FOCUS

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Prospects for Math/Science Education Bills Now Uncertain

Hopes for passage of Senate Bill S.1285, "Education for Economic Security Act," which seemed almost certain last summer, are now considerably dimmed. This bill, reported out of committee last May, calls for a total of $425 million in FY 1984 and $540 million in FY 1985 for programs in science and mathematics education at both the National Science Foundation (NSF) and the Department of Education (DOEd). The fact that the Senate failed to bring this bill to the floor before adjourning for its winter recess has raised doubts among knowledgeable observers about its eventual passage.

One of the factors in the delay has been the announced intent of some Senators to tack on amendments adding school desegregation funds and a tuition tax credit provision to the bill. This has made the Senate leadership hesitant about bringing the bill to the floor knowing that debate would be both heated and time-consuming. Fortunately, there are some indications that this problem may now be resolved and that the bill will be brought to the Senate floor early in the next session. If this occurs, the 1984 elections will undoubtedly play a significant role in the outcome; however, whether they will increase or decrease the chances of its passage is by no means clear.

It should be noted that many of the NSF precollege activities now underway resemble some of what is called for in S.1285 and in the House version, H.R.1310, which was passed by the House on March 2. (See "NSF Announces 1984 Precollege Mathematics and Science Activities" on page 2 of this issue.) Although many Senators still strongly favor higher funding levels for NSF, the chief interest for some is not in NSF, but in the large amounts of money slated for DOEd programs.

Even if S.1285 passes in the next session of Congress, the differences between it and H.R.1310 are so great that resolution of these differences in conference is likely to be extremely difficult and the outcome uncertain. A final bill, passed by the House and the Senate and signed by the President, would provide authorization—not appropriations—to NSF and DOEd. Separate action would still be required for the funds to be actually appropriated to these agencies.

(continued on page 2)

Conference Sets New Goals for Mathematical Sciences Education

A prestigious group of representatives from the major mathematical sciences societies in the United States gathered for two days last November at Airlie House, a conference center just outside of Washington, D.C., to discuss what the community of mathematical sciences professionals should be doing about a wide range of problems in mathematical sciences education, kindergarten through college.

The impetus for the conference came from the flood of recent reports from national commissions, state task forces, and other groups documenting our nation's failure to provide sufficient numbers of its young people with a quality education in mathematics and science. These reports present a clear challenge to the mathematical sciences community—including its professional societies—to set up specific, realizable goals for improving mathematical sciences education at all levels and, working in partnership with schools and teachers, to begin taking the steps necessary to achieve these goals.

(continued on page 3)

Sixty-Seventh Annual MAA Meeting

The Sixty-Seventh Annual MAA Meeting will be held in Louisville, Kentucky, on January 26-28, 1984, at the Commonwealth Convention Center and the Hyatt Regency Louisville. The meeting program will feature eight minicourses, Richard D. Anderson's Retiring Presidential Address, seven fifty-minute invited addresses, a National Meeting of Department Chairmen, and various panel discussions and other sessions.

Complete program information appeared in the November-December issue of *FOCUS*. Although the preregistration deadline has now passed, anyone who wishes to attend the meeting may register at the Joint Mathematics Meetings Registration Desk in the Main Lobby of the Commonwealth Convention Center, Tuesday, January 24, 4:00 p.m.-8:00 p.m., Wednesday, January 25, 8:00 a.m.-5:00 p.m., or Thursday, January 26 through Saturday, January 28, 8:00 a.m.-4:00 p.m.

The meeting will be held in conjunction with the meetings of the American Mathematical Society, January 25-29 and the Association for Women in Mathematics, January 26-27.

Prospects *(continued from page 1)*

Despite these problems, there still is hope that a major new Federal initiative in mathematics and science education will be signed into law in 1984. Letters, phone calls, or telegrams from members of the mathematics community will help insure that S.1285 is brought to the Senate floor for consideration early in the second session of the 98th Congress.

NSF Announces 1984 Precollege Mathematics and Science Activities

In a recent report to the National Science Board, the National Science Foundation (NSF) outlined the major features of its FY 1984 precollege mathematics and science education program. The program will be administered by NSF's newly reestablished Directorate for Science and Engineering Education.

