FOCUS

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A Visit to Vietnam

Peter Hilton

In early April of this year, I received a 'mysterious' phone call from Dr. Judy Ladinsky, Professor of Preventive Medicine at the University of Wisconsin-Madison. It transpired that she was telephoning me, in her capacity as chairwoman of the U.S. Committee for Scientific Cooperation with Vietnam, to enquire if I would be able to visit the University of Hanoi after attending an international conference on algebraic topology in Singapore in mid-June.

It was known to the Hanoi topologists, and particularly to Dr. Huynh Moi, the leader of the algebraic topology group there (who was at the time visiting the U.S. and was actually in Dr. Ladinsky's office when she made her phone call) that I would be in Singapore at the conference, and that I had made a considerable effort to get some Vietnamese topologists invited to that conference. (My efforts foundered, unfortunately, owing to the strained political relations between Singapore and Vietnam.) I agreed to visit Hanoi from June 21 to June 26, and learned that it would be necessary to go to Bangkok to get my visa and then fly to Hanoi from Bangkok. In fact, Bangkok is the unique airport in the non-communist world from which one can fly directly to Hanoi, but there are only 2 flights a week in each direction!

I arrived in Bangkok on Thursday, June 20, and, after some difficulties with my visa, caught a flight for Hanoi early the next morning on a Vietnamese airline.
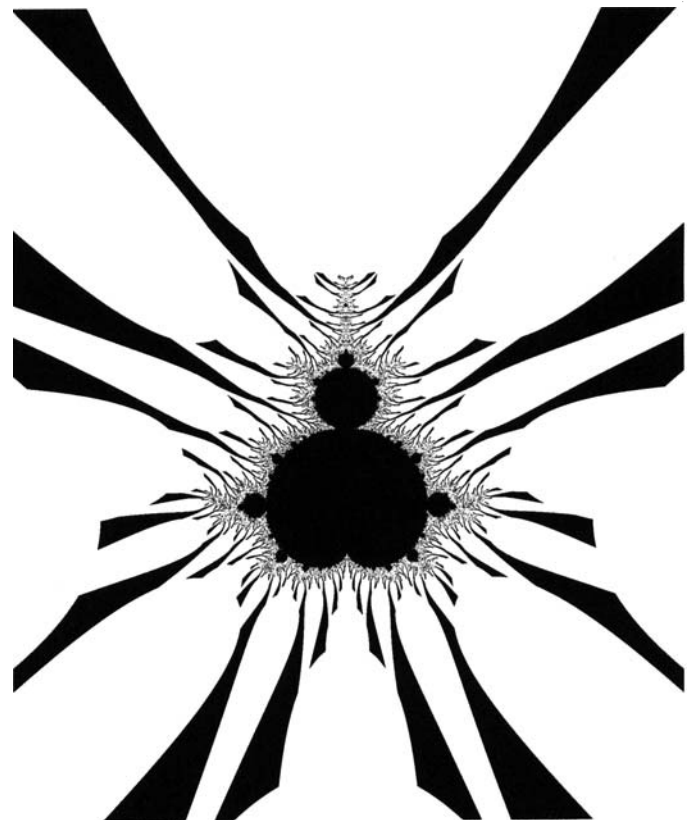
On arrival, I was met by Professor Pham, head of the sec-

tion of geometry, topology and algebra in the Faculty of Science, and by Hugh (such, he said, was his name, but I suspect he used a different spelling!) on behalf of the Ministry

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An exhibit, "Frontiers of Chaos," which features some 90 computer graphics is currently touring museums, galleries, and academic institutions in Western Europe and the United States. The fractal pictured above, titled "The 'Signature' Mandelbrot Set", is by Benoit B. Mandelbrot, Harvard University. For information on dates and locations of the exhibits, contact the Goethe Institute, 530 Bush Street, San Francisco, CA 94108; (415)391-0370.

The January 1986 Joint Mathematics Meetings

The January 1985 Joint Mathematics Meetings will be held in New Orleans, Louisiana, January 7-11. The meetings will include the **69th Annual Meeting of the Mathematical Association of America**, January 9-11, the **92nd Annual Meeting of the American Mathematical Society**, and the 1986 annual meetings of the **Association for Women in Mathematics**, and the **National Association for Mathematicians**. All meeting sessions will be held in the Hyatt Regency and the Superdome.

Vietnam *(continued from page 1)*

of Higher Education. I also became acquainted with my chauffeur (who responded to the name O.K.) who, driving an ancient Volga saloon, was to be my frequent companion over the next few days, and with whom I set up a very friendly relationship largely on the basis of his appetite for Swiss cigarillos. (There is a lot of cigarette smoking in Vietnam, but I suspect that the quality of the cigarettes leaves something to be desired).

It would take too long to recount the many memorable incidents of my visit, so let me record my most vivid impressions.

First, the Vietnamese are people of great dignity and self-respect, who have come to accept, with stoical calm, their extremely difficult circumstances. The standard of living is very low, even by third world standards; and the country has certainly not yet recovered (if it ever will) from the ravages of a war of more than 30 years' duration. Second, despite their privations and the resentment they might reasonably be expected to feel toward those who destroyed their country, the Vietnamese are very friendly—and this I found among ordinary people as well as among my hosts. There is no doubt at all that the Vietnamese, but more especially the intellectuals, would want far more contact with colleagues from the West.

Indeed, they are starved of such contact, at first or second hand. I was told that I was only the second mathematician from the U.S. to visit Vietnam since 1975 (the other being Neal Koblitz of the University of Washington). A few dedicated medical scientists (Dr. Ladinsky, whose committee arranges such visits, among them) have visited Vietnam and done wonderful work there in combating disease and inculcating good health habits; but the overall picture is one of almost total isolation. The isolation is reinforced by the fact that the University of Hanoi cannot afford to purchase books for its library nor to subscribe to journals. If there is a xerox machine at the university, I didn't see it; and a typewriter is a rare luxury!

In the circumstances, the level of mathematical activity, with respect to both research and teaching, is extraordinarily high, testifying to a rare combination of outstanding talent and total dedication. Within my own field I can state with certainty that the work being done by Dr. Mui and his school places them among the most skillful in the use of cohomology theory, and especially, of cohomology operations involving general cohomology theories, in the study of homotopy classification problems for various spaces (manifolds, configuration spaces, . . .). It was also my impression, from long and detailed discussions I had with mathematicians at the National Center for Scientific Research, that in other fields, too, including applied mathematics, the standard was extremely high.

The same outstanding research mathematicians at the university played an important role in developing and implementing a very comprehensive and demanding curriculum of courses, not only in Hanoi but also in the provinces. Nowhere have I seen more convincing evidence of the natural complementarity of teaching and research.

