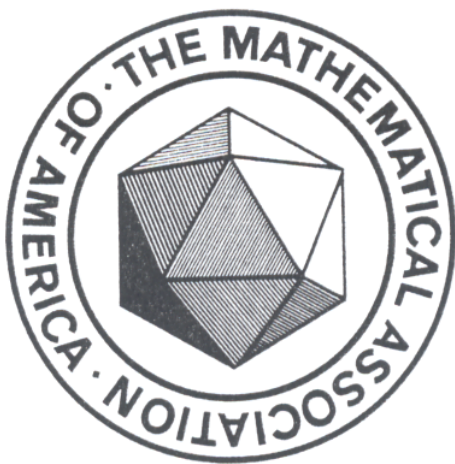# MARYLAND—DISTRICT OF COLUMBIA—VIRGINIA SECTION OF THE MAA NEWSLETTER

vol 7 No 4 March 1986

MARYLAND—DISTRICT OF COLUMBIA— VIRGINIA SECTION OF THE MAA NEWSLETTER

SPRING MEETING AT MARY WASHINGTON COLLEGE

Mary Washington College in Fredericksburg, Virginia will host the spring meeting of the MD-DC-VA section of the MAA on April 26. We will be electing a Vice-Chairman for Programs and a Chairman-Elect at the meeting. Anyone interested in placing a name in nomination (self nominations are permissible) may contact a member of the nominating committee: Professors Caren Diefenderfer (Department of Mathematics, Hollins College, Hollins College, Virginia 24010, 703-362-6524), Ed Bender (J. Sargeant Reynolds Community College, Downtown Campus, P. O. Box 12084, Richmond, Virginia 23241, 804-786-7374) or Flo Ashby (Department of Mathematics, Montgomery College, Rockville, Maryland 20850, 301-279-5194).

Registration and talks will take place in Monroe Hall (see map). The Seacobeck Dining Hall will be the site of a cold buffet luncheon consisting of roast beef, turkey and ham slices, Swiss and American cheese slices, assorted salads, rolls and desserts, iced tea or lemonade. Reservations must be made by April 18. The preregistration form may be found elsewhere in the newsletter. The cost is a real bargain at $5.

INVITED SPEAKERS

Our invited speakers are Dr. Kathleen Heid and Dr. Stefan Shrier.

Dr. Heid is an assistant professor of mathematics education at Penn State University at University Park. Her research interests center on assessing conceptual understanding of calculus and on the use of the computer as a tool in teaching mathematics. She was a contributing author to the University of Maryland - NCTM publication Computing in Mathematics and author of a November 1983 Computing Teacher article "Calculus with muMath: Implications for Curriculum Reform." An abstract of her talk follows.

The Use of a Symbol Manipulation Program (muMath) to Refocus Calculus on Concepts

Sophisticated computer tools (graphers and symbol manipulators) can be used in an applied calculus course to shift students' attention to the understanding of concepts. In a study to be discussed, applied calculus

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students used muMath and computer graphing programs to perform all routine manipulations during the first twelve weeks of the semester. The course developed conceptual understanding to a greater degree than is usually true in the traditional skills-first course.

Dr. Shrier has been Technical Director at Grumman-CTEC, Inc. since 1983 and currently serves as Director of the Laboratory for Machine Intelligence and Correlation. He provides technical oversight for a variety of projects undertaken by the company. He is also responsible for research and development programs conducted within the Laboratory and the application of machine intelligence technology. Concurrently, Dr. Shrier is Adjunct Professor of Computer Science at George Mason University. Dr. Shrier received his Ph. D. in Applied Mathematics from Brown University and his B. S. and M. S. degrees in Engineering Mathematics and Operations Research from Columbia University. An abstract of his talk follows.

