

FOCUS

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Congress Passes Science and Mathematics Education Bill

Peter Farnham

On July 25, 1984, the House agreed overwhelmingly to approve the Education for Economic Security Act (S.1285), a massive science and mathematics education bill. S.1285 was approved by the Senate Labor and Human Resources Committee in May 1983, but languished at that point until late June 1984, when it was finally passed by the Senate. The House version of the bill, H.R. 1310, passed the House in March 1983.

The long delay in securing Senate approval of the bill was caused by a controversial "equal access" amendment, which allows religious student groups to meet on school property after classes. This amendment was opposed by civil libertarians on grounds that it infringed on the separation of church and state.

Following passage of the bill by the Senate on June 27, Speaker O'Neill, mindful of the controversy, referred the bill to the House Education and Judiciary Committees for their review. Supporters of the amendment interpreted this move as an attempt to "bury" the bill, even though the science and mathematics education portion would have been interred as well.

To force a floor vote and thus avoid consideration by the House committees, Rep. Carl Perkins (D-KY), a supporter of equal access and the chief sponsor of H.R.1310, made use of a little-used parliamentary maneuver called "Calendar Wednesday," which allowed the bill to come directly to the House floor. By a vote of 337 to 77, the House agreed to the equal access provision, and then, by a vote of 393 to 15, approved the science and mathematics education provisions of the bill. Since both houses now agree on the Senate version (redesignated H.R. 1310), the bill does not need to go to conference but goes straight to the President for his signature. He is expected to sign it shortly.

Provisions

The provisions of the bill are contained in four titles. Title I authorizes \$45 million for FY 1984 and \$80 million for FY 1985 for National Science Foundation (NSF) programs, including teacher institutes, materials development, graduate fellowships, undergraduate scholarships, and discre-

tionary projects. Professional societies or associations "in the fields of mathematics, physical or biological sciences, or engineering" may enter into cooperative agreements with NSF, local education agencies, or institutions of higher education to develop 1) teacher training and retraining programs, and 2) instructional programs and materials in science and mathematics.

Title II is primarily a formula grant program administered by the Department of Education, and carries an authorization of \$350 million for FY 1984 and \$400 million for FY 1985. Ninety percent of the funds will be made available to the states; of those funds, 70% will be passed on to local education agencies and 30% to state higher education agencies for programs, principally operated by institutions of higher education, for training new teachers, and retraining and *(continued on page 2)*



The TEAM (Teaching Experiential Applied Mathematics) team celebrates completion of the first three multi-media learning modules for use in college classrooms. From left to right, TEAM members are: Jim Choike, John Jobe, Marvin Keener, and Jeanne Agnew, all from Oklahoma State University. See "Applied Mathematics Multi-media Modules Now Available from the MAA" on page 5 of this issue.

Congress (continued from page 1)

in-service training for current teachers. The remaining 10% goes into a discretionary fund out of which the Secretary of the Department of Education will make grants to various organizations, including professional societies, for "programs of national significance" in mathematics and science instruction, computer learning, and other subjects.

Title III provides opportunities for the private sector and educational institutions to form partnerships for special projects in mathematics and science education. This title authorizes \$30 million for FY 1984 and \$60 million for FY 1985 for these projects and requires a 50% match. Awards under this title will be made by NSF.

Title IV authorizes the President to make awards for excellence in teaching to elementary and secondary classroom teachers.

The bill authorizes a total of \$425 million for FY 1984, and \$540 million for FY 1985.

Outlook on Appropriations

A point to keep in mind is that this is an authorization bill, not an appropriations bill. As such, the bill *authorizes* money to be appropriated; it does not appropriate the money itself. Thus, another bill actually appropriating the money will need to be passed. Senate staff sources are optimistic that an appropriations bill in some form will pass before Congress adjourns.

NSF already has science education programs in place that are funded and operating. While they do not meet the exact specifications contained in the bill, they are close enough to be considered as fulfilling the spirit of the legislation.

Peter Farnham is a freelance writer who follows science policy and education matters on Capitol Hill. The information in this article was current as of August 1, 1984.

News from NSF

Over the summer, there were a number of personnel changes at the National Science Foundation (NSF) of particular interest to the mathematical community.

In June, **Edward A. Knapp** announced his resignation as NSF Director, after only 18 months in that position. Knapp has returned to physics research at the University of California's Los Alamos National Laboratory. His replacement is **Erich Bloch**, a vice president of the International Business Machines Corporation. Bloch is the first NSF Director from industry and the second engineer to hold the post.

John Polking of Rice University has replaced **F. James Infante** as Director of NSF's Division of Mathematical Sciences. Polking is on leave of absence from the Mathematics Department at Rice for two years. Infante has accepted the position of Dean of Science and Engineering at the University of Minnesota.

