of the citation, see "MAA Gives Special Recognition to the Women's Movement in Mathematics" on page 3 of this issue.

MAA Officers Elected

Lynn Arthur Steen of St. Olaf College and **Gerald L. Alexanderson** of the University of Santa Clara have been elected, respectively, President-Elect and First Vice President of the MAA. Steen will serve for one year in the office of President-Elect, for two years as President, and for one additional year as Past-President. Alexanderson will serve as First Vice President for two years.



Steen is best known to MAA members for his writing and editing. He was co-editor of *Mathematics Magazine* during the period 1976-80, and has been editor of the Telegraphic Reviews section in the *American Mathematical Monthly* since 1970. He has written numerous articles about contemporary mathematics that have appeared in such journals as *Scientific American*, *The New Scientist*, *Science*, and *Science News*.

Steen received a B.A. degree in mathematics and physics from Luther College in Iowa in 1961, and a Ph.D. in analysis under Kenneth Hoffman from the Massachusetts Institute of Technology in 1965. In 1970-71 he held a National Science Foundation fellowship at the Institut Mittag-Leffler in Djursholm, Sweden, and in 1974-75 was a Writing Fellow of the Conference Board of the Mathematical Sciences.

Editor or author of seven books, including *Mathematics Today* and *Mathematics Tomorrow*, Steen's most recent publication is the report *Undergraduate Mathematics Education in the People's Republic of China*, MAA Notes No. 3.

Steen is Secretary of Section A (Mathematics) of the American Association for the Advancement of Science (AAAS), and a member of the Council of the American Mathematical Society. He is a Trustee and former Council Chair of the Consortium for Mathematics and its Applications (COMAP).

In 1980-81, Steen served as First Vice President of the MAA. He also served several terms on the Publications Committee and on the Committee for the Exchange of Information in Mathematics. Most recently, he chaired the Chauvenet Prize Committee.



Alexanderson, who is Chairman of the Department of Mathematics at the University of Santa Clara, has also long been active in the MAA. He is Associate Director of the William Lowell Putnam Competition, is on the Board of Editors of the *College Mathematics Journal*, and is an Editor of the Problems Section of the *American Mathematical Monthly*. He has been active in the Northern California Section of the MAA and represented that section on the Board of Governors in 1975-78. In addition he has served on or chaired a number of MAA committees.

Alexanderson was a student of G. Pólya at Stanford University, joining the faculty at the University of Santa Clara in 1958. His publications are in the area of combinatorics and geometry and he has co-authored several texts with A. P. Hillman, the most recent of which is *A First Undergraduate Course in Abstract Algebra* (Wadsworth). This year a book of interviews and profiles of mathematicians, co-edited with Donald J. Albers, *Mathematical People*, will be published jointly by Birkhäuser and the MAA.

Contributed Papers for Eugene Meeting Due May 15

Papers are being accepted on four topics in collegiate mathematics for presentation in contributed paper sessions at the MAA Summer Meeting at the University of Oregon in Eugene, Oregon. The topics and the session leaders are:

- Precollege, college, and remedial instruction: common concerns—Anneli Lax, New York University, Courant Institute.
- Visual mathematics in the undergraduate curriculum—Martin E. Flashman, Humboldt State University.
- Motivating, teaching ideas that do not compromise mathematics: presentations, examples, or applications—Larry Runyan, Shoreline Community College.
- Use of computers in upper division mathematics courses—Ronald Wenger, University of Delaware.

Presentations will normally be ten minutes, although selected contributors may be given up to twenty minutes.

Individuals wishing to submit papers for any of the sessions at the Eugene Meeting should send the following information to the MAA's Washington Office (Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036) before May 15:

1. Title
2. Intended session
3. A one paragraph abstract for distribution at the meeting
4. A one page outline of the presentation
5. A list of special equipment required for the presentation (eg., computer, movie projector, videotape player).

This information will be sent to session leaders who will arrange for refereeing. Selection of papers will be announced by July 1, 1984.

VisUMAP Update

Solomon A. Garfunkel

I have received many inquiries about the progress of VisUMAP (Visual Mathematics Application Project). When will the program be available? How much progress has been made up to date?

First, some background information. VisUMAP, a project of the Consortium for Mathematics and its Applications (COMAP), is producing thirty half-hour television programs, plus text and test materials, that demonstrate contemporary, real-world applications of mathematics. It is funded jointly by the Annenberg School of Communications/Corporation for Public Broadcasting Project and the Carnegie Corporation of New York. The first funding for the project was received in October 1983.

Our work through most of last year was concentrated on refining the content for the thirty television programs. Six development teams were formed and working videotapes were prepared, in order to give the television producers a clearer idea of the mathematical content we will present. Once funding began last October, we were able to initiate a subcontract with the Chedd-Angier Production Company of Watertown, Massachusetts. Graham Chedd and John Angier, the company's founders, have worked as executive producers of a host of scientific documentaries, including the NOVA series at WGBH in Boston. Their work in designing the overall look of the series and the treatments of scripts is now in progress.