Machine Intelligence in a Problem Solving Context

As a computer technology, machine intelligence, expressed as Symbolic computation, is almost as old as the computing used during the Second World War to solve diffusion equations and calculate artillery tables. Unlike numerical computing, Symbolic computation has until recently been confined to research laboratories where feasibility not performance is emphasized. End-user interest, peaked by burgeoning success in applications, has fueled excitement and expectation that further promote interest in this field. However, an "aura of mystery" surrounds this emerging technology. Broadly-based in diverse disciplines such as mathematics, psychology, linguistics and philosophy, its practitioners generate discussions reminiscent of those that surrounded Operations Research not too long ago. Describing "Operations research" in 1959, T. L. Saaty wrote:

As an organized field, operations research is in its early growth. The inability of those who conduct research in operations to state succinctly their function in the research world has both good and bad effects. On the negative side, an unsought aura of mystery has grown up around the name, clouding the picture of what is really going on and preventing an informed evaluation. On the positive side, lack of confinement to a conventional domain has meant that no group has been kept out and, consequently contributions have come from a wide variety of sources.

With minor editing these words aptly describe machine intelligence. This tutorial will lift the contemporary aura of mystery that traces the intellectual origins, and will provide an historical perspective that

specific techniques and landmark achievements of machine intelligence.

MARY WASHINGTON COLLEGE

Small, state-supported, residential, coeducational, liberal arts - Mary Washington College is unique among Virginia Colleges. With an enrollment of 2700 degree seeking undergraduates, MWC is large enough to offer a broad range of academic programs: 19 departments offer 32 majors. Yet, in both enrollment and atmosphere, MWC is one of Virginia's small colleges.

Although MWC's reputation in academics and quality of campus life have led many to believe that it is a private college, it is one of the 15 senior colleges in Virginia receiving state support. With almost 80% of the students living in 19 residence halls, MWC offers the advantage of a truly residential campus.

Named for George Washington's mother, MWC is located on the site of the battle of Fredericksburg; however its location had significance long before the Civil War. The nation's first president grew up here and the town became a favorite meeting place for the founding fathers.

MWC was founded in 1903 as the State Normal and Industrial School for Women in Fredericksburg and became affiliated with the University of Virginia in 1944 as its women's undergraduate liberal arts college. In 1970 the College became coeducational and in 1972, by action of the General Assembly of Virginia, the College became an independent state supported institution with its own governing board.

The College has adopted the provision of instruction of the highest quality as its most pervasive and important function. Its philosophy is that quality education is the sum of excellent teaching, small classes and personal attention to students. Excellent teaching is encouraged by hiring and rewarding faculty members who see their primary role as teachers. MWC's educators come from a variety of backgrounds and 84% hold doctoral degrees. Full professors teach at all levels. Personal attention comes in the form of faculty members being available for consultation or advising and from the ease of posing questions in small classes - 50% of the classes have fewer than 15 students.

The Department of Mathematical Sciences and Physics includes mathematics, computer science and physics. There are 10 full time faculty members in mathematics. The number of declared majors in mathematics for the past three semesters were 46 (Fall 1984), 61 (Spring 1985) and 50 (Fall 1985).

Changing Times magazine analyzed the nation's colleges in terms of value given for tuition paid. It called MWC "one of the best buys in higher education in America." For the resident of Virginia living in a residence hall, the annual charge (1985-1986 session)

is $4320 including room, board, tuition, college fees, student activities fees and health center privileges. The same services are $5980 per year for a resident of another state. A commuting student from Virginia pays $1578 per year. The low tuition is a result of the support MWC receives from the state of Virginia as well as private contributions from friends of the college.

Located near Interstate 95, MWC is 50 miles from both Washington and Richmond, and 70 miles from Charlottesville. Amtrak and I-95 provide rapid north-south transportation.

Finally, many of the members of the college community feel that the best thing about MWC is its picturesque 275-acre campus, which offers the beauties of traditional Virginia landscaping and architecture. It has attracted many a student to attend MWC who only "stopped by to look it over." "At the end of April, if the weather cooperates, the campus should be at its peak.

DIRECTIONS TO MARY WASHINGTON COLLEGE

The college is located in Fredericksburg, just off Route 3 (which is called Plank Road and then William Street as you enter the city).

By car: Fredericksburg is located almost midway between Washington, DC and Richmond, Va. Driving time from either city is approximately one hour along I-95 in non-rush hour traffic. Ada 15 to 30 minutes for rush hour.