I gave many lectures in rather exhausting circumstances (temperature 36°C, humidity 85%, no air-conditioning). I was amazed with what avidity my lecturers were received! Even on the Sunday of my visit my program included 3½ hours of lectures (followed by sightseeing!), and this meant, for many members of my audience, two round-trip cycle rides of 20 kilometers.

I also gave one lecture for actual and aspiring secondary teachers, and for university faculty, in which I compared the higher educational systems in the U.S.A. and the U.K., with respect to both principle and practice. I was humbled to learn that some had endured a 48-hour train journey to attend this lecture. The questions following my talk were keen and apposite—no sign of 'math avoidance' here!

Just before I left on Wednesday, Hugh arrived, together with a young topologist with whom I had become very friendly, Dr. Dung, to escort me to the airport. Hugh was bearing gifts for my wife and myself from the Dean of Faculty (whom I had met on Monday and with whom I had had a long discussion on the role of mathematics in the university); Dr. Dung wanted to accompany me right up to the last possible moment to discuss topology. Their two roles epitomized for me my overall abiding impressions of the Vietnamese—warm-hearted, generous and with an unquenchable desire for knowledge and human contact.

Peter Hilton is a Professor of Mathematics at the State University of New York at Binghamton.

from the President's desk....

Lynn Arthur Steen, St. Olaf College

Planning for Strength

Rapid change is the hallmark of collegiate mathematics. Ten years ago new Ph.D.'s were begging for jobs; few departments of computer science existed; discrete mathematics had not yet been "discovered," and microcomputers were only a shop project in a California garage. Now there are far more jobs than candidates; computer science enrollments have exploded, outpacing mathematics in most institutions; curricular ferment is debated in every department; and textbooks now come with disks in the back cover.

To help the MAA respond to these changes, the Executive Committee established a long-range planning process to set goals and determine priorities. The process began last spring with a questionnaire to committee members and Section leaders. In August the Board of Governors discussed the findings from this poll, and by straw vote established a preliminary list of priorities. During this year these issues will be discussed further by committees and within Sections. The results will be submitted to the Board for approval as a guide for Association program and budget decisions during the next several years.

Any planning process attracts a wide variety of ideas; that is part of its function. But among the diversity, several themes emerge with great clarity—themes that identify the strengths and weaknesses of the Association, and suggest priorities for future effort.

The MAA publications, especially the journals, are cited most often as the major strength of the Association. Quality exposition concerning undergraduate mathematics is our most important product. Curricular leadership with the associated support of meetings, minicourses, and committee recommendations is also seen as a distinctive strength, important not only for the Association, but for the nation as a whole.

Ironically, the weakness most often cited also concerns exposition: the failure of the MAA, and of the entire mathematical community, to make mathematics visible outside our own associations. We perceive ourselves, probably with some justice, as being relatively ineffective in public forums concerning scientific or educational policy.

In its straw vote the Board of Governors ranked issues concerning the public understanding of mathematics as its top priority: activities designed to communicate mathematics beyond our own members received consistently high ratings. Concern for precollege mathematics came in a close second. The Board is very concerned with the preparation and supply of precollege teachers, and with educational, motivational, and guidance materials for high school students.

Services to our own members came in third, but with some very strong support: professional development (e.g., minicourses), standards for promotion and tenure, special interest groups, accreditation, and related support services.

These priorities are responses to perceived weaknesses. The areas of strength—journals, mathematical exposition, curricular support—must continue and grow, while at the same time we must work to strengthen areas in which there is continuing need. The planning process will continue throughout this year, with refinements and details added by various MAA committees and Sections.

In the meantime, action to carry on the work of the Association goes on in MAA committees, journals, and Sections. We dare not wait for the results of some final "plan" before taking initiatives to strengthen collegiate mathematics.
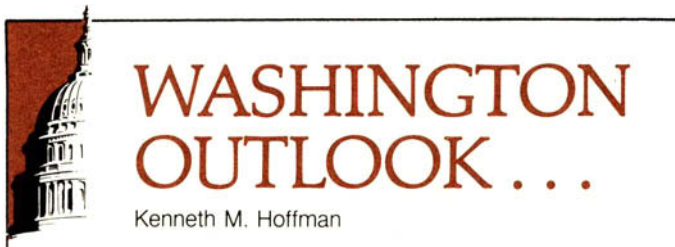
MAA Planned Giving Program Established

The MAA has established a Planned Giving Program which will create opportunities for members and other donors to make substantial gifts to the MAA while achieving income tax and/or estate tax savings for themselves and their heirs. The program was approved by the Board of Governors at its August meeting in Laramie, Wyoming.

The program will be phased in during the next several years. The first phase in 1986 will be a wills and bequests program. The Planned Giving Program will eventually provide assistance for major gifts of cash, securities, real and personal property, undivided interests, insurance policies, annuities, a pooled income fund, lead trusts and charitable remainder unitrusts.

A national volunteer advisory committee will be formed. This committee will consist of certified public accountants, attorneys, bank trust officers, investment counselors, life underwriters, and financial planners.

The first mailing to the membership about the Planned Giving Program is scheduled for early 1986. For more information contact: MAA Development Office, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

WASHINGTON OUTLOOK...
Kenneth M. Hoffman

Mathematics Leaves Isolationism Behind

Recent appearances by several of our colleagues at the extensive House Committee on Science and Technology Hearings on Science Policy are another reminder that the era of isolationism in American Mathematics is coming to an end. The testimony of Dick Anderson (LSU) on international science and John Hubbard (Cornell) on the impact of information technology, when combined with staff briefings by Jim Glimm and the more frequent oral and written contacts maintained by Ed David (Exxon), Lynn Steen (MAA President), and the author, signal the beginnings of major change. A concerted effort is now under way to make both the importance and the basic needs of mathematics known to Congress. In contrast, there was virtually no sustained contact between our community and the House or Senate during the previous decade.

By the standards of the scientific community at large, congressional contact by mathematicians constitutes a trickle, not a flood. Yet, its recent increase is significant, when seen in the light of other outreach activities initiated by our community in the last few years:

- Reconstitution of the Joint Policy Board for Mathematics (JPBM) as a joint action arm of AMS-MAA-SIAM.
- Restructuring of the Conference Board of the Mathematical Sciences (CBMS) as a communication/project-initiation body comprised of the presidents of 13 professional mathematical sciences organizations.
- Formation of the David Committee at the National Research Council (NRC), to produce an in-depth review of research funding for the mathematical sciences and pursue the implementation of its own basic recommendations.
- Establishment last year of the NRC Board on Mathematical Sciences, to strengthen our ongoing ability to set long-range goals and priorities.
- The September start of a new JPBM public information program, utilizing Kathleen Holmay & Associates, specialists in media consulting and public affairs.
- The launching in late October of NRC's bold education initiative, the Mathematical Sciences Education Board. The process of formation of this Board, which grew out of CBMS recommendations, has begun to bind our research and teaching communities together more strongly. Its work will give the country a capability to continuously renew mathematics education which it has never had. (See article on page 5 of this issue.)

