FOCUS

Rookie US Team Holds its Own at IMO

Stephen B. Maurer

With no returning mathletes for the first time in memory, the US Team for the 28th International Olympiad nonetheless made a respectable showing, placing fifth last July in Havana. The top teams and scores, obtained in oppressive heat and humidity, were Romania (250), West Germany (248), USSR (235), East Germany (231), USA (220), Hungary (218), Bulgaria (210) and China (200).

Old timers considered this an easy IMO, relatively speaking, with lenient grading as well. Romania was just 2 points short of a perfect score (6 students × 6 problems × 7 points). In contrast, last year the high score (a USA/USSR tie) was 203. So you don't think it was a gut, one of this year's problems is reprinted below.

Two US students received perfect individual scores (42) and a Gold Medal: Eric Wepsic of Boston and Jordan Ellenberg of Potomac MD. The next 3 US participants received Silver: Robert Southworth of Winchester MA, 38; Will Schneeberger of Oklahoma City, 36; and John Woo of Chagrin Falls OH, 32. Matthew Cook of Evanston IL received a Bronze Medal with 30.

42 countries and 237 students participated, a record. Participation from Latin America was especially high.

The US Team has never scored below fifth since it first entered the IMO in 1974. It has been first twice. The US coaches this year, for the third time, were Professor Cecil Rousseau of Memphis State University and Gregg Patruno of the First Boston investment firm. *(continued on page 2)*

USAMO Winners Bernstein, Vakil, Cook, Wilmer, Kahn, Vandervelde, Schneeberger, and Lee in Einstein's lap. Schneeberger and Cook went on to Cuba for the US and Vakil went on for Canada.

INTO THE FUTURE
THE MAA LONG RANGE PLAN

Andrew Sterrett

Anticipation of the 75th Anniversary of the MAA gave the opportunity to assess current MAA programs and to look to the future. In 1985-86, a Long Range Planning Committee (Gerald Alexanderson, Ronald Davis, Kenneth Hoffman, Peter Renz, Andrew Sterrett, Marcia Sward, Richard Witter, Lynn Steen-Chair) was appointed to evaluate the strengths and weaknesses of the MAA and to identify major goals against which to measure both present and future activities. Surveys of the membership at large and of MAA leaders were undertaken to ensure that a broad range of points of view were heard. Committee chairs and Section officers reported on their current activities and aspirations. At the annual meeting in San Antonio, the Committee's report was submitted to the Board of Governors, discussed, and approved by the Board.

For more than seventy years, the Association has pursued its 1915 charter to promote the interests of mathematics "especially in the collegiate field." Helping faculty meet professional challenges is and always has been a central concern of the MAA. Today it is more essential than ever. Major forces are changing the landscape of collegiate mathematics, providing challenges and opportunities:

The nature and applications of mathematics are changing at an unprecedented rate; these changes also require changes both in what mathematics should be taught and in how mathematics should be taught. New links between formerly distinct specialties, as well as applications of abstract theories, have enlarged enormously the scope of mathematics and the scope of its application. These changes compel a major re-examination of the mathematics curriculum at all levels of education.

Just as calculators transformed the way people use arithmetic skills, the new generation of graphic and symbolic computers is transforming the way scientists use collegiate mathematics. This modern technology provides new opportunities to involve students in modeling real-world problems that require mathematical treatment; but taking advantage of these opportunities will require that mathematicians re-evaluate their own approaches to teaching and the contents of their courses.

IMO *(continued)* For the 1988 IMO in Australia, 5 of the 6 US Team members are eligible to return, so hopes are high. After that the schedule is West Germany, China, and Sweden.

The US IMO Team is picked on the basis of the American Mathematics Competitions and further work at a rigorous Training Session, this year at Westpoint. The results of the first Competitions, the AHSME and AIME, were reported in the May-June FOCUS. As for the third, the USA Mathematical Olympiad, the 8 winners were Matthew Cook of Evanston IL, Samuel Vandervelde of Amherst VA, Ravi Vakil of Islington Ontario, Jeremy Kahn of New York City, Daniel Bernstein of Brookhaven NY, Will Schneeberger of Oaklahoma City OK, Elizabeth Wilmer of New York City, and Rocky Lee of Scarborough Ontario. This was only the second time that one of the winners was female, and the first time that two winners were Canadian. (Ravi obtained a Gold Medal in Havana for the Canadian Team which placed 16th.)

Problem-solution pamphlets are available for all the AMC Exams. Contact Professor Walter E. Mientka, 917 Oldfather Hall, University of Nebraska, Lincoln NE 68588-0322 for prices.

An IMO Problem   Prove that no function from N to N satisfies $f(f(n)) = n + 1987$ for every natural number n.

NOTE This will be Professor Maurer's final column, written as outgoing Chairman of the AMC.—the Editor

Into the Future *(continued from page 1)*

The need for international competitiveness at school and at work sets new standards for achievement, from grade school to graduate school. Currently it appears that students from other countries master mathematics better and at an earlier age than do US students. This is a challenege that cannot be ignored.

Industrial demand for mathematicians is at a record high—simultaneously increasing the demand for graduates and reducing the supply of able teachers. Strong demand will attract more and better students to mathematics, yet shortages in supply of college faculty will compound existing problems arising from shortages in the supply of high school mathematics teachers. Consequently there will be more classrooms filled with eager students but the students will be taught by marginally qualified teachers.

There will also be a shortage of well-qualified teachers of collegiate mathematics. The recently published CBMS survey (see UNDERGRADUATE PROGRAMS IN THE MATHEMATICAL AND COMPUTER SCIENCES: THE 1985-1986 SURVEY, MAA Notes 7, page 53) reported a downward trend in the percentage of Ph D's teaching mathematics and computer science—from 82% in 1975 to 74% in 1985. There is little reason for optimism about the future.

The need to respond to these problems places severe strains on the mathematical community, but the MAA is now in a stronger position to serve its members—now almost 27,000. The 29 regional Sections are active local organizations, with distinctive characteristics. They inspire loyalty on the part of their members, and this loyalty extends to the national organization. The national headquarters in Washington, D.C., has a dedicated staff and is ready to effectively meet future goals of the membership. With these needs and strengths in mind, the Long Range Planning Committee identified the following broad goals for the MAA:

To promote excellence in teaching mathematics
  Stimulate curriculum development

  Encourage innovative instructional practices
  Provide opportunities for professional development
  Encourage excellence in preparation of mathematics teachers
  Recognize the role that computers might play in the teaching of mathematics

To disseminate mathematical knowledge
  Support quality exposition of mathematics
  Arrange meetings for exchange of mathematical information
  Publish books and journals in the mathematical sciences

To cultivate mathematical talent
  Promote mathematical opportunities for women and minorities
  Identify and encourage mathematically talented students
  Demonstrate how mathematics is useful and necessary
  Increase awareness of mathematically based careers

To enhance public awareness of mathematics
  Stimulate awareness of mathematics and its applications
  Encourage sound public policy concerning mathematics
  Publicize the importance of mathematics

Each of these four major goals is essential to the mission of the Association; none can be met unless all are strongly supported. By tradition, the MAA has emphasized programs designed to improve collegiate mathematics—publications, meetings, curriculum reform—programs associated with the first two broad goals listed above. The Long Range Planning survey indicated considerable member-satisfaction with these MAA activities.

Although the national organization has recently joined in several programs intended to cultivate mathematical talent and to enhance public awareness of mathematics, it seems clear that many additional efforts will be needed in the future. There is simply not enough interest in mathematics among young people to sustain an adequate supply of talented mathematicial scientists. Among the public and government officials, there is not enough knowledge or appreciation of mathematics to understand the vital role that mathematics plays in our technological society.

At its San Antonio meetings, the Board of Governors indicated its priorities for the future by adopting the following resolution: ". . . the MAA in its next quarter century intends to complement its traditional strengths in collegiate mathematics by vigorous and imaginative new programs designed to cultivate mathematical talent among students and to enhance public awareness of the mathematical sciences." Many individiuals and several Sections have been ahead of the national leadership in recognizing the importance of these issues, but these goals cannot be reached by the efforts of a few individuals or by our national organization. An army of 27,000 is none too many.

Innovative Teaching

Have you tried something new in your classes that worked and would you like to share it with others? Would you like to learn about what other people are trying? The MAA's Committee on the Teaching of Undergraduate Mathematics is setting up an informal forum for the exchange of teaching techniques. To participate, write to:

Ed Dubinski   or   Bonnie Gold
Mathematics Department   Wabash College
Purdue University   Crawfordsville, IN 47933
West Lafayette, IN 47906

from the
President's desk. . .
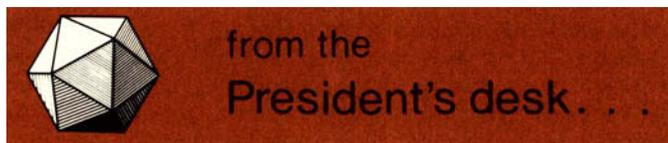
Leonard Gillman   The University of Texas, Austin

Two Proposals for Calculus

In 1946, in the town of Sullivan, Indiana, a man was accused of murdering his estranged wife in what was an open and shut case. The county put its greenest attorney in charge, and no lawyer seemed willing to undertake the defense. Finally, Norval Kirkhan Harris (later Judge Harris), a well-known local attorney, agreed to take it on. He decided on the line that the whole thing was an *unfortunate accident*, and he played up the phrase unsparingly. ("You say you were at the grocery the morning of this *unfortunate accident*. Where were you the afternoon of this *unfortunate accident*?") At the final summation, the prosecutor got up and began, "I intend to show that this *unfortunate acci-dent* . . . ." (The entire courtroom from the judge down burst into a guffaw, and the defendant got away with a measly 2-1/2 years for manslaughter.)

I am reminded of the incident every time I encounter the phrase *the crisis in calculus*. There is no crisis in calculus. Students come into the course unprepared—yes. Textbooks are too big—of course. Emphasis should be modified to reflect the world of computers—certainly. Crisis—no.

Any crisis that may exist is in education, or in society. Up to World War II, only a minor portion of college-age youth went on to college, and of those, only a small fraction took calculus. Students typically began with a full semester of analytic geom-etry or a preceding semester of trigonometry. Calculus was big stuff; at Columbia University, where I studied, the final require-ment for the mathematics major was a comprehensive exam in calculus and analytic geometry. In those days, a class of 40 students was considered huge. There was little concern with "motivating" students; when a professor told you something was important, you learned it.