To get to the campus from I-95, take the Route 3 EAST exit, stay in the LEFT lane on Route 3 for 2 miles until (after rounding a gentle bend at the top of the hill) the lane distinctions end. At the next light, turn LEFT onto College Avenue and then at the next light, turn RIGHT, entering through the main gate onto Campus Drive. Follow the signs to parking. Registration is in Monroe Hall.

By air: From either Washington National Airport or Byrd Airport in Richmond, Groome Transportation runs a limousine service during most of the day, leaving each airport at every hour on the half hour, direct to the Sheraton-Fredericksburg Resort & Conference Center. Call (800)-552-7911 for specific times and costs. It takes 5 to 10 minutes by taxi to travel from the Sheraton to the college.

HOTEL/MOTEL RESERVATIONS

You should make your own reservations. Many motels offer reduced rates if you mention that you are attending the Mary Washington College mathematics meeting and several offer senior citizen discounts. The one marked with (@) will give reduced rates if at least 10 rooms have been booked in conjunction with the meeting. All have Fredericksburg, VA 22401 as the last line of the address.

Since the springtime is prime tourist season, you are strongly advised to make any reservations early.

Kenmore Inn
Lewis and Princess Anne Street
The regular rate is $60.00 per room, but we are being given a $15.00 "corporate discount" if you mention MWC. Price includes a continental breakfast.
703-371-7622 (approx. 5 min. to MWC)
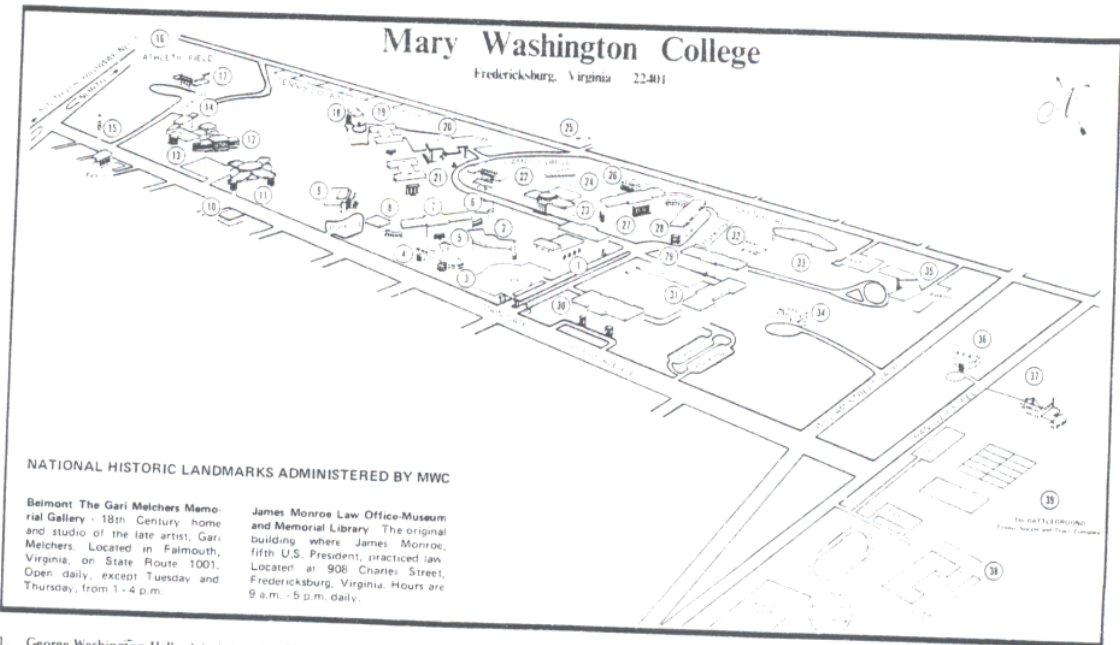
Thunderbird Motor Inn
On Route 3, just east of the I-95 and Route 3 interchange
Prices: Single $30.95
Double $40.95
703-371-5050 (approx. 5 min. to MWC)

