NORTHEASTERN SECTION

NEWSLETTER

FALL 1991

VOLUME 13 NUMBER 2

SECTION OFFICERS

GOVERNOR
Dennis M. Luciano
Department of Mathematics
Western New England College
Springfield MA 01119-2684
(413)-782-1275

CHAIRPERSON
Karen J. Schroeder
Mathematical Sciences Dept.
Bentley College, 175 Forest St.
Waltham MA 02154-4705
(617)-891-2267

VICE-CHAIRPERSON
Laura L. Kelleher
Department of Basic Sciences
Massachusetts Maritime Academy
Buzzards Bay MA 02532-1803
(508)-759-5761 x268

SECRETARY-TREASURER
Premjit Singh
Department of Mathematics
Fitchburg State College
Fitchburg MA 01420
(508)-345-2151

TWO-YEAR COLLEGE REP.
Helene S. Savicki
Mathematics/Science Department
Dean Junior College
Franklin MA 02038
(508)-528-9100 x275

NEWSLETTER EDITOR
Frank P. Battles
Department of Basic Sciences
Massachusetts Maritime Academy
Buzzards Bay MA 02532-1803
(508)-759-5761 x264

FUTURE SECTION MEETINGS

Providence College
November 22-23, 1991
See this bulletin for details

Merrimack College
June 5-6, 1992
Local Arrangements Chair: John Royal
Program Co-Chairs: J. J. Tattersall, Providence College
and Barry Schiller, Rhode Island College

Trinity College
November 20-21, 1992
Local Arrangements: David Robbins

CHAIRPERSON'S MESSAGE

Two years ago, in my initial message, I outlined some of the initiatives I hoped to undertake in my two-year tenure as Chairperson of the Northeastern Section. Now, as I prepare to leave this position, I would like to report to you on the status of each of these programs. On April 27, 1991, the national minicourse, "Using History in the Teaching of Calculus", was presented by V. Frederick Rickey of Bowling Green State University at Bentley College. The hundred and four participants from two and four-year colleges, high schools and industry were unanimous in their enthusiasm for the topic and for the speaker's lively manner of presentation. Since I would like to make the one-day minicourse a regular part of our Section programming, I have recently finalized arrangements to bring a second national minicourse to the Section. On April 11, 1992, David Pengelley and Ed Gaughan of New Mexico State University will be presenting their minicourse, "Challenging Students with Research Projects in Calculus", at Western New England College in Springfield, MA. A description of this minicourse will be available at the Fall meeting and a flier and registration form will be mailed to each Section member in early 1992.

The Regional Dinner Meetings Committee chaired by Thomas Koshy (Framingham State College) has met several times. Fourteen regions have been established. Eight of these regions have coordinators and some regions have already set up programs for Spring 1992. Announcements of these meetings may be found in this Newsletter on page 20. and a flier listing all meetings will be mailed to all members in early 1992. Coordinators are still needed for the regions of Southern Maine, Northern Maine, New Brunswick, Newfoundland, Nova Scotia and Prince Edward Island. If you are interested in serving as a coordinator for one of these regions, please contact me or Tom Koshy. We have received another grant from the Exxon Education Foundation to be used to encourage participation by MAA Student Chapters in Northeastern Section meetings. This grant of $500 must be supplemented by funds from the Section. At our Fall Meeting, Sonja Sandberg of Framingham State College will be presenting a workshop for the students on mathematical modeling with applications to AIDS and Lyme disease. Some funding will be available for Student Chapter members to attend. Details will be mailed to Student Chapter coordinators. This workshop is not limited to student chapter members - all interested students and faculty are welcome.

At the National MAA meeting held at Orono, I attended the Twenty-five Year Banquet (although, I'm not yet a twenty-five year MAA member). At the banquet, I had the privilege of dedicating The Howard Eves Room in the Washington headquarters of the MAA and of presenting a plaque and doorknob to Clayton Dodge, representing Howard Eves. It was fitting that this ceremony take place at the University of Maine where Howard spent so many years inspiring students and colleagues.