THE PROBLEM   Today, we bellow at 100 poorly prepared stu-dents at a time and "cover" in two terms what used to use up three. Students are reluctant to ask questions in front of so many people, and no sensible exchange of ideas is possible anyhow. Faced with student evaluations, we play to the gallery, giving easy quizzes and grades that students did not earn. (Why should I split a gut trying to buck the system? If they didn't study, that's their problem. I'll go back to my research or my garden or what-ever.)

I am unpersuaded by results purporting to show that learning is independent of class size. To me, the experiments prove once again that the standard tests are insufficient. We test only a small, easily quantifiable part of what we hope the student is learning. We leave out subject matter that cannot be easily adapted to the test, as well as searching questions that require thoughtful responses and equally thoughtful, time-consuming grading. And we perforce omit a host of delicate intangibles, such as the little ways the instructor responded to a question or attacked a prob-lem, which can make a lasting impression on students and shape their attitudes. Certainly I can never forget a discussion in George Adam Pfeiffer's class at Columbia when one of the students—a very bright one, by the way—was wrestling with epsilon and

delta. Finally, in desperation, he blurted out, "But suppose I choose epsilon *large*?" "Ah," said Pfeiffer, "but you *don't* choose epsilon. *I* choose epsilon."

American students spend hours watching television. That most of what they look at is without merit is the minor crime. The major one is the fact of passive looking, encouraging them to sit back and let things come to them. "Good" television pro-grams are still television programs: Sesame Street and Square One are still passive entertainment. There is no opportunity for viewers to hold up the show while they sit back and reflect, to mull over ideas and express them in their own words—as they can when reading a book. The constant, mindless blare trains people not to listen. Mathematics requires intense concentra-tion; televsion encourages nonconcentration. I sometimes won-der how many of my students are capable of concentrating on one idea, uninterrupted, for ten full minutes.

Today there are vast numbers of families where both parents work, or in which there is only one parent (who perforce works). Parents therefore have less time to spend with their kids, stim-ulating their curiosity, answering their questions, reading to them, relaxing with them, inculcating a love of books. (If they can. Allan Bloom, in THE CLOSING OF THE AMERICAN MIND, asserts that though families may eat, play, and travel together, they do not think together.) As a result, students don't know *anything*. They don't know who Grant and Lee were (reported by E.D. Hirsch in CULTURAL LITERACY). A history colleague tells of a student's question: "I keep forgetting. Which side was Hitler on?" I remem-ber a college algebra class being tripped by a problem because they didn't know a revolution of the moon takes about a month. (Can they never have remarked on the similarity of the words?) In 1980 I gave a counting problem that depended on knowing the number of days in that year, but the class stumbled because they didn't know it was a leap year; the day of the test was February 29th.

Neither can we count on mathematical prerequisites—the ele-mentary facts. What we really hope for is some true mathematical understanding; but you can't understand ideas without knowing the facts they rest on. It is always exciting to me to announce to a calculus class that we are about to enter a new realm of mathematical power—in computing areas, we will jump from parallelograms and trapezoids or other polygons to *curved* boundaries. Many students fail to share my excitement. The big jump in power I am so excited about is to them a confused blur. They have no clear picture of what they have been able to do thus far. They are not confident about computing the area within a parallelogram. As for trapezoids, they are not ever sure what they are.

Our students live in a world of morale-sapping hypocrisy. (When was the last time *you* braked on the yellow light?) They see America being run by crooks. (Where is Richard Nixon now that his country needs him?) The glamorizing of senseless violence by the movies and TV pays off in real life: during 1986, the city of Detroit averaged one child murder per day. What our young people see about them are not incentives to scholarship and learning but causes for despair. If all our values are a mess, what's the point of clean living?

TWO PROPOSALS   Mathematicians cannot single-handedly solve the problems of society, but we can do better than leave out related rates. Updating the curriculum is a worthy goal but addresses only one of the variables under our control. I suppose it is an improvement to go from outmoded methods of teaching

WASHINGTON OUTLOOK...

Kenneth M. Hoffman
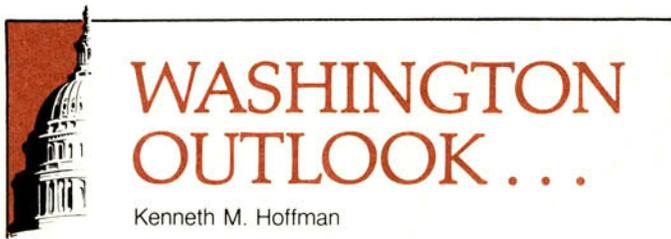
A Community Says "Thank You"

Warm weather is here again and with it comes a familiar feeling for many of us—satisfaction with the completion of another academic year blended with anticipation of real time to work and relax; relief that "the year" is over combined with disquiet at the thought of all that must be done over the summer. For those who are people-oriented, it's a time of farewells, of reappraisals, and of endings called commmencements. So it is in Washington, as well as in academe.

This is the time of year when the "rotators" depart, the people from our community and others like it who have spent one or more years on leave in Washington to help lead and manage the scientific research and education programs which help sustain us. The rewards for this sort of public service are few. The monetary rewards are negative and the experience gained probably has a negative impact on status back in the home department. But much depends on the quality of the people whom our community sends to Washington for these stints. Unless we show them that we value what they do, it will be very difficult to count on having successors of the same high quality.

This year a special thank-you is due to three mathematicians, each of whom has put in (at least) a two-year tour of duty and each of whom has exercised strong leadership on our behalf: Frank Gilfeather, who returns to the University of Nebraska from his position as Staff Director of the Board on Mathematical Sciences of the National Research Council (NRC); John Polking, headed home to Rice University from his post as Director of the Mathematical Sciences Division of the National Science Foundation (NSF); and John Thorpe, Deputy Director of the Materials Research and Informed Science Education Division at NSF, who returns to the State University of New York at Stony Brook.

The Board on Mathematical Sciences (BMS) grew out of the David Committee effort. Frank Gilfeather, with his two chairmen, Mike Artin and Phil Griffiths, has molded it into an effective force for presenting analyses of the role of the mathematical sciences in the national research effort. He has shaped the National Chairman's Research Colloquium into an annual fall event that brings department chairs usable information on all things Washington, gathers their input on policy directions, and promotes dialogue among the chairmen. He has gotten the many advisory arms of BMS functioning, from the US National Committee on Mathematics, which relates US mathematics to the International Mathematical Union, to the panels which advise the Air Force Office of Scientific Research and the Office of Naval Research. He has generated each year highly visible events as part of National Science Week, maintained close liaison with the heads of math programs in federal agencies, and steadfastly driven home to "his" Board the importance of collegiate mathematics education for their concerns.

John Polking inherited the mantle of Jim Infante at NSF, and he has worn it well, carrying forward to increase funding for mathematical research with imagination and with a steady perseverance which has earned him the respect of the upper management of NSF. One result has been continued Foundation support of substantial increases for the Mathematical Science Division, which still accounts for 60% of the total federal support for research in our field. John has pushed to have NSF resources for collegiate mathematics located in his division. He has initiated a small mentoring program for talented undergraduates and plans, in addition to his consistent articulation of the basic research needs of mathematics, for a substantial NSF investment in the reformation of calculus. An important legacy he has left is a five-year plan for more than doubling the Division's budget, building on the David Report and paralleling NSF Director Erich Bloch's plan for a similiar doubling of the Foundation budget.

John Thorpe left his role as undergraduate chairman at Stony Brook two years ago, to accept a temporary position in the Science and Engineering Education Directorate at NSF. He did this from the conviction that University mathematicians must become actively involved with precollege education issues. As John has said himself, he went to NSF and began to learn about the really hard issues and the pockets of creative work going on in the development of materials for school mathematics. He used the knowledge acquired and his status as ranking mathematician in the "Science Ed" directorate to create one of the first NSF-initiated programs in the re-incarnation of the Directorate, his $5 million five-year program in the development of materials to incorporate computer technology into the early years of mathematics education.

Those of us carrying on in the small community of mathematicians who constitute the ever-changing Washington presence of the mathematics community will feel very directly the absence of Frank Gilfeather, John Polking, and John Thorpe. We can find local and immediate ways of expressing respect and gratitude for the jobs they have done. It is to be hoped that numbers of you out there in the community whose respect they value most will call or write them to say that you appreciate their efforts on your behalf.

NSF Gives Award to John C. Polking

Dr. Erich Bloch, Director of NSF recognized John Polking for his contributions to NSF during Dr. Polking's term as Director of the Division of Mathematical Sciences (1984–1987) by conferring upon him the Foundation's Meritorious Service Award.

Dr. Bloch wrote of Dr. Polking's contributions as follows:

"Throughout his tenure at the NSF he has maintained a very effective leadership role in the community of mathematicians. He has been a strong supporter of the David report and has been very effective in implementing the recommendations of the report, with special emphasis on the expansion of the support of graduate students and postdoctoral fellows.

"Dr. Polking realized the major importance of computational methods to all aspects of science and engineering and was a major force in initiating the Foundation's interdisciplinary program of Computational Science and Engineering. He also recognized that recent advances in mathematics and computational methods made a complete revision of the calculus curriculum both possible and imperative. The new program in this area is largely due to his leadership.