The policies adopted to guide this program, designed specifically to avoid problems experienced in past NSF science and mathematics education programs, include:

- Establishment of a clear focus on improving science and mathematics education for *all* students.
- Development of a *limited number* of precollege programs under which a variety of activities can be supported.
- Increased attention to publicizing results.
- Increased interaction with the Foundation's research directorates to foster the involvement of active research scientists and engineers in science education projects.
- Encouragement of novel high-leverage activities by universities and colleges, professional associations, private industry, and other groups.
- Development of mechanisms for systematic evaluation of the long-term effectiveness of NSF-funded activities.

Three major programs are planned for FY 1984:

Precollege Materials Development and Research

This program includes funds for development of new or improved science and mathematics instructional materials for students and the corresponding teacher instructional materials; research and development in the application of advanced technologies (particularly the computer) as educational and instructional tools for students and their teachers; development of new materials and approaches for (1) the instruction of undergraduate students who are training to become precollege science and mathematics teachers, and (2) the continuing improvement of precollege teachers who are currently teaching mathematics and science; and basic and applied research on effective teaching and learning of mathematics and science at the precollege level.

Precollege Teacher Development and Incentives

This program will provide support for local and regional programs and projects for the continuing education and professional development of precollege science and mathematics teachers; Presidential Awards for Excellence in Science and Mathematics Teaching; and Honors Workshops for Precollege Teachers of Science and Mathematics.

Special Activities

The Special Activities program will include support for improved understanding and awareness of precollege students and their teachers through programs of informal science education; activities to publicize and disseminate information about highly successful programs and outstanding quality research in science and engineering education; and studies and analyses of existing data bases to provide a systematic and continual understanding of the condition of precollege science and mathematics education in the United States.

In developing its precollege science and mathematics education program for FY 1984, NSF relied on policy recommendations issued by the National Science Board, recommendations from the National Science Board Commission on Precollege Education in Mathematics, Science, and Technology, discussions with leaders in the science and scientific education communities, and advice and instructions from Congress.

The goal of the NSF program, as stated in a quotation from the report of the NSB Commission is ". . . to provide all the Nation's youth with a level of education in mathematics, science, and technology, as measured by achievement scores and participation levels (as well as other non-subjective criteria), that is not only the highest quality attained anywhere in the world but also reflects the particular and peculiar needs of our Nation."

Program announcements may be obtained by sending a self-addressed mailing label to: Announcements, Directorate for Science and Engineering Education, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550.

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

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NSF Establishes Program for Research in Undergraduate Institutions

At its September meeting, the National Science Board approved establishment of a National Science Foundation program, Research in Undergraduate Institutions (RUI), to enhance the research contribution of the Nation's primarily undergraduate institutions. The new program also seeks to strengthen departmental research environments in which large numbers of students are encouraged to go on to graduate study and careers in scientific and engineering research.

Award eligibility as a "primarily undergraduate institution" is defined in both departmental and institutional terms: the department may not offer the doctorate and the campus may not confer an annual average of over 20 doctorates in science and engineering.

Awards are made in two categories: research and instrumentation. Research awards may be for projects conducted at the faculty member's home institution or at a research university or laboratory. Instrumentation awards, also based on research proposals, incorporate NSF's former Two- and Four-Year College Research Instrumentation program, which is now discontinued.

Applicants are requested to submit proposals directly to the appropriate NSF program office for the discipline involved, where the review process is managed and award recommendations are made. A program announcement (NSF 83-79) containing detailed guidelines for proposal submission may be obtained from: Forms and Publications Unit, Room 233, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550. (*NSF Bulletin*, November 1983.)

Conference *(continued from page 1)*

The conference, titled "New Goals for Mathematical Sciences Education," was sponsored by the Conference Board of the Mathematical Sciences (CBMS), an organization of the presidents of twelve national mathematical sciences societies—American Mathematical Association of Two-Year Colleges, American Mathematical Society, American Statistical Association, Association for Computing Machinery, Association for Symbolic Logic, Association for Women in Mathematics, Mathematical Association of America, Institute of Mathematical Statistics, National Council of Teachers of Mathematics, Society for Industrial and Applied Mathematics, Society of Actuaries, and The Institute of Management Sciences.

Participants in the conference included the presidents of four mathematical sciences societies and twenty other mathematical scientists and mathematical science educators who share a keen interest and concern about the state of mathematical sciences education in this country. Funding for the conference was provided by the National Science Foundation.