It does not seem too harsh to describe these structural changes collectively as a movement away from isolationism. For too many years, we as a community remained aloof from the affairs of government and science policy, save for the herculean efforts of two or three individual mathematicians and those of our colleagues in government funding agencies. We took it for granted that policy makers and the public understood the importance of our work and would automatically provide for our needs.

It is worth noting that behind the recent changes in structure and action lies something more fundamental, the movement away from scientific isolationism. As the David Report stressed, mathematics is looking outward now, toward its intellectual involvement with science and engineering. This is a healthy trend, which will continue.

Some members of our community will ask, of course, whether it is equally healthy for us to expand and regularize our contact with Congress. It won't be healthy if we do it badly, that is, if we engage in generalized special pleading or try to bypass scientific decision-making processes. To do it well, we must begin (as we have) by informing ourselves about Congress and informing Congress about the mathematical sciences. Then, since our field generally lacks massive projects which provide foci for congressional attention and contact, we must have some central organization and be systematic about what we do.

As for what we hope to accomplish, the most basic goal is simple: to keep our discipline on the minds of Congress when matters of research and education are discussed. We cannot rely on people in other disciplines to tell our story. They won't. A more specific goal for the near future is to create among key legislators and staff the awareness which we have made pervasive in federal funding agencies: that research support for mathematics is out of balance with support for related fields of science. This will create a supportive climate for the current efforts of the executive branch to remedy the situation. Other such goals can be set as we develop the reasoned analyses to support them.

Kenneth M. Hoffman is a Professor of Mathematics at the Massachusetts Institute of Technology and Executive Secretary for National Affairs of JPBM.

Mathematics Education Board Meets for First Time

October 28, 1985, was an historic day for mathematics education in the United States, as the first meeting of the Mathematical Sciences Education Board (MSEB) of the National Research Council (NRC) began in Washington, D.C. Frank Press, NRC Chairman, speaking on behalf of the National Academies of Science and Engineering, applauded the unity of the mathematics research and education communities, and outlined the ambitious hopes he has for the Board: to provide national leadership in mathematics education, coordination among ongoing projects, advice and recommendations to local, state, and federal government, and service to localities and states as they work toward educational excellence.

Members of the Board were also addressed by Bassam Shakhashiri, National Science Foundation Assistant Director for Science and Engineering Education, and Representative Don Fuqua of Florida, Chairman of the House Committee on Science and Technology.

The outcome of the two-day meeting matched expectations, as the Board laid out an Action Agenda for its first year's activities. Detailed were major projects and the associated leadership roles the Board would attempt to play in several critical areas of precollege education: the constraints imposed by testing; the impact of technology on the classroom; articulation of core competencies in mathematics; standards for teacher preparation and development; improved information exchange and coordination.

The new Board is chaired by **Shirley A. Hill**, University of Missouri at Kansas City. (See *FOCUS*, October 1985.) Other members of the Board are: **Gordon M. Ambach**, Commissioner of Education, State of New York; President, Council of Chief State School Officers; **J. Myron Atkin**, Dean, School of Education, Stanford University; **David H. Blackwell**, Professor of Statistics, University of California, Berkeley, Member, National Academy of Sciences; **Gail F. Burrill**, Chair, Department of Mathematics, Whitnall High School, Greenfield, Wisconsin; **Iris M. Carl**, Elementary Mathematics Instructional Supervisor, Houston Independent School District, Houston, Texas; **C. Herbert Clemens**, Professor of Mathematics, University of Utah; **Clyde L. Corcoran**, Mathematics Teacher, California High School, Whittier, California; **F. Joe Crosswhite**, Professor of Mathematics Education Emeritus, The Ohio State University; President, National Council of Teachers of Mathematics; **Richard DeAguero**, Director of Student Activities, Miami Senior High School, Miami, Florida; **William J. Dennis, Jr.**, Director of Research, National Federation of Independent Business; **John A. Dossey**, Professor of Mathematics, Illinois State University; President-Elect, National Council of Teachers of Mathematics; **James T. Fey**, Professor of Curriculum & Instruction and Mathematics, University of Maryland; **Robert Glaser**, Director, Learning Research & Development Center, University of Pittsburgh; **Andrew M. Gleason**, Professor of Mathematics, Harvard University; Member, National Academy of Sciences; **Brother Neal Golden**, Mathematics & Science Teacher, Brother Martin High School, New Orleans, Louisiana; **Gene Hoffman**, State Representative, Illinois House of Representatives; **Kenneth M. Hoffman**, Professor of Mathematics, Massachusetts Institute of Technology; **Joseph R. Hoffmann**, Consultant in Mathematics Education, California State Department of Education; President, Association of State Supervisors of Mathematics; **David**

R. Johnson, Chairman, Mathematics Department, Nicolet High School, Glendale, Wisconsin; President, National Council of Supervisors of Mathematics; **Ann Kahn**, President, The National PTA; **Jeremy Kilpatrick**, Professor of Mathematics Education, University of Georgia; **Joan R. Leitzel**, Professor of Mathematics and Associate Provost, The Ohio State University; **Peggy C. Neal**, Mathematics Teacher, Burney Harris Lyons Middle School, Athens, Georgia; **Henry O. Pollak**, Assistant Vice President, Mathematical, Communications & Computer Sciences Research Laboratory, Bell Communications Research; **Jack Price**, Superintendent, Palos Verdes Peninsula Unified School District, Palos Verdes, California; **Anthony Ralston**, Professor of Mathematics and Computer Science, State University of New York, Buffalo; **Stephen B. Rodi**, Division Chairperson, Mathematics & Physical Sciences, Austin Community College; President, American Mathematical Association of Two-Year Colleges; **Frederick A. Roesch**, Senior Vice President, Global Electronic Marketing, Citibank, N.A., New York City, New York; **Paul J. Sally**, Professor of Mathematics, The University of Chicago; **C. Thomas Sciance**, Director, Engineering Research, E.I. duPont de Nemours and Company; **Lynn A. Steen**, Professor of Mathematics, St. Olaf College; President, Mathematical Association of America; **Dorothy S. Strong**, Director of Mathematics, Chicago Public Schools; and **Calvin J. Wolfberg**, President, Pennsylvania School Boards Association.