FOCUS on MAA SECTIONS
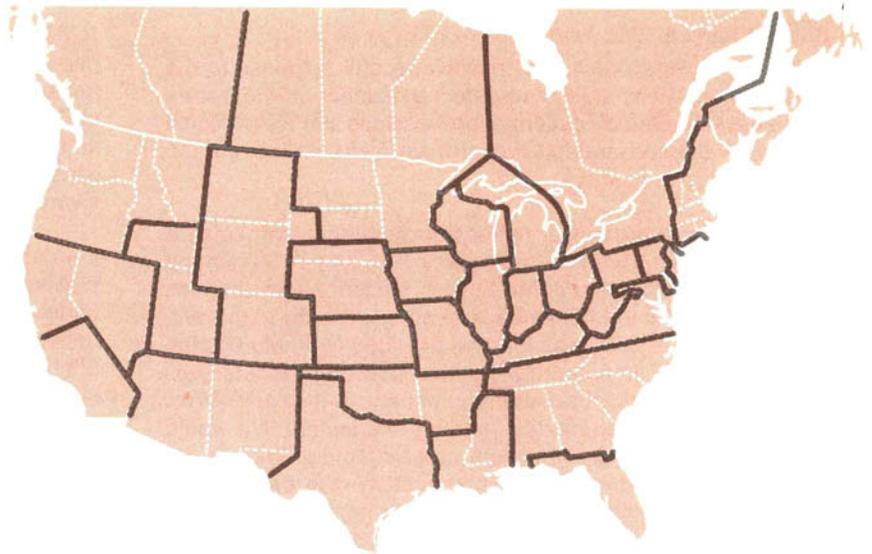
Summary of Section activities

David W. Ballew, Chairman, Committee on Sections

Year after year, the twenty-nine MAA Sections prove themselves to be a very important part of our professional lives. This past year over 4500 of us attended a Section meeting; we heard over 750 papers. Over two-thirds of the Sections now provide mini-courses, workshops, and summer seminars to help keep us mathematically alive and current. Several Sections have been very active in government, moving their legislatures and policy boards to better mathematical education. Many Sections have advanced toward the MAA's goal of increasing public understanding and appreciation of our discipline. Indeed, the Sections have taken the lead in developing innovative programming to serve the membership, and the Sections have shown that we have much to offer our nation and communities.

The following is a brief summary of some of the important or unique activities of each of the Sections that responded to our requests for information. As you read this, you should be aware of two trends: increased undergraduate student participation (170 of the 750 Section presentations were by undergraduates), and increased emphasis on professional development (a total of forty-five mini-courses, workshops, and summer short courses were reported on by twenty-three of our twenty-nine Sections). As is usually the case, more MAA members attended one of the thirty-nine Section meetings than attended a national meeting. Truly, for many mathematicians, the Sections are the MAA.

ALLEGHENY MOUNTAIN   The Third Annual Summer Short Course was given by Steven Brams, Professor of Politics at New York University, on "Game Theory, Politics, and Public Choice." This program featured entertainment by the Allegheny Summer Music Festival. Eight undergraduate students presented papers at the Annual Meeting, continuing this section's long tradition of student participation.

EASTERN PENNSYLVANIA AND DELAWARE   The Spring Meeting focused on actuarial mathematics, with three invited lecturers and a panel discussion on "How Do You Prepare To Become An Actuary?" The panelists were recent graduates from liberal arts colleges now in actuarial careers. Doris Schattschneider

Student Participation at Section Meetings

by Milton D. Cox, Miami University

We had a close call at the Spring, 1987, Ohio Section meeting: almost more students registered and attended than regular MAA Members; of the 224 who registered, 102 were students! However, the 31 fifteen-minute student papers did outnumber the faculty papers!

The phenomenon of student papers at section meetings is not limited to the Ohio Section. The number of MAA sections having student paper sessions at section meetings is rising dramatically. The Ninth Annual Section Survey of activities for the year ending June 20, 1986, with 21 of 29 sections reporting, indicates that all but three of the reporting sections had student papers, and there were 120 student papers presented.

For years, many MAA sections occasionally included a student paper presentation at a contributed paper session. In the late 1970's, sections were invited to encourage student participation and design special activities for them. Today, the student presence at Section meetings is making an important contribution to the vitality of the Sections and to the mathematical development of students. To quote from the June 19, 1986 report from the Committee on Sections, "Every section involved with student

Student Joseph Digennaro presenting a paper at a conference at Miami University, Oxford, Ohio, in 1985
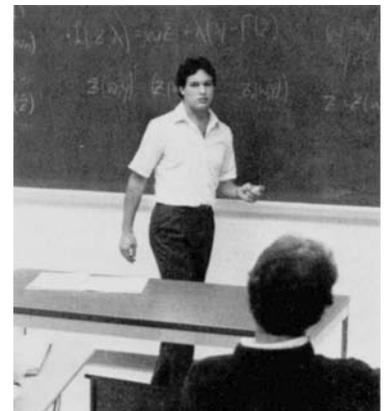
Student Participation *(continued from page i)*
papers reports favorable and positive faculty response to the presentations." I would like to reflect a moment on the history of the development of student paper sessions and review some of the activities and strategies which have been helpful in attracting student participation.

Formal student sessions at national professional mathematics meetings were introduced in the early 1950's by J. Sutherland Frame, who established Pi Mu Epsilon student paper sessions at the Joint Summer Mathematics Meetings; the key to the success of these sessions was funding provided by Pi Mu Epsilon for student travel. In order to widen the opportunity for students to share mathematics by presenting papers, in the early 1970's Pi Mu Epsilon offered modest funding to chapters that would host regional joint meetings with other chapters. These were most successful when held in conjunction with professional mathematics meetings, for example, special conferences or MAA Section meetings. Miami University of Ohio started sponsoring such student conferences in 1974 as part of its annual departmental conferences, and this fall, the 14th Annual Miami University Student Conference will take place; over 20 papers were presented at last year's conference. Some MAA sections began student paper sessions with this Pi Mu Epsilon sponsorship; all students were welcome to present papers. By 1980, the first year that the Annual Section Survey of activity included a question about the number of student papers presented, 13 sections reported student presentations totalling 60, and the Ohio and Oklahoma/Arkansas Sections tied for the most at 15. By 1982, 17 sections reported having student papers totaling 98 in number with the Ohio Section leading with 22. The number of sections reporting no student papers has decreased each year. Recognizing the potential value of student paper presentations, in 1982 the MAA offered to each section three student MAA memberships which could be awarded to the student presentors a Section deemed most worthy. Some sections used their own funds to add to the number of MAA membership awards; for example, the Iowa Section also awards a copy of one of the MATHEMATICAL GEMS. In 1986 the MAA approved MAA student memberships for all students presenting papers at Section meetings.

Now here are some helpful ideas for Sections to keep in mind in planning for student paper sessions at Section meetings. These ideas come from my years of experience in working with student paper sessions. First, a Section should have at least a three-person committee on student paper sessions (CSPS). The members of the CSPS should be enthusiastic and realistic about working with students. Second, the Section should ask each campus MAA representitive to designate a recruiter at that school—probably the advisor of the local mathematics club or Pi Mu Epsilon Chapter—and this contact person will try to recruit on his or her campus. The CSPS needs to have its own central recruiter in charge of publicity and of contacting each campus recruiter. The CSPS recruiter should design and mail a poster, a registration form, and the details about the Section meeting to each campus recruiter several months before the meeting. As the meeting nears, the central CSPS recruiter may need to call the campus recruiters in order to get a nucleus of student papers. This personal contact is important. A second CSPS committee member who is at the host campus should be in charge of the local arrangements for the student session. For meetings requiring an overnight stay, this local arranger should enlist the help of the students in the local mathematics club to secure housing with club members for student guests. Presentation rooms for the student sessions should not be large; normal classrooms are best and decrease student anxiety. The third CSPS member should be in charge of the student program. Each

registration form with title and abstract should be mailed to this person who then prepares the program. Deadlines should be flexible and permit late entries up to ten days before the meeting, since students are inexperienced at this and have classes, exams, and other distractions (faculty do, too, but we're used to it). This person should also coordinate any judging if prizes are to be awarded.

If a college or university does not have a tradition of students presenting papers, it is a challenge to get that tradition started: hence here is some advice for campus recruiters. First, several underclassmen should attend a Section meeting in order to see other student presentations and become convinced that the event is not life-threatening. In order to encourage students who may have trouble finding topics, you might wish to have a special one-hour seminar, including several students, in which the first weeks are devoted to searching journals for appropriate and interesting topics, then the middle weeks are spent working through selected articles in preparing the talks (all in the seminar help any person who is stuck), and the final weeks are left for practicing the presentations with the benefit of critiques from all in the seminar. Emphasize that employers and graduate schools are impressed favorably with resumés noting a paper presented at a professional meeting. Welcome expository topics, applications in statistics, computing, economics, etc., as well as research topics.

Let me summarize some key points for having a successful student paper session at a Section Meeting; for more details, see section F of the guidelines of the "Handbook for Section Officers":

1 Have an enthusiastic and student oriented Section committee on student paper sessions (CSPS).

2 On each campus identify a contact person who will recruit student papers. Publicize well and keep in close personal contact with these persons.

3 Keep student costs low. Use Section funds to subsidize a pizza party for the students. If the meeting involves an overnight stay, have the student guests bring sleeping bags and stay with local mathematics club members. Suggest that students ride with faculty (you may learn some interesting perceptions about your department and curriculum).

4 If you wish to judge the student presentations for prizes, be discrete. Do not publicize this much or identify judges at the sessions. Prepare a uniform evaluation form with clearly stated criteria for use by the judges.

5 Make the students feel welcome and comfortable. Do not schedule their session opposite a major attraction. Schedule the student paper sessions in regular classrooms, not large lecture halls. Include students at any parties, coffee breaks, etc. Have a special session for students, for example, a recreational mathematics contest, campus tour, or swap session with graduate directors.

6 Encourage expository as well as research topics.
Student paper sessions have obvious advantages for the mathematics profession. While the brilliant undergraduate will usually be invited to present a departmental colloquium, Section meetings provide an opportunity for state and national exposure. Other students—those who have two majors or are not yet committed to mathematics, students thinking about mathematics education, B students—all can benefit from and become more interested in mathematics. Providing our students with the opportunity to experience the pride and thrill of sharing mathematics with others is one thing that higher education is about.

Making Education Policy
Sections Versus States

Lynn Arthur Steen, Past President of the MAA

In the last quarter century or so, states have come to be the dominant force in setting educational policy for the United States. Nearly 90% of secondary education and over three-quarters of college education is under the direct control of state legislatures. Initiatives from state governors, often driven by inter-state competition for jobs, set the pace for educational reform throughout the country.

Examples of renewed educational power can be found in every state. At the precollege level, states set standards for teacher licensure, appropriate budgets for school districts, and establish graduation standards. At the collegiate level, states determine budget levels for public institutions, provide funds (often with exam-based strings) to students, and increasingly are setting assessment hurdles for entrance, for junior standing, or for graduation.

Insofar as MAA expects to influence the development of new standards for school and college mathematics, it must do so by activities that will influence state decisions. Nearly half of our Sections are ideally suited to undertake this work since they are defined by state boundaries. But a majority of the Sections cross state (and national) boundaries in various ways, making it difficult for a single MAA voice to be heard at the state level.