Bassam Z. Shakhshiri was appointed Assistant Director for Science and Engineering Education. Shakhshiri was Professor of Chemistry and Director of the Institute for Chemical Education at the University of Wisconsin—Madison. He replaces **Laura P. Bautz** who has been Acting Assistant Director for Science and Engineering Education since October 1, 1983. Bautz will return to her former position as Director of NSF's Division of Astronomical Sciences.

Massera Released Last March

Campaign Launched to Release Orlov and Shcharansky

The Canadian Committee of Scientists and Scholars has initiated an international campaign, under the direction of Henri Cartan of Paris and Israel Halperin of the University of Toronto, to persuade the USSR to release Yuri Orlov (physicist) from Siberia and Anatoly Shcharansky (mathematician) from prison. Anyone wishing to support this effort, or to get further information about the campaign, should write to: Professor Israel Halperin, Department of Mathematics, University of Toronto, Toronto, Ontario, Canada M5S 1A7.

A similar international effort was launched in 1981 by the Canadian Committee to obtain the release from prison of Professor José Louis Massera of Uruguay. This campaign ended on March 3, 1984, with Massera's release. Massera is now living in his home in Montevideo and is reported to be in reasonably good health.



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National Academy Report Released **Committee Finds U.S. Mathematics in** **Need of Renewal**

The long-awaited National Academy of Sciences report, *Renewing U.S. Mathematics: Critical Resource for the Future*, was released on June 6 and has been widely reported and commented on in the national press. The report details both the "dazzling record of accomplishments" of mathematical sciences research over the last several decades and the "astonishing decline" in support, which has thrown support for mathematical sciences research markedly out of balance with support for related scientific and technological efforts.

The chairman of the committee that produced the report, Edward E. David, Jr., President of Exxon Research and Engineering Company, presented the preliminary findings and recommendations of the committee in an address at the Joint Mathematics Meetings in Louisville in January 1984 (see *FOCUS*, March-April 1984).

In the report, the committee estimates the loss in federal funding to have been "33% in constant dollars in the period 1968-73 alone . . . followed by nearly a decade of zero growth, so that by FY 1982 federal support for mathematical sciences research stood at less than two-thirds its FY 1968 level in constant dollars." According to David, the mathematics community is "losing its ability to renew itself," let alone maintain its essential contributions to the nation's technical activities.

The committee identified three factors which masked the decline, making it difficult for mathematicians and policy-makers to grasp the full extent of the weakening of support for mathematics:

- Increased support from universities to make up for the sharp declines in federal funding in the late 1960's and early 1970's. Only after financial problems hit the universities in the mid-1970's did the severe lack of resources become evident.
- The growth of computer science support together with the federal budget practice (until 1976) of carrying 'mathematics and computer science' as a line item.
- Rapid growth in support for applications of mathematics to other fields, often labeled 'mathematical research' in federal support data.

Among the consequences of the decline in support have been lowered morale at many of the major mathematical sciences departments, diminished ability to attract new talent into the field, and a general slowing down of the mathematical enterprise in the United States. According to the committee, "the field has been living off the investments of human and dollar resources made in the late 1960's."

The report underscores the fact that this underfunding has occurred at a time when advanced mathematics has never been more important to the nation's scientific and technological enterprise:

The period since World War II has been one of dazzling accomplishments in science and technology, especially in mathematics, which is riding the crest of a wave of development rare in intellectual history. This flourishing of the discipline has run hand-in-hand with burgeoning applications. These applications, unknown before the War, today permeate the theoretical fabrics of many disciplines and make up important parts of the intellectual tool kits of working scientists, engineers, social scientists, and managers.

As evidence of the contributions of mathematics, the committee notes that in the last two years, advanced mathematics figured critically in no less than four Nobel Prizes awarded to U.S. scientists, much of it employing mathematical structures and tools developed over the last few decades.

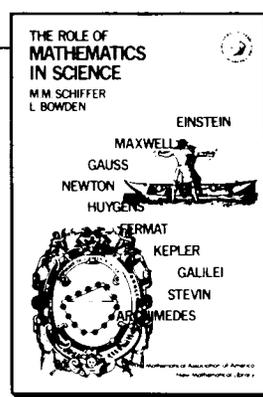
Looking to the future, the committee sees a blurring of the boundaries of the major disciplines and a new sense of unity of the mathematical sciences:

There is a heightened awareness that sophisticated and abstract systems of mathematical thought, developed only because of man's drive to understand order, turn out with surprising regularity to find application in science. There is increased respect for the wealth of mathematical ideas generated by those who pursue mathematics precisely because of its direct contributions to science or engineering. There is increased appreciation of the continuity of methods and ideas across the spectrum of the mathematical sciences. . . . The changing face of mathematics suggests that we are entering a new era, that we have just begun to see the power of the mathematical machine created over the last several decades, and that what lies ahead could be even more impressive.

