

FOCUS

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Congress Discovers Science Education Issue

Peter Farnham

For at least two years now, the state of science education in the United States has been one of the major subjects of discussion in Washington's scientific and academic circles. Although most agree that the situation is serious, there is little agreement on what should be done about it. Worse, it seemed for most of the past two years that few were listening.

But 1982 has seen something of a turning point in the battle against declining budgets, public apathy, and poor standards. And Congress, its collective fingers always pressed to the nation's pulse, has begun to respond.

There have been more than 30 bills introduced in the Congress since February that deal with science education in one way or another. As might be expected, the bills take many

approaches, and are based on different assumptions about what the problems are that need addressing in the first place.

Some take a tax incentives approach, while others take the more traditional route of spending money directly on fellowships, councils, and continuing education programs. Others use a matching funds approach. Some support teacher training and retraining, while some support teaching elementary and high school students how to use computers.

Tax Incentives

The tax approach to the science education problem that is furthest along is H.R.5573, the "Technology Education Act," introduced last February by Rep. Fortney Stark (D-Cal). The bill would extend a deduction in the 1981 tax law to 1983 contributions of computers and related equipment to elementary and secondary schools. After debate on September 20, the House passed the bill overwhelmingly (323 to 62) on the 22nd.

The outlook for the bill's companion piece in the Senate, S.2281, introduced by Senator John Glenn (D-Ohio) last April, is less favorable. The bill has not even left subcommittee yet, and no action is scheduled, according to a spokesman for (continued on page 2)



The "Bucking Bronco" and "On the Warpath" statues, reminders of Denver's western frontier heritage, stand before the 24-carat, gold-plated dome of the Colorado State Capitol Building in downtown Denver. Denver is the site of the MAA Annual Meeting in January.

Meeting Program Inside

The center section of this issue contains the program for the MAA Annual Meeting, January 6-9, 1983 in Denver, Colorado. Housing and preregistration forms and Employment Register forms were mailed to all MAA members in October.

At the meeting, there will be five **mini-courses**, three on various aspects of computing, one on placement testing, and one on statistics topics in mathematics courses. Two **contributed paper sessions** will be held, one on computing in mathematics instruction and one on discrete mathematics. Papers for these sessions should be sent for refereeing to Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C. 20036 by December 1.

See the program for more information about these and the many other attractive features of this meeting.

Congress (continued from page 1)

Glenn. At this late date, with Congress looking toward an early October adjournment, the bill is unlikely to get anywhere.

Fellowships and Continuing Education

Another approach is found in Rep. Larry Winn's (R-Kans) "National Science and Technology Revitalization Act," H.R.6656, introduced on June 22. It establishes presidential teaching and research fellowships in mathematics and science, and a presidential precollege science and mathematics "in-service teaching program." The fellowship program would be authorized at \$150 million through 1987; the in-service teaching program at \$100 million through 1986. The programs will be run by the National Science Foundation, in consultation with the White House Office of Science & Technology Policy.

Senator Harrison Schmitt (R-N. Mex) has introduced S.2809, which would provide over \$300 million between 1983 and 1987 for special grants to untenured science and engineering faculty members, and to training elementary and secondary school science and mathematics teachers. In the House, Rep. Margaret Heckler (R-Mass) has introduced a similar bill, H.R. 6930, which has since been combined with a bill introduced by Rep. Don Fuqua (D-Fla) last December which would set up a "National Coordinating Council on Engineering and Scientific Manpower."

The new bill, H.R.7130, the "National Engineering and Science Manpower Act of 1982," creates the Council Fuqua wanted, and gives it \$180 million over five years to support research, fellowships, capital spending, and other activities. These funds are to be used to match other private or public sector funds on a dollar-for-dollar basis.

The bill also authorizes \$60 million per year in 1984-85, and \$85 million per year in 1986-87, for modernization of instructional instrumentation, technician training, young investigators' awards, and precollege teacher training and improvement. The Fuqua/Heckler bill was introduced on September 16, and was reported out by the House Science & Technology Committee on September 22.

A Return to Summer Institutes?

Another recent piece of legislation has been introduced in the House by Rep. Mervyn Dymally (D-Cal) and in the Senate by Senator Christopher Dodd (D-Conn). This legislation, the "National Science and Mathematics Teachers Development Act," establishes a National Mathematics and Sciences Teachers Development Board within the Department of Education. The Board consists of seven nongovernment educators, mostly from secondary school math and science departments, and seven prominent government officials, including the Secretary of Education and the Directors of NSF, the National Academy of Sciences, and the Office of Science & Technology Policy.

The bill creates a \$30 million fund to "make grants to institutions of higher education for continuing education programs for secondary school teachers of science and mathematics designed to improve the skills of such teachers and to assist such teachers to qualify for certification in the field of science or mathematics, or both."

Dymally says that this legislation is based on the "summer institutes" program run by NSF in the early 1960's. This program was found to be "one of the fastest and most successful ways of improving teaching skills," by allowing

teachers to keep informed about the latest developments in their fields. Dymally hopes to begin these programs again with this legislation.

Senator Dodd is equally enthusiastic about the bill. He says that it "will help strengthen the quality of science and mathematics education, insure our national research potential, provide for qualified industrial and Armed Forces personnel, protect [the] United States' [competitive] position in the international marketplace, and provide for a stable and healthy national economy."

While this may be a tall order for one piece of legislation, many believe it addresses the most serious problem in the science education area—that of poorly qualified teachers in science and math. It should be pointed out that this is not a partisan view—the Winn, Heckler, and Schmitt bills referred to above also contain elements based on the "summer institutes" concept. Thus Democrats and Republicans alike recognize the seriousness of this problem.

Senator Claiborne Pell (D-R.I.) has introduced two bills in the Senate which also attack the science education problem. The first, S.2953, or the "Education for Economic Security Act," provides funds to local education agencies for school programs in math, science, and computer learning and instruction. Local schools would have considerable latitude in fashioning educational programs that would meet the students' needs. The only requirement is that the program implemented at the local level must involve many students,



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at several grade levels.

Pell's second bill, S.2954, the "Teacher Training Assistance Act," would allow a person entering the teaching profession in math, science, and computer technology to cancel 15 percent of his or her NDSL obligation each year, for up to 5 years or 75 percent of the teacher's loan obligation. In return, the teacher would be obligated to remain in the teaching profession for 5 consecutive years.

Outlook—Better Next Year

Unfortunately, the outlook for all of the many bills introduced this year is not good. Congress has a tremendous amount of unfinished essential business to attend to between now and the end of the year, and there simply is not enough time to consider these bills with the seriousness they deserve. Also, only the Heckler and Schmitt bills have even lukewarm White House support.

Still, hearings on six math and science education bills were held before the House Committee on Education and Labor during the week of September 27. The hearings provided a forum for 17 representatives of the federal government, the Congress, local school boards, and relevant associations to express their views.

This series of hearings, and the fact that so many bills have been introduced to attack the problem in the first place, clearly indicate that Congress has become aware of the near crisis in science and mathematics education in this country. Thus, while it is likely that none of the bills will end up on Reagan's desk by the end of the 97th Congress, it is almost certain that next year will see at least some of them signed into law.

Peter Farnham is the Administrative Officer of the Council of Scientific Society Presidents (CSSP). The views expressed here are his own and do not necessarily reflect official CSSP policy. The information in this article was current as of October 1, 1982.