Econo Lodge
On Route 3, west of the I-95 and Route 3 interchange
Prices: 1 person - 1 bed $24.95 + tax
2 people - 1 bed $28.95 + tax
2 people - 2 beds $32.95 + tax
703-786-8374 or toll-free: 800-582-5882 (approx. 5-10 min. to MWC)

Sheraton-Fredericksburg Resort & Conference Center (@)
On Route 3, west of the I-95 and Route 3 interchange
Prices: Single $59.00
Double $69.00 (Group rate)
703-786-8321 or toll-free: 800-325-35535 (approx. 5-10 min. to MWC)

Best Western - Thunderbird Motor Inn
On Route 3, west of the I-95 and Route 3 interchange
Prices: Same as Thunderbird Motor Inn (above)
703-786-7404 toll-free: 800-528-1234 (approx. 5-10 min. to MWC)

Ramada Inn - Spotsylvania Mall
On Route 3, west of the I-95 and Route 3 interchange
703-786-8361 toll-free: 800-2 RAMADA (approx. 5-10 min. to MWC)

Mary Washington College
Fredericksburg, Virginia 22401

NATIONAL HISTORIC LANDMARKS ADMINISTERED BY MWC

Belmont The Gari Melchers Memorial Gallery - 18th Century home and studio of the late artist, Gari Melchers. Located in Falmouth, Virginia, on State Route 1001. Open daily, except Tuesday and Thursday, from 1 - 4 p.m.

James Monroe Law Office-Museum and Memorial Library The original building where James Monroe, fifth U.S. President, practiced law. Located at 908 Charles Street, Fredericksburg, Virginia. Hours are 9 a.m. - 5 p.m. daily.

1. George Washington Hall - Administration Hall
2. Westmoreland Hall - Residence Hall
3. Hamlet Hall - Residence Hall
4. Fairfax Hall - Residence Hall
5. Tyler Hall - Residence Hall
6. Madison Hall - Residence Hall
7. Ball Hall - Residence Hall
8. Custis Hall - Residence Hall
9. Chandler Hall - Academic Hall
10. U. S. Post Office
11. Seacobeck Hall - Dining Hall
12. Melchers Hall - Academic Hall
13. duPont Hall - Academic Hall
14. Pollard Hall - Academic Hall
15. Heating Plant
16. Athletic Field
17. Goolrick Hall - Gymnasium
18. Mercer Hall - Residence Hall
19. Willard Hall - Residence Hall
20. Monroe Hall - Academic Hall
21. Virginia Hall - Residence Hall
22. Lee Hall - Student Services, Health Center Counseling Center, Bookstore, Police
23. Trinkle Library
24. Amphitheater
25. Cornell Hall - Residence Hall
26. Marye Hall - Residence Hall
27. Mason Hall - Residence Hall
28. Randolph Hall - Residence Hall
29. Bushnell Hall - Residence Hall
30. Combs Hall - Academic Hall
31. Jefferson Hall - Residence Hall
32. Brent Hall - Residence Hall
33. Russell Hall - Residence Hall
34. Framar Hall - Residence Hall
35. Marshall Hall - Residence Hall
36. Trench Hill - Development and Alumni Offices
37. Brompton - President's Home
38. Physical Plant Building - Maintenance
39. The Battleground - Athletic Complex

The MD-DC-VA Section of the MAA

Will Sponsor
Two Workshops at
SALISBURY STATE COLLEGE
on the Eastern Shore of Maryland

MATHEMATICAL MODELING   2 - 6 JUNE 1986

Dr. F.R. Giordano, U.S. Military Academy and **Dr. M.D. Weir,** Naval Postgraduate School. The lecturers are joint authors of the recently-published book "A First Course in Mathematical Modeling". Dr. Giordano has prepared faculty to teach modeling courses, both at West Point and other campuses.

MON   Teaching an undergraduate modeling course. Graphical models.
TUE   The modeling process. Modeling via proportionality.
WED   Model fitting. Empirical model construction.
THR   Dimensional analysis & similitude. Monte Carlo simulation.
FRI   Modeling via the derivative. Modeling dynamic systems.