Serving as liaisons from Commissions within NRC are: **Hirsh G. Cohen**, Vice-President, Divisional Operations, IBM Research; and **Morris DeGroot**, Professor of Statistics, Carnegie-Mellon University.

The Board's staff is led by **Marcia Peterson Sward**, who comes to the role of MSEB Executive Director from her positions as Associate Director of the MAA and Administrative Officer of the Conference Board of the Mathematical Sciences.

Murphy Awarded Congressional Science Fellowship

James R. Murphy, a biostatistician from the University of Colorado Medical School, has been awarded the 1985-86 Congressional Science Fellowship by the American Mathematical Society (AMS), the MAA, and the Society for Industrial and Applied Mathematics (SIAM). He will spend one year working in the Nation's capital as a special legislative assistant on the staff of Senator Pete V. Domenici (R-NM).

Murphy is the seventh Fellow to serve in the AMS-MAA-SIAM program since it was established in 1978. The 1984-85 Fellow was T. Christine Stevens, Arkansas State University. An article by Stevens describing her year working on the staff of Congressman Ted Weiss (D-NY) will appear in the January-February 1986 issue of *FOCUS*.

The AMS-MAA-SIAM Fellowship is one of some thirty similar fellowships supported by scientific societies in a program administered by the American Association for the Advancement of Science. The purpose of the program is to contribute to the mathematical and scientific literacy in government and to promote the effective use of scientific and technical knowledge in the United States Congress.

News from NSF

NSB Holding Hearings on Undergraduate Education

The National Science Board (NSB), the policy-making body of the National Science Foundation (NSF), is holding a series of public hearings to assess the condition of undergraduate science, engineering and mathematics education in the Nation's colleges and universities. National leaders from industry, government, and the academic world are being invited to present their views on the importance of undergraduate education in producing this country's technical work force and in enhancing its economic security.

Lynn A. Steen, MAA President, is scheduled to testify before the NSB committee on November 20.

Although NSF and other agencies have programs at both the graduate and pre-college levels, no systematic Federal leadership or support exists for science, engineering and mathematics education at the undergraduate level.

The committee will deliver its recommendations to the NSB at its meeting on January 16-17.
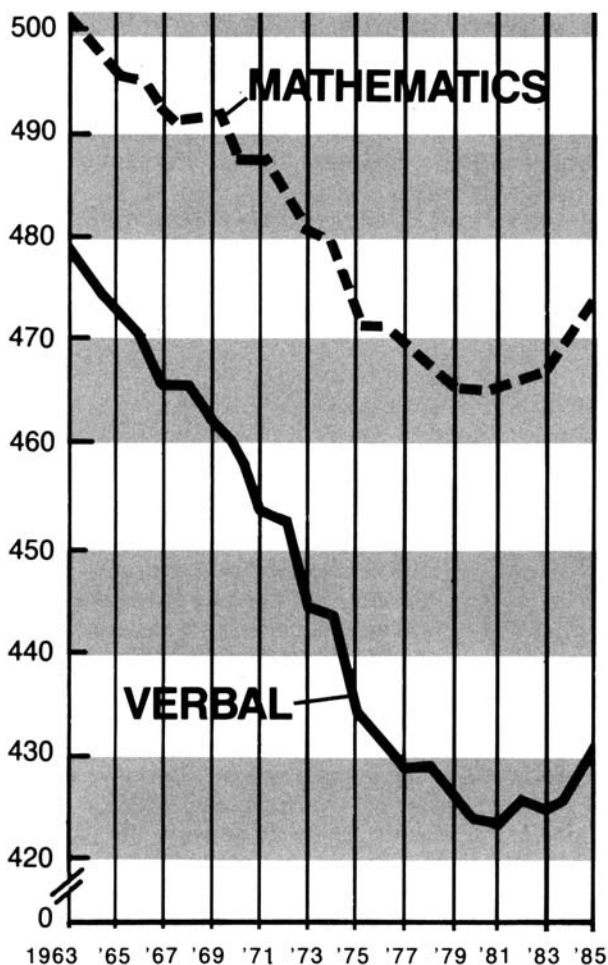
Scores on both the mathematics and verbal sections of the College Board's Scholastic Aptitude Test (SAT) continued their upward trends last year, with average mathematics scores up by four points, to 475, and average verbal scores up by five points, to 431. The combined increase of nine points was the largest since 1963, when SAT scores began a 17-year decline.

NSF Invites Proposals on Use of Calculators and Computers in K-6

The Division of Materials Development and Research of the Science and Engineering Education Directorate at NSF is inviting proposals for projects that will explore the consequences of the availability of calculators and computers for the elementary mathematics (K-6) curriculum.

The goal is to develop model mathematics curricula and prototypical instructional materials under the assumption that every student has a calculator and has access to a computer. It is expected that these curricula will, for example, place substantially more emphasis on mental arithmetic, estimation, and approximation, and substantially less on paper and pencil calculations. Exploration of the implications of using calculators and/or computers for teaching applications of elementary mathematics is another appropriate emphasis for these projects.

NSF expects to make three to six awards in this area, with a duration of from three to four years each, totaling up to $5 million.

All proposals must be submitted no later than March 17, 1986. Copies of the program announcement may be obtained from: Instructional Materials Development Program, Division of Materials Development and Research, Directorate for Science and Engineering Education, National Science Foundation, Washington, D.C. 20550.

This is the first in a projected series of program solicitations issued by the Division of Materials Development and Research. The Division expects to issue two additional solicitations in the very near future, one targeted on improved programs and materials for science instruction at the elementary level, and one targeted on improved programs for the preparation of science and/or mathematics teachers.

CBMS Survey to be Conducted This Fall

The MAA has received a grant of $112,134 from the National Science Foundation to conduct, on behalf of the Conference Board of the Mathematical Sciences (CBMS), a survey of undergraduate programs in the mathematical and computer sciences.

This year's survey will be the fifth in a series of surveys begun by CBMS in 1965-66 and conducted every five years since then. The continuing data base provided by these surveys is important for the professional community in understanding phenomena and trends in undergraduate mathematics and computer science.

The survey uses a carefully selected sample from the more than 2400 universities, colleges, and two-year colleges that teach mathematics or computer science at the undergraduate level. Survey forms are expected to be mailed by November 1. To get meaningful data, very high response rates from those departments receiving the survey questionnaire are needed. If your department is one of the chosen few, you are urged to fill out and return the questionnaire.

Donald J. Albers, Menlo College, is Chairman of the Survey Committee, and Richard D. Anderson, Louisiana State University, is Executive Director and Official Project Director.