Starting from a list of eighteen salient issues in mathematical sciences education, the conference focused on those topic areas seen to hold the greatest potential for significant contributions from the mathematical sciences community—curriculum, teacher support networks, communication of standards and expectations, mathematical competence and achievement, remediation, and faculty renewal. Within each of these areas, working groups of conference participants developed wide-ranging recommendations for projects and activities to be carried out by professional societies, educational institutions, government agencies and individuals.

The conference also issued a strong and unanimous recommendation that CBMS establish a National Mathematical Sciences Education Board (or its equivalent). This Board would be responsible for developing a comprehensive view of the needs of mathematical sciences education in the United States and for carrying out, or helping others carry out, projects and activities to meet these needs. The Board would be expected to work actively to establish closer ties than heretofore have existed between the research and education communities in the mathematical sciences.

A draft report from the conference was presented to the CBMS Council at its semi-annual meeting in Washington, D.C., on December 1 by Herbert J. Greenberg of the University of Denver, who chaired the conference Steering Committee. The other members of the Steering Committee were Ingram Olkin of Stanford University, James Fey of the University of Maryland, Leon Henkin of the University of California-Berkeley, and Paul Sally of the University of Chicago. The Council "accepted in gratitude and approved in principle" the report and directed CBMS Chairman Henry O. Pollak to start taking the necessary steps toward establishment of a National Mathematical Sciences Education Board.

The final report of the conference, which contains the detailed findings of the conference, will be available by mid-January. Copies of the report may be obtained by sending a self-addressed mailing label to: New Goals, CBMS, 1529 Eighteenth Street, N.W., Washington, D.C. 20036. A summary of the recommendations of the conference will appear in the March-April issue of *FOCUS*.

from the Journal Editors' desks . . .

Getting Published

What kinds of things are published in the Association's three journals? On average, about 20 percent of everything that is submitted. But that's not the whole story: nearly two-thirds of *Articles* and *Notes* that are well written and of general interest are published. There is no backlog of high quality manuscripts.

Here's what works:

- Bridges between different areas of the undergraduate curriculum.
- Clever "nuggets" to spice up standard course material.
- Insights into areas of new emphasis: computer science, modeling, discrete mathematics . . .

And here's what doesn't:

- Extensions and perturbations of standard results.
- Anything written in choppy or sloppy English.

The *American Mathematical Monthly*, *Mathematics Magazine*, and *The (Two-Year) College Mathematics Journal* exist first to serve their readers, and then their authors. The sets of readers of these journals overlap quite a lot, with mathematical backgrounds that include those of high school students, graduate students, college teachers, and research mathematicians. (Detailed statements of editorial policy can be found in each of the three journals.)

Editors welcome manuscripts that fulfill their objectives. Most well-written papers which are on target can appear within one year of submission.

Paul Halmos, Editor
American Mathematical Monthly
Doris Schattschneider, Editor
Mathematics Magazine
Warren Page, Editor
(Two-Year) College Mathematics Journal

Travel Grants to ICME-5 Available

The MAA has received a grant of $30,450 from the National Science Foundation for the support of delegates to the Fifth International Congress on Mathematics Education (ICME-5). ICME-5 will be held in Adelaide, Australia, on August 24-30, 1984. Plans for the Congress were described in the November-December 1983 issue of *FOCUS*. Also appearing in that issue was a preliminary announcement of the travel grants.

ICME-5 is the only international forum for the exchange of information on mathematics instruction from kindergarten through college. At this time of crisis in precollege science and mathematics education in the United States, it is deemed vital that the United States be well-represented and that delegates bring back organized and comprehensive information on the proceedings.

The travel grants will be administered by a joint MAA/NCTM (National Council of Teachers of Mathematics) committee. Approximately twenty-five awards will be made to delegates who have a current or potential active interest in improving precollege mathematics education. The awards will not exceed the traveller's actual transportation costs to the Congress. Delegates will be required to submit written reports on the sessions of the Congress to MAA and NCTM.

Persons interested in applying for travel grants to ICME-5 should write for application materials to: ICME-5 Travel Grants, MAA, 1529 Eighteenth Street, N.W., Washington, D.C. 20036. Completed applications must be received by March 1, 1984.