CBMS Advises NSB Commission on Precollege Mathematics Curriculum

The Conference Board of the Mathematical Sciences (CBMS) held a special meeting on September 25-26 to address the topic "The Mathematical Sciences in K-12: What is Still Fundamental and What is Not." This conference was called by Henry O. Pollak, CBMS Chairman, at the request of the National Science Board (NSB) Commission on Precollege Education in Mathematics, Science, and Technology. It was funded by a grant from the National Science Foundation to CBMS.

The conference was held at the headquarters of the MAA in Washington, D.C. The thirty-three participants included two Commission members, Katherine P. Layton and Frederick Mosteller, and the presidents of five CBMS member organizations—Richard D. Anderson, MAA; James Baldwin, American Mathematical Association of Two-Year Colleges; Andrew Gleason, American Mathematical Society; Seymour Parter, Society for Industrial and Applied Mathematics; Stephen Willoughby, National Council of Teachers of Mathematics.

A report on the conclusions and recommendations from the conference is being prepared for delivery to NSF by November 1. Highlights of this report will appear in a future issue of *FOCUS*.

New Intermediate High School Examination to Start Next Spring

Beginning in Spring 1983, a new intermediate examination—the American Invitational Mathematics Examination (AIME)—will be added to the sequence of yearly high school examinations sponsored by the MAA and four other organizations. Invitations to the AIME will be extended to the top 1000 or so participants in the Annual High School Mathematics Examination. The top 50 AIME contestants will in turn, be invited to participate in the USA Mathematical Olympiad (USAMO). Thus the AIME will stand between the two current examinations and will replace the AHSME as the qualifying examination for the USAMO.

The motivation for introducing the AIME is two-fold. First, because of the severe cut in past years from over 400,000 students taking the AHSME to only about 100 taking the USAMO, many of North America's best mathematics students did not receive the recognition and challenge inherent in going on to a high-level examination.

Second, the Committee on High School Contests, which administers all three examinations, is concerned that the multiple-choice format of the AHSME may not provide the best means for determining who is likely to do well on the USAMO, an essay-type test.

The AIME format will be short-answer. Students will submit only their final answers, to be marked right or wrong. They will have two-and-one-half hours to answer 15 questions. The difficulty level will be similar to that of the last third of the AHSME.

Because of the introduction of the AIME, the Committee intends to make the AHSME somewhat easier than in the past, thus allowing a greater number of students to achieve high scores. Also, because of the ever-growing use of the AHSME by students from other countries, the name "Annual High School Mathematics Examination" will be changed in 1983 to "American High School Mathematics Examination."

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from the Executive Director's desk . . .

1982 SAT Up!

For more than a decade we have become accustomed to annual reports that Scholastic Aptitude Test (SAT) mathematics and verbal scores have dropped again. So it was a distinct shock—albeit a pleasant one—to learn that this year both scores had risen.

The College Board, which sponsors the SAT, announced in September that the average score on the SAT mathematics test increased from 465 in 1981 to 466 in 1982. The verbal score increased from 424 to 426. It has been 13 years since the last increase in either score and 19 years since both scores increased in the same year. In 1969 when the long slide began, the average mathematics and verbal scores were 493 and 463, respectively.

It would be premature, of course, to suggest that this good news signals a reversal of the long decline. But, according to George Hamilton, President of the College Board, "... this year's rise . . . is a welcome sign . . . that serious efforts by the nation's schools and their students to improve the quality of education are taking effect."

The SAT score decline was only one of a number of symptoms of decay in the quality of U.S. education. Much remains to be done to restore our nation's traditional leadership in science and mathematics education. In fact, not all of the SAT news is good this year. While the average mathematics score for all students rose, the average for female students did not. And while scores for male students in 1969 averaged 43 points higher than those for female students, the gap in 1982 is 50 points. There is a challenge in these numbers.

But, still, it is good to see the first encouraging sign in a decade of depressing statistics. It will be even better if the sign stimulates us to still greater effort.

A. B. Willcox

Highlights of the Board of Governors' Toronto Meeting

Award for Distinguished Service to Mathematics

The Board elected Edwin F. Beckenbach as the 1983 recipient of the Award for Distinguished Service to Mathematics. This award is presented annually at the MAA Business Meeting in January. *(It is noted with sorrow that Professor Beckenbach died on September 6, 1982. Alice C. Beckenbach will accept the award at the Denver meeting on behalf of her late husband.—Editor)*

New MAA Awards

The Board approved two new awards, the MAA Book Prize and the Certificate for Meritorious Service. More information about these awards will appear in the next issue of *FOCUS*.

MAA Treasurer

Leonard Gillman, University of Texas at Austin, was re-elected as MAA Treasurer for the period 1983-87. Professor Gillman has served as Treasurer since 1973.

Grants

- The Board of Governors gratefully accepted two grants:
- \$3000 from Connecticut Mutual Life Insurance Company for support of the secondary school lectureship program *Blacks and Mathematics*.
 - \$5000 from General Electric Corporation for support of the secondary school lectureship program *Women and Mathematics*.

NSB Commission

The Board devoted a considerable amount of time at its meeting to discussion of the work of the National Science Board Commission on Precollege Education in Mathematics, Science, and Technology. (See *FOCUS*, March-April 1982 and September-October 1982.) Representing the Commission was Katherine P. Layton of Beverly Hills High School.

Resolution on Bills Before Congress

The Board passed a resolution strongly supporting the objectives of bills recently introduced by Senator John Glenn (D-Ohio) and Representatives Dave McCurdy (D-Okla) and Larry Winn (R-Kans) as they apply to precollege education in mathematics, science, and technology.

Interested in a Year on Capitol Hill?

Congressional Science Fellowship Program Offers Opportunity

Applications are now being accepted for the 1983-84 Congressional Science Fellowship sponsored by the American Mathematical Society, Mathematical Association of America, and Society for Industrial and Applied Mathematics. The AMS-MAA-SIAM Fellow will spend one year, starting September 1, 1983, working in Washington, D.C. on the staff of a congressman or a congressional committee or in the congressional Office of Technology Assessment. The stipend is \$25,000. A small additional amount may be included for relocation and travel expenses. The stipend may be supplemented by sabbatical salary or other employer contribution.

The AMS-MAA-SIAM Fellow will serve along with about thirty Fellows sponsored by other scientific societies under a program coordinated by the AAAS. This year's Congressional Science Fellow is John T. Chu of the Polytechnic Institute of New York. Professor Chu is working on the staff of Senator Inouye, Senior Senator from Hawaii.

Applications for the AMS-MAA-SIAM Fellowship should be sent* to: Conference Board of the Mathematical Sciences, 1529 Eighteenth Street, N.W. Washington, D.C. 20036. Applications should contain a résumé, a summary of the applicant's qualifications for the Fellowship, and a statement of the applicant's reasons for wanting to be a Congressional Science Fellow. The deadline for receipt of applications is February 15, 1983. The applicant should arrange for three letters of recommendation to be sent to the address above, also by February 15. The award will be made by about April 1, 1983.

Mathematical Association of America • Denver

January 6-9, 1983

66th ANNUAL MEETING

The Sixty-Sixth Annual Meeting of the Mathematical Association of America will be held at the **Denver Convention Complex** and the **Executive Tower Inn in Denver, Colorado**, from Thursday, January 6 through Sunday, January 9, 1983. This meeting will be held in conjunction with meetings of the American Mathematical Society, Association for Symbolic Logic, Association for Women in Mathematics, and Rocky Mountain Mathematics Consortium. The MAA sessions on Thursday, January 6 and Sunday, January 9 will be joint sessions with the National Council of Teachers of Mathematics.