The most important way for MAA to provide leadership to the coming reform in mathematics education would be to strengthen each Section's role in state educational policy. For the 13 state Sections, this could be done routinely by adding state policy issues to the Section's agenda. For the six multi-state Sections, whose membership includes 2-5 whole states, it could be done by appropriate internal committees, perhaps backed up by a Vice-Chair for each state.

Those Sections that cross state and national borders on geographic rather than political boundaries will find it difficult to vote, act, and speak on state-defined issues. This is an issue that those Sections will have to address. One possibility might be to realign certain Sections to establish more state-defined Sections. The membership in MAA has grown now so that more states could support individual Sections.

It is unlikely, however, that all boundary confusion would be clarified in this way, partly because strong Section traditions would continue to cross state boundaries. An alternative would be to establish a state-defined overlay on the Sections charged with responsibility for monitoring state policy on mathematics education. For example, an MAA Executive Committee for South Dakota could be jointly established by appointments from the Sections to which South Dakota MAA members belong, and could speak for MAA on issues of importance in South Dakota.

One could foresee, therefore, not 50 Sections, but 50 state committees—some being identical to current Section Executive Committees, others being formed by special appointment by the Sections represented in the State. Information gathered by such committees would provide an important base for continued MAA involvement in decisions that affect the circumstances of mathematics education throughout the country.

MAA and Two-Year Faculty Links
Kentucky Leads the Way

Roger Hammons, Past Chair, Kentucky Section

> Several Sections are working to make contact and improve relations with the two year college faculties within their areas. The following article from the Kentucky Section describes how it has collaborated with KYMATYC, The Kentucky Mathematics Association of Two-Year Colleges. This may serve as a model for other Sections in their efforts to work with two year colleges and encourage their participation.
> —David W. Ballew, Associate Editor

There are two organizations within Kentucky's higher education system which serve the needs of the mathematics faculty member. Although there is no formal relationship between these two organizations, an informal link exists between them which benefits both.

The Kentucky Mathematical Association of Two-Year Colleges (KYMATYC) is composed of mathematics teachers in both the community college system and the private two-year colleges. The organization holds an annual spring meeting in March at historic Shakertown, located in Pleasant Hill, Kentucky. On the other hand, the Kentucky Section of the Mathematical Association of America holds its annual spring meeting in April at various colleges and universities, rotating the meeting sites geographically throughout the state.

The Kentucky Section Newsletter, published three times each year, serves as a common link between the two organizations. In particular, the Fall issue of the Newsletter contains news items about the members of both organizations such as faculty appointments, promotions, and retirements. The Winter issue contains program details of the spring meetings of both organizations. The Newsletter is mailed to members of each organization but is totally funded by the Kentucky Section.

An obvious benefit of a shared newsletter is an increase in awareness of mathematical activities within the state. Attendance at both of the spring meetings also seems to have improved and a substantial number of KYMATYC members are active in the Kentucky Section. Indeed, both a former Section Governor and the present Secretary-Treasurer of the Section are members of the faculty of the community college system in Kentucky.

Recent informal discussions between interested members of both organizations point to another area where cooperation between the two organizations would be mutually beneficial. A recent meeting of interested members from both organizations was held to discuss the planning of a statewide mathematics placement examination. The main goals are to collect data on mathematical skills of freshman within the state and to explore the possibility of generating a state wide placement examination which could be given to high school juniors in an effort to provide early assessment for mathematics skills required in college courses. The impetus for this effort originated in a presentation given by Professor Franklin Demana of The Ohio State University at the KYMATYC meeting and subsequent discussions held at the Kentucky Section annual meeting. The Early Math Placement Test (EMPT) and the Calculus Readiness Test (CRT) are both placement examinations developed at OSU that have been widely used in Ohio, with apparent success.

The proposed combined effort of both organizations does not represent any formal agreement between KYMATYC and the

Kentucky *(continued from page iii)*

Kentucky Section: however, it is viewed as a project where both organizations work together for the benefit of mathematics students at both the secondary and college level. Further planning sessions are being discussed.

Although the Kentucky Section and KYMATYC are autonomous organizations, there seems to exist points of common interest and concerns which invite both groups to work together to achieve common goals. By doing so, both organizations benefit.

Workshops and Mini-Courses in Florida

Robert Kalin, Secretary, Florida Section

> Almost half of the MAA Sections are offering mini-courses with their meetings or in special summer sessions. The 1987 Florida experience is one of the most ambitious efforts yet attempted, and it demonstrates what can be done with creative programming.—David W. Ballew, Associate Editor

To help celebrate its 20th anniversary, the Florida Section offered half-day workshops on Problem Solving and Discrete Mathematics during the 24-hour period before the opening of its Annual Meeting on the Florida Atlantic University campus. The workshops began Friday noon, March 6, and were completed by Saturday afternoon, March 7.

Murray Klamkin of the University of Alberta led the Problem Solving workshop, meeting on Thursday, March 5 from 1:00 to 5:00 pm. Fred Roberts of Rutgers was the instructor in Discrete Mathematics, which met Friday from 8:30 am to 12:30 pm. Each lecturer also gave a related one-hour talk during the Annual Meeting itself.

Klamkin's pre-meeting workshop emphasized optimization problems, while his meeting lecture, entitled "Mathematical Creativity," covered generalizations of typical problems occurring in the International Olympiads. Roberts's Friday morning workshop stressed such discrete-mathematics applications as switching functions, DNA chains, and power in simple economic games; his related lecture opened the meeting with a discussion of "Meaning-ful Statements."

Florida Atlantic Professor Fred Hoffman organized and administered this combination of pre-meeting workshops and meeting lectures. The Florida Section was particularly fortunate to have Hoffman arrange for the FAU Center for Excellence to offer a preliminary mini-course on "Discrete Mathematics and its Applications," led and done by Fred Roberts in conjunction with his workshop. Held on the Monday, Tuesday, an Wednesday half-days preceding the workshop, this mini-course covered such topics as systems of binary, ternary and quaternary relations, and homomorphisms of relational systems. The Center for Excellence offers programs to school teachers, students, and community college instructors, audiences that fit well with the intent of the Section's workshops.

A participant taking the mini-course, workshop, and lecture could earn one credit at FAU. The mini-course was free; either workshop cost $10. Help from the FAU Center and a financial guarantee of up to $600 by the Florida Section made the offerings possible; further, a grant of $300 from the MAA Fund for Sections gave additional support. Section officers were willing to assume

the risk because annual contributions from the national MAA and from publishers exhibiting at the Annual Meeting or advertising in Section newsletters (over $900) had recently strengthened the Section treasury. It is worthy of note that twenty high school students attended the mini-course given by Fred Roberts.

The History of a Section: Why Not Write One for Your Section?

John Neff, Committee on Sections and The Southeastern Section

One of the pleasures of being a member of the Committee on Sections is having the opportunity to read the newsletters of each section. One needs to read but a few issues to see that the various sections are deeply involved in a surprising array of projects, some continuing over many years and some being tried as innovative experiments. The newsletters create an ongoing history of the section, with each new issue containing an interesting record of the past, present, and future.

Why not assemble the various highlights over the years into one volume and call it a "History of the Section?"

Give it a moment's thought. Do you recall some highlights of past section meetings? Did you have a particularly good speaker, whose name frequently appeared afterwards in The MONTHLY or FOCUS? Perhaps it was there before, but you never really noticed it. Or, on the other hand, did a speaker "bomb out" and you really were surprised? Or, was something innovative offered and no one came (or many did)? The Southeastern Section main speaker at a long past meeting was even a Nobel Prize winner, a rare commodity in this profession (it was a joint meeting with the Georgia Academy of Science).

Surely someone in the section has the "archives," a euphemism for the beat up old box of stuff from all of the past meetings. Say, for example, the Section Employment Register for the 1938 meeting, i.e., a spiral notebook which listed applicants and departments in scrawled longhand. Or the outrage expressed by the Secretary when the local hotel raised the room price to $3.25 for a double room or to 75 cents for the banquet. Curiously, maybe some things in life are constant, when you compare a room price to the typical academic year salary, as expressed by the approximate proportion $3.25 : 1500 = 85 : 40,000$.

It is obvious from the Central Limit Theorem (or is it the Chinese Remainder Theorem?) that there is at least one history hobbyist (or latent genealogist) in every section. Why not identify such a person in your section and see if he or she would be interested in collecting the bits and scraps from the many years and putting it into one brief publication?

A good place for the writer to start is to talk to some of the the long-term members of the section. They can be a real goldmine of information. In addition to adding interesting details to the written records, they might also recall matters which never got into the record. This "oral history" will help to liven up the account and make it much more interesting. (These oral accounts are also great presentations at any Section meeting as many Section have discovered.) It has been quipped that history is much too interesting to be taught as a college subject. Another good place for the writer might be to look at the book "The First Fifty Years," edited by the late Kenneth O. May and published by the M.A.A. in 1972.

Five of the sections have published a history to date: The Iowa Section (organized 1916) in 1956, the Kansas Section (organized 1915) and the Metropolitian New York Section (organized 1941) both in 1980, the Southeastern Section (organized 1922) in 1982, and the Michigan Section (organized 1923) in 1984. Rumor has it that other "granddaddy" sections like the Ohio Section (organized 1915) and the Rocky Mountain (organized 1917) are contemplating histories. Perhaps a 75th anniversary history in 1990 for Ohio or Missouri might be a nice timing for the project. Or, the history of the unique and very lively Northern California Section (organized 1939) in time for its 50th anniversary in 1989.

But, we need not look for magic numbers (multiples of 5) to get started. Almost no excuse is needed, if someone is convinced that a history would be interesting for everyone to read. For some, it would be interesting to recall these highlights and, for everyone, the sense that getting together once or twice a year really is quite enjoyable and professionally worthwhile and one can help make it get even better in the future.

As with all great ventures, there is a cost for reproducing such a history. The Washington office administers a "Fund For Aid to Sections," which may be approached for financial assistance in preparing and reproducing such a history.

Maybe the quip about history as a course has a ring of truth. Why not record a living, continuing history for all to enjoy while you, the readers, are actually participating in its creation?