Benbow and Stanley Reaffirm Findings on Sex Differences in Mathematical Ability

In 1980, Camilla Benbow and Julian Stanley of Johns Hopkins University reported large sex differences in mean scores on a test of mathematical reasoning ability for mathematically talented 7th and 8th graders who entered the Johns Hopkins Regional Talent Search from 1972 through 1979 (*Science*, December 12, 1980, p.1261). In a recent article entitled "Sex Differences in Mathematical Reasoning Ability: More Facts" (*Science*, December 2, 1983, pp.1029-1031), they report additional results obtained from SAT scores in connection with the Regional Talent Searches of 1980 through 1982. This latest report purports to establish a highly significant preponderance of males at the high end of the distribution of mathematical reasoning ability, a conclusion predicted by the authors earlier on the basis of their 1980 findings.

The SAT-M, designed to measure the developed mathematical reasoning ability of 11th and 12th graders, was administered to groups of students under age 13. One set of statistics was drawn from 7th graders from the Middle Atlantic Region of the United States who were selected for high intellectual ability. A second set came via a national talent search for which any student under 13 years of age willing to take the SAT was eligible.

The authors concluded that the results under the two separate procedures substantiated their prediction.

Although the 1980-82 sample was more general than the earlier sample and the representation of males and females was about equal (19,883 males and 19,937 females), the mean sex difference on the SAT-M remained constant at 30 points—male $\bar{X}$ = 416, female $\bar{X}$ = 386—with respective standard deviations of 87 and 74. Mean scores in verbal ability in both treatment groups were almost equal.

The authors felt that the most important phenomenon observed was the ratio of males to females among the high scorers. In the regional search, out of the highest possible score of 800, the male-to-female ratios ranged from 1.5:1 for those scoring 420 or more points to 4.1:1 for those scoring 600 or more points. In the national search, the ratio for those scoring 700 or more points was 13:1.

Several "environmental" hypotheses proposed to account for sex differences in mathematical ability were rejected by the authors. Their evaluations, both for the populations studied earlier and a subsample of the students in the current study, denied differences between male and female attitudes or background, including differential course-taking. No mention was made as to whether any attempt at analysis of the various items in the test was considered.

For more detailed information on the report, the reader is referred to the current article in *Science*.

The Microcomputer— A Second Chance

B. A. Fusaro

To understand the reception given the computer by established mathematics, it is necessary to journey back in time. The current dangerously imbalanced period of mathematics, which is showing signs of coming to a close, began with G. Cantor's fascinating creations (1878). Presumably mathematics could be seen as a pure creation of human thought, completely independent of the world of nature. This budding humanistic conceit was bolstered by the work of G. Frege (1884) and G. Peano (1897). The three "G's" laid the foundation for a new mathematics that came to full power after World War II, as exemplified by Bourbaki & Co. The ground floor was laid by the epic "Principia Mathematica" (1910-1913) of Whitehead and Russell, who purported to show all of mathematics was reducible to an abstract, severe logic, devoid of content. Ironically, the superstructure was erected by D. Hilbert (1904, 1927), known to applied mathematicians for his "Mathematical Physics." The workmen were urged on by G. H. Hardy, who believed that mathematics was creative, beautiful and valuable in some sort of inverse relation to its utility.

Statistics rapped on the door in the 1920's, but found no *Welcome* sign. In fact, it was clearly a case of *Do Not Disturb*. It went out to find a home where it could, usually in schools of agriculture or forestry. The field of operations research, developed during World War II, also found itself unwelcome and went to departments of engineering or business and management. Step by step, mathematics alienated itself from its scientific and engineering cognates. Even classical applied mathematics came to be viewed as an aberrant or interloper. Bourbaki-itis was epidemic, infecting even the precollege levels via the New Math.

This is the situation the computer bantling faced in the 1950's. Could an electronic apparatus breach the walls of abstract formalism? The message to the babe was predictable: *Go away*. And so it did, to engineering and business departments, and to administrative data processing centers. Thus an extraordinary tool for numerical or constructive mathematics became only remotely or indirectly accessible to departments that could have had mainframes for the asking.

Even today, the mathematical world seems largely unaware of this missed opportunity. So it is indeed a blessing that the mathematical maiden (to switch metaphors), through no virtue of her own, has a second chance. The second chance is the microcomputer.