To rejuvenate mathematics research in the United States, the committee calls for significant increases in support for research in the mathematical sciences over the next five years, from the present level of \$78 million per year to \$180 million. The committee proposes a National Plan for Graduate and Postdoctoral Education in the Mathematical Sciences which would provide for:

- Substantial amounts of supported research time for each of the approximately 1000 graduate students per year who reaches the active level of research for a Ph.D. thesis.
- Postdoctoral positions at research centers for 200 of the 800 Ph.D.'s per year.
- At least 400 research grants for young investigators (Ph.D. age three to five years).
- Support for at least 2,600 established mathematical scientists for their own research and for time to train Ph.D.'s and postdoctoral students.

(continued on page 7)



New from the MAA . . .
New Mathematical Library #30

The Role of Mathematics in Science

by Leon Bowden and
M. M. Schiffer
220 pp Paperbound
List: \$14.00
MAA Member: \$11.00

This book is based on a series of lectures given over a period of years to high school mathematics teachers. The lectures focused on topics in mechanics, questions of population growth, probability and other uses of exponential functions, optics and application of metrics to relativity theory.

The aim of the book is to illustrate the power and elegance of mathematical reasoning in science with some examples ranging from the work of Archimedes to that of Einstein. The book starts with problems of the lever, the mirror and the growth of populations and ends up with problems of space travel and atomic energy.

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Californian First on USAMO U.S. Team Fourth on IMO

Led by David J. Grabiner, a tenth grader from Claremont, California, eight students rose through a pyramid of exams to be honored in June as the winners of the 13th USA Mathematical Olympiad (USAMO). Then, after further training and selection, a U.S. team of six tied for fourth place honors with Hungary at the 25th International Mathematical Olympiad (IMO), held July 4-5, in Prague, Czechoslovakia.

The exam sequence began with the 35th American High School Mathematics Examination (AHSME), given February 28. (See *FOCUS*, May-June 1984.) Those with scores of 95 or more out of 150 (624 students out of 393,000 participants!) were invited to the second American Invitational Mathematics Examination (AIME). The AIME is a two-and-one-half-hour, 15-question exam in which all answers are integers from 0 to 999. The 90 students who answered 11 or more problems correctly were invited to the USAMO. (There were no perfect scores on the AIME; 8 students scored 14.) The USAMO, a three-and-one-half-hour proof exam, was given May 1.

As usual, USAMO winners were honored in a two-day ceremony in Washington, D.C., on June 4-5. In addition to Grabiner, the winners were: Douglas R. Davidson of McLean, Virginia; David J. Moews of Storrs, Connecticut; Joseph G. Keane of Pittsburgh, Pennsylvania, Steven Newman of Ann Arbor, Michigan, and Michael Reid of Woodhaven, New York, in a triple tie; Andrew Chin of Austin, Texas; and William Jockusch of Urbana, Illinois.

Grabiner is the son of Sandy and Judith Grabiner, both professors of mathematics and MAA members. This is the first time the top winner has been from California; first place has been held by students from New York City six of the thirteen times.

After the ceremonies in Washington, the winners and sixteen other high scorers on the USAMO (mostly younger students) headed for the U.S. Naval Academy for a three-week intensive training session where the IMO team was selected. Those chosen were USAMO winners Grabiner, Davidson, Moews, Newman, and Reid, and also Jeremy Kahn of New York City.

At the IMO, the USSR was first with 235, followed by Bulgaria, 203; Romania, 199; the U.S. and Hungary, 195; and Great Britain, 169. Last year's winner, West Germany, was eighth with 150. The most improved was Mongolia, at ninth. Thirty-four countries participated, up two from last year's competition in Paris.

Seven students received first prizes for perfect scores, among them David Moews. Davidson received a third prize, and all the other U.S. team members received second prizes. Davidson and Kahn won their honors under adverse conditions—they both broke out with chicken pox during the competition!

The American IMO Team coach and USAMO Chairman is Murray Klamkin of the University of Alberta. Copies of all the examinations discussed above, as well as solutions and summary data, may be purchased from the Executive Director of the MAA Contests Committee: Professor Walter E. Mientka, Department of Mathematics and Statistics, University of Nebraska, Lincoln, NE 68588-0322.

Allendoerfer, Ford, and Pólya Awards Presented at Eugene Meeting

Awards for eight outstanding articles which appeared in *Mathematics Magazine*, *The American Mathematical Monthly*, or *The College Mathematics Journal* during 1983 were made at the MAA Business Meeting in Eugene, Oregon, in August.

The **Allendoerfer Award** was given to Judith Grabiner of California State University at Dominguez Hills for her article, "The Changing Concept of Change: The Derivative from Fermat to Weierstrass," which appeared in the September 1983 issue of *Mathematics Magazine*, pp. 195-206. Grabiner also received a Ford Award for her article "Who Gave You the Epsilon? Cauchy and the Origins of Rigorous Calculus," which appeared in the March 1983 issue of *The American Mathematical Monthly*, pp. 185-194.