The **Board of Governors** will meet at 9:00 a.m. on Thursday, January 6. This meeting is open to all members of the Association.

At 7:00 p.m. on Thursday, January 6, there will be a **panel discussion**, *Please, professor, let's work together on this! (A dialog between secondary and collegiate mathematicians)*. Speakers are William E. Briggs, John H. Hodges, Ruth Rebekka Struik (all from the University of Colorado), and Roe Willis, Boulder High School.

The **Section Officers** will hold an informal meeting at 4:00 p.m. on Friday, January 7.

The **Committee on Corporate Members** will sponsor an evening session on *Mathematics publishing, copyright, and software*, at 7:00 p.m. on Friday, January 7. Speakers will include Jerry Lyons (presider), PWS Publishers; Richard Moynihan, Mitre Corporation; Carol Rischer, Association of American Publishers; and Robert Runck, D.C. Heath and Company.

At 7:00 p.m. on Friday, January 7, John L. van Iwaarden of Hope College will run a **workshop** on *High level languages—why PASCAL?* This workshop will provide an opportunity for anyone with a working knowledge of one other language to see the special structures built into PASCAL.

Sessions for **contributed papers** are scheduled on Friday afternoon, January 7, and Saturday morning and afternoon, January 8. The topics and session leaders are: (1) *The use of computers in undergraduate mathematics instruction*, Ronald H. Wenger, University of Delaware; (2) *Discrete mathematics in the lower division curriculum*, Anthony Ralston, SUNY at Buffalo.

The **Annual Business Meeting** of the Association will take place at 9:30 a.m. on Saturday, January 8. The 1983 Award for Distinguished Service to Mathematics will be presented. Also at this meeting, members of the Association will be asked to approve proposed amendments to two articles of the MAA Bylaws. See page vii of this program for the proposed amendments.

The MAA will sponsor five minicourses: (1) *Introduction of microcomputers in mathematics instruction*; (2) *Placement testing*; (3) *Introducing statistical topics in existing mathematics courses*; (4) *An introduction to the mathematical foundations of computer graphics*; (5) *Users of computers in undergraduate mathematics instruction*. See page iii of this program for complete information on these minicourses.

The dates and times of **other MAA meeting events** are listed on pages iv and v of this program. Locations will be listed in the final program distributed at the Denver meeting.

Registration

Registration Fees

Meeting preregistration and registration fees only partially cover expenses of holding meetings. All mathematicians who wish to attend sessions are expected to register, and should be prepared to show their meeting badge, if so requested. The fees for Joint Meeting registration at the meeting (listed below) are 30 percent more than the preregistration fees.

Joint Mathematics Meetings

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

Employment Register

Employer	\$75
Applicant	No charge

AMS Short Course

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

MAA Minicourse

All Participants	\$15
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Registration fees may be paid at the meetings in cash, by personal or travelers' checks, or by VISA or MASTERCARD credit cards. Canadian checks must be marked for payment in U.S. funds.

There is no extra charge for members of the families of registered participants, except that all professional mathematicians who wish to attend sessions must register independently.

All **full-time** students currently working toward a degree or diploma qualify for the student registration fees, regardless of income.

The unemployed status refers to any person currently unemployed, actively seeking employment, and who is not a student. It is not intended to include persons who have voluntarily resigned or retired from their latest position.

Persons who qualify for emeritus membership in either the Society or the Association may register at the emeritus member rate. The emeritus status refers to any person who has been a member of the AMS or MAA for twenty years or more, and is retired on account of age from his or her latest position.

Nonmembers who register at the meetings and pay the \$75 nonmember registration fee are entitled to a discount of the difference between the member registration fee of \$49 and the nonmember registration fee of \$75 as a \$26 credit against dues in either the AMS or MAA or both, provided they apply for membership before February 9, 1983.

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

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

Registration Dates and Times

AMS Short Course

Promenade Foyer, Executive Tower Inn

Monday, January 3	9:00 a.m. to 4:00 p.m.
Tuesday, January 4	8:00 a.m. to 2:00 p.m.

Joint Mathematics Meetings

[and MAA Minicourse (until filled)]

Arena, Denver Convention Complex

Tuesday, January 4	4:00 p.m. to 8:00 p.m.
Wednesday, January 5	8:00 a.m. to 5:00 p.m.
Thursday, January 6,	through
Saturday, January 8	8:00 a.m. to 4:00 p.m.

Assistance and Information Desk

Outside Arena, Denver Convention Complex

Sunday, January 9	8:30 a.m. to noon
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Please note that the Joint Mathematics Meetings registration desk **will not be open on Sunday, January 9**, and that the telephone message center will not be in operation. Other services provided during the meeting at the registration desk will also no longer be available (see section below on Registration Desk Services). There will, however, be a small desk set up outside the Arena in the Denver Convention Complex, where local information will be available and where a staff member will provide limited assistance to participants. No registration or cash transactions will be possible at this desk.

REGISTRATION DESK SERVICES

AMS/MAA Information

Information on the publications and activities of both organizations may be obtained at this section of the registration desk.

Assistance, Comments and Complaints

A log for registering participants' comments or complaints about the meeting is kept at the Transparencies section of the registration desk. All participants are encouraged to use this method of helping to improve future meetings. Comments on all phases of the meeting are welcome. If a written reply is desired, participants should furnish their name and address.

(continued on page vi)

Minicourses

The MAA is planning five Minicourses, as follows:

Minicourse #1: *Introduction to microcomputers in mathematics instruction* is being organized by KLAUS E. ELDRIDGE and DONALD O. NORRIS, both of Ohio University, and will be given from 8:30 a.m. to 12:30 p.m. on Thursday, January 6. This Minicourse is intended for novices, and is a repeat of the very popular course offered in Pittsburgh in August 1981, in Cincinnati in January 1982, and in Toronto in August 1982. It will consist of a brief introduction to BASIC, followed by a discussion of how computers can be used in a variety of courses. The discussion will include traditional examples from calculus and differential equations, as well as simulation models in liberal arts courses or mathematics education courses. It is planned that microcomputers will be available for use by the participants.

Minicourse #2: *Placement testing* is being organized by RICHARD H. PROSL of the College of William and Mary in Virginia, who is Chairman of the MAA Committee on Placement Examinations. This Minicourse consists of two sessions which will take place from 7:00 p.m. to 10:00 p.m. on Thursday evening, January 6, and Saturday evening, January 8. The talks included in this course are designed to provide an overview of placement testing, test development, and testing-program administration. These talks will complement workshops on test-item writing, the establishment of cut-off scores, and the statistical analysis of test data. Participants will write test items and compose a placement test during the first session of the course. This test will be administered to a group of students in the Denver area by personnel from the Air Force Academy. During the second session, participants will analyze data generated by this administration of their test. James Braswell of the Educational Testing Service staff and Hope Florence of the College of Charleston will join the members of the MAA's Committee on Placement Examinations to conduct the course.

Minicourse #3: *Introducing statistical topics in existing mathematics courses* is being organized by RICHARD WALKER of Mansfield State College, and will be given from 8:30 a.m. to 12:30 p.m. on Friday, January 7. Probability and statistics are very important areas within the mathematical sciences; however, many students of mathematics, both majors and nonmajors, have little or no exposure to these subjects. The purpose of this Minicourse is to suggest some ways in which topics from probability and statistics, particularly from the latter, can be introduced into existing mathematics courses. In this manner more of our students can be exposed to these important areas. Suggestions will be presented on how one might introduce statistical thinking in both lower division and upper division courses. Resource materials, including some UMAP modules, will be provided.