The first "cluster" of programs, five in all, including an overview program and four instructional shows, will be completed in October 1984. If all goes well, the full telecourse will be ready for release in the fall of 1985. Course adoptions are not likely until the following spring semester.

There has been one especially exciting and unexpected development in the project. COMAP has been able to contract with Cranston-Csuri Productions to do the computer-generated graphics for our series. Cranston-Csuri is one of a handful of companies at the leading edge of this field. Samples of their work have appeared on ABC News, promotions for the Olympic games, and the lead-in to the Super Bowl. We expect that this increased graphics capability will lead to more visually exciting programs which will better motivate the mathematical concepts being presented.


Since VisUMAP is intended as a course offering and since the content of the course is innovative, we are planning to produce an undergraduate text. While this textbook will take advantage of the television programs, it will be designed independently and is intended to serve Mathematics for Liberal Arts audiences with or without the video series. COMAP has again been quite fortunate—Lynn A. Steen has agreed to serve as editor for the text, coordinating the work of the various development teams. The Alfred P. Sloan Foundation has awarded the funds necessary to put the book into production. The text, to be published by W. B. Saunders, will be produced in full color thus enabling us to take full advantage of the graphics from the television programs.

We greatly appreciate the interest and help of the entire mathematical community as we work on this challenging project. We plan to have demonstration tapes of our first shows available at the Summer Meetings in Eugene, Oregon.

Solomon A. Garfunkel is the Executive Director of COMAP.


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Donald W. Bushaw, Leader
Edited by Lynn Arthur Steen



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Northeast Section to Sponsor Short Course on Optimization

The Northeast Section of the MAA, together with the University of Maine, will sponsor its Sixth Annual Short Course on Combinatorial and Geometric Aspects of Optimization, June 11-15, 1984, at the University of Maine at Orono. The lecturer will be Professor Victor Klee of the University of Washington. Professor Klee is a past president of the MAA and received the MAA's Award for Distinguished Service to Mathematics in 1977.

The week-long course will include four lectures on combinatorial optimization, two lectures on the computational complexity of certain integer and nonlinear programming problems, two lectures on convex polytopes, and two lectures on the computational complexity of linear programming.

The cost of the Short Course, including course fee, room, and board, is \$175. For more information, contact Professor Grattan Murphy, Department of Mathematics, University of Maine at Orono, Orono, Maine 04469 or Professor Don Small, Department of Mathematics, Colby College, Waterville, Maine 04901.

Over 700 Members Support the 1983 Greater MAA Fund

The *Greater MAA Fund* had a very good year in 1983, thanks to the generosity of 773 members who contributed a grand total of \$34,503. The names of all those who made contributions of \$25 or more are listed below; an additional 292 members made contributions of smaller amounts. The officers of the Association wish to express their sincere appreciation for these gifts.

Each year the proceeds from the *Greater MAA Fund* are used to support one or more projects of the Association. The proceeds from this year's fund are being held to pay the extra, one-time expenses incurred in the move of the MAA Editorial Office from Buffalo, New York, to the MAA's Washington, D.C. Headquarters.

Grand Benefactors Malcolm Brachman, Everett Pitcher, Marvin Bittinger, Anon. in memory of Edward G. Begle, Anon.

Benefactors Herbert and Binnie Baruch, Carroll Newsom, Anon. in memory of Mark Ingraham.

Grand Patrons Richard Anderson, Ivan Niven, Joan Wyzkoski.

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Contributing Members Jeanne Agnew, H. L. Alder, R. Lucile Anderson, Tom Apostol, Billy Arendt, Winifred Asprey, Bernice Auslander, George Bachman, Edward Baker, Arianne Balsler, Leon Bankoff, Lida Barrett, Donald Batman,

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Calendar

National MAA Meetings

64th Summer Meeting, Eugene, Oregon, August 16-19, 1984.
68th Annual Meeting, Anaheim, California, January 11-13, 1985.

69th Annual Meeting, New Orleans, Louisiana, January 9-11, 1986.
70th Annual Meeting, San Antonio, Texas, January 23-25, 1987.

Sectional MAA Meetings

Allegheny Mountain Washington & Jefferson College, Washington, Pennsylvania, April 13-14, 1984.
Eastern Pennsylvania and Delaware Lehigh University, Bethlehem, Pennsylvania, March 31, 1984.
Florida University of Tampa, Tampa, Florida, March 9-10, 1984.
Illinois Eastern Illinois University, Charleston, Illinois, April 27-28, 1984.
Indiana Rose Hulman Institute of Technology, Terre Haute, Indiana, April 14, 1984.
Intermountain Ricks College, Rexburg, Idaho, April 27-28, 1984.
Iowa Wartburg College, Waverly, Iowa, April 13-14, 1984.
Kansas Bethel College, North Newton, Kansas, March 30-31, 1984.
Kentucky Centre College, Danville, Kentucky, March 30-31, 1984.
Maryland-DC-Virginia Virginia Commonwealth University, Richmond, Virginia, April 13-14, 1984.
Metropolitan New York College of Mount St. Vincent, Riverdale, New York, May 6, 1984.
Michigan University of Michigan, Ann Arbor, Michigan, May 4-5, 1984.
Missouri Southeast Missouri State University, Cape Girardeau, Missouri, April 27-28, 1984.
Nebraska Nebraska Wesleyan University, Lincoln, Nebraska, April 13-14, 1984.