The microcomputer, with costs and capabilities that would have left the mainframe architects gasping, has opened a window. Science departments, with their accustomed equipment budgets, may order $2000 microcomputers without raising an administrative eyebrow. Mathematics departments, however, have largely insisted that they are pencil-and-paper operations. Luckily, a view persists that somehow computers do belong in mathematics departments.

The term "microcomputer" and the association with electronic games do not suggest anything serious. Moreover, the formats do little to dispell the view that they are only toys or expensive gadgets. This is bolstered by a pervasive mainframe mentality that seems unwilling or unable to take microcomputers seriously. It is largely a question of perception. For example, a great deal of resistance to the microcomputer evaporated when the IBM Personal Computer hit the market in 1982. The situation was beautifully summarized by A. R. Immel (1983): "Corporate America has now blessed the microcomputer because IBM did." It also became OK for physicians and other professionals to buy microcomputers. Several engineering schools have broken the ice by requiring entering freshmen to buy microcomputers. Who can make it OK for academic mathematicians to take these midgets seriously?

The microcomputer has many roles to play in math education. We will be facing students who have spent a lifetime looking at screens, who expect mathematics to deal with computers, and who are likely to have had some computer experience. (K-12 teachers do not seem to have as much built-in resistance as those of us in colleges and universities.) Since the computer comes equipped with BASIC, we can now do what we could have started 25 years ago—write short programs for mathematical applications and have students do the same.

An important offspring of the "artificial intelligence" language LISP offers opportunities for math departments to get involved in computer activities. MACSYMA does symbolic differentiation, anti-differentiation, algebraic factoring, grouping and other symbolic operations. Although MACSYMA is too large for the current generation of desk-tops, there is a smaller version, Mu-math, available for under $300. The integral calculus and algebra will never be the same once students can buy their own Mu-math for a home computer.

The interesting language Logo puts at the user's disposal a powerful graphics geometry for as little as $75. There is currently a physical drawback in that screen resolutions are so low, often no better than 300 points horizontal by 200 vertical, but the 16-bit computers will change that. Computers with screens that will deliver high resolution are currently very expensive, but is likely that 600 by 400 resolution will be available for under $3000 in 1984.

Another language worth looking into is APL. Essentially a vector and matrix scratch-pad language, it is so powerful that APL programs seldom run over half a page. It is a mathematician's language, and a 10-minute exposure is enough

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In Memoriam

Arnold G. Horner, a Defense Department Mathematician from Fort Meade, Maryland, died August 24, 1983 at the age of 40. He was a member of the MAA for 16 years.

Leonard Procita of Albany Medical College, died March 25, 1983. He was a member of the MAA for 22 years.

Patrick M. Sutherland, an Operations Research Analyst for the United States Department of Transportation in Fort Worth, Texas, died September 29, 1983 at the age of 34. He was a member of the MAA for 3 years.

The Association has also been informed of the deaths of the following individuals: **Lewis C. Corey** of Bedford, Massachusetts, an MAA member for 10 years; **E. G. Strauss** of Los Angeles, California, an MAA member for 21 years; **Darrell C. Terrell** of Ada, Oklahoma, an MAA member for 28 years.

Microcomputer *(continued from page 5)*

to start a love affair. The requirements of a large memory and a special keyboard have shackled APL. There are now small versions that will work on some micros. By the end of 1984 off-the-shelf computers will have keyboards, or overlay templates, and large enough memories to have APL on tap.

The biggest opportunity to join up with the computer revolution is given by educational software. Here is a chance to inject some applied realism into our courses.

This software often takes the form of tutorials. It might be better to have software that parallels a modified standard text. (Such software is currently being prepared for calculus and for linear algebra.)

The reader might be recalling the Computer-Aided-Instruction (CAI) fizzle a few years ago. Even now, there is widespread criticism of available software. Educational software is more likely to improve if mathematicians will involve themselves in it. The graphics capabilities of emerging hardware present great opportunities for creative approaches to computer learning.

It requires only a slight knowledge of language coding to write educational software. Directions to the programmer can be written in modified English, supplemented by conventions to indicate what is to be done with graphics. The main ingredients for writing such software are definite goals, a willingness to lay the subject out in step by step detail, and the ability to assume the role of a student user who is sitting at the keyboard facing a screen. Here is a good chance to update subject matter, introduce applications, and maybe even make some money.