Minicourse #4: *An introduction to the mathematical foundations of computer graphics* is being

organized by GERALD J. PORTER of the University of Pennsylvania, and will be given from 1:00 to 5:00 p.m. on Friday, January 7. This Minicourse will be a short survey of the mathematics necessary to create pictures on a graphical display device (e.g. Apple computer, Tektronix storage tube, VT100 terminal with retrographics). Knowledge of a structured language such as PASCAL would be helpful. Among the topics discussed will be virtual and device coordinate systems, homogeneous coordinates, coordinate transformations, data structures for pictures, clipping, splines, *b*-splines, two-dimensional representations of three-dimensional objects, and hidden line removal. The emphasis will be on pictures useful in the teaching of mathematics. Apple computers will be available for demonstrations.

Minicourse #5: *Uses of computers in undergraduate mathematics instruction* is being organized by DAVID A. SMITH of Duke University who is Series Editor in Mathematics for CONDUIT. This Minicourse will take place from 8:30 a.m. to 12:30 p.m. on Saturday, January 8. A repeat of the course will be scheduled from 1:00 p.m. to 5:00 p.m. on Saturday, if the demand so warrants. This Minicourse is a workshop intended for college teachers. Uses of *existing* microcomputer software to enhance instruction in full courses in the undergraduate mathematics curriculum will be demonstrated, including software for use in single- and multi-variable calculus, differential equations, and topics at the lower division college level. Presentations/demonstrations will be given by mathematicians who have developed the software *and* have had extensive experience with its use in their courses. It is planned for participants to have the opportunity to work with the software themselves on microcomputers. Speakers will include DAVID A. SMITH, and AUSTIN R. BROWN, JR., Colorado School of Mines.

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

The Minicourses have separate registration fees of \$15 each, and are limited to 30 participants each.

Employment Register

The Employment Register will take place in the Ballroom Complex on the lobby level of the Denver Hilton Hotel on Thursday, Friday, and Saturday, January 6, 7, and 8. A short (optional) orientation session will be conducted by the AMS-MAA-SIAM Committee on Employment Opportunities at 9:00 a.m. on Thursday, January 6. The purpose of the orientation session is to familiarize participants with the operation of the Register and with the various forms involved. Interviews between applicants and employers will be scheduled for Friday and Saturday, January 7 and 8.

MAA PROGRAM

THURSDAY, January 6

8:30 a.m.-12:30 p.m.

MAA Minicourse #1: *Introduction to microcomputers in mathematics instruction*

9:00 a.m.-4:00 p.m.

MAA Board of Governors Meeting

7:00 p.m.-9:00 p.m.

MAA/NCTM Panel Discussion: *Please, professor, let's work together on this! (A dialog between secondary and collegiate mathematicians)*
William E. Briggs, University of Colorado; John H. Hodges, University of Colorado; Ruth Rebekka Struik, University of Colorado; Roe Willis, Boulder High School

7:00 p.m.-10:00 p.m.

MAA Minicourse #2: *Placement testing*

FRIDAY, January 7

8:30 a.m.-9:20 a.m.

MAA Invited Address: *Nonassociative algebras, the first 101 years*
Marvin L. Tomber, Michigan State University

8:30 a.m.-12:30 p.m.

MAA Minicourse #3: *Introducing statistical topics in existing mathematics courses*

9:30 a.m.-10:20 a.m.

MAA Invited Address: *Geometric structures for 3-manifolds with symmetry*
William P. Thurston, Princeton University

10:30 a.m.-11:20 a.m.

MAA Invited Address: *How to throw small matrices away, or, just what did Brown, Douglas, and Filmore do in 1973?*
Paul R. Halmos, Indiana University

11:30 a.m.-12:20 p.m.

MAA Invited Address: *Nerve conduction and cardiac fibers: some qualitative problems in differential equations*
Jane Cronin Scanlon, Rutgers University

Afternoon

MAA Contributed Paper Session

1:00 p.m.-5:00 p.m.

MAA Minicourse #4: *An introduction to the mathematical foundations of computer graphics*

4:00 p.m.-6:00 p.m.

MAA Section Officers' Informal Meeting

4:30 p.m.-6:00 p.m.

MAA/AMS Committee on Employment and Educational Policy Panel Discussion: *Freshman mathematics: are there alternatives to calculus?*
Organizer: Irvin Kra, SUNY, Center at Stony Brook

7:00 p.m.-9:00 p.m.

MAA Committee on Corporate Members Session: *Mathematics publishing, copyright and software*

Presider: Jerry Lyons, PWS Publishers

Panel: Richard Moynihan, Mitre Corporation, Carol Rischer, Association of American Publishers, Robert Runck, D.C. Heath and Company

7:00 p.m.-9:30 p.m.

MAA Workshop: *High level languages—why PASCAL?*
John L. van Iwaarden, Hope College

Program Committee: C.E. Burgess (Chairman), Ronald L. Graham, Peter A. Lindstrom, Ruth Hoffman, Kenneth I. Gross, John H. Hodges, Stanley Gudder, Gary Bitter (NCTM Representative)

SATURDAY, January 8

Morning

8:30 a.m.-9:20 p.m.

MAA Contributed Paper Session

MAA Invited Address: *A systematic method for teaching mathematical proofs*

Daniel Solow, Case Western Reserve University

8:30 a.m.-12:30 p.m.

MAA Minicourse #5: *Uses of computers in undergraduate mathematics instruction*

9:30 a.m.-10:20 a.m.

MAA Annual Business Meeting

10:30 a.m.-11:20 a.m.

MAA Invited Address: *Mathematical modeling in petroleum reservoir simulation*

Richard E. Ewing, University of Wyoming

11:30 a.m.-12:20 p.m.

MAA Invited Address: *Homoclinic bifurcation and phase transition in time discrete dynamical systems (with computer pictures)*

Heinz-Otto Peitgen, University of Bremen and University of Utah

Afternoon

1:00 p.m.-5:00 p.m.

MAA Contributed Paper Session

MAA Minicourse #5: *Uses of computers in undergraduate mathematics instruction (tentative)*

7:00 p.m.-10:00 p.m.

MAA Minicourse #2, Second Session: *Placement testing*

SUNDAY, January 9

8:30 a.m.-9:20 a.m.

MAA/NCTM Invited Address: *VisiCalc and mathematical algorithms: mathematical applications of an electronic spreadsheet*

Deane E. Arganbright, Whitworth College

9:30 a.m.-10:20 a.m.

MAA/NCTM Invited Address: *Applications in the undergraduate curriculum*

Solomon Garfunkel, University of Connecticut

10:30 a.m.-11:20 a.m.

MAA/NCTM Invited Address: *The role of microcomputers in the mathematics curriculum*

Ruth Hoffman, University of Denver

11:30 a.m.-12:20 p.m.

MAA/NCTM Invited Address: *Progress report of the National Science Board Commission on Precollege Preparation in Mathematics*

Katherine P. Layton, Beverly Hills High School

Registration (continued from page ii)

Participants with problems of an immediate nature requiring action at the meeting should see the meeting manager, who will try to assist them.