My thanks to Steve Ingram (Vermont Technical College) and his program committee for their hard work in formulating such an excellent program for our Spring Meeting and to Paul Calter for his artistic endeavors and for extending the hospitality of Vermont Technical College to the members of our Section. My thanks, also, to Thurmon Whitley (University of New Haven) who recently resigned as Student Chapters Coordinator. Thurmon's help in organizing the Chapters and in dealing with the Exxon

grants has been invaluable over the past two years. The list of those who have assisted me in the past two years is too long to single out each person. So, I would like to say a general thank you to the members of the Executive Committee, program chairs and their committees, local arrangements coordinators, committee chairs and members and area dinner meetings coordinators, all of whom have worked so hard to make our programs successful. I would like to thank, most especially, our Vice-Chairperson, Laura Kelleher, for doing an outstanding job and always being there when I needed her. Our Fall Meeting will be held at Providence College on November 22 and 23. Dick Pelosi and Alan Gorfin (Western New England College) have prepared an interesting and diverse program. I hope you will attend.

Karen J. Schroeder
Bentley College
Chairperson NES/MAA

THE HOWARD EVES ROOM

Although The Howard Eves Room in the Washington headquarters of the MAA was formally dedicated on August 11, 1991, the fund-raising effort is not over. We have raised only 75% of the $20,000 cost of the room. If you would like to make a contribution (in any amount) to this effort, you may send it to:

The Mathematical Association of America
1529 Eighteenth Street. NW
Washington, DC 20036

Please make sure to designate your contribution for "The Howard Eves Room". The MAA and the Northeastern Section are grateful for your support of this project.

STUDENT CHAPTERS

Since the resignation of Student Chapters Coordinator, Thurmon Whitley, in June, Section Chairperson and Vice-Chairperson, Karen Schroeder and Laura Kelleher have been serving in this capacity. We joined with several other Student Chapter Advisors and Coordinators in Orono last August to exchange ideas and share experiences. We hope to assist faculty advisors with programming and to help revitalize chapters which are having difficulty sustaining student interest.

A special and exciting program for students is planned for the Fall Section Meeting which will be highlighted by the workshop on **Mathematical Models for AIDS and Lyme disease** given by Sonja Sandberg of Framingham State College. As mentioned in the Chairperson's Message some funding will be available for Student Chapter members to attend. We will be sending information on the Fall Meeting to advisors shortly.

If anyone wants to start a Student Chapter or has any ideas for future endeavors, please contact us at the addresses inside the front cover of this Newsletter.

Karen J. Schroeder
Laura L. Kelleher

GOVERNOR'S MESSAGE

My work as Governor was initiated at the MAA-AMS Summer Meeting this past August at the University of Maine. The Board of Governors Meeting, scheduled from 8:00 a.m. to 5:00 p.m., had an incredible agenda, as detailed in 123 pages of reports and motions, which was mailed to each participant weeks prior to the meeting. To my surprise not only did we complete all agenda items but we even left ample time for an interesting discussion on diversity in mathematics. Let me tell you about a few of the highlights of this meeting as well as my thoughts on some related issues.

The MAA has been growing so rapidly that it is now the largest professional organization (approaching 32,500 members) in the world at the college or university level. To address the needs of such a membership a new structure has been implemented, one which not only provides for more efficient operation of the 100+ committees, but also allows us to take a step back to seek innovative initiatives and look for visionary directions. As reported by Don Kreider, MAA Treasurer, the MAA ended 1990 significantly in the black. While the budget is quite complex, making fiscal outcomes difficult to predict, the MAA expects similar results at the end of 1991. The MAA is also growing in terms of programs and activities. It is eager to implement the MAA awards program for distinguished teaching at the college or university level, and our section will be leading the way. The MAA is looking forward to publishing a periodical specifically designed for undergraduate students, and is planning a Career Fair for students at the Baltimore meeting in January 1992. The SUMMA Project (whose goals are increasing the representation of minorities in the fields of mathematics, science, and engineering, and improving the mathematics education of minorities) is making excellent progress and just received a $327,000 two-year grant from the Carnegie Corporation of New York. The U.S.A. team placed fifth at the 32nd International Mathematical Olympiad in Sigtuna, Sweden, and has high expectations for next year since four members of the team are still eligible. For more highlights and information about the MAA read FOCUS published six times a year.