B. A. Fusaro, a member of the department of mathematical sciences at Salisbury State College, is education editor for SIAM NEWS.

Committee on Computers in Mathematics Education Appointed

In recognition of the important role which computing now occupies in mathematics education, MAA President Ivan Niven has appointed a Committee on Computers in Mathematics Education (C^2IME). The committee has been charged to advise the membership on all topics related to the use of computers in collegiate mathematics education. Among the issues to be examined by the committee are:

- The creation of mechanisms for sharing information and providing guidance to the mathematical community regarding hardware, software, and curricular innovations.
- The impact of the computer on mathematics curriculum and instruction.

The committee will work closely with other MAA committees on areas of mutual concern.

The committee members are Susan Devlin, Central Staff Organization-Bell Laboratories; David Lesley, San Diego State University; Jerome Goldstein, Tulane University; Gerald Porter (chair), University of Pennsylvania; Alan Schoenfeld, University of Rochester; J. Arthur Seebach, St. Olaf College; and Ronald Wenger, University of Delaware. MAA members with particular concerns are encouraged to communicate their ideas to the members of the committee.

People in the News

Richard D. Anderson, MAA Past President, and **Julia Robinson**, AMS President, have been elected, respectively, as Chairman and Chairman-Elect of the Council of Scientific Society Presidents (CSSP). CSSP is an organization of thirty-one scientific societies, including organizations in the mathematical, physical, life, and behavioral sciences. Programs and activities of the Council are concerned with policy issues of science and of science education.

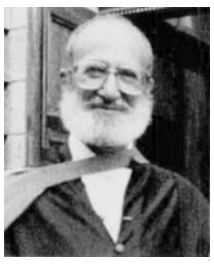
CSSP presented its first Award for Support of Science to **Congressman Don Fuqua** at its semi-annual meeting in Washington, D.C., last November. Congressman Fuqua, who has served as the Chairman of the Committee on Science and Technology of the U.S. House of Representatives since 1979, was cited for "his outstanding efforts on behalf of science, technology, research, and education" and for "his efforts to keep American science in its preeminent position in the world."

The Wolf Foundation Prize in Mathematics for 1983-84 has been awarded jointly to **Sling S. Chern** of the University of California-Berkeley and **Paul Erdos** of the Mathematical Institute, Hungarian Academy of Sciences, Budapest. The two veteran mathematical giants will share the $100,000 award.

Professor Chern was cited for his outstanding contributions to "global differential geometry, which have profoundly influenced all mathematics." Professor Erdos, said to be "one of the most prolific mathematicians of all time" was honored for his ". . . numerous contributions to number theory, combinatorics, probability, set theory, and mathematical analysis, and for personally stimulating mathematicians the world over."

Don Hill of Florida A & M University has been commended by Speaker H. Lee Moffitt of the Florida House of Representatives for his role as a member of the Speaker's Task Force on Mathematics, Science, and Computer Education. Recommendations of the Task Force formed the base for the Education Reform Act of 1983, landmark legislation in education appropriating $40 million for improvement in mathematics and science in the schools and colleges of Florida.

Professor Hill is the Governor of the MAA Florida Section and chairs the National Academy of Science/National Research Council U.S. Commission on Mathematical Instruction.



Paul R. Halmos, Distinguished Professor of Mathematics at Indiana University and Editor of the *American Mathematical Monthly*, has been awarded the 1983 Steele Prize, in the expository writing category, by the American Mathematical Society (AMS). The citation for the award states: "The award . . . is made to Paul R. Halmos for his many graduate texts in mathematics, dealing with finite dimensional vector spaces, measure theory, ergodic theory and Hilbert space. Many of these books were the first systematic presentations of their subjects in English. Their felicitous style and content has had a vast influence on the teaching of mathematics in North

America. His articles on how to write, talk and publish mathematics have helped to communicate their ideas and results more effectively." Professor Halmos was presented with a check for $1500 at the Summer Meeting of the AMS in Albany, New York, last August.

Professor Halmos was also honored by the MAA at the Summer Meetings for his expository writing, receiving the Pólya Award for his article "The Thrills of Abstraction" in the September 1982 issue of the *Two-Year College Mathematics Journal*. (See *FOCUS*, November-December 1983.)