Undergraduate Participation in Allegheny Mountain Section Meetings

Charles Cable, Allegheny Mountain Section

> Participation by undergraduate students has increased enormously over the past few years. One of the first Sections to regularly have organized sessions for undergraduates was the Allegheny Mountain; the following describes how this came to be.   —David W. Ballew, Associate Editor

Allegheny College received a COSIP (College Science Improvement Program) grant via NSF for three academic years, beginning in 1972. One facet of that program was a modest amount of money to take undergraduate mathematics majors to MAA sectional or nearby national meetings of the MAA. Therefore, in the spring of 1973 interested mathematics majors were invited to accompany the Allegheny faculty in attending the sectional meetings. A number of students did attend and to our knowledge this was the first time that undergraduate students attended the Allegheny Mountain Sectional Meetings. Each year since that time interested mathematics majors from Allegheny have attended with the number of students ranging from six to twelve; at least one usually presents a paper. While the NSF funding for COSIP ended in 1975, the college has continued to fund this student participation.

In 1973 the sectional meetings were held at Butler Community College. Subsequent to these meetings, Debbie Bergstrand and Diane Herrmann, two Allegheny students who had attended the previous meeting, asked me if it would be possible to have a separate session at these meetings where students could present talks, as well as sessions where people in industry described how they applied mathematics to their profession. I was the Chairman of the Section at that time and brought this proposal before the section officers for their consideration. They agreed that the meetings should include sessions designed primarily for undergraduate mathematics majors.

In 1974 the sectional meetings were held at Allegheny and there was a panel discussion for undergraduates where a number of panelists from industry described what mathematical training they had received and how they used mathematics in their professional work.

In 1975 the Allegheny Mountain Meetings were held at Duquesne a session of short talks scheduled for students, and a total of seven students gave talks; three talks were given by undergraduate students David Carothers of Westminster and Debbie Bergstrand and Diane Herrmann of Allegheny. Richard Lundgren of Allegheny College was in charge of scheduling the student sessions for the first few years. Later Barbara Faires was named the Director of the Student Program. At any rate, it is believed that 1975 was the first year that undergraduates presented short talks at the Allegheny Mountain Section Meetings. These talks have been an integral and important part of this section's meetings ever since that time.

Section Activities *(continued from page i)*

arranged the exhibition "A Mathematician Views Escher," which could be seen during the meeting at Moravian College. The Section sponsored a Mathematical Modeling Workshop given by Frank Giordano and Maurice Weir. The Eastern Pennsylvania and Delaware Section is unique in that it has Special Interest Groups (SIGs) devoted to specific subjects of interest to the membership; at present there are SIGs in Computer Science, the Monster Group, Mathematical Anxiety, Operations Research, and Mathematics in the High School. These SIGs often plan sessions and programs for their membership.

FLORIDA   The Florida Section celebrated its Twentieth Anniversary with an innovative program featuring several National speakers, a variety of local invited addresses, and several mini-courses and workshops (see accompanying article by Robert Kalin). A highlight of the meeting was a panel of founding members discussing the origins and history of the Section. Florida has been very successful in working within the state political system, and has had the Governor designate April as Mathematics Education Month. The Section has published a one hundred page spiral bound collection of the Invited Addresses of the previous meeting ($5.00); this has proven to be very popular and is something other Sections may wish to consider.

ILLINOIS   The Annual Meeting was highlighted by a mini-course on "The Art and Science of Modeling Social Phenomena" by Robert Muncaster and by two specialized research talks in statistics and group theory. Illinois Mathematics Department Heads lunched and discussed calculus texts. The Section has reorganized to allow for greater participation by the membership; there are now seven active standing committees and five ad-hoc committees working to solve the problems of the mathematics community in Illinois. The Section is making special efforts to attract membership and participation from all sectors of the mathematical profession.

INDIANA   The Section conducted the Annual Indiana College Mathematics Competition in conjuction with its Spring Meeting; this gave a significant increase in attendance by undergraduate students. The program featured talks of general interest accessible to advanced undergraduates; for example, there were two major presentations on the history of mathematics. Immediately following the Section Meeting was a meeting of the Wabash Extramural Functional Analysis Seminar, which many members of the Section attended.

Section Activities *(continued from page v)*

INTERMOUNTAIN   The Section had a spirited meeting with six invited addresses, fourteen contributed papers, two panel discussions, and twelve excellent undergraduate student papers. A particularly interesting panel discussion concerned "Consistency in Service Courses"—a topic that is becoming much more important.

IOWA   The Iowa Section met jointly with the American Statistical Association and the Society of Industrial and Applied Mathematicians with a truly integrated program reflecting the interests of all the participants. The Iowa Section Newsletter published abstracts of the major addresses before the meeting to better aid members in choosing between parallel sessions. The Section is working on ways of increasing the quality of elementary and secondary mathematics.

KENTUCKY   The Section awarded trophies to the top teams and top individuals in the American High School Mathematics Examination. The Section works closely with the Kentucky two-year college group (see the article by Roger Hammons elsewhere in this issue) to improve communication and identify community interests between the groups. James Andrews presented a short course on actuarial mathematics titled "Mathematics, Life, Death, Sex, and Money." A special attraction of the Annual Meeting was a visit to some unique facilities at the University of Louisville including the the rare book collection and the Robotics Institute.

LOUISIANA-MISSISSIPPI   This was a very successful meeting with twenty-eight contributed papers, eight student papers, two major invited addresses, four computer oriented workshops (Finite Math, Determinants, SCOPE, and MUMATH), two panel discussions, and an "Open Concerns" discussion. One participant stated that there were far more things to do than time permitted! The Section has made a special effort to attract student papers and not only award the MAA memberships but also give $100 U.S. Saving's Bonds for the two best such papers. By Special Resolution the Section has written the governing bodies for elementary, secondary, and higher education in both Louisiana and Mississippi to convey "the nature and composition of our organization and our willingness and desire to be involved in all matters concerning mathematics ... " (see the related article by Lynn Steen in this issue of FOCUS).

MARYLAND-DISTRICT OF COLUMBIA-VIRGINIA   The Section continued its Summer workshops with two at Salisbury State: "A Mathematician's Guide to AI" by Stefan Shrier and "Mathematics, Operations Research, and the Microcomputer" by J.J. Bartholdi. The Fall Meeting was highlighted by a workshop by Sr. Helen Christensen on Elementary Graph Theory, and the Spring Meeting by Lawrence Husch's presentation on "How NOT to Run a Mathematics Microcomputing Laboratory."

METROPOLITIAN NEW YORK   The Annual Greater New York Math Fair for high school students was its usual remarkable success. The Section considers this to be its most important project. The Section plans to meet in joint session with the New York State Mathematical Association of Two-Year Colleges in 1988 in the Catskills. The Section gives awards to the highest regional scorer in the Putnam Examination and to the highest scorer in the AHSME Examination.

MICHIGAN   The Section is examining the possibility of offering an extended program of Summer Short Sessions, and the possibility of using television tapes from the National MAA Office in conjuction with interviews or other forms of publicity for better public awareness of mathematics. The 1987 Summer Short Course was given by Peter Hilton and Jean Pederson on "Integrating Mathematics: Geometry, Numbers, Algebra, and Combinatorics." An aggressive membership campaign has resulted in a 22% increase in members in the past year. The Executive Committee is visiting the Mathematics Departments in the state to explain the Section's programs and discuss what is being done for the membership. A total of 23,293 Michigan high school students participated in the Thirtieth Annual Michigan Prize Competition sponsored, prepared, and graded by Section Members; this Competition grows each year and now has considerable corporate sponsorship. The Michigan Mathematical Association of Two-Year Colleges had their Annual Meeting in conjunction with the Section's Spring Meeting.

MISSOURI   An unusual event at the Missouri Meeting is the Annual 5K Run and Walk held on the morning of the second day. This has proven to be a very popular event even among non-athletes. The twenty-nine papers presented at the Annual Meeting were highlighted by a panel discussion on the future of the calculus sequence.

NEBRASKA-SOUTHEAST SOUTH DAKOTA   The Section annually meets with the Nebraska Academy of Science and shares programs with them. The Program Chairman always invites the membership to a Wine and Cheese Party at his/her home the evening before the meeting. Perhaps this is the reason that this Section has the greatest percentage of its membership attending its sessions (41%).

NEW JERSEY   The Fall Meeting was highlighted by four superb invited addresses: "Queueing Models" by William Massey, "Derivatives of Fractional Order" by Rhonda Hughes, and "The Monster Theorem: Parts I and II" by Daniel Gorenstein. Another featured segment was a breakfast hosted by the Association for Women in Mathematics.

NORTH CENTRAL   The Summer Seminar on Graph Theory and Linear Algebra was presented by Allen Schwenk. The Section is resolved not to hold meetings at institutions censured by AAUP or other academic societies. Several institutions within the Section are experimenting with new approaches to the teaching of calculus with the aid of computers.

NORTHERN CALIFORNIA   Other Sections will be envious to learn that the Section had its Spring Meeting in Honolulu with a special program of invited addresses by Victor Klee, Henry Pollak, and Ivan Niven. The February Meeting was held at San Jose with five invited speakers and meetings of Department Chairs and MAA Representatives.

NORTHEASTERN   The Christie Lecturer for the Fall was Ernst Snapper who spoke on "What Do We Do When We Do Mathematics?" The Microcomputer Software Exchange continues with material for all types of applications and brands of microcomputers. The Section has inaugurated a new type of session designated as Case Studies; example presentations were: "Getting It Right Consistently: Experimental Design" by Ken Constantine; "Are Male and Female Teachers Paid Differently?" by Arlene Ash; and "Making Clinical Trials More Efficient" by David Harrington. The Section Short Course was presented by Fred Roberts on "Applications of Discrete Mathematics." The two Meetings featured twelve invited addresses, presentations on CAD/CAM, eighteen contributed papers, and eleven student presentations.

OHIO   The Annual Short Course was given by Alan Tucker on "A New Unified Approach to Applied Linear Algebra," and the

Fall Meeting featured a micro-course by Robert Young on "Excursions in Calculus." The Ohio Section should be commended for its record in attracting undergraduate student presentations; last year they had fifty such papers and this year thrity-two participated and one hundred and two students attended. The Spring Meeting offers "Swap Sessions" where persons with similar interests can meet to discuss educational problems and their solutions; topics this year included MAA Student Chapters, Promoting Mathematical Awareness, and Graduate Directors.

OKLAHOMA-ARKANSAS   The Fifteenth Annual Nathan Court Lecture was given by Asger Aaboe on "Babylonian Mathematics and Mathematical Astronomy and Their Legacy" at the Spring Meeting. The Annual Meeting also included thirty-seven contributed papers and eight undergraduate presentations.