Check Cashing

The meeting cashier will cash personal or travelers' checks up to \$50, upon presentation of the official meeting registration badge, provided there is enough cash on hand. Canadian checks must be marked for payment in U.S. funds.

Local Information

This section of the desk will be staffed by members of the Local Arrangements Committee and other volunteers from the Denver mathematical community.

Lost and Found

See the meeting cashier.

Mail

All mail and telegrams for persons attending the meetings should be addressed to the participant, Joint Mathematics Meetings, c/o Denver & Colorado Convention & Visitors Bureau, 225 West Colfax Avenue, Denver, Colorado 80202. Mail and telegrams so addressed may be picked up at the mailbox in the registration area during the hours the registration desk is open. U.S. mail not picked up will be forwarded after the meeting to the mailing address given on the participant's registration record.

Personal Messages

Participants wishing to exchange messages during the meeting should use the mailbox mentioned above. Message pads and pencils are provided. It is regretted that such messages left in the box cannot be forwarded to participants after the meeting is over.

Telephone Messages

A telephone message center is located in the registration area to receive incoming calls for participants. The center is open from January 5 through 8 only, during the hours that the Joint Mathematics Meetings registration desk is open. Messages will be taken and the name of any individual for whom a message has been received will be posted until the message has been picked up at the message center. The telephone number of the message center will be announced in the January issue of the *Notices*.

Transparencies

Speakers wishing to prepare transparencies in advance of their talk will find the necessary materials and copying machines at this section of the registration desk. A member of the staff will assist and advise speakers on the best procedures and methods for preparation of their material. There is a modest charge for these materials. Please note that this service will **not** be available on Sunday, January 9.

ACTIVITIES OF OTHER ORGANIZATIONS

The American Mathematical Society (AMS) will hold sessions beginning on Wednesday, January 5. That evening the 1983 Gibbs Lecture, *Mathematical models and controversies in evolutionary theory*, will be presented by Samuel Karlin of Stanford University. The Society will also sponsor a series of four Colloquium Lectures on *The uncertainty principle* by Charles L. Fefferman of Princeton University. The Retiring Presidential Address, *Nonexpansive maps*, will be presented on Wednesday, January 5 by Andrew M. Gleason of Harvard University.

The sessions of the Society will be preceded by a Short Course on *Computer communications* under the direction of B. Gopinath of Bell Laboratories.

The Association for Symbolic Logic (ASL) will hold its 1982-1983 Annual Meeting on Saturday and Sunday, January 8-9. In addition to contributed papers, there will be several invited talks, including, so far, T. CARLSON, D. A. MARTIN, M. RUBIN, and S. TODORČEVIĆ. Note the related AMS special sessions on *Proof theory* and *Automatic theorem proving*.

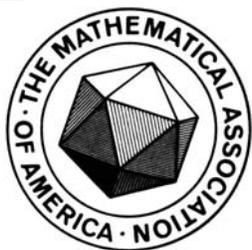
The Association for Women in Mathematics (AWM) will sponsor a Panel Discussion concerning mathematicians' uses of home computers at 11:15 a.m. on Thursday, January 6, to be immediately followed by the AWM Business Meeting. The fourth annual AWM Emmy Noether Lecture will be given at 3:30 p.m. on Thursday, January 6, by CATHLEEN S. MORAWETZ. The title is *How do perturbations of the wave equation behave?* A party is being planned for Thursday evening, January 6.

The Rocky Mountain Mathematics Consortium (RMMC) will sponsor a symposium on *Mathematics and seismic prospecting* at 2:15 p.m. on Friday, January 7. The symposium has been organized and will be moderated by A. DUANE PORTER of the University of Wyoming. Speakers are NORMAN BLEISTEIN, University of Denver; ROBERT BURRIDGE, Courant Institute of the Mathematical Sciences, New York University; and KENNETH LARNER, Western Geophysical, Houston.

The RMMC Board of Directors will meet at 2:00 p.m. on Thursday, January 6.

WILLIAM G. ROSEN, Head of the Mathematical Sciences Section of the National Science Foundation (NSF) will speak at 3:30 p.m. on Thursday, January 6, on the *Annual report from the NSF's Mathematical Sciences Section*.

The NSF will again be represented at a booth in the exhibit area. NSF staff members will be available to provide counsel and information on NSF programs of interest to mathematicians from 9:00 a.m. to 5:00 p.m., Thursday and Friday, January 6-7.



Visit the MAA Booksale While You Are at the Meeting

Take this opportunity to buy MAA books at a special savings.
VISA and MASTERCARD accepted.

Look for these recently published MAA books.

Dolciani Mathematical Expositions #6
Maxima and Minima Without Calculus
by Ivan Niven

List: ~~\$24.50~~ MAA Member: ~~\$18.50~~
\$19.60 \$14.80

Two-Year College Mathematics Readings
edited by Warren Page

List: ~~\$19.50~~ MAA Member: ~~\$14.50~~
\$15.60 \$11.60

Dolciani Mathematical Expositions #7
Great Moments in Mathematics after 1650
by Howard Eves

List: ~~\$23.50~~ MAA Member: ~~\$17.50~~
\$18.80 \$14.00

OTHER EVENTS OF INTEREST

Book Sales

Books published by the AMS and MAA will be sold for cash prices somewhat below the usual prices when these same books are sold by mail. These discounts will be available only to registered participants wearing the official meeting badge.

Exhibits

The book and educational media exhibits are located in the Arena of the Denver Convention Complex and will be open Wednesday, January 5, through Saturday, January 8. The exhibits will be open from 1:00 p.m. to 5:00 p.m. on Wednesday; from 9:00 a.m. to 5:00 p.m. on Thursday and Friday; and from 9:00 a.m. to noon on Saturday. All participants are encouraged to visit the exhibits during the meeting. **Participants visiting the exhibits will be asked to display their meeting badge in order to enter the exhibit area.**

Proposed Bylaw Amendments

Article VII—Publications

1. The Association shall publish one or more journals.
2. The Board shall have full control of the publication and sale of each journal, and of all other publications.
3. There shall be appointed by the Board a body of Associate Editors for each journal.
4. The Board shall from time to time, as the need arises, make special provisions for the management of any other publications.
5. The Board shall fix the price of each journal and of any other publication of the Association.

Article VIII—Dues

1. The Board shall establish the annual dues and privileges of membership for individual and institutional members. The dues of individual members shall include a subscription to one or more of the Association's journals.
2. All dues shall be payable on the first of January of each year. Should the annual dues of any member remain unpaid beyond a reasonable time, that member shall be dropped from the list after due notice.
3. New members entering the Association after April 1 of any year may have their dues prorated for the balance of the year, except when they desire to receive the full current volume of a journal.
4. Any individual member who because of age is no longer in active service, who is in good standing at the time of retirement, and who has been a member of the Association for twenty years, may upon notifying the central office of said retirement, be exempt from the payment of dues, while retaining all the privileges of membership except receipt of journals. Such a member may elect to receive one or more journals at an annual cost of one half of the dues paid by a regular individual member receiving the same journals.

Local Arrangements Committee

The members of the Local Arrangements Committee are Nancy S. Angle, Paul T. Bateman (ex-officio), Jerrold W. Bebernes, William S. Dorn, John P. Gill, Jr., Gary W. Grefsrud, Raymond R. Gutzman, Zenos Hartvigson, Frieda K. Holley, William J. LeVeque (ex-officio), Arne Magnus, Richard Osborne, Arlan B. Ramsay (chairman), William N. Reinhardt, David P. Roselle (ex-officio) and Nancy M. Thompson (publicity director).