MAA to Produce Multi-Media Learning Modules

The MAA has received a three-year grant from the Fund for the Improvement of Post-Secondary Education (FIPSE) to support a project *Teaching Experiential Applied Mathematics* (TEAM) under the direction of Professor John Jobe of Oklahoma State University (OSU). Funding for the first year has been approved by FIPSE; funding for years 2 and 3 is contingent on satisfactory progress in year 1 and availability of funds in these years.

The project, which will be conducted mainly at OSU, will produce six multi-media classroom learning modules for colleges in which mathematical applications are presented in a form closely approximating their origin in industry. Using video-cassettes, printed materials, and computer software, each learning module will present an industrial representative describing a problem which actually arose in his or her company, help students to create their own mathematical models leading to solutions of the problem, and allow the industrial representative to "wrap-up" the project by describing how mathematically trained analysts in the company solved the problem.

The learning modules will be designed for use in standard undergraduate courses and will be made available to mathematics departments in the United States upon completion of the project. TEAM will make use of ideas developed recently by Professors Jean Agnew and Marvin Keener, both of OSU, with support from the National Science Foundation. Progress reports and announcements of availability of TEAM learning modules will appear in future issues of *FOCUS*.

Articulation Committee Awarded Grant from Lilly

The Joint MAA/NCTM Committee on Articulation has been awarded a $7200 grant from the Lilly Foundation of Indianapolis, Indiana. The committee is concerned with the transition from secondary school to college mathematics, and has been collecting data on high school graduation requirements, state-wide university entrance requirements, and articulation projects of a local or a state-wide nature. The funding from Lilly will enable the committee to hold planning meetings in order to analyze these findings and determine ways in which this information, and other related materials, can best be made available to teachers, administrators, and other interested persons.

Anyone with information that might be helpful to the committee should write to the chairman of the committee, Professor Billy E. Rhoades, Department of Mathematics, Indiana University, Bloomington, IN 47405.

MAA Sections to Hold Summer Short Courses

Maryland-DC-Virginia

Two five-day workshops, sponsored by the Maryland-DC-Virginia Section of the MAA, will be given at Salisbury State College on the Eastern Shore of Maryland this June. This is the ninth year the Section has sponsored workshops in applied mathematics.

"Teaching Mathematics via APL," June 4-8, will be given by K. E. Iverson of Sharp Associates of Toronto and D. L. Orth of IBM Research Center, Yorktown Heights. Dr. Iverson invented APL and has done extensive writing on this powerful interactive language. Dr. Orth has been active in APL work and wrote the text *Calculus in a New Key*.

"Exploratory Data Analysis," June 11-15, will be given by Peter Bloomfield of the North Carolina State University Statistics Department. Dr. Bloomfield is former chairman of the Princeton State Department and has been active in EDA short courses.

The cost, including room and board, is $190 for each five-day workshop. For more information, write or call Dr. B. A. Fusaro, Department of Mathematical Sciences, Salisbury State College, Salisbury, MD 21801 (301-543-6470 or 6465).

Ohio

"Systems Programming," Denison University, June 11-29, 1984 (See *FOCUS*, November-December 1983).

A grant from the GTE Corporation will cover all expenses related to instruction and use of facilities. The cost of room and board is $475. For additional information and/or application forms, write or call: Dr. Zaven A. Karian, Mathematical Sciences Department, Denison University, Granville, Ohio 43023 (614-587-6563).

Calendar

National MAA Meetings

67th Annual Meeting, Louisville, Kentucky, January 26-28, 1984.
64th Summer Meeting, Eugene, Oregon, August 16-19, 1984.
68th Annual Meeting, Anaheim, California, January 11-13, 1985.
69th Annual Meeting, New Orleans, Louisiana, January 9-11, 1986.