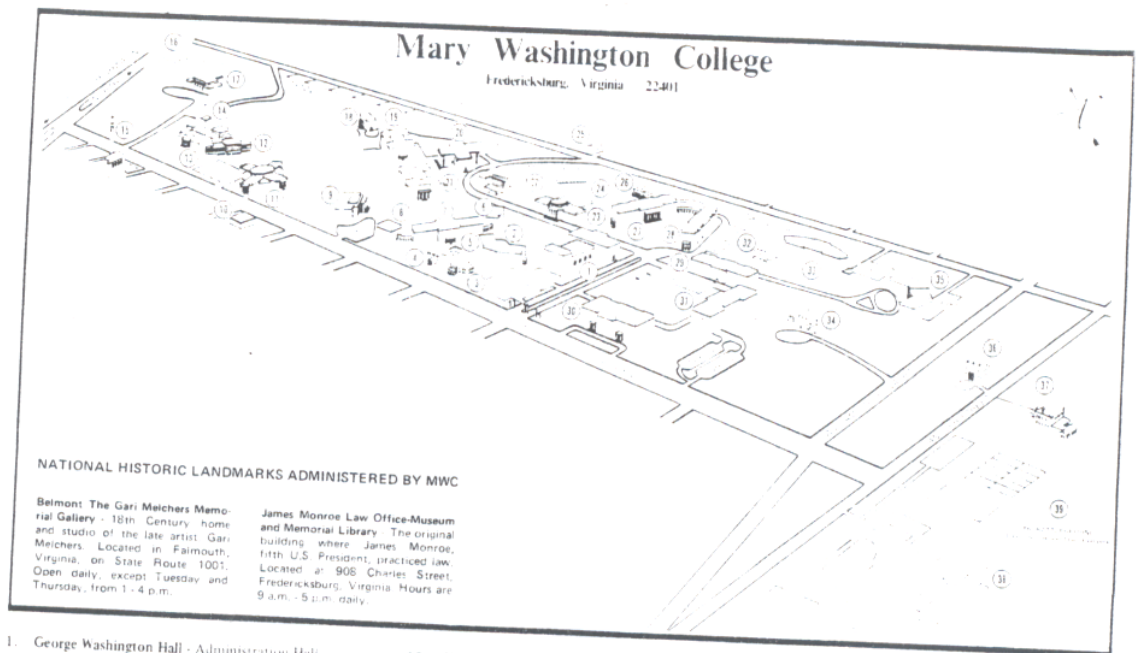## DISCRETE MATHEMATICS WITH DIFFERENCE EQUATIONS   9 - 13 JUNE 1986

Dr. J.T. Sandefur, Georgetown University. He received his PhD from Tulane in 1974. He has taught discrete mathematics since 1977 and presented a minicourse on the topic at the MAA annual meeting in January 1986. Dr. Sandefur is writing an undergraduate discrete mathematics text based on the concept of recursion.

MON   Recursion and iteration via first order difference equations. Applications.
TUE   Stability, non-linear difference equations, and chaos.
WED   An iterative approach to counting arguments. Probability.
THR   Applications of probability & recursion. Gambler's ruin. Topics in genetics.
FRI   Linear algebra applied to systems of difference equations. Strange attractors.

These workshops are intended for college mathematics teachers. The total cost is $210 per workshop *including meals and room* (double occupancy). There is a deposit of $100 per workshop, refundable until 9 May 1986.

WORKSHOP DIRECTOR: Dr. B.A. Fusaro   (301) 543-6470 or 543-6471
Dept Math Sciences, SSC, Salisbury, MD 21801

Mary Washington College
Fredericksburg, Virginia 22401

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38. Physical Plant Building - Maintenance
39. The Battleground - Athletic Complex

The Maryland - District of Columbia - Virginia Section
of the Mathematical Association of America

Spring Meeting
Saturday, April 26, 1986
Mary Washington College
Fredericksburg, Virginia

All talks and meetings will be in Monroe Hall

8:00 - 11:00 Registration outside Monroe 204

8:30 - 11:00 Coffee and donuts available in Monroe 204

8:40
Monroe 104 "Welcoming Remarks"
Philip L. Hall, Vice President for
Academic Affairs