The Denver Meetings Travel Hotline — Call 800-556-6882

In Rhode Island and outside the continental U.S. call 401-884-9500 or Telex 952165

CONVENIENCE, SAVINGS, IMMEDIATE CONFIRMATION ON AIRLINE ARRANGEMENTS

Hours of Operation: 9 a.m.-8 p.m. Eastern Time Monday through Thursday, Fridays until 6 p.m.

Another Member Service to Assist You if You're Attending the Denver Meetings and Use a Major Credit Card

One free call answers all your travel questions and supplies you with all your needs, including reduced-rate airline arrangements. Meeting preregistration can only be done through the Mathematics Meetings Housing Bureau, which can not be reached through this 800 number.

MISCELLANEOUS INFORMATION

Child Care

Nanny's Hotel Babysitting, Inc., offers a professional babysitting service in the safety of your hotel room. Many of the babysitters are older parents who have already raised a family of their own. Day or evening service is available. Please notify them as far in advance as possible. For more information, call 303-696-7855. The Brown Palace and the Hilton will arrange for babysitters if given enough prior notice.

Local Information

Taxis presently cost \$2.05 for the first mile and 90 cents each additional mile, one passenger. Each additional person is charged 40 cents extra, as long as they go from the same pickup point to the same destination. The Regional Transit District (RTD) operates buses throughout the area. Buses making local stops charge a flat fee of 70 cents during peak hours (6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m., Monday through Friday), or 35 cents all other hours Monday through Friday, all day Saturday and Sunday. Express buses charge \$1-1.50 within town.

A section of 16th Street has been turned into a pedestrian mall, with free transportation up and down its length. Participants staying at the Hilton will find it convenient to utilize this transportation as far as Champa Street, which is only two blocks away from the Convention Complex.

Denver has an Art Museum, a Natural History Museum (including a Planetarium), an Arboretum, the State Capitol building (with a gold dome), the Denver Mint, and historical features such as the Molly Brown House. The nearest ski areas are over an hour away by automobile. Further information will be available at the Local Information section of the registration desk.

Parking

Those coming by car are advised to stay at either the Holiday Inn (which is within walking distance from the Convention Complex and provides free parking for registered guests), the Quality Inn (which has free parking for registered guests and a shuttle service to the Convention Complex), or the Executive Tower Inn (which is adjacent to the Convention Complex and has parking facilities for registered guests costing \$3 per day, either onsite or across the street, in and out privileges included).

Social Events

The Local Arrangements Committee has arranged a no-host, cash-bar social at 6:30 p.m. on Friday, January 7. More details will be available in a later issue.

Travel

In January, Denver is on Mountain Standard Time. There is regular airline service to the Stapleton International Airport by several major airlines.

At the suggestion of the AMS Board of Trustees, the AMS/MAA Joint Meetings Committee authorized the experimental agreement with a travel service in an attempt to assist participants in obtaining the best airline fares possible to and from Denver. This travel service (which has an 800 number) is described in the box on page 686. All participants are urged to consider this organization for their airline reservations. This experiment will be evaluated in order to determine whether it can provide a useful service for members.

The airport in Denver is approximately five miles from downtown, and the trip takes about fifteen minutes. The airport limousine stopping at the downtown hotels runs every 20 minutes from 6:30 a.m. until 10:30 p.m. daily. Present cost is \$4 per person. A taxi from the airport to a downtown hotel costs \$8.55 plus 40 cents for each additional passenger one way. There is good bus service provided by the Regional Transit District (RTD) on buses #28, #32, and #38 from the airport to downtown, with the fare varying between 35 cents and 70 cents, depending on the hour of day. Most major car rental agencies maintain desks at the airport.

AMTRAK'S San Francisco Zephyr provides train service between Denver and Chicago and between Denver and the major west coast cities. The Denver Rio Grande Western Railroad operates a day train between Salt Lake City and Denver three days per week; in fact this is the only nonAMTRAK intercity train still running in the United States.

Denver can be reached by car via I-70 from the east and west, and via I-25 from the north and south.

Weather

Denver is located on the eastern slope of the Rocky Mountains and has a continental climate. The temperature can vary greatly at this time of year, and can easily drop below 0°F; however, the average high temperature in January is 52°F, and the average low is 23°F, with the median temperature in January being 31°F. The temperature drops rapidly at sundown, so the evening temperature is usually close to the overnight low (25°F to 28°F).

Excellence in Expository Writing Recognized

Several articles which appeared in 1981 issues of MAA journals have been chosen as examples of outstanding expository writing in mathematics. The authors of these articles were presented awards at the Business Meeting of the Association in Toronto, Canada, on August 24, 1982.

George Pólya Awards for articles in the *Two-Year College Mathematics Journal* in 1981 were given to:

- John A. Mitchem of San Jose State University for "On the History and Solution of the Four-Color Problem," March 1981, pages 108-116.
- Peter L. Renz of W. H. Freeman and Company for "Mathematical Proof: What It Is and What It Ought to Be," March 1981, pages 83-103.

Carl B. Allendoerfer Awards for articles in *Mathematics Magazine* in 1981 were presented to:

- J. Ian Richards of the University of Minnesota at Minneapolis for "Continued Fractions Without Tears," September 1981, pages 163-171.
- Marjorie Senechal of Smith College for "Which Tetrahedra Fill Space?" November 1981, pages 227-243.

Each prize winning author received a check for \$100.

The **Lester R. Ford Awards** for articles in *The American Mathematical Monthly* will be presented in January at the MAA Annual Meeting in Denver, Colorado.

Sabbatical Exchange Listings Due December 1

The MAA Sabbatical Exchange Information Service (SEIS) will be accepting listings for the 1983 SEIS Directory until December 1, 1982. This service helps faculty members who are interested in no-cost sabbatical exchanges to contact individuals with similar interests at other institutions.

MAA members who want to be listed in the 1983 SEIS Directory should write to SEIS, Mathematical Association of America, 1529 Eighteenth Street, N.W., Washington, D.C.

In Memoriam

Edwin F. Beckenbach, Professor Emeritus of the University of California, Los Angeles, died September 6, 1982 at the age of 76. He had been Chairman of the MAA Publications Committee since 1971. In recognition of his many contributions to the mathematical community, Professor Beckenbach was to have received the MAA's Award for Distinguished Service to Mathematics at the Denver Meeting. (See *Highlights of the Board of Governors' Toronto Meeting*, page 4 of this issue.)

Paul Bryan Patterson, retired from Appalachian State University, died August 29, 1982. He was a member of the MAA for 34 years.

Gerald S. Silberman, Professor at California State University, Sacramento, died July 31, 1982 at the age of 51. He was a member of the MAA for 11 years.

Raymond L. Wilder, former President of the MAA, 1965-1966 and of the AMS, 1955-56, died July 7, 1982 at the age of 85. Professor Wilder was retired from the University of Michigan and, at the time of his death, was employed as a Research Associate at the University of California, Santa Barbara. He was a member of the MAA for 62 years.

20036, enclosing the following information about themselves: (1) Name (2) Institution (3) Department (4) Address (5) Rank (6) Major field of interest (7) Highest earned degree (8) Names of courses recently taught (9) Normal teaching load (10) Section of the United States or foreign country preferred for visit (11) Period during which the exchange is desired (12) Whether this is an "official" sabbatical.