Reflections on ICM-86

R.H. Bing

National meetings of the Mathematical Association of America offer us the opportunity to meet old friends, make new friends, see national leaders, hear mathematical talks, learn of curriculum changes, and get a feel for trends in research and changes in the teaching of mathematics. There will be no national meeting of the MAA in the summer of 1986 since the International Congress of Mathematicians (ICM-86) will be meeting at the University of California, Berkeley. This international meeting serves somewhat as a substitute for the summer meeting of the MAA and offers some additional attractions.

We will not only see the usual group of American participants at this meeting, but we will also have the opportunity to meet more than the usual number of international leaders. We can act as hosts and tell them about the condition of mathematics in this country, as well as learn from them how things are done in other parts of the world. Perhaps many of us get more from the contacts with people at such meetings than we do from the mathematical lectures that we hear.

Those of us who are teachers enjoy seeing our students do well—some of these students have potential that surpasses our own. Perhaps we can improve their chance of success by bringing to them accounts of our meetings with famous mathematicians. Our attractiveness as teachers may be enhanced by our first-hand experience in having seen and met international leaders. The meeting of ICM next summer offers us an opportunity to see more of these famous mathematicians than we would otherwise have the opportunity to meet.

I have met many interesting foreign mathematicians at past ICM's. One meeting in particular that stands out in my memory is the meeting in Edinburgh in the summer of 1958. While there I met the Russian mathematician Yu. M. Smirnov whom I particularly wanted to meet since he and I, along with J. Nagata, had obtained independent solutions of the metrization problem. That proved to be only the first of many meetings with Smirnov, including dinner at his home in Moscow along with his mentor, Paul Alexandrov. We exchange cards at the Christmas season and remain friends.

San Francisco is many people's favorite spot and ICM-86 will be held next door in Berkeley. Berkeley is the home of the Mathematical Science Research Institute (MSRI), where mathematical researchers spend time to learn, think, and write. I hope that, if you attend ICM, you will take advantage of the opportunity to visit the site of MSRI (if you have not already done so). There, high in the hills, you will see a breathtaking view of Berkeley, San Francisco, San Francisco Bay, the Golden Gate Bridge, and Alcatraz.

International mathematical congresses offer us an opportunity to feel the pulse of mathematics. I hope to see you at ICM-86.

R.H. Bing is a Professor of Mathematics at the University of Texas at Austin and a past MAA President.

MAA Seeking Associate Director

The Mathematical Association of America expects to have an opening in its Headquarters Office for the position of Associate Director, beginning on January 1, 1986, or as soon as possible thereafter. For an exceptional candidate, a starting date as late as July 1 may be negotiated.

The responsibilities of the Associate Director will be largely in the area of publications, as editor of *FOCUS* and administrative supervisor of a publications program which includes three journals and 5-10 books per year. The Associate Director will also work on special projects and assist the Executive Director in the administration of the Headquarters Office.

Mathematical training is a requirement for this position, preferably to the doctoral level. However, a strong master's degree, especially when combined with administrative experience, may qualify.

This position offers the possibility of an exciting leadership career in publishing and association management.

Applications will be accepted at any time. However, interviews with candidates are scheduled to begin soon after November 15. Applicants should send a curriculum vitae and arrange to have three letters of recommendation sent to A.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.

Second Announcement of ICM Available from AMS

The Second Announcement of the International Congress of Mathematicians (ICM-86), which will be held at the University of California-Berkeley, August 3-11, 1986, will soon be available from the American Mathematical Society. Anyone wishing to receive a copy should write to: ICM-86, P.O. Box 6887, Providence, RI 02940. The Second Announcement will describe all activities of the Congress in detail, and provide instructions on how to complete the preregistration process and obtain accommodations.

For more information about the Congress, see R.H. Bing's article on this page, and two articles in the October 1985 issue of *FOCUS*, "Plans for ICM-86 Nearing Completion" and "Mathematics Around the World" by Lynn Arthur Steen.

MAA to Sponsor Session at Educational Computer Conference

The MAA has made arrangements to sponsor a special session on Computers in Undergraduate Mathematics Education at the 1986 National Educational Computer Conference. The meeting will take place in San Diego, June 3-5.

Members interested in participating in this session by presenting state-of-the-art talks based on their personal experiences in developing and using innovative computer-based instructional methodologies should contact, before January 1: Sheldon P. Gordon, Suffolk Community College, Selden, New York 11784 [Office: (516) 451-4270; Home: (516) 368-3781].

Approval Voting Proposed for MAA

The Board of Governors is proposing to the MAA membership a change in the way the Association conducts its national elections for President and First Vice-President. (See "Bylaw Changes to be Decided by MAA Membership in January" on page 10 of this issue of *FOCUS*.)

The new method proposed is by a **single ballot**, under a procedure known as approval voting. It replaces a three-stage system of a primary plurality election followed by a committee selection followed by a run off election. As before, a nominating committee prepares a slate for each office, consisting of (at least) five names. As before, the voters do not rank the candidates but simply vote for their choices.

In approval voting, you are not restricted to voting for just one candidate. Instead, you vote for ("approve of") as many candidates as you wish—one vote to each. Thus you decide whether to vote for 0, . . . ,5 candidates (in our case), rather than just 0 or 1 candidates. The winner of the election is the candidate who gets the most votes.

Advantages of Approval Voting

It is known that <u>no</u> voting system can be free of anomalies; but approval does better than other systems with respect to a number of important criteria. ([1] is a technical treatise on approval voting. [2] is a highly readable account of the common paradoxes.)

Approval voting offers several attractive options. If some candidate is your strong favorite, you can vote for that one alone. If your preferences among several are not strong, you can vote for each one. Finally, consider the common predicament in which your favorite—perhaps a minority candidate—has no chance of winning over the bad guy, while a lesser choice has. Under approval voting, there is no dilemma—you vote for both, simultaneously proclaiming your true feelings and helping to defeat the bad guy. Thus, approval voting offers viable options to many voters who might have been discouraged from voting at all, and so it invites greater voter participation. Moreover, the results will show an accurate picture of how *every* candidate stands among the electorate. (This information will be useful to the nominating committee when making up the slate for the next election.)

Finally, approval voting encourages **sincere** voting: whenever you vote for *a* you also vote for all candidates you prefer to *a*. (In the earlier example, if you vote for your second choice in order to defeat the bad guy, you are voting *insincerely*.)

Strategies in Approval Voting

Do you gain an advantage the more candidates you vote for? In the extreme case the answer is clear: voting for all five is equivalent to abstaining. Then how far down the line should you go? A good strategy is to assign "utility values" to the candidates—for instance, rate them on a scale of 10—and then vote for those whose values lie above the arithmetic mean; this maximizes your expected utility. In the simplest case, in which you divide the candidates into two classes, the good guys and the bad guys—not uncommon, by the way—you of course just vote for the good guys.