9:00
Monroe 104 INVITED ADDRESS   1 Hour Presentation
"The Use of a Symbol Manipulation Program
mu(Math)) to Refocus Calculus on Concepts
Dr. Kathleen Heid, Pennsylvania State University

10:00
Monroe 101 "Using LOGO to Explore the Properties of Fractals"
Thomas C. McMillan, Radford University

10:00
Monroe 102 "Ties at Rotation"
Howard Penn, U. S. Naval Academy

10:30
Monroe 202 "The Eigenvalue Problem for the Dielectric Rod"
James P. Coughlin, Towson State University

11:00
Monroe 101 "Using the IBM-PC in the College Math Classroom:
Developmental Math through Differential Equations"
Mary Kay Abbey, Elizabeth Teles, Montgomery College

11:00
Monroe 102 "Combinatorial Card Games"
Craig Bailey, U. S. Naval Academy

11:00
Monroe 202 "Spatial Problem Solver and Its Associated Spatial
Representation"
Douglas Chubb, U. S. Army Signal Warfare Center

11:00
Monroe 104 MAA BUSINESS MEETING

11:45 - 12:45 LUNCH   Seacobeck Dining Hall
See details elsewhere in the newsletter

12:30 - 1:00

1:00
Monroe 104 INVITED ADDRESS   1 Hour Presentation
"Machine Intelligence in a Problem-Solving Context"
Dr. Stefan Shrier, Grumman-CTEC, Inc.

2:00
Monroe 101
"Semi-intelligent Computer Assisted Instruction Model"
Nimer. F. Baya'a, American University

102
"Right Brain, Left Brain, and No Brain: Matching Styles of Learning with Styles of Teaching": Matching Styles of Education?" As a result of the discussion I was requested to
Robert F. Abbey, Office of Naval Research
Mary Kay Abbey, Montgomery College

202
"Not Pitchers"
Mark Kidwell, U. S. Naval Academy

2:30
Monroe 101
"Teach Beginning Calculus with a Numerical Emphasis"
G. Edgar Parker, James Madison University

102
"Initializing the Transportation Problem"
Benjamin L. Schwartz, Collins Communications Systems Division

202
"Several Presentations of S_n"
William T. Wardlaw, U. S. Naval Academy

3:00
Monroe 101
"A Branch and Bound Algorithm for Integer Programming"
Carvel S. Wolfe, U. S. Naval Academy

102
"Design of an X-Ray Telescope for the High Energy Astronomical Observatory"
Bernice Kastner, University of Maryland

202
"Composition Roots and Approximate Analytic Roots"
James E. Clark, Western Maryland College

3:30
Monroe 101
"PROLOG and Proof by Analytic Tableaux"
Daniel B. Widdis, U. S. Naval Academy

102
"Results of the 1986 Math Competition in Modeling"
Ben Fusaro, Salisbury State College

202
"A Decomposition Theorem for Minkowski Sums of Polytopes"
Jim Lawrence, George Mason University

NOTES FROM THE CHAIRMAN

During our Fall meeting at Montgomery College about thirty members attended a forum entitled "Should Our Section Become Involved in Issues Relating to Elementary and High School Mathematics Education?" As a result of the discussion I was requested to contact the executive committees of local sections of the National Council of Teachers of Mathematics to determine to what extent our cooperation in their efforts to strengthen mathematics programs would be welcome.

To date there has been one positive response. James Mullenex, President of the Virginia Council of Teachers of Mathematics, has written to express his interest in joint efforts which might "enhance the teaching and learning of mathematics in the public schools." He promised to discuss our proposal at the next meeting of the Executive Board of VCTM. His seems like a very active organization. In addition to an annual conference, they offer awards each year to a mathematics teacher in each of the four levels of elementary, middle, secondary and college teaching, and they provide a $500 scholarship to a college senior preparing to teach mathematics. They also publish a very impressive journal, Virginia Mathematics Teacher, three times a year.

As a follow-up I have proposed to Mr. Mullenex that the Spring 1987 meeting of both our organizations be held jointly. If he favors this suggestion, we will begin working on the feasibility and logistics of such a meeting.

Although definite dates have not yet been established, the fall section meeting will take place in November 1986 at Loyola College in Baltimore.