SEIS Directories will be sent to all SEIS participants in January 1983. Others who want copies should write to SEIS at the address above or pick up a copy at the MAA Publications Desk at the Annual Meeting in Denver. There is no charge for MAA members. The charge for non-members is \$5.

**NEW
from
MAA**

GREAT MOMENTS IN MATHEMATICS AFTER 1650

by Howard Eves
xii + 263 pp. Hardbound.
List: \$23.50 MAA Member: \$17.50

A companion to GREAT MOMENTS IN MATHEMATICS BEFORE 1650, this new volume covers outstanding events in mathematics after 1650, such as the invention of the differential calculus (1629-1680s), the discovery of non-Euclidean geometry (1829), Gödel's incompleteness theorem (1931), and the resolution of the four-color conjecture (1976).

If you have not already purchased the earlier volume, take this opportunity to purchase BOTH and enjoy a special discount. The GREAT MOMENTS PACKAGE price is:

List: \$39.00 MAA Member: \$29.50

Order from:
Mathematical Association of America
1529 Eighteenth Street, N.W.
Washington, D.C. 20036



MAXIMA AND MINIMA WITHOUT CALCULUS

by Ivan Niven
xv + 323 pp. Hardbound.
List: \$24.50 MAA Member: \$18.50

An excellent sourcebook in the area of maxima and minima, this book will serve as a textbook or as enrichment material for anyone with a good working knowledge of precalculus.

Topics covered are:

- Simple Algebraic Results
- Elementary Geometric Questions
- Isoperimetric Results
- Basic Trigonometric Inequalities
- Polygons Inscribed and Circumscribed
- Ellipses
- The Bees and Their Hexagons
- Further Geometric Results
- Applied and Miscellaneous Problems
- Euclidean Three-Space
- Isoperimetric Results not Assuming Existence
- Postscript on Calculus

Dolciani Mathematical Expositions Series

Committee on Retraining for Computer Science Formed

A joint committee of the MAA and the Association for Computing Machinery (ACM) has been appointed to oversee projects aimed at retraining mathematicians and other professionals for teaching undergraduate computer science courses. Members of the Committee are: Terry Frederick, University of Central Florida; Patricia Goldberg, IBM-Yorktown Heights; Zaven Karian, Denison University; Donald Kreider (Chair), Dartmouth College; Anthony Ralston, SUNY at Buffalo; Olaf Stackelberg, Kent State University.

The committee has its roots in a conference, funded by the Sloan Foundation, which was held at Airlie, Virginia in April 1982. That conference considered the severe shortage of faculty for teaching computer science courses, both now and in the foreseeable future. It studied and endorsed two specific models for retraining—a two summer program and a year-long sabbatical type program.

Two projects are now underway. The first, under the direction of Professor Ed Dubinsky, is the Institute for Retraining in Computer Science at Clarkson College announced below. The second, based on the sabbatical leave model, is being developed as an MAA project directed by Professor John Dalphin of Indiana University-Purdue at Fort Wayne. There

will be announcements in *FOCUS* and in other publications when the project director is ready to accept applications for this program.

At the recent MAA meeting in Toronto, Professor Dubinsky arranged an open session on the retraining issue. Some 120 persons attended to hear about the planned projects and to participate in the discussion.

The Joint Committee's charge is broader than simply monitoring and evaluating on-going projects. The Committee was asked, both by the Airlie Conference and through its formal charge from ACM and MAA, to consider also other modes of retraining such as short courses, mini-courses and MAA Section activities, such as the Ohio Section Short Course on Data Structures announced below. Some such programs might be especially valuable in preparing individuals to meet the prerequisites of the two-summer or sabbatical programs. The Committee wishes to learn of any other activities underway or contemplated that relate to retraining for computer science. Information should be sent to Professor Donald Kreider, Department of Mathematics, Bradley Hall, Dartmouth College, Hanover, NH 03755.

New Programs in Retraining for Computer Science Offered

Clarkson College Institute for Retraining in Computer Science

Under the auspices of the Joint ACM/MAA Committee on Retraining for Computer Science, Clarkson College has established a Summer Institute for Retraining Mathematicians to Teach Computer Science. The first class will begin in June 1983.

The Retraining Program will consist of two summers in residence at Clarkson plus a large programming project to be completed at the home institution during the intervening year. Participants will also be expected to teach an introductory computer science course during that year.

The curriculum will emphasize modern methods of structured programming and top-down design plus a strong exposure to the fundamental concepts in the growing field of computer science. Course syllabi will take full advantage of the mathematical background of the participants.

At the end of the first summer, participants will be qualified to teach a two-semester introductory sequence in programming and computer science, including some material on data structures. After the full program, they will be qualified to teach about half of the ACM '78 Core Curriculum in Computer Science. This includes most of the material for a computer science minor in a mathematics department as recommended in the 1981 CUPM (Committee on the Undergraduate Program in Mathematics) report. Also, they will have learned a considerable amount of computer science beyond this level.

In addition to a mathematics background and college teaching experience, participants will be expected to have some familiarity with programming and a personal commitment to continue in college teaching. There should be facilities on campus adequate for instruction in the computer

science curriculum.

It is possible that funding will be available to defray all or part of the participant's cost. Details will be announced later.

For more information and/or application forms, write to Professor Ed Dubinsky, Department of Mathematics and Computer Science, Clarkson College of Technology, Potsdam NY 13676.

Ohio Section Short Course on Data Structures

The MAA Ohio Section will offer a short course on data structures at Denison University, June 13-July 1, 1983. The course will consist of the implementation and analysis of algorithms used in the manipulation of data structures and study of the data structures commonly used (e.g., linked-lists, trees, graphs).

The primary objective of the course is to enable mathematics faculty who already know how to program to teach an undergraduate course on data structures similar to CS7 of the ACM '78 Core Curriculum in Computer Science. The PASCAL programming language will be used. Applicants who are not fluent in PASCAL may be accepted into the program if they have sufficient expertise in another general-purpose programming language (e.g., BASIC or FORTRAN) to be self-sufficient. The costs of the short course are anticipated to be \$325 for registration and \$425 for room and board.

The organizers of the short course are Douglas J. Faires, Youngstown State University, Zaven A. Karian, Denison University, and Andrew Sterrett, Jr., Denison University. For more information and/or application forms, write to Professor Zaven A. Karian, Department of Mathematical Sciences, Denison University, Granville, OH 43023. The deadline for applications is March 25, 1983.

People in the News

John Dossey, Professor of Mathematics at Illinois State University, has been presented with the Max Beberman Award by the Illinois Council of Teachers of Mathematics. This award honors an individual in mathematics education who has given outstanding service through leadership in curriculum development and research in the field and who, through those efforts, has had a significant impact on mathematics education in the State of Illinois. Professor Dossey has chaired the Commission on Education of Teachers of Mathematics for the National Council of Teachers of Mathematics and has been on the Board of Directors of that organization. He is also an active participant in MAA committee work, most recently serving as Chairman of the CUPM Panel on Teacher Training.



The 1982 Houssay Prize in the Exact Sciences has been awarded to **Leopoldo Nachbin**, George Eastman Professor of Mathematics at the University of Rochester, for his numerous research works in various fields of mathematics—harmonic analysis, functional analysis, topology, topological vector spaces, approximation theory, and infinite

dimensional holomorphy. Also cited as reasons for Nachbin's selection are his work as a university professor and doctoral adviser, his editorial activities, his international ties, and his contribution to the creation, support, and strengthening of scientific institutions on the American continent. The prize amounts to \$30,000 and is awarded on a rotating basis among the fields of biological sciences, exact sciences, agricultural sciences, and technical research. This is the first time since the Prize was established in 1972 that it has been awarded to a mathematician.