PACIFIC NORTHWEST   The Section annually sponsors a Textbook Exchange where persons list the undergraduate texts they have used and on which they are willing to comment; this exchange helps members get honest opinions from faculty users. These lists are published in the Section Newsletter and are available at the Annual Meeting. The Section combined its meeting with the AMS for 1987. This year's Short Course was given by James Sandefur on "Discrete Mathematics Using Difference Equations," and the mini-course was given on "NP Completeness" by Joe Buhler. The Section is considering publishing a "Problem Corner" for students in its newsletter.

ROCKY MOUNTAIN   The Section continues its history of encouraging an interview with one of the student participants from 1986. In the interview the student noted that his presentation had given him his first opportunity to interact professionally with mathematicians and that the experience awakened in him a new interest in the subject and greatly encouranged him in his studies. The Rocky Mountain Short Course was held at Fort Lewis College in Durango by William Lucas on "Modern Topics in Discrete Mathematics." The Spring Meeting featured a presentation by Robin Wilson on the 400th Anniversary of the Publication of Newton's Principia; it was a multi-media presentation with slides, overheads, and a tape recorder in the background playing Purcell. Gerald Alexanderson, the other prime speaker said, "It's hard to top that!"

SEAWAY   The Seaway Section is one of several that publish abstracts of the upcoming meeting's talks to give members a better opportunity to choose between parallel sessions. Further, these abstracts have substantially increased meeting participation. The Spring Meeting featured the Twentieth Annual Harry M. Gehman Lecture by Mark Ablowitz on "Solutions and Exact Solutions of Nonlinear Partial Differential Equations of Physical Interest." The Fall Meeting included a student's view of "How Mathematics Should be Taught" presented by Michael Segal.

SOUTHEASTERN   This Section takes honors for having the largest number of participants at its Annual Meeting (290) and having the largest number of contributed papers (51); there were also three invited addresses and three presentations by students. Frank Giordano gave a free short course on "Teaching Mathematical Modeling." The Southeastern Section made special efforts to recognize those colleges and universities that excelled in their celebration of National Mathematics Awareness Week, and the Section Newsletter noted, with pride, that many members from small or non-research institutions were contributing significant work to the journals and the profession.

SOUTHERN CALIFORNIA   The Fall Meeting featured three invited one hour addresses, a luncheon speaker, a panel on the calculus curriculum, and a short course by William Lucus on "The Apportionment Problem." The Spring Meeting was highlighted by four invited one hour addresses, a luncheon speaker, and a second short course by William Lucus on "The Marriage Problem and Its Applications."

SOUTHWESTERN   The Annual Meeting featured a Dinner presentation by Edward Gaughan on "Fifty Years of the Southwestern Section: A Celebration of Our History" (see related article by John Neff in this issue of FOCUS). Further, the Section heard a group of professors, high school teachers, and students present an interesting panel on "Bridging the Mathematical Gap Between The High School and The University." In addition, there were three invited addresses, nineteen contributed papers, and eight student presentations.

TEXAS   The Texas Section always has a large and varied meeting with numerous invited addresses, contributed papers, special reports, panels, student papers, and other activities. This year was no exception. The Annual Short Course was presented over two days by Henry Pollack on "Applications of Mathematics in the Telephone Industry," and there were five parallel sessions of contributed papers. There were two sessions presented by the Texas Long Range Planning Committee, and the Department Chairs met at lunch. There were six featured one hour addresses.

WISCONSIN   The theme of this year's meeting was "Focus on Curriculum" and twelve of the twenty-nine contributed papers were directly tied to that theme. The Section Short Course on "Algorithms and Discrete Mathematics" was quite successful with fifty-three participants including twelve high school teachers. The Section is seriously looking at the problems of remediation at the college level, the Wisconsin Public Instruction's Curriculum Guide for Mathematics Instruction, and articulation between the high schools and the colleges.

EMPLOYMENT ADVERTISEMENTS

WHITTIER COLLEGE
WHITTIER, CALIFORNIA 90608

The Department of Mathematics invites applications for a tenure track position, at the level of Asst. Prof. beginning Fall 1988. The five members of the department teach a wide range of undergraduate courses in mathematics and computer science. Ph.D. in mathematics preferred, but no particular field is required. A background in Computer Science would be most welcome. Candidates should submit a vita, graduate transcripts, three letters of recommendation, and a statement of teaching philosophy to Dr. Fritz Smith, Department of Mathematics, Whittier College, Whittier, California 90608. EO/AA

Mathematics Professor. Tenure track position starting August 22, 1988, rank and salary dependent upon qualifications. Ph.D. required. Applicants expected to teach normal range of undergraduate mathematics courses, average teaching load is 12 hours per semester. Applicants in all areas of mathematics are encouraged to apply. Send letter of application, resume, graduate transcripts, and 3 letters of reference to: Dr. Charles Kerr, Chair, Department of Mathematics, Boise State University, Boise, ID 83725. Screening will begin on February 1, 1988 and continue until the position is filled. The BSU Mathematics Dept. offers a Bachelor's in mathematics with a computer science option, and in mathematics for secondary education. EEO/AA Institution.

CLAREMONT McKENNA COLLEGE
Endowed Position in Computer Science and Applied Mathematics

Applications are invited for an endowed tenure-track position in Computer Science and Applied Mathematics with rank and salary dependent on qualifications. Starting date fall 1988.
Claremont McKenna College is a liberal arts college with 800 students. It is a member of the Claremont Colleges (along with Pomona, Scripps, Harvey Mudd, and Pitzer Colleges and Claremont Graduate School). The Claremont Colleges have a total of forty-three mathematicians and computer scientists, and are located in Claremont, Southern California.
Qualifications for the position include a Ph.D. in a computer-related field such as Computer Science, Mathematics, Operations Research, or Information Science. If the degree is in a field other than Computer Science, substantial formal education in Computer Science is required.
Applicants should have a strong commitment to undergraduate teaching, an established scholarly record, and practical experience with computer applications. The appointee will be expected to teach some applied mathematics courses in addition to computer science courses and to participate in course and program development.
The College is an equal opportunity/affirmative action employer. Applications will be reviewed as soon as received and a decision reached preferably by January 1988. Please send resume and the names of four references to Professor John Ferling, Chairman, Computer Science Search Committee, c/o Dean of Faculty's Office, Claremont McKenna College, Claremont, CA 91711.

ALFRED UNIVERSITY
DIVISION OF MATHEMATICS & COMPUTER SCIENCE
Alfred, New York 14802

Tenure track position in mathematics, available Fall 1988. Ph.D. required, as is a commitment to teaching excellence. Rank and salary commensurate with qualifications and experience. Teaching load is three courses per semester. Scholarly activity encouraged and supported. Submit letter of application (outlining career goals and professional interests), vita, graduate transcripts, and three letters of recommendation (at least one should address teaching) to Dr. Robert Williams, Chair. An EO/AA institution.

CHAIRPERSON
Department of Mathematics and Physical Science

Applications are invited for Department Chairperson of Mathematics and Physical Science at Embry-Riddle Aeronautical University,. The department has 28 full-time faculty in mathematics, physics, and chemistry with a new program in engineering physics beginning this Fall. An excellent teaching background and experience in administration is required. A Ph.D. is required and strong credentials in applied mathematics or aerospace physics desired The start date is August 24, 1987. Send cover letter, resume and three letters of reference under separate cover to:

Dr. R. S. Brown, Dean and Chair
MA/PS Search Committee
Embry-Riddle Aeronautical University
Daytona Beach, FL 32014
        EQUAL OPPORTUNITY EMPLOYER

Department of Mathematics and Physical Sciences
Embry-Riddle Aeronautical University

A tenure-track, assistant professor position in math is available for Fall 1987. A Ph.D. in math and a strong commitment to teaching excellence is required. A background in applied math and demonstrated research accomplishments/ potential is preferred. Salary is commensurate with experience. the Department offers an /Engineering Physics Degree and provides service courses to other degree programs.
Send a cover letter, a resume, and three letters of reference to Dr. William Grams, Chairman, Department of Mathematics and Physical Science, Embry-Riddle Aeronautical University, Daytona Beach, FL 32014.
Embry-Riddle Aeronautical University is an EEO/AA employer.

CARLETON COLLEGE
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
NORTHFIELD, MN 55057-4025

Two tenure-track faculty positions beginning 1988-89. Ph.D. required. Teach six courses per year in mathematics, computer science and/or statistics. Excellent teaching ability essential; researach encouraged. Interviewing at MAA/AMS meeting in January. Deadline January 18; applications accepted until positions are filled. Equal Opportunity Employer; applications specifically invited from women and minorities. Send letter of application, resume, and three recent letters of reference to David Appleyard, Chair. Carleton College is a small, highly selective, liberal arts college 35 miles south of Minneapolis/St. Paul.

CENTRE COLLEGE
MATHEMATICS POSITION

Applications are invited for a tenure-track position at the rank of assistant or associate professor beginning September, 1988. Ph.D. in mathematics required. The position requires the teaching of a wide range of undergraduate courses and a strong commitment to liberal arts education. Ability to teach mathematical statistics or computer programming is desirable. Excellent fringe benefit program including home mortgage plan and tuition scholarship program for dependent children. Application, resumes, transcripts, and three letters of reference to Leonard DiLillo, Dean, Centre College, Danville, KY 40422. E.O.E.

MILLS COLLEGE
Department of Mathematics and Computer Science
Oakland, California 94613

Mills College is seeking outstanding candidates for a tenure-track position as Assistant, Associate, or Full Professor of Mathematics commencing Fall 1988. Candidates must submit evidence of superior teaching and research abilities, and demonstrate a commitment to become involved in a highly innovative and energetic department. Rank and salary will depend on experience and qualifications. The initial contract will be for three years, subject to final administrative approval. Mills College is an Affirmative Action/Equal Opportunity Employer.
Send vita and direct three letters of reference to:

Professor Richard Bassein
Chair of the Mathematics Search Committee
Mills College
Oakland, Ca 94613

Deadline for application: January 15, 1988

LANDER COLLEGE
DIVISION OF SCIENCE AND MATHEMATICS
GREENWOOD, SOUTH CAROLINA 29646

Applications are invited from qualified applicants for a tenure-track position in mathematics at a rank of Assistant or Associate Professor, beginning January 4, 1988. A Ph.D. in mathematics is required, and expertise in computer science is strongly desired. Primary responsibilities are teaching of undergraduate mathematics courses and general academic duties.
Applicants should send resume, transcripts, and three letters of recommendation to:

Dr. Jerry D. Wilson, Chair
Division of Science and Mathematics
Lander College
Greenwood, S.C. 29646

Lander College is a fully-accredited, four-year liberal arts college in the South Carolina State System, and is an affirmative action, equal opportunity employer.