Approval voting counts each vote 1—would it not be fairer to count each vote $1/n$, where n is the number of candidates you vote for? Answer: Under that scheme, your best strategy would be to give your one vote to your top choice, and we would be back to the old system.

References
[1] Brams, Steven J., and Peter C. Fishburn, "Approval Voting", Birkhäuser, 1983.
[2] Straffin, Philip D., Jr., "Topics in the Theory of Voting", *UMAP Expository Monograph*, Birkhäuser, 1980.

In Memoriam

Ella F. Casey, of Scottsville, New York, died May 31, 1985 at the age of 76. She was an MAA member for 38 years.

Peter J. Cocuzza, of Brooklyn, New York, died April 1, 1985. He was an MAA member for 35 years.

Cecil Calvert Craig, Professor Emeritus of the University of Michigan, died June 16, 1985. He was an MAA member for 63 years.

Harry Ferguson, of Centerville, Ohio, died February 21, 1985. He was an MAA member for 26 years.

Emilie Haynsworth, Auburn University, died May 4, 1985 at the age of 68. She was an MAA member for 25 years.

Fred Meyer, of Manhattan Beach, Connecticut, died July 19, 1985 at the age of 70. He was an MAA member for 33 years.

Earl J. Mickle, Professor Emeritus of The Ohio State University, Columbus, died April 11, 1985 at the age of 74. He was an MAA member for 42 years.

Joseph Steffen, of Differdange, Luxembourg, died September 21, 1984 at the age of 38. He was an MAA member for 8 years.

Alexander Tartler, Professor Emeritus of Drexel University, died February 14, 1985 at the age of 79. He was an MAA member for 55 years.

Stephen James Wolfe, of the University of Delaware, died September 5, 1985 at the age of 42. He was an MAA member for 15 years.

Gerhard N. Wollan, Professor Emeritus of Purdue University, died July 16, 1985. He was an MAA member for 39 years.

Alice Kelsey Wright, of Carbondale, Illinois, died August 18, 1985 at the age of 87. She was an MAA member for 58 years.

Sloan to Sponsor Conference on the Teaching of Calculus

The Sloan Foundation will sponsor a Conference/Workshop at Tulane University in January to develop alternate curricula and teaching methods for calculus at the college level. A relatively small group of participants, representing all the mathematical sciences and the service disciplines, has been invited to formulate alternate curricula and methods for teaching calculus and to address the problems, political and economical, in having them tried and adopted at American colleges and universities. A preliminary report on the conference will be available in Spring, 1986, with proceedings to appear later that summer.

For further information, contact: R.G. Douglas, Department of Mathematics, State University of New York, Stony Brook, NY 11794.

Update on New Orleans Meeting

Some corrections and additions to the program for the Annual Meeting of the MAA in New Orleans, Louisiana, January 9-11, 1986, are given below.

The meeting program, preregistration and housing forms, and Minicourse and Employment Register information and forms were mailed to all MAA members in the center section of the October issue of FOCUS. The deadline for preregistration, the Employment Register, and MAA Minicourses is **November 15**.

Anyone who has not preregistered for the meetings may register at the Registration Desk in the Regency Ballroom Foyer, Hyatt Regency New Orleans, Monday, January 6, 4:00 p.m.-8:00 p.m.; Tuesday, January 7, 8:00 a.m.-5:00 p.m.; Wednesday, January 8-Friday, January 10, 8:00 a.m.-4:00 p.m.; and Saturday, January 11, 8:00 a.m.-noon. Reduced fees are available for participants wishing to attend sessions for only one day.

Program Corrections and Additions

Invited Addresses

Ronald L. Graham, AT&T Bell Laboratories, *Some remarks on the finite radon transform*, 1:10 p.m. Friday.
Peter J. Hilton, SUNY at Binghamton, *A new algorithm in number theory*, 8:00 a.m. Friday.
Victor L. Klee, University of Washington, *Complexity of linear programming: The d-step conjecture and its relatives*, 2:15 p.m. Friday.
Henry O. Pollak, Bell Communications Research, *School buses, baseball, and public key cryptography*, 10:00 a.m. Saturday.
The invited address by **Cathleen Morawetz** will not be presented as previously scheduled.

Minicourses

The enrollment limit for Minicourse #1 has been changed from 80 persons to 30 persons.

The description and enrollment limitation for Minicourse #11 have been changed as follows: **Minicourse #11**: *The teaching of applied mathematics* is being organized by **W. Gilbert Strang**, Massachusetts Institute of Technology. Part A is scheduled from 7:00 p.m. to 9:00 p.m. on Thursday, January 9 and part B from 10:30 a.m. to 12:30 p.m. on Friday, January 10. Total enrollment for this Minicourse is now limited to 50 persons.

The organizer will describe a unifying framework for the basic courses in modern applied mathematics. The syllabus emphasizes ideas that are shared by a wide range of applications (discrete as well as continuous). It combines linear algebra with calculus, so that matrix equations are seen in parallel with differential equations. It includes numerical as well as combinatorial algorithms, such as the Fast Fourier Transform, which fit into the framework and make it more specific and useful. The response from engineers and computer scientists is encouraging; a fresh approach is welcomed there also. Participants may contribute to the discussion of this fundamental course, which deserves to be more timely and coherent, and more interesting to teach.

Other MAA Sessions

The Committee on Computers in Mathematical Education (C²IME) is sponsoring a panel discussion on *Evaluating instructional software* from 8:20 a.m. to 9:50 a.m. on Saturday, January 11. The organizer will be **R. Stephen Cunningham**, California State College at Stanislaus. The other participants will be **Judith R. Brown**, University of Iowa, **Sheldon P. Gordon**, Suffolk County Community College and **Stuart Thomas**, Wadsworth Publishing Company.

C²IME will also sponsor a panel discussion titled *Computing in calculus: Its past history, present status, and prospects for the future.* The panel is scheduled for 3:30 p.m. to 5:00 p.m. on Thursday, January 9. **Gerald J. Porter**, University of Pennsylvania, will chair the panel. The other panelists will be **L. Carl Leinbach**, Gettysburg College, and **David A. Smith**, Duke University and Benedict College.

A panel discussion on *Teaching assistants and part-time or temporary instructors* is being sponsored by the CTUM Subcommittee on Teaching Assistants and Part-time Instructors. The panel is scheduled from 9:00 a.m. to 11:00 a.m., Friday, January 10. The moderator will be **Bettye Anne Case**, Florida State University. The other panelists will be **Wendell H. Fleming**, Brown University, **John Philip Huneke**, Ohio State University, and **David P. Kraines**, Duke University.