Other authors who received **Ford Awards** for articles in the *Monthly* are:

- Roger E. Howe of Yale University for "Very Basic Lie Theory," November 1983, pp. 600-623.
- John W. Milnor of the Institute for Advanced Study, Princeton, New Jersey, for "On the Geometry of the Kepler Problem," June-July 1983, pp. 353-365.
- Joel H. Spencer of the State University of New York, Center at Stony Brook, for "Large Numbers and Unprovable Theorems," December 1983, pp. 669-675.
- William C. Waterhouse of the Pennsylvania State University for "Do Symmetric Problems Have Symmetric Solutions?," June-July 1983, pp. 378-387.

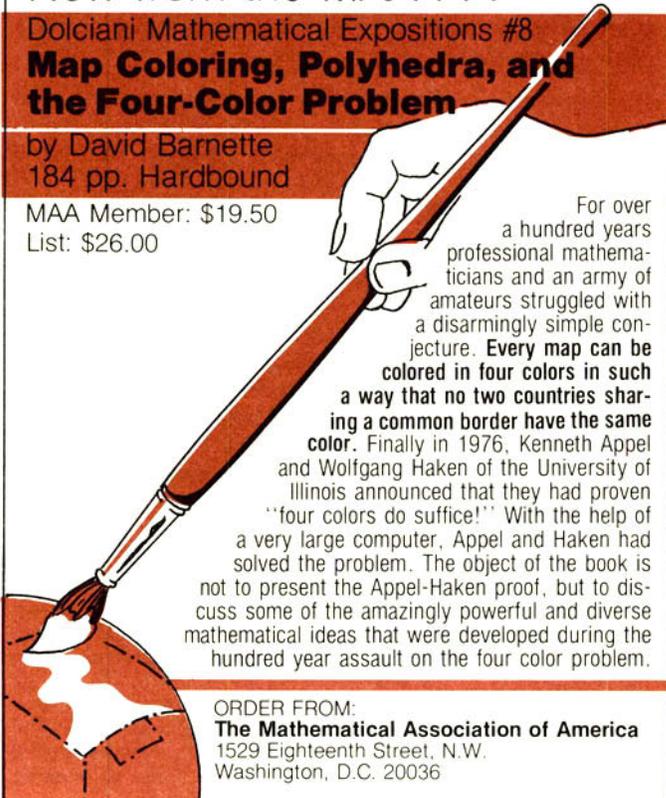
College Mathematics Journal authors who received 1984 **Pólya Awards** are:

New from the MAA . . .

Dolciani Mathematical Expositions #8
**Map Coloring, Polyhedra, and
the Four-Color Problem**

by David Barnette
184 pp. Hardbound

MAA Member: \$19.50
List: \$26.00



For over a hundred years professional mathematicians and an army of amateurs struggled with a disarming simple conjecture. **Every map can be colored in four colors in such a way that no two countries sharing a common border have the same color.** Finally in 1976, Kenneth Appel and Wolfgang Haken of the University of Illinois announced that they had proven "four colors do suffice!" With the help of a very large computer, Appel and Haken had solved the problem. The object of the book is not to present the Appel-Haken proof, but to discuss some of the amazingly powerful and diverse mathematical ideas that were developed during the hundred year assault on the four color problem.

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- Ruma Falk, a member of the Psychology Department and the School of Social Work at Hebrew University, Jerusalem, Israel, and Maya Bar-Hillel, a psychologist at Hebrew University, "Probabilistic Dependence Between Events," June 1983, pp. 240-247.
- Richard J. Trudeau of Stonehill College for "How Big is a Point," September 1983, pp. 295-300.

Each award-winning author(s) received a check from the MAA for \$200.

Applied Mathematics Multi-media Modules Now Available from the MAA

The MAA announces the availability of three multi-media learning modules for use in college classrooms. In these modules, which consist of video cassettes, written materials, and (for some modules) microcomputer software, real-world industrial problems and their solutions are presented by industrial representatives who have actually encountered these problems in their work.

The modules were produced during the first year of a three-year project called Teaching Experiential Applied Mathematics (TEAM) funded by a grant to the MAA from the Fund for the Improvement of Post-Secondary Education (FIPSE). Three additional modules will be developed during the second and third years of the project.

The TEAM learning modules are intended to help college instructors introduce into the undergraduate curriculum a viable component in applied mathematics. Each learning module contains a two-part video cassette in which the problem and a solution are presented, a *Student Resource Book* (which contains the problem setting and some related background information), and a *Teacher Resource Book* (which contains the solution to the problem in complete detail, alternative solutions, and suggested teaching strategies). Two of the three completed learning modules also include software for the Apple II.