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"During Dr. Polking's three years at the Foundation the Division of Mathematical Sciences has worked hard to attract women and minorities into the discipline. Dr. Polking has been consistently supportive of these efforts. In a similar vein he has encouraged the external mathematics community to be more active in considering the needs of the discipline and in explaining these needs to the external community. His strong support of the Mathematical Sciences Education Board and the Board of the Mathematical Sciences of the National Research Council epitomizes this concern.

"Such professional dedication warrants the deep appreciation of the National Science Foundation and the entire scientific community. I am therefore conferring the Meritorious Service Award on John C. Polking for his outstanding intellectual and administrative leadership in planning and implementing programs in the mathematical sciences."

Haimo Stands in for Gillman During Busy Salt Lake Meetings

BOARD ACTIONS First Vice-President Deborah Haimo chaired the meetings of the Executive and Finance Committees and the Board of Governors while President Leonard Gillman was temporarily sidelined by illness in Salt Lake. Fortunately, Gillman was able to participate in the Board meeting and recovered fully during the meetings. Secretary Ken Ross's report on the meetings will give members a sense of how productive they were. Ross thanked Haimo for her skillful presiding and welcomed Ann Watkins as new second Vice-President. He went on to report Board actions as follows:

"The Board elected Donald L. Kreider Treasurer, 1988-1992. Also, the Board elected Ann and William Watkins as co-Editors of the COLLEGE MATHEMATICS JOURNAL, 1989-1993. I wish to recognize Warren Page for his fine editorship of this Journal. He's not through yet, but his hard work is coming to an end.

"The MAA publications program is thriving and the Board has approved a new book series, called Spectrum. This series is part of an Association goal to serve a wider audience of readers, including educated laypersons. The series will include biographies, popular expositions of old and new ideas, elementary problem books, books on the history of mathematics, and books on the teaching of mathematics.

"The Board approved a modified version of a report by COMET, the Committee on the Mathematical Education of Teachers, concerning the Holmes and Carnegie Reports on Teacher Preparation . . . . [see Henry Alder's article on this in this issue of FOCUS] . . .

"The Board approved of some bylaw changes—to be submitted to the membership at a Business Meeting—that will split the job of Secretary into roughly two equal parts. The half that involves arranging meetings will become the responsibility of an Associate Secretary, who will be a member of the Board but not an Officer. The remaining responsibilities will stay with the Secretary, who will continue to be an Officer as described in the bylaws.

"The Board approved a policy for stating entrance requirements in mathematics, which it is hoped will be a joint statement with NCTM, the National Council of Teachers. This statement will encourage colleges to use uniform, unambiguous language in their catalogs to describe mathematics requirements for entering freshmen. There will be a separate article on this in FOCUS later.

"Finally, the Board took another step towards the establishment of Student Chapters, by encouraging the Finance Committee to budget some funds, if feasible, for initiation of Student Chapters.

"I'd like to close with two observations. First, the MAA is a very healthy organization. Our membership has grown 39% since 1983. On the other hand, we are doing so many worthwhile things that we are having to watch our finances very carefully.

"Secondly, yes there will be more meetings. We have a very rich program planned for Atlanta in January. This will include three evening programs devoted exclusively to mathematics education. Next summer the AMS is celebrating its 100th anniversary and has an elaborate program planned. We are cooperatng by not competing. We will officially meet in Providence, but the program will be limited. Officially means that the Board of Governors will meet, there will be a Business Meeting, and committees will meet if they want to. The program will be limited to three joint AMS-MAA invited addresses and perhaps a half dozen minicourses just prior to the meeting."

TWENTY FIVE YEAR MEMBERS BANQUET There were seventy six people at this dinner. Eileen Poiani introduced the diners, decade by decade according to the year they joined, accompanied by her delightful chronicle of those past times. For the second year running, the member of longest standing at the dinner was Paul K. Rees, who joined in 1924 and whose son, Charles, is now the Governor for the Louisiana-Mississippi Section. The after dinner speakers were Donald Kreider, who spoke amusingly on the capabilities of the new symbolic and graphic calculators, and Shirley Hill who spoke about the serious progress being made on revitalizing mathematics education.

Board of Governors Acts on Holmes and Carnegie Reports on Teacher Preparation

Henry Alder

The critical need to improve the quality of pre-college teaching has been addressed in two reports, published in 1986: TOMORROW'S TEACHERS, by the Holmes Group and A NATION PREPARED: TEACHERS FOR THE 21ST CENTURY, by the Carnegie Forum on Education and Economy.

At its meeting on August 4, 1987, the Board of Governors—advised by the MAA's Committee on the Mathematical Education of Teachers (COMET)—has taken a position on the recommendations in these reports directly relevant to the teaching of mathematics. The Board urges MAA members to give a high priority to active implementation of them.

Recommendation 1 The undergraduate curriculum needs to be revised so that future teachers can study the subjects they will teach with instructors who model fine teaching and who understand the pedagogy of their material.

This goal is widely accepted but deserves continuing emphasis to encourage greater efforts towards its achievement. Instructors who teach *any* courses for prospective teachers must themselves be expert in the art and craft of teaching.   (over)

Carnegie and Holmes (continued from page 5)

Recommendation 2   Academic course requirements and courses need to be organized to show the structure, scope, and significance of the discipline.

The MAA RECOMMENDATIONS ON THE MATHEMATICAL PREPARATION OF TEACHERS (MAA Notes, Number 2, 1983) and the GUIDLINES FOR THE CONTINUING MATHEMATICAL EDUCATION OF TEACHERS, being prepared by the MAA for publication, provide detailed recommendations for the preparation, with a strong background in mathematics, of career teachers at all levels and for mathematics specialists for elementary and middle schools.

Recommendation 3   Coherent programs in professional education must be devised for prospective teachers including, but not limited to, replacement of generic undergraduate "methods" courses with subject matter-oriented studies of teaching and learning.

It is especially important that all prospective teachers have appropriate instruction in the special problems in teaching mathematics effectively at the appropriate level so that students can enjoy learning it. This is why the MAA has already previously recommended that the "courses should be taught by individuals with interest and expertise in school teaching and continuing contacts with school classrooms."

Recommendation 4   A national standards and certification board for teachers should be established.

Present teacher certification standards are adequate at best in a few states and are seriously flawed in most. Thus, national standards are badly needed to *raise* substantially criteria nationwide. Such a national standard should include the MAA RECOMMENDATIONS ON THE MATHEMATICAL PREPARATION OF TEACHERS.

Recommendation 5   Teachers need to be given more say on how to accomplish state and local educational goals.

Decisions will be made on how mathematics is to be fitted into the overall programs for the preparation of teachers. If teaching is to be accorded the same treatment as other comparable professions, its practitioners—that is, career professional teachers with a preparation consistent with these Reports—need to be given a similar voice in setting the standards for the profession. This means, in particular, that in the various states the boards concerned with teaching standards need to be comprised of a majority of such career professional teachers.

In addition to these five recommendations from the Holmes and Carnegie Reports, the Board of Governors adopted the following two recommendations.

Recommendation 6   Prospective teachers of mathematics in grades 9-12 should major in a mathematical science with a program of study that follows the MAA RECOMMENDATIONS ON THE MATHEMATICAL PREPARATION OF TEACHERS.

Recommendation 7   Prospective teachers in grades K-8 should major in an academic discipline. Those aspiring to teach at the elementary level should include in their programs of study the mathematics courses recommended in the MAA RECOMMENDATIONS ON THE MATHEMATICAL PREPARATION OF TEACHERS and prospective teachers of middle school and junior high school mathematics those specified for that level in the same RECOMMENDATIONS.

Beyond this, undergraduate majors in mathematics or combined majors in the mathematics and the natural sciences should be developed, especially for prospective elementary school teachers so that eventually all mathematics in at least grades three and beyond is taught *only* by mathematics specialists.

NOTE   Henry Alder prepared this report for FOCUS and it has been reviewed and approved by COMET.

Two Proposals (continued from page 3)

ill-prepared students a spruced-up curriculum, but we can set our sights higher. I have two proposals, both simple, although to put them into effect may require some unglamorous hard work. But I think they would go a long way toward setting our classes on a more realistic footing.

Proposal 1   Let computers handle the drill.   In learning a subject, there are two things you have to do—absorb the ideas, and acquire skill in the routines. The appropriate setting for learning ideas is some thoughtful give and take with a teacher. For skill with the routines, you have to have a lot of just plain drill. Today we don't need humans to oversee routine drill. That task should be taken over by computers. This requires some truly first-rate programs; but such things are possible.

Advantages of computer drill are well known, but I will mention some anyhow. Students do their practicing at times convenient to them. They work at their own pace. They not only get feedback but instant feedback. (In contrast, homework papers are often graded without comment by a teaching assistant and returned several days after being handed in.) Students work in privacy, with no one scolding or laughing at them or chiding them for being slow. A well-designed program, with thoughtful conditional branching, will offer guidance while at the same time allowing students to pick the topics they need practice on. The instructor is freed to devote full time to the exchange of ideas. Finally, classes can meet less often, and large classes can be divided into smaller ones.

Proposal 2   Enforce the prerequisites.   Not only do we award grades that were not earned, but we do a disservice at the beginning when we admit students who are not qualified for the course. These students usually do poorly and end up soured on math. Instructors feel obliged to review background material in class, cutting into time for the regular syllabus, degrading the character of the course, and shortchanging the better-prepared students.

I propose we all be brave and enforce the prerequisites. This is consistent with the MAA-NCTM resolution of last fall on calculus in high school. Just remember to check your plan with your engineering and business colleagues, pointing out that they too will gain from the new standards—otherwise, they may put in their own mathematics courses.

The resolution just referred to lists algebra, trigonometry, analytic geometry, complex numbers, and elementary functions, studied in depth, as prerequisites for the high school calculus course. For the college precalculus course, I would say be sure to include a thorough treatment of the conic sections (with the byproduct of freeing up the calculus course from that heretofore obligatory chapter.) It's a difficult course to handle, because the students know some of the material and become easily bored; but that's a poor reason for putting them directly into calculus, where the material is assumed to be known. Do an honest job, make the course exciting—there is plenty of exciting material— and entrust it to your conscientious teachers. And don't inflate the grades.