Sectional MAA Meetings

Allegheny Mountain Washington & Jefferson College, Washington, Pennsylvania, April 13-14, 1984.
Florida University of Tampa, Tampa, Florida, March 9-10, 1984.
Illinois Eastern Illinois University, Charleston, Illinois, April 27-28, 1984.
Indiana Rose Hulman Institute of Technology, Terre Haute, Indiana, April 14, 1984.
Intermountain Ricks College, Rexburg, Idaho, April 27-28, 1984.
Iowa Wartburg College, Waverly, Iowa, April 13-14, 1984.
Kansas Bethel College, North Newton, Kansas, March 30-31, 1984.
Kentucky Centre College, Danville, Kentucky, March 30-31, 1984.
Louisiana-Mississippi Southeastern Louisiana University, Hammond, Louisiana, February 17-18, 1984.
Maryland-DC-Virginia Virginia Commonwealth University, Richmond, Virginia, April 13-14, 1984.
Metropolitan New York College of Mount St. Vincent, Riverdale, New York, May 6, 1984.
Michigan University of Michigan, Ann Arbor, Michigan, May 4-5, 1984.
Missouri Southeast Missouri State University, Cape Girardeau, Missouri, April 27-28, 1984.
Nebraska Nebraska Wesleyan University, Lincoln, Nebraska, April 13-14, 1984.
New Jersey Montclair State College, Montclair, New Jersey, March 10, 1984.
North Central Macalester College, St. Paul, Minnesota, April 27-28, 1984.
Northern California San Francisco State University, San Francisco, California, February 25, 1984.
Ohio Bowling Green State University, Bowling Green, Ohio, April 13-14, 1984.
Oklahoma-Arkansas Arkansas Tech University, Russellville, Arkansas, March 30-31, 1984.
Pacific Northwest In conjunction with National Meeting in Eugene, Oregon, August, 1984.
Rocky Mountain U.S. Air Force Academy, Colorado, April 27-28, 1984.
Seaway Broome Community College, Binghamton, New York, April 6-7, 1984.
Southeastern Tennessee Tech University, Cookeville, Tennessee, April 6-7, 1984.
Southern California California State University, Los Angeles, California, March 3, 1984.
Southwestern Arizona State University, Tempe, Arizona, April 13-14, 1984.
Texas University of Texas at Tyler, Tyler, Texas, April 6-7, 1984.
Wisconsin St. Norbert College, DePere, Wisconsin, April 13-14, 1984.

Other Meetings

JANUARY 1984

23-24. **AMS Short Course**, "Mathematics of Information Processing." Louisville, Kentucky. Contact: AMS, P.O. Box 6248, Providence, RI 02940.

23-25. **NCTM Seminar Series**, "Teaching Math With Microcomputers," Las Vegas, Nevada. Contact: NCTM, 1906 Association Drive, Reston, VA 22091.

25-29. **90th Annual Meeting of the American Mathematical Society**, Louisville, Kentucky. Contact: AMS, P.O. Box 6248, Providence, RI 02940.

26-27. **Meeting of the Association for Women in Mathematics**, Louisville, Kentucky. Contact: AWM, Women's Research Center, Wellesley College, 828 Washington Street, Wellesley, MA 02181.

MARCH 1984

5-8. **Fifteenth Southeastern Conference on Combinatorics, Graph Theory and Computing**, Louisiana State University, Baton Rouge, Louisiana. Instructional lecture series by Paul Erdos, William M. Kantor, Paul Seymour, and Robert Tarjan. There will be sessions for fifteen-minute contributed papers. Abstract deadline: February 20. Contact K. B. Reid, Department of Mathematics, Louisiana State University, Baton Rouge, Louisiana 70803 (504-388-1665).

APRIL 1984

13-15. **National Conference on Microcomputers and Basic Skills in College**, The Instructional Resource Center of The City University of New York, New York City. Call for papers on use of microcomputers in postsecondary basic skills instruction including mathematics (arithmetic through precalculus). Deadline for abstracts: February 7. Contact: Geoffrey Akst, Conference Chair, Instructional Resource Center, The City University of New York, 535 East 80th Street, New York, NY 10020 (212-794-5425).

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

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

MAY 1984

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

JUNE 1984

4-8. **Maryland-DC-Virginia Summer Workshop**, "Teaching Mathematics via APL," Salisbury State College. (See "MAA Sections to Hold Summer Short Courses" on page 7 of this issue.)

11-15. **Maryland-DC-Virginia Summer Workshop**, "Exploratory Data Analysis," Salisbury State College. (See "MAA Sections to Hold Summer Short Courses" on page 7 of this issue.)

11-19. **Ohio Section Short Course**, "Systems Programming," Denison University, Granville, Ohio. (See "MAA Sections to Hold Summer Short Courses" on page 7 of this issue.)

AUGUST 1984

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

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