A central concern of the MAA Washington staff during the past few months has been strategic planning. The Strategic Planning Task Force, chaired by Tom Tucker, held a two-day retreat prior to the summer meeting. It began an intensive examination of the central issues concerning the MAA's programs, publications, staffing, and resources. Strategic planning will continue for about 15 months, with regular reports and active involvement of the Board of Governors. Feel free to direct comments, advice, etc., to me concerning this venture.

National interest and attention to educational issues continued its upward spiral this year. At MSEB's National Summit on Mathematics Assessment in April, President Bush commended the mathematics community on our strong leadership in mathematics education, urged us to continue and expand our efforts, and pledged his support as we seek ways of meeting his challenge to make American students the best in the world in mathematics and science education by the year 2000. We all hope his support is more than rhetoric. There have been a number of reports out this year that deserve our attention. The challenge, indicated above, by President Bush is one of the goals of AMERICA 2000 released April 18, 1991. In the MAA committee (COMET) report *A Call for Change: Recommendations for the*

Mathematical Preparation of Teachers of Mathematics issued in March in conjunction with NCTM's *Professional Standards for Teaching Mathematics* and MSEB's *Counting on You: Actions Supporting Mathematics Teaching Standards,* we seek a significant revision in the teacher preparation program. The release this past spring of the much anticipated report of the MS 2000 committee at the National Research Council, *Moving Beyond Myths: Revitalizing Undergraduate Mathematics,* is stimulating considerable interest in the issues of mathematics education at the college and university level. After reading all these reports (and I urge that you do the same), it is clear to me that we have much work in front of us in order to create the changes that the future well-being of our profession will depend on. The reports are out there; there is not much more that needs to be said. It is our responsibility to act, and to initiate the action now!

Interest in majoring in mathematics is at an all-time low among entering freshmen. In the 1960's, about 6 percent of all college students were majoring in mathematics, and now it is less than one-half of 1 percent. Since 1975, the percentage of top high school seniors who expressed an interest in majoring in mathematics or statistics has declined by over 50 percent, even as the corresponding percentage for science and engineering remained relatively constant. However, with today's powerful computers, mathematics is being used in all areas in unprecedented ways. There are far more career opportunities for mathematics majors now than there were thirty years ago. Mathematicians often work side by side with non-mathematicians, assisting them to formulate and solve mathematical problems. We must shift public attitudes about mathematics from indifference and hostility to recognition of the important role that mathematics plays in our lives and society. The public perception of mathematics as a fixed body of arbitrary rules operating on numbers must be shifted to an awareness of mathematics as an exciting, active science of patterns. Some progress has been made. The MAA capsules *Mathematicians at Work* and the excellent publication by the AWM, *Careers that Count* need to be widely distributed. Getting these in the hands of students and their parents would, I suggest, make a positive impact on the small percentage of students interested in majoring in mathematics.

Currently, 8 percent of the labor force consists of scientists or engineers; the overwhelming majority are white males. Mathematics as a profession is also dominated by white males. However, between now and the end of the century, only 15 percent of the net new entrants to the labor force will be native born white-males. Obviously, mathematics as a profession will need to become more diverse if it is to survive in America. Will women alone be able to take up the slack? Probably not! Already women constitute a major component of today's workforce (42.5 percent in 1980), and by the year 2000 the women's share of the overall workforce is expected to rise to 47 percent. Presently 46 percent of the mathematics baccalaureates go to women, yet only 35 percent of the master's degrees and 17 percent of the Ph.D. degrees in the mathematical sciences are earned by women. There are really no "good" reasons for the drastic decrease in these percentages. Evidence from the vast majority of students shows almost no difference in performance among male and female students who have taken equal advantage of similar opportunities to study mathematics. Gender differences in mathematics performance are predominately due to the accumulated effects of sex-role in family, school, and society. We need to do a much better job at keeping women in the mathematics pipeline. By the year 2000, 26 percent of the labor force will be composed of blacks, Hispanics, Asians,

Native Americans, and other non-white minority groups, and 57 percent of new workers will be minorities. By the year 2000, one in every three American students will be non-white; by 2020, today's "minorities" will become the majority of students in the United States. However, "minorities," except for Asians, are almost nonexistent in our profession, and fewer than 10 percent of students who complete calculus are Black or Hispanic. The waste of human resources evidenced by the significant underrepresentation of women and minorities in mathematically based fields is appalling. We must reduce all factors that compromise a student's potential to learn mathematics. Women and minorities must be pumped into the pipeline instead of filtered; the well-being of our profession depends on it.