- Bob Lewand

MAA PLACEMENT EXAMINATIONS

Many of you know that the MAA's Committee on Placement Examinations (COPE) was formed in 1977 to provide national leadership in the area of collegiate mathematics placement testing. COPE administers a program called the Placement Test Program (PTP) which provides a battery of placement tests to collegiate institutions on an annual subscription basis. The committee also publishes a newsletter, provides consulting services to colleges and universities and conducts minicourses on placement testing at national meetings. COPE is active in prognostic testing and has produced two tests for this use in the high schools. It currently has a proposal before the NSF for a national conference on prognostic testing.

Some nineteen institutions in the MD-DC-VA section are using COPE's examinations to determine placement into calculus and precalculus courses.

Each institution determines its own cutoffs for placement into courses. COPE provides subscribers a summary each year which gives a general indication of how subscribers placed students on the basis of the tests.

COPE has recently appointed Sectional Representatives who are charged with providing information to the sections about the program. Our representative is Fred Gooding of Goucher College. Anyone desiring more information can write or call Prof. Gooding at the Department of Mathematics and Computer Science, Goucher College, Towson, MD 21204. The telephone number is 301-337-6285.

GOVERNOR'S REPORT

The meeting in New Orleans was an interesting one, with almost as much suspense as the Super Bowl two weeks later. It was nice that a number of members of the section were able to attend.

At the Association's business meeting, the amendments to the bylaws (which previously had been endlessly discussed) were adopted without further discussion.

Like any other board, the Board of Governors conducts most of its business through committees. The Board adopted a statement titled "College and University Responsibilities for Mathematics Teacher Education" which was prepared by the Committee on Mathematical Education of Teachers. The statement is to be distributed to department chairmen and deans throughout the country. The Board also endorsed a National Council of Teachers of Mathematics statement on "Mathematics Credit for Computer Courses." The Board also approved a series of minor amendments to the bylaws which were recommended by the Executive and Finance Committees and by the Committee on Sections. There were several elections by the Board. Donald Kreider of Dartmouth College was elected to complete the unexpired term of the previous Treasurer, Leonard Gillman, who became the President-Elect. Two Governors-at-Large were elected, including Professor Rogers J. Newman of Southern University who is a Commonwealth Visiting Professor at Longwood College in Farmville, Virginia, this year. The Board also received reports from a number of other committees.

It has been a pleasure to represent you on the Board during the past three years. Unfortunately, sometimes I think that I am just catching onto the job and my time is expiring. I look forward to serving you in other capacities.

— John Smith

SMITHSONIAN EXHIBIT

Three small exhibits will open at the National Museum of American History on March 31, 1986 that focus on mathematics. On the first floor two exhibits "Learning Mathematics with Objects" and "Learning Mathematics with Books" can be seen during all museum

hours. In the Didner Library on the third floor is an exhibit "Classics of Mathematics", containing originals of classic mathematics books. This latter exhibit may be viewed from 10:00 - 4:30 by appointment only.

MAA AND OSU RECEIVE $742000 GRANT

The National Science Foundation has awarded a grant of $742000 to fund the program Applications in Mathematics (AIM) of the Mathematics Association of America and Oklahoma State University. The project is designed to develop problem solving learning modules for secondary school students. With the leadership of Professors John Jobe and Jeanne Agnew of Oklahoma State University, six learning modules using the discovery-learning approach to teaching/learning mathematics will be developed for high school classroom use during the next three years. Three experts in secondary school mathematics curricula will provide a continuous advisory and formative review program for the AIM program: Dr. Kay Davis, director of the Fernbank Inc. in Atlanta, GA; Dr. Katherine Layton, Beverly Hills High School, Beverly Hills, CA; and Dr. Zachary Jeffers, Capitol Page High School, Washington, DC.

Send reservations to: Dr. Ray Hancock
                         Box Y
                         Emory and Henry College
                         Emory, Virginia 24327

Registration for the Spring Meeting

Preregistration Form

Lunch reservation   [ ] @ $2.00 $_____

                       [ ] @ 5.00 $_____

Name _____

Address _____