Charles F. Kelemen, Swarthmore College, is organizing a panel titled *Model curriculum for a liberal arts degree in computer science*, a curriculum created at a workshop funded by the Sloan Foundation, from 2:10 p.m. to 3:30 p.m., Saturday, January 11. The panel, including the organizer, will consist of **Stuart Hirshfield**, Hamilton College, **Jeffrey Parker**, Amherst College, **Allen Tucker**, Colgate University, and **Henry M. Walker**, Grinnell College.

A presentation by **B.A. Fusaro**, Salisbury State College, on *The mathematical competition in modeling* will be held from 1:00 p.m. to 2:00 p.m. on Saturday, January 11. The presentation will describe the general nature of the Mathematical Competition in Modeling (MCM), summarize two of the papers, and suggest how faculty members can become involved. For more information about MCM, see the October 1985 issue of FOCUS.
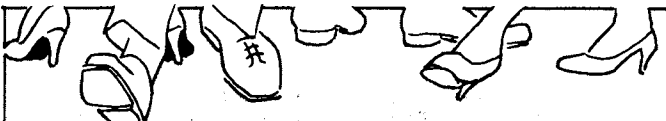
Joint AMS-MAA Sessions

Some additional information on the Joint AMS-MAA Sessions follows:
Victor W. Guillemin, Massachusetts Institute of Technology, title to be announced, 11:10 a.m., Friday.
Paul R. Halmos, University of Santa Clara, *Matrices I have met*, 11:10 a.m., Thursday.
Thomas Hawkins, Boston University, title to be announced, 2:15 p.m., Thursday.

Bylaw Changes to be Decided by MAA Membership in January

Several Bylaw changes will be submitted to the membership of the Association at the Business Meeting in New Orleans at 4:40 p.m. on Friday, January 10. All of the changes have been approved by the Board of Governors and will become official provided they receive at least a two-third (⅔) vote of those present at the Business Meeting and entitled to vote.

Many of the changes are of a purely routine nature; some involve minor corrections and others complete the program of removing sexist language. The most interesting changes involve the procedure for electing the President and First Vice-President. The new procedure would eliminate the primaries and involves the relatively new method known as "approval voting." (See the article, "Approval Voting Proposed for MAA" on page 8 of this issue.) Also, under the current procedure the Nominating Committee selects the candidates to appear on the final ballot from among the people receiving the most votes in the primary. Under the new procedure, after the election the Nominating Committee would make no selections except in the case of a tie.

Note: In the following, text to be deleted is crossed out; text to be added is underlined.

Routine Changes

I.2 Its object shall be to assist in promoting the interests of the mathematical sciences in America, especially in the collegiate field, by holding meetings in any part of the United States or Canada for the presentation and discussion of mathematical papers, by the publication of mathematical papers, journals, books, monographs, and reports, by conducting investigations for the purpose of improving the teaching of mathematics, ~~by accumulating a mathematical library~~ and by cooperating with other organizations whenever this may be desirable for attaining these or similar objects.

Explanation. Routine change. The MAA does not maintain a mathematical library.

III.2 There shall be a Board of Governors (herein called "the Board") to consist of the officers, the ex-presidents for terms of six years after the expiration of their respective presidential terms, the Editor of each of its two publications entitled ~~TWO-YEAR~~ THE COLLEGE MATHEMATICS JOURNAL and MATHEMATICS MAGAZINE, the members of the Finance Committee, and additional elected members (herein called "Governors"). . . .

Explanation. Routine correction of a journal title.

III.3 There shall be an Executive Committee of the Board consisting of the ~~President, the President-Elect (only during a year immediately preceding the expiration of a President's term), the Past President (only during a year immediately following the expiration of a President's term), the two Vice-Presidents, the Editor of the AMERICAN MATHEMATICAL MONTHLY, the Secretary, and the Treasurer.~~ Officers of the Association. . . .

Explanation. This definition is equivalent to and less redundant than the previous one; item III.1 defines the Officers of the Association.

IV.1 (c) The Board shall elect annually two Governors for terms of three years and at appropriate times by ballot and for terms stated: a Second Vice-President for two years, an Editor of the AMERICAN MATHEMATICAL MONTHLY, an Editor of ~~TWO-YEAR~~ THE COLLEGE MATHEMATICS JOURNAL, an Editor of MATHEMATICS MAGAZINE, a Secretary, and a Treasurer each for five years, and two members-at-large of the Finance Committee ~~(other than the President, the Past-President, the Secretary, and the Treasurer)~~ for four years.

Explanation. Routine correction of a journal title and a clarification of the membership of the Finance Committee elected by the Board.

IV.4 In the absence of the President, the First Vice-President (or in his or her absence the Second Vice-President) shall have and exercise the powers of the President, except that the Past-President shall preside at meetings of the Finance Committee (or in his or her absence the senior member, in terms of service on the Committee, of the two elected members of the Finance Committee). . . .

Explanation. Correction.

IV.7 (a) There shall be an Executive Director who shall be a paid employee of the Association. ~~He~~ The Executive Director shall have charge of the central office of the Association and shall carry out such other duties as may be assigned to him or her by the Board. ~~He~~ The Executive Director shall be responsible to the Board and shall attend meetings of the Board, the Executive Committee, and the Finance Committee, except when they meet in executive session, but ~~he~~ shall not be ex officio a member of these bodies. ~~He~~ The Executive Director shall be especially responsible for implementing and coordinating Section activities.

IX.1 Changes in the Articles of Association or amendments to the Bylaws may be made at any annual business meeting of the Association, or at any adjourned session thereof, or at any special meeting of the Association called for such purpose, by a two-third (2/3) vote of those present and entitled to vote; *provided* that due notice con-

cerning such amendment shall have been ~~printed in each official journal, or~~ mailed to each member at least one (1) month before the date of such meeting. ...

Explanation. The term "official journal" is no longer used.

Finance Committee membership

III.5 There shall be a Finance Committee responsible to the Board; at the direction of the Board it shall receive and administer the funds of the Association, control its properties and investments, make its contracts, and exercise such powers as may be delegated to it by the Board. This Committee shall consist of six members including the President, ~~the Past-President (for a term of one year), the Secretary, and the Treasurer~~ the Secretary, the Treasurer, the President-Elect or the Past-President, and two members-at-large.

Explanation. The purpose of this change is to make the President-Elect a member of the Finance Committee. Since the President chairs the Finance Committee, he or she should be a member the previous year. Moreover, since the Past-President is on the Committee for only one year following the term as President, having the President-Elect join the Committee upon election would insure that the Finance Committee always has six members, as prescribed in the Bylaws.