So what is the key to obtaining more diversity in our mathematics classrooms and keeping these diverse groups in the mathematics pipeline long enough so that a significant proportion of these groups obtain advanced degrees? I suspect many things must occur simultaneously, and if one in particular doesn't occur our future will be bleak. None of our problems will be remedied until we revitalize mathematics through the reform in both curriculum and teaching style. All students who prepare to teach mathematics acquire attitudes about mathematics, styles of teaching, knowledge of content, and an understanding of the power of mathematics from their undergraduate/graduate experiences. With approximately 50% of school teachers leaving every seven years, it is feasible to make significant changes in the way mathematics is perceived, understood, and taught simply by creating change at the college/university level. Research shows that "lecture and listen," the traditional approach to mathematics teaching, does not work for many of today's students. To learn mathematics, students must be engaged in exploring, conjecturing, questioning, and thinking. All teachers, including undergraduate instructors, need to think about not only what they will be teaching but who they will be teaching and how they will be teaching. Teachers need to adapt their teaching to different cognitive styles, as well as the cultural backgrounds of their students. Most mathematicians would concur that U.S. mathematics has achieved worldwide preeminence. There is no reason why we cannot achieve the same stature in the teaching of mathematics. Presently, the reward structure at most universities undervalues innovation in teaching or evidence of improved learning. In fact at many institutions the climate is such that teaching and research are viewed as in competition. Universities must reexamine their mission to ensure that undergraduate teaching receives appropriate priority. Colleges and universities must adopt a broad standard of professional responsibility encompassing teaching and scholarship as well as research, and they must use these broad standards in decisions about hiring, retention, salary, promotion, and tenure. I look forward to the day when universities recruit some faculty solely based on their ability to teach. However, the climate on our campuses can't assume all the blame for our current ailments. Teachers must explore effective alternatives to the traditional teaching mode, teach the students they have, not the ones they wish they had, and set stringent personal standards that will make them accountable if their students do not succeed.

I look forward to serving the Section as Governor for the next three years, and I hope to see many of you at the Fall Meeting in Providence.

Dennis M. Luciano
Western New England College
Governor NES/MAA

MINUTES OF THE LAST MEETING

The Fall Meeting of the Northeastern Section was held on June 7-8, 1991 at Vermont Technical College in Randolph Center, Vermont. There were approximately 80 registrants.

Invited Papers

The Shape of Space by Jeff Weeks of Middlebury College.
Symmetry: From Euclid to Quantum Physics and Relativity by Ken Gross of the University of Vermont.
Who Polluted Lynnhaven Inlet?: The Power of Mathematical Modeling in Physical Problems by William D. Lakin of the University of Vermont.
Aircraft Position Reconstruction for the Microwave Landing System Avionics: An Algorithm Designer's View by Frederic D. Powell of the MITRE Corporation.
Applications: The Buck Stops Here by Ray Coughlin of Temple University.
Student Chapter Session: Studying Mathematics in an African University by James E. Ward of Bowdoin College.

Computer Workshops

EPIC by James W. Burgmeier of the University of Vermont.
MATHEMATICA by David Dummit of the University of Vermont.
ISETL by Chuck Gambler of Norwich University.

Poster Session

My Favorite Calculus Problem. There were presentations by Lucy Deephouse of Trinity College, Jim Bozeman of Lydon State College, Dan Archdeacon of the University of Vermont, and the Mathematics Department of Northeastern University.

Panel Discussion

Writing to Teach Mathematics with Priscilla Bremmer of Middlebury College (Presider), Ray Coughlin of Temple University, Ted Marsden of Norwich University, Frank Morgan of Castleton State College and Mike Olinick of Middlebury College.

Contributed Papers

Equienergy Surfaces in Nutrition Space by Domina Spencer, Teri L. Mascardo and Irene N. K. Tan of the University of Connecticut.
Structured