New Jersey Montclair State College, Montclair, New Jersey, March 10, 1984.
North Central Macalester College, St. Paul, Minnesota, April 27-28, 1984.
Northeastern Plymouth State College, Plymouth, New Hampshire, June 29-July 1, 1984.
Ohio Bowling Green State University, Bowling Green, Ohio, April 13-14, 1984.
Oklahoma-Arkansas Arkansas Tech University, Russellville, Arkansas, March 30-31, 1984.
Pacific Northwest In conjunction with National Meeting in Eugene, Oregon, August, 1984.
Rocky Mountain U.S. Air Force Academy, Colorado, April 27-28, 1984.
Seaway Broome Community College, Binghamton, New York, April 6-7, 1984.
Southeastern Tennessee Tech University, Cookeville, Tennessee, April 6-7, 1984.
Southern California California State University, Los Angeles, California, March 3, 1984.
Southwestern Arizona State University, Tempe, Arizona, April 13-14, 1984.
Texas University of Texas at Tyler, Tyler, Texas, April 6-7, 1984.
Wisconsin St. Norbert College, DePere, Wisconsin, April 13-14, 1984.

Other Meetings

APRIL 1984

6-8. **Shaping Space, An Interdisciplinary Conference on Polyhedra**, Smith College. Contact: Marjorie Senechal, Clark Science Center, Smith College, Northhampton, MA 01063.

13-15. **National Conference on Microcomputers and Basic Skills in College**, The Instructional Resource Center of the City of New York. Contact: Geoffrey Akst, Conference Chair, Instructional Resource Center, The City University of New York, 535 East 80th Street, New York, NY 10020 (212-794-5425).

19-21. **Fifteenth Annual Pittsburgh Conference on Modeling and Simulation**, University of Pittsburgh. Contact: William G. Vogt or Marlin H. Mickle, Modeling and Simulation Conference, 348 Benedum Engineering Hall, University of Pittsburgh, PA 15261.

25-28. **62nd Annual Meeting of the National Council of Teachers of Mathematics—Using Technology in Mathematics Education**, San Francisco, California. Contact: NCTM, 1906 Association Drive, Reston, VA 22091.

MAY 1984

10-13. **11th Annual Conference of the Ontario Association for Mathematics Education**, Kingston, Ontario. Contact: Dave Handley, Publicity Coordinator OAME '84, % BCIVS, 230 John Street, Belleville, ONT K8N 3G1 (613-962-9581).

16-18. **NCTM Seminar Series—Teaching Math with Microcomputers**, Miami, Florida. Contact: NCTM, 1906 Association Drive, Reston, VA 22091.

24-29. **American Association for the Advancement of Science (AAAS) Annual Meeting**, New York City. Contact: AAAS Meetings Office, 1776 Massachusetts Avenue, Washington, D.C. 20036 or see the March 9 or March 30 issue of *Science*.

JUNE 1984

4-8. **Maryland-DC-Virginia Summer Workshop—Teaching Mathematics Via APL**, Salisbury State College, Salisbury, Maryland. (See *FOCUS*, January-February 1984.)

11-15. **MAA Northeast Section Sixth Annual Short Course—Combinatorial and Geometric Aspects of Optimization**, University of Maine at Orono. (See "Northeast Section to Sponsor Short Course on Optimization" on page 7 of this issue.)

11-15. **Maryland-DC-Virginia Summer Workshop—Exploratory Data Analysis**, Salisbury State College, Salisbury, Maryland. (See *FOCUS*, January-February 1984.)

11-19. **Ohio Section Short Course—Systems Programming**, Denison University, Granville, Ohio. (See *FOCUS*, January-February 1984.)

JULY 1984

16-20. **Society for Industrial and Applied Mathematics National Meeting**, University of Washington, Seattle. Contact: Meetings Arrangements, SIAM, 117 South 17th Street, Philadelphia, PA 19103 (215-564-2929).

AUGUST 1984

16-19. **American Mathematical Society Summer Meeting**, University of Oregon, Eugene, Oregon. Contact: AMS, P.O. Box 6248, Providence, R.I. 02940.

16-19. **Meeting of the Association for Women in Mathematics**, University of Oregon, Eugene, Oregon. Contact: AWM, Box 178, Wellesley College, Wellesley, MA 02181.

24-30. **Fifth International Congress on Mathematical Education**, Adelaide, Australia. (See *FOCUS*, November-December 1983).

27-31. **First International Conference on Fibonacci Numbers and Their Applications**, University of Patras, Greece. Contact: Andreas N. Philippou, Department of Mathematics, University of Patras, Patras, Greece.

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