The three TEAM learning modules which are now available from the MAA through a free loan program are:

- "Hours of Daylight," a junior/senior level problem, presented by Jerry Cline, an applied mathematician from the McDonnell Douglas Corporation of St. Louis. The problem is to find, for a given date, the amount of time a particular location on a planet spends in sunlight. This learning module includes software for the Apple II.
- "Highway Slope Design," a freshman/sophomore level problem, contributed by Jerry Smith, a civil engineer and Director of Public Services of Enid, Oklahoma. The problem is to find the smooth parabolic transition between two straight roads of different grades.
- "Aircraft Sidestep Maneuver," a junior/senior level problem, contributed by Donald Pate, an operations research analyst from the Federal Aviation Administration of Oklahoma City. The problem is to determine the path of an airplane while it is rolling to make the transition from a straight line path to a circular path. This learning module includes software for the Apple II.

In the first part of the video presentations, the industrial representatives discuss their work, philosophy of problem solving, and the problem, and then challenge the students to model and solve the problem. In the second part, they present and discuss their solution to the problem. Each part runs for approximately 25 minutes.

TEAM learning modules are very flexible educational tools. A module can be given to a small group of students working together as a team, to a single student as an independent study project, or to an entire class. The instructor can direct the students to work out their own solutions before viewing the industrial representative's solution, or can use a learning module merely to show the class an interesting industrial problem and its solution.

Modules can be used in existing mathematics courses such as calculus, differential equations, linear algebra, numerical analysis, or discrete mathematics, or they can be used to create new courses to fit the needs of a particular college or university.

The TEAM materials were produced by John Jobe and Jim Choike at Oklahoma State University. Jobe is TEAM Project Director and Coordinator of Video Production and Choike is Coordinator of TEAM Written Materials and Computer Software. Jeanne Agnew and Marvin Keener, also of Oklahoma State University, serve as curriculum consultants for the project.

All TEAM materials are available free from the MAA. Brochures announcing the availability of the TEAM materials are being sent to the mathematics departments at every college and university in the United States. Each MAA Section will have a complete set of TEAM materials and will assist with local dissemination.

Upon request, all three of the TEAM Resource Books and any one of the video cassettes and/or microcomputer diskettes will be sent to users. Users will be asked to copy the cassettes and diskettes promptly and return the originals to the MAA. They may then order materials for another TEAM learning module. *Resource Books* may be copied in unlimited quantities.

Readers who would like information about ordering TEAM materials should write to: Alfred B. Willcox, Executive Director, Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036.

Flatland Centenary to be Celebrated at Brown

Brown University will host an interdisciplinary symposium, "*Flatland: Visualizing Higher Dimensions*," on October 11-13, 1984, in honor of the 100th anniversary of the publication of Edwin Abbott Abbott's classic novel. *Flatland*, which depicts a society of flat creatures in a two-dimensional universe and their encounters with a being from the third dimension, has intrigued generations of mathematicians and influenced the work of artists, philosophers, writers, and theologians.

Speakers on October 11 (Mathematical Portion) will be Robert MacPherson, John Milnor, and William Meeks. Speakers on October 12 and 13 (Interdisciplinary Portion) will include Rudolf Rucker, Alexander Dewdney, John Tukey, Paul Tukey, and Linda Henderson. On October 11, there will be a dinner in honor of Nicolaas Kuiper who will receive an honorary degree from Brown on October 12. There will also be a centenary bibliographical exhibition, "*Flatland* and Edwin Abbott Abbott," which will run the entire month of October at the Brown library, and an exhibit *Hypergraphics 1984*, October 1-15, in the Woods-Gerry Gallery of the Rhode Island School of Design.

For further information contact: Professor Thomas Banchoff, Mathematics Department, Brown University, Providence, RI 02912 (401-863-3319).

Putnam Competition Scheduled for December 1

The 45th Annual William Lowell Putnam Mathematical Competition will be held at participating institutions on Saturday, December 1, 1984. This competition is supported by the William Lowell Putnam Prize Fund for the Promotion of Scholarship and is administered by the Mathematical Association of America.

Any college or university in Canada or the United States may register eligible undergraduates for the Putnam Competition. Registration forms will be mailed in mid-September to institutions that participated in the 44th Competition. Other institutions that wish to enter undergraduates should request registration forms from: Professor L. F. Klosinski, Director, William Lowell Putnam Mathematical Competition, University of Santa Clara, Santa Clara, CA 95053. Completed registration forms must be received by the Director no later than October 12.

In Memoriam

Jon A. Bucsela, a student at the Massachusetts Institute of Technology, died April 3, 1984, at the age of 21. He was a member of the MAA for 2 years.

K. D. Fryer, of the University of Waterloo, Ontario, Canada, died May 15, 1984, at the age of 59. He was a member of the MAA for 28 years.

Larry S. Haw, of Nicholls State University, died in February of this year. He was a member of the MAA for 60 years.

Burton W. Jones, of the University of Colorado, died December 8, 1983, at the age of 81. He was a member of the MAA for 60 years.

Yudell L. Luke, of the University of Missouri, died May 7, 1984, at the age of 67. He was a member of the MAA for 29 years.

Norman Miller, Professor Emeritus at Queen's University, Canada, died May 31, 1984. He was a member of the MAA for 65 years.

Charles B. Morrey, Jr., Professor Emeritus at the University of California, Berkeley, died April 29, 1984, at the age of 76. He was a member of the MAA for 33 years.

Joseph A. Placek, of the University of Pittsburgh, died April 13, 1984, at the age of 41. He was a member of the MAA for 19 years.

John K. Sterrett, scientific advisor at NORAD, Colorado Springs, died February 15, 1984. He was a member of the MAA for 48 years.

Stanislaw M. Ulam, Professor Emeritus at the University of Colorado, died May 13, 1984, at the age of 75. He was a member of the MAA for 25 years.

The Association has also been informed of the deaths of the following individuals: **Sidney G. Hacker** of Pullman, Washington, an MAA member for 55 years; **Victor A. Hoersch** of Urbana, Illinois, a member of the MAA for 38 years; **Greta Neubauer** of Laramie, Wyoming, an MAA member for 58 years; **Walter T. Scott** of Tempe, Arizona, a member of the MAA for 45 years; **Robert Tates** of Purdys, New York, a member of the MAA for 29 years.

People in the News

F. Joe Crosswhite, Professor of Mathematics Education at the Ohio State University, became President of the National Council of Teachers of Mathematics (NCTM) at the close of the Council's 62nd Annual Meeting in San Francisco last April.

Prior to going to Ohio State, Crosswhite was a mathematics teacher in Salem (Missouri) High School and Keokuk (Iowa) High School. He has also served as Associate Director, ERIC Center for Science, Mathematics, and Environmental Education at Ohio State; Program Manager, National Science Foundation; and Chairman, Faculty of Science and Mathematics Education, Ohio State University.

The Alan T. Waterman Award, established by Congress in 1975 for the purpose of recognizing and supporting talented young research scientists, was presented last May to **Harvey M. Friedman** of Ohio State University. Professor Friedman, who was recognized for his fundamental contributions in mathematical logic, is the third mathematician to receive this award. Charles L. Fefferman of Princeton University received the Waterman Award in 1976 and William P. Thurston, also of Princeton University, received it in 1979.

In an address delivered at the Waterman Award Ceremony at the National Academy of Sciences, Professor Gian-Carlo Rota of the Massachusetts Institute of Technology stated:

Harvey Friedman's greatest discovery (of concrete mathematical facts that lie beyond the reaches of axiomatization), if we may dare to predict, will reach beyond mathematics. Behind the glitter of his beautiful theorems, we begin to see the unfolding of a great drama of our culture. For two thousand years, the exact sciences have thrived on the axiomatic method, on the bedrock of belief that the basic ideas of any subject will be captured by self-evident axioms. Friedman's discovery . . . opens up the possibility, indeed the probability, that the axiomatic method itself will soon be rendered obsolete. It will be replaced by something new and awesome, something as yet unnamed yet far more powerful, which will change the face of mathematics and of all predictive sciences.

Professor Friedman will receive \$50,000 per year for three years for research at an institution of his choice.



Ronald L. Graham, Director of Scientific Research for AT&T Bell Laboratories and former MAA First Vice-President, was presented with an honorary Doctor of Laws degree on April 21, 1984, by Western Michigan University. The citation honoring Dr. Graham's contributions states, "Your career stands as one of the most outstanding examples

of the partnership between industry and academe, between applications and theory. Your larger vision, as well as your own work, have played a major part in transforming the world's conception of what applied mathematics really is."

The Courant Institute of Mathematical Sciences has appointed **Cathleen S. Morawetz** as its new director. According to Institute officials this is the first time a woman has been named to head a mathematical institute in the United States. Morawetz began at Courant as a research assistant in 1951, just after receiving her Ph.D. from New York University, and has served as the Associate Director of the Courant Institute since 1979. Her research interest lies mainly in the application of partial differential equations to fluid dynamics and wave propagation.



Eileen L. Poiani, Professor of Mathematics and Assistant to the President for Planning at Saint Peter's College has been elected to the presidency of Pi Mu Epsilon, the National Honorary Mathematics Fraternity. She will be the first woman president of this organization since it was founded in 1914.

Poiani served as the National Director of the Women and Mathematics Program of the MAA from 1975-81 and is now a Special Consultant to the program. She is a former Governor of the New Jersey Section and is currently a Visiting Lecturer for the Association and a member of the *FOCUS* Editorial Committee.



T. Christine Stevens of Arkansas State University has been awarded the 1984-85 Congressional Science Fellowship by the American Mathematical Society (AMS), Mathematical Association of America (MAA), and the Society for Industrial and Applied Mathematics (SIAM). She will spend one year, starting this month, working in Washington, D.C.,

as a special legislative assistant on the staff of a member of Congress or a Congressional committee. Stevens is the sixth Fellow to serve in the AMS-MAA-SIAM program since it was established in 1978.

Winter Meetings to be Held in Anaheim

The Joint Mathematics Meetings will be held January 9-13, 1985, in Anaheim, California. They will include the 68th Annual Meeting of the Mathematical Association of America (January 11-13), the 91st Annual Meeting of the American Mathematical Society, and meetings of the Association for Women in Mathematics and the Association for Symbolic Logic.

Nine invited addresses are planned for the MAA meeting: *The Search for Randomness* (tentative), Persi Diaconis, Stanford University; *Algorithms, Geometry, and $GL(n, Z)$* , Helaman Ferguson, Brigham Young University; *Toolkit for Non-linear Dynamics*, John Guckenheimer, University of California, Santa Cruz; an address by Mark Kac, University of Southern California; *The Many Lives of Invariant Theory*, Gian-Carlo Rota, Massachusetts Institute of Technology; an address by Murray Schacher, University of California at Los Angeles; *Combinatorial Set Theory and Its Applications to Topology*, Franklin Tall, University of Toronto; *Some Recent Advances in Real, Complex, and Harmonic Analysis*, Guido Weiss, Washington University; and an address by Joseph Weizenbaum, Massachusetts Institute of Technology.

The MAA meeting will also feature ten minicourses. The topics of the minicourses and their organizers are: *The Teaching of Applied Mathematics*, W. Gilbert Strang, Massachusetts Institute of Technology; *APL—A Functional Computer Language for Mathematicians*, Garry A. Helzer, University of Maryland; *Teaching Problem Solving*, Alan H. Schoenfeld, University of Rochester; *Applications of Discrete Mathematics*, Fred S. Roberts, Rutgers University; *Mathematics in Computer Science*, Eugene M. Luks, University of Oregon; *PROLOG*, Frederick Hoffman, Florida Atlantic University; *Linear Programming*, Charles E. Haff, University of Waterloo; *Microcomputer Software in Mathe-*

matics Instruction, Roy E. Myers, Pennsylvania State University, New Kensington; *Teacher In-Service Programs (A COMET Minicourse)*, Eugene A. Maier, Mathematics Learning Center and Portland State University; *Constructing Placement Examinations*, Richard E. Prosl, College of William and Mary, Chairman of the Committee on Placement Examinations.

Additional meeting features will include contributed paper sessions, panel discussions on *How to Give a Successful Talk to Secondary School Students*, *The Fifth International Congress on Mathematical Education (ICME V)*, and *New Directions in Two-Year Colleges* (a discussion of the recent conference sponsored by the Sloan Foundation). There will also be a workshop for mathematicians teaching computer science, conducted by Ed Dubinsky of the Clarkson Institute for Retraining in Computer Science.

The meeting program, information about meeting arrangements, and preregistration and housing forms will appear in the new October issue of *FOCUS*, which will be mailed to all MAA members near the end of September.

Foundation Supports Headquarters Renovation

The MAA has received a grant of \$20,000 from the Vaughn Foundation in support of needed renovation of the MAA's turn-of-the-century Carriage House, one of the three buildings in the Association's Washington, D.C. headquarters complex.

The renovation, which was also supported by gifts to the Greater MAA Fund, includes interior and exterior painting and repairs, installation of air conditioning, and up-grading of a second-floor storage area into a suite of offices (for rent now, and for MAA use in the future). It has also improved the Association's mailroom and warehousing facilities. The work was completed during the summer.

The Vaughn Foundation was a major contributor to the purchase of the MAA Headquarters buildings in 1978. In recognition of this generous contribution, the main building of the complex is named the Edgar H. Vaughn Building.

Committee (continued from page 3)

In an editorial in *Science* (June 15, 1984), David states: "There has already been progress, primarily in National Science Foundation support. But to ensure that renewal becomes reality, the mathematicians are taking their case to the mathematics constituencies in the sciences, engineering, industry, and government. For the sake of their own enterprise and of the nation, the members of those constituencies should heed their call and help ensure that mathematics regains its essential place in the nation's research priorities."

The committee included prominent mathematicians and a wide range of industrial and academic scientists who use mathematics in their work. The Executive Director of the committee was Kenneth Hoffman of the Massachusetts Institute of Technology who is currently serving as the Executive Secretary for National Affairs for the American Mathematical Society, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics.