Procedures for general elections

Article IV.2 on general elections should be replaced by the following:

IV.2 (a) For each odd-numbered year there shall be a Nominating Committee appointed by the President with the approval of the Board. Its duties shall include preparation of slates and ballots for general elections by the membership of the Association. The Nominating Committee shall consist of five members appointed for one-year terms. Where possible, exactly two of its members shall be selected from those who served on the preceding Nominating Committee.

Explanation. This specifies the size and terms of the Nominating Committee.

IV.2 (b) For the general election the Nominating Committee shall prepare printed ballots with five or more nominees for President-Elect and three or more for each other office to be filled by the members. Blank spaces on the ballot shall be provided for write-in votes. Each voting member of the Association may vote for as many candidates for each office as he or she desires. This ballot shall be mailed to the membership approximately eight months before the annual meeting and the voting shall close four months prior to the annual business meeting. For each office, the Nominating Committee shall declare elected the person having received the most votes and been determined by the Nominating Committee to be willing and able to serve. In the case of ties, the Nominating Committee shall make the selection from among those tied.

Explanation. This bylaw article provides for approval voting. The primary and final elections will be replaced by a single election which will be held around the time that the primary elections used to be held.

Financial Administration

Change Article IX to Article X and insert the following new article.

Article IX—Financial Administration

1. The deposit, investment, and disbursement of all funds shall be subject to the direction of the Board. The Executive Director shall be custodian of the current operating funds. The Treasurer shall be responsible for the control and administration of all investment funds; endowment, trust, and gift funds; and such other funds as the Board may designate.

2. All incoming funds shall be received by the Executive Director, entered in the Association's books, and deposited or invested as shall have been prescribed by the Finance Committee. The Executive Director shall keep proper accounts of all financial transactions of the Association. The accounts of the Association shall be audited annually by a certified public accountant.

3. The Board shall annually adopt a budget allocating funds of the Association for the purpose of carrying out the objectives of the Association.

4. The Executive Director, the President, and the Treasurer are empowered and authorized to enter into contracts for the Association that have been approved by the Board or the Finance Committee acting between meetings of the Board, or that are required for the conduct of the Association's activities specifically provided for in the approved annual budget.

5. Checks drawn on the accounts of the Association shall bear the signature of any one of several individuals whom the Finance Committee shall have authorized to sign checks on behalf of the Association.

6. The fiscal year of the Association shall be from January 1 through December 31.

7. There shall be an Investment Committee, a subcommittee of the Finance Committee. The Investment Committee shall make recommendations to the Finance Committee on the investment of the Association's funds and on financial questions. The securities of the Association may be bought, sold, or exchanged upon the oral orders of members of the Investment Committee who have been given this authority by the Investment Committee.

Explanation. This sort of article is common in bylaws. As written it simply reflects and codifies current practice.

Calendar

National MAA Meetings

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

71st Annual Meeting, Atlanta, Georgia, January 8-10, 1988.
72nd Annual Meeting, Phoenix, Arizona, January 10-14, 1989.

Sectional MAA Meetings

Allegheny Mountain, Clarion State University, Clarion, Pennsylvania, April 18-19, 1986.

Florida, Seminole Community College, Sanford, Florida, February 28-March 1, 1986.

Illinois, Augustana College, Rock Island, Illinois, April 25-26, 1986.

Intermountain and Rocky Mountain, Mesa College, Grand Junction, Colorado, April 25-26, 1986.

Iowa, University of Iowa, Iowa City, Iowa, April 11-12, 1986.

Kansas, Pittsburg State University, Pittsburg, Kansas, April 11-12, 1986.

Kentucky, Murray State University, Murray, Kentucky, April 11-12, 1986.

Louisiana-Mississippi, in conjunction with the MAA Annual Meeting, New Orleans, Louisiana, January 10, 1986.

Metropolitan New York, Queen's College, CUNY, Flushing, New York, May 4, 1986.

Michigan, Central Michigan University, Mount Pleasant, Michigan, May 9-10, 1986.

Missouri, Southwest Missouri State University, Springfield, Missouri, April 18-19, 1986.

Nebraska, University of South Dakota, Vermillion, South Dakota, April 11-12, 1986.

Northern California, University of California-Davis, Davis, California, February 22, 1986.

Oklahoma-Arkansas, Arkansas College, Batesville, Arkansas, March 28-29, 1986.

Pacific Northwest, Southern Oregon State College, Ashland, Oregon, June 19-21, 1986.

Rocky Mountain and Intermountain, Mesa College, Grand Junction, Colorado, April 25-26, 1986.

Southeastern, Auburn University, Auburn University, Alabama, April 11-12, 1986.

Southwestern, University of Texas at El Paso, El Paso, Texas, March, 1986.

Texas, Eastfield College, Mexquite, Texas, April 11-12, 1986.

Wisconsin, University of Wisconsin-Stout, Menomonie, Wisconsin, April 25-26, 1986.

Other Meetings

December 1985

7-9. **Canadian Mathematical Society Annual Winter Meeting**, University of Calgary. Contact: K. Salkauskas, Department of Mathematics and Statistics, University of Calgary, 2500 University Drive Northwest, Calgary, Alberta, Canada T2N 1N4.

29-30. **The Association for Symbolic Logic Annual Meeting**, Hilton Hotel, Washington, D.C., in conjunction with the American Philosophical Association. Contact: C. Ward Henson, Department of Mathematics, University of Illinois, 1409 W. Green Street, Urbana, Illinois 61801.

January 1986

5-6. **American Mathematical Society Short Course—Approximation Theory**, New Orleans, Louisiana. The program is under the direction of Carl de Boor of the University of Wisconsin-Madison. Contact: AMS, P.O. Box 6248, Providence, RI 02940.

7-11. **92nd Annual Meeting of the American Mathematical Society**, New Orleans, Louisiana. Contact: AMS, P.O. Box 6248, Providence, RI 02940.

7-11. **Meeting of the Association for Women in Mathematics**, New Orleans, Louisiana. Contact: AWM, Box 178, Wellesley College, Wellesley, MA 02181.

20-24. **Fourth Annual William H. Roever Lectures in Geometry-Geometry in Curvature Theory**, Washington University. Lecturer: Nicholaas H. Kuiper of l'Institut des Hantes Etudes Scientifique, Bures-sur-Yvette, France. Contact: William M. Boothby, Department of Mathematics, Washington University, St. Louis, MO 63130.

April 1986

4-6. **1986 National Educational Computing Conference**, San Diego, California. Contact: J. Adams, ACM, 11 West 42nd Street, NY, NY 10036.

August 1986

9-11. **International Congress of Mathematicians**, Berkeley, California. (See FOCUS, October 1985 and November-December 1985.)