Louis Nirenberg, Professor of Mathematics at New York University's Courant Institute of Mathematics and **V.I. Arnold**, Professor of Mathematics at Moscow State University, have been named the first winners of the Holger-Crafoord Prize in Mathematics. This international prize is awarded by Sweden's Royal Academy to honor scientific achievements not specifically covered by the Nobel Prizes. Professor Nirenberg, a former director of the Courant Institute, is a member of the National Academy of Sciences and is internationally known for his research in the theory of non-linear differential equations.



Guido Weiss, Professor of Mathematics at Washington University, has been named as the first occupant of a new endowed professorship, the Elinor Anheuser Professorship of Mathematics. Professor Weiss was selected for the Chair because of his international reputation as a mathematician and because of his leadership within the Washington

University Mathematics Department and in the wider community. In 1967, Professor Weiss was awarded the MAA's Chauvenet Prize for expository writing in mathematics.

Shing Tung Yau, of Princeton's Institute for Advance Study, **William Thurston**, of Princeton, and **Alain Connes**, of the

Centre Nationale de la Recherche Scientifique (Paris), have been awarded Fields medals by the 1982 International Congress of Mathematicians. Yau received his award for his contributions dealing with complex structures on projective spaces and his recent works in applying geometric methods in relativity theory. Thurston was recognized for his work treating the relationship of three-dimensional differential geometry and three-dimensional topology. Connes, the third winner, has solved long-standing problems in operator theory and proved a version of the Atiyah-Singer theorem for certain infinite surfaces.

Over One Hundred Members Made Gifts to MAA With 1982 Dues

The Association is deeply indebted to the generosity of the 109 members listed below who elected to become Patrons, Sponsors, Contributing Members, or Sustaining Members for 1982 by making contributions beyond the normal dues for 1982. The names of members making contributions to the *Greater MAA Fund*, which was initiated last spring, as well as those who made contributions of \$20 or more with their 1983 dues payments, will be listed in the March-April 1983 issue of *FOCUS*.

Patrons James C. Bradford, William G. Chinn, Herbert J. Ryser, Saturnino L. Salas, Peter H. Sellers, Earl W. Swokowski, Harry A. Watson, Jr.

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Calendar

National MAA Meetings

66th Annual Meeting, Denver, CO, January 6-9, 1983
63rd Summer Meeting, SUNY at Albany, NY, August 8-10, 1983

67th Annual Meeting, Louisville, KY, January 27-29, 1984
68th Annual Meeting, Anaheim, CA, January 11-13, 1985

Sectional MAA Meetings

Eastern Pennsylvania West Chester State College, West Chester, Pennsylvania, November 20, 1982.
Florida State University, Tallahassee, Florida, March 4-5, 1983.
Illinois Rockford College, Rockford, Illinois, April 29-30, 1983.
Intermountain University of Utah, Salt Lake City, Utah, April 29-30, 1983.
Iowa Iowa State University, Ames, Iowa, April 22-23, 1983.
Kansas University of Kansas, Lawrence, Kansas, April 8-9, 1983.
Kentucky Bellarmine College, Louisville, Kentucky, April 8-9, 1983.
Louisiana-Mississippi Delta State University, Cleveland, Mississippi, February 18-19, 1983.
Maryland-D.C.-Virginia Gallaudet College, Washington, D.C., November 12-13, 1983.
Metropolitan New York St. John's University, Jamaica, New York, May 7, 1983.
Michigan Oakland Community College, Auburn Heights, Michigan, May 6-7, 1983.
Nebraska University of Nebraska, Omaha, Nebraska, March 25-26, 1983.

North Central University of Minnesota, Duluth, Minnesota, October 29-30, 1982.
Northeastern Worcester State College, Worcester, Massachusetts, November 19-20, 1982.
Oklahoma-Arkansas University of Oklahoma, Norman, Oklahoma, March 18-19, 1983.
Pacific Northwest University of Idaho, Moscow, Idaho, June 16-18, 1983.
Rocky Mountain Colorado State University, Ft. Collins, Colorado, April 29-30, 1983.
Seaway St. Lawrence University, Canton, New York, November 12-13, 1982.
Southeastern The Citadel, Charleston, South Carolina, April 15-16, 1983.
Southern California Pepperdine University, Malibu, California, November 13, 1982.
Southwestern New Mexico Institute of Mining and Technology, Socorro, New Mexico, March 25-26, 1983.
Texas North Texas State University, Denton, Texas, April 8-9, 1983.
Wisconsin University of Wisconsin, West Bend, Wisconsin, April 15-16, 1983.

Other Meetings

NOVEMBER 1982

11-14. **American Mathematical Association of Two-Year Colleges Annual Convention**, Las Vegas, Nevada. Contact: Shirley Trembly, Convention Chairperson, Department of Mathematics, Bakersfield College, Bakersfield, CA 93305 or James Baldwin, Department of Mathematics, Nassau Community College, Garden City, NY 11530.

DECEMBER 1982

10-12. **Canadian Mathematical Society Annual Winter Meeting**, University of Toronto. Contact: Canadian Mathematical Society, 577 King Edward Avenue, Ottawa, Ontario K1N 6N5.

JANUARY 1983

5-9. **American Mathematical Society Annual Meeting**, Denver, Colorado. Contact: AMS, P.O. Box 6248, Providence, RI 02940.
5-9. **Meeting of the Association for Women in Mathematics**, Denver, Colorado. Contact: AWM, Women's Research Center, Wellesley College, 828 Washington Street, Wellesley, MA 02181.
8-9. **Association for Symbolic Logic Annual Meeting**, Denver, Colorado. Contact: J. Donald Monk, Mathematics Department, University of Colorado, Boulder, CO 80309.

FEBRUARY 1983

14-17. **Fourteenth Southeastern Conference on Combinatorics, Graph Theory, and Computing**, Florida Atlantic University. Instructional lecture series by Paul Erdős, Victor Klee, Carl Pomerance, Jacobus H. van Lint, Fifteen-minute presentations on contributed papers. Abstract deadline: February 1, 1983. Contact: Professor Frederick Hoffman, Department of Mathematics, Florida Atlantic University, Boca Raton, FL 33431. (305-393-3345 or 305-393-3340).

MARCH 1983

28-31. **1983 Mathematics and Computation Topical Meetings, American Nuclear Society**, Salt Lake City, Utah. The theme is "Advances in Reactor Computations." Contact: Elmer E. Lewis, Department of Mechanical and Nuclear Engineering, Northwestern University, Evanston, IL 60201. (312-492-7025).

APRIL 1983

21-22. **Fourteenth Annual Pittsburgh Conference on Modeling and Simulation**, Pittsburgh, PA. Abstract Deadline: January 31, 1983. Contact: William G. Vogt or Marling H. Mickle, Modeling and Simulation Conference, 348 Benedum Engineering Hall, University of Pittsburgh, Pittsburgh, PA 15261.
25-27. **The Institute of Management Science/Operations Research Society of America Joint Meeting**, Chicago, Illinois. Contact: ORSA, 428 East Preston Street, Baltimore, MD 21202.

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IN THIS ISSUE: Annual Meeting Program