Copies of the report may be obtained from: The Board on Mathematical Sciences, 2101 Constitution Avenue, Washington, D.C. 20418.

Calendar

National MAA Meetings

68th Annual Meeting, Anaheim, California, January 11-13, 1985.
69th Annual Meeting, New Orleans, Louisiana, January 9-11, 1986.

70th Annual Meeting, San Antonio, Texas, January 23-25, 1987.

Sectional MAA Meetings

Eastern Pennsylvania and Delaware Swarthmore College, Swarthmore, Pennsylvania, November 17, 1984.

Louisiana-Mississippi Host: University of Southern Mississippi; location: Broadwater Beach Hotel, Biloxi, Mississippi; February 15-16, 1985.

Maryland-DC-Virginia U.S. Naval Academy, Annapolis, Maryland, November 9-10, 1984.

New Jersey Rutgers University, New Brunswick, New Jersey, November 3, 1984.

North Central Moorhead State University, Moorhead, Minnesota, October 26-27, 1984.

Northeastern Western New England College, Springfield, Massachusetts, November 16-17, 1984.

Ohio Muskingum College, New Concord, Ohio, November 2-3, 1984.

Seaway St. Bonaventure University, St. Bonaventure, New York, November 2-3, 1984.

Southern California San Diego State University, San Diego, California, November 9-10, 1984.

Other Meetings

SEPTEMBER 1984

10-14. **NSF/CBMS Regional Conference on Theory and Applications of J Inner Matrices**, Case Western Reserve University. Lecturer: Harry Dym. Contact: Kenneth Hochberg and Clyde Martin, Department of Mathematics and Statistics, Case Western Reserve University, Cleveland, OH 44106.

28-29. **Twelfth Annual Mathematics and Statistics Conference—Mathematics Curricula: Crisis Intervention**, Miami University. Speakers include Peter Lax, Arthur Coxford, Anthony Ralston, and John Saxon. Contact: David Kullman, Department of Mathematics and Statistics, Miami University, Oxford, Ohio 45056.

28-29. **Eleventh Annual Student Conference of the Ohio Delta Chapter of Pi Mu Epsilon**, Miami University. Undergraduate and graduate students are invited to contribute 15-minute papers. Abstracts should be sent by September 20 to Milton Cox, Department of Mathematics and Statistics, Miami University, Oxford, Ohio 45056. Lodging at no cost is available for students.

OCTOBER 1984

6-10. **NSF/CBMS Regional Conference on Minimal Surfaces and Their Applications to Low-Dimensional Topology**, Oklahoma State University. Lecturer: William H. Meeks. Contact: William Jaco, Department of Mathematics, Oklahoma State University, Stillwater, OK 74078.

8-10. **Association for Computing Machinery Annual Conference**, San Francisco, California. Theme: The Fifth Generation Challenge. Contact: Karen Duncan, Chairman, ACM '84, 15 Parsons Way, Los Altos, CA 94022.

12-13. **Symposium on Flatland: Visualizing Higher Dimensions**, Brown University. (See "Flatland Centenary to be Celebrated at Brown" on page 5 of this issue.)

12-13. **Dozenal Society of America Annual Meeting**, Nassau Community College. Contact: Professor Gene Zirkel, Nassau Community College, Garden City, Long Island, New York 11530.

24-27. **Stewart Cairns Memorial Lectures, "Dynamics in One Variable—A Rather Complete but Rather Complicated Theory"**; a series of three lectures by Dennis Sullivan honoring the memory of Stewart Cairns, University of Illinois at Urbana-Champaign. Contact: Department of Mathematics, 273 Altgeld Hall, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

25-28. **10-Year Anniversary Convention of the American Mathematical Association of Two-Year Colleges**, Vista Hotel, New York City. Contact: Allen Angel, Convention Chairperson, Monroe Community College, Rochester, NY 14623.

NOVEMBER 1984

26-28. **National Meeting of the Operations Research Society of America and The Institute of Management Sciences**, Dallas, Texas. Contact: ORSA, 428 East Preston Street, Baltimore, MD 21202.

JANUARY 1985

7-11. **NSF/CBMS Regional Conference on Multivariate Estimation: A Synthesis of Bayesian and Frequentist Approaches**, University of Florida. Lecturer: James O. Berger. Contact: Malay Ghosh, Department of Statistics, University of Florida, Gainesville, FL 32611.

9-13. **91st Annual Meeting of the American Mathematical Society**, Anaheim, California. Contact: AMS, P.O. Box 6248, Providence, RI 02940.

9-13. **Meeting of the Association for Women in Mathematics**, Anaheim, California. Contact: AWM, Box 178, Wellesley College, Wellesley, MA 02181.

12-13. **Annual Meeting of the Association for Symbolic Logic**, Anaheim, California. Contact: ASL, P.O. Box 70557, Pasadena, CA 91107.

FOCUS

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