Special Fall Meeting of NE Section

With the 100th birthday of the AMS in mind, the Northeastern Section has planned a meeting, organized aroung the theme of the promotion of mathematics. It will be held November 20-21 at Bentley College, Waltham, Massachusetts. Invited participants are A.K. Dewdney, Computer Recreations Editor of SCIENTIFIC AMERICAN, and Peter L. Renz, Associate Director of the MAA and formerly an editor at W.H. Freeman and Company, on Writing for the Public; Peter J. Hilton, SUNY at Binghamton, and Joel E. Schneider, Children's Television Workshop, on Mathematics for Children; Reuben Hersh, UNM (Christie Lecturer) on Ethical Questions in Mathematics, and Serge Lang, Yale, on Misuse of Mathematics. John W, Milnor, Institute for Advanced Studies, will speak on Chaos in Polynomials of Low Degree, representing the phenomenon of popular trends in research. Several workshops will be offered, and there will be a session for contributed papers on the topic of Special Courses (for majors or non majors) in mathematics.

Local accomodations are available, and members from other sections are welcome. Requests for registration materials should be addressed to Karen Schroeder, Local Arrangements Coordinator. Dept. of Mathematics, Bentley College.

People in the News

Richard L. Baker and **Abigail Thompson** will join the Berkeley Department of Mathematics as University of California President's Fellows for 1987-88.

Professor John P. Gill of the University of Southern Colorado has been elected Rocky Mountain Sectional Governor and member of the MAA Board of Governors. His term will expire in June 1990.

Dr. Eve Bofinger, University of New England, Armidale, Australia, has been awarded the 1986 Jacob Wolfowitz Prize. Dr. Bofinger received the prize for her paper "On the Non-Existence of Consistent Estimators for P(CS)."

Dr. T.P. Hutchinson of Coventry (Lanchester) Polytechnic, Coventry, United Kingdom, is the recipient of the 1986 Thomas L. Saaty Prize for his paper "Presenting One Probability Distribution as a Function of Another—Some Applications." Both articles appeared in the AMERICAN JOURNAL OF MATHEMATICAL AND MANAGEMENT SCIENCES.

In Memoriam

Richard V. Andree, Professor Emeritus, University of Oklahoma, died May, 1987, at the age of 67. He was an MAA member for 42 years.

Lucian J. Braden, retired, died April, 1987. He was an MAA member for 10 years.

A. Jay Goldstein, Member, Technical Staff, Bell Communications Research, died October, 1986, at the age of 59. He was an MAA member for 18 years.

Laura Guggenbuhl, Hunter College, retired, died, March, 1985. She was an MAA member for 33 years.

Ladis D. Kovach, Naval Postgraduate School, died April, 1987, at the age of 72. He was an MAA member for 29 years.

Robert L. Long, Assistant Professor, University of Florida, died March, 1987, at the age of 46. He was an MAA member for 1 year.

Frances Yu Lu, Professor Emeritus, Biola University, died April, 1984, at the age of 67. She was an MAA member for 22 years.

Franklin Mohr, retired, died April, 1987, at the age of 91. He was an MAA member for 30 years.

H. Randolph Pyle, retired, died June, 1987, at the age of 82. He was an MAA member for 42 years.

George Saute, retired, died November, 1986. He was an MAA member for 62 years.

Sr. Mary Van Straten, Professor, St. Mary College, died January, 1987, at the age of 73. She was an MAA member for 38 years.

Word has also been received on the deaths of the following MAA members:
Reginald H. Downing, Dean Emeritus, Air Force Institute of Technology; **Clarence H. Lindahl**, Professor Emeritus, Iowa State University; **Edwin D. Mouzon**, Professor Emeritus, Southern Methodist University; **Calvin Poss**, teacher, Georgia State University; **Frank Prather**, Professor, Wayne State College.

Calendar

National MAA Meetings

71st Annual Meeting, Atlanta, Georgia, January 6-9, 1988. (Board of Governors, January 5, 1988).

72nd Annual Meeting, Phoenix, Arizona, January 11-14, 1989. (Board of Governors, January 10, 1989).

73rd Annual Meeting, Louisville, Kentucky, January 24-27, 1990. (Board of Governors, January 23, 1990).

Sectional MAA Meetings

Allegheny Mountain, Bethany College, Bethany, West Virginia, April 22-23, 1988.

Eastern Pennsylvania & Delaware, Franklin & Marshall University, Lancaster, Pennsylvania, November 21, 1987.

Florida, Rollins College, Winter Park, Florida, March 4-5, 1988.

Illinois, Bradley University, Peoria, Illinois, April 29-30, 1988.

Indiana, Tri-State University, Angola, Indiana, October 17-18, 1987.

Intermountain, Utah State University, Logan, Utah, April 22-23, 1988.

Iowa, Grinnell College, Grinnell, Iowa, April 15-16, 1988.

Kansas, Fort Hays State University, Hays, Kansas, April 15-16, 1988.

Kentucky, Georgetown College, Georgetown, Kentucky, April 15-16, 1988.

Louisiana—Mississippi, Northwestern State University, Natchitoches, Louisiana, February 27-28, 1988, Columbus, Mississippi, February 27-28, 1988.

Maryland-DC-Virginia, Northern Virginia Community College (Alexandria Campus), Alexandria, Virginia, November 13-14, 1987.

Metro. New York, Concord Resort Hotel, Kiamesha Lake, New York, April 22-24, 1988.

Michigan, Eastern Michigan University, Ypsilanti, Michigan, May 6-7, 1988.

Missouri, Washington University, St. Louis, Missouri, April 8-9, 1988.

Nebraska, Kearney State College, Kearney, Nebraska, April 15-16, 1988.

New Jersey, College of Saint Elizabeth, Convent Station, New Jersey, November 14, 1987.

North Central, Bemidji State University, Bemidji, Minnesota, October 23-24, 1987; College of St. Thomas, St. Paul, Minnesota, April 1988.

Northeastern, Bentley College, Waltham, Massachusetts, November 20-21, 1987.

Northern California, St. Mary's College, Moraga, California, March 5, 1988.

Ohio, College of Wooster, Wooster, Ohio, October 30-31, 1987.

Oklahoma-Arkansas, Hendrix College, Conway, Arkansas, Spring 1988.

Pacific Northwest, University of British Columbia, Vancouver, British Columbia, June 16-18, 1988.

Seaway, SUNY Center at Buffalo, Buffalo, New York, November 6-7, 1987.

Southeastern, Furman University, Greenville, South Carolina, April 15-16, 1988.

Southern California, UCLA, Los Angeles, California, November 14-15, 1987. Joint meeting with AMS. **Southwestern**, Northern Arizona University, Flagstaff, Arizona, Spring 1988.

Wisconsin, University of Wisconsin-La Crosse, La Crosse, Wisconsin, April 22-23, 1988.

Other Meetings

October 1987

9-10. **Ohio Delta Chapter of Pi Mu Epsilon**, Miami University, Oxford, Ohio. Abstracts of student contributed papers in mathematics and statistics should be sent to Professor Milton Cox, Department of Mathematics and Statistics, Miami University, Oxford, OH 45056.

11-12. **Commission on Professionals in Science and Technology** will present symposium entitled, "Competition for Human Resources in Science and Technology." Harold Hodgkinson, of the American Council on Education, will give the keynote address. For more information, contact, Commission on Professionals in Science and Technology, 1500 Massachusetts Avenue, N.W., Suite 831, Washington, D.C. 20005, (202) 223-6995.

12-15. **SIAM 35th Anniversary Meeting**, Marriott Hotel-City Center, Denver, Colorado. For information, contact SIAM, 1405 Architects Building, 117 South 17th Street, Philadelphia, PA 19103. Telephone (215) 564-2929.

20-22. **PROTEXT IV, the Fourth International Conference on Text Processing Systems**, Boston, Massachusetts, contact: Conference Management Services, PO Box 5, 51 Sandycove Road, Dun Laoghaire, Co. Dublin, Ireland. Telephone: (+ 353 – 1) 452081 9 or 808025 if no reply) Telex: 30547 SHCN EI (Ref. BOOLE) FAX: (+ 353 – 1) 805990 (Ref. BOOLE).

24. **New York State Mathematics Association of Two-Year Colleges Regional Meeting**, Erie Community College. For information contact: Maryann Justinger or Barbara Donsley.

25-27. **Sixth Annual Pacific Northwest Computer Graphics Conference: Applications on the Leading Edge**, Eugene Conference Center and Hult Center for the Performing Arts, Eugene, Oregon. For more information, contact: Conference Manager, Sixth Annual Pacific Northwest Computer Graphics Conference, University of Oregon Continuation Center, 1553 Moss Street, Eugene, Oregon 97403, (503) 686-3537 or, in Oregon, 1-800-824-2714.

28-29. **National Colloquium on Calculus for a New Century**, National Academy of Sciences, Washington, D.C. For more information, contact: Dr. Bernard Madison: (202) 334-3294.

31. **New York State Mathematics Association of Two-Year Colleges Regional Meeting**, Cayuga County Community College. For information contact: John Daum.

November 1987

12-14. **350 Years After Descartes: Postmodern Vistas in Mathematics**, San Jose State University, San Jose, California. Lectures on geometry, number theory, problem solving, computer graphics, chaos, and other topics. For more information, contact: Reneco, Department of Mathematics and Computer Science, San Jose State University, San Jose, California 95192, (408) 277-2411.

24. **New York State Mathematics Association of Two-Year Colleges Regional Meeting**, Orange County Community College. For information contact: Peter Cook.

December 1987

13-15. **Canadian Mathematical Society Winter Meeting**, University of British Columbia, Vancouver, British Columbia. Contact: Denis Sjerve, Department of Mathematics, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Y4.

February 1988

15-19. **The Nineteenth Southeastern International Conference on Combinatorics, Graph Theory, and Computing**, Louisiana State University, Baton Rouge, Louisiana. Information available after October 15, 1987 from K.B. Reid, Chairman, Department of Mathematics, Louisiana State University, Baton Rouge, Louisiana, 70803.

July 1988

23-Aug.3. **Sixth International Congress on Mathematical Education (ICME 6)**. See FOCUS, Volume 7, Number 1, page 3 for details.

Editorial Note • This issue has been delayed • The next issue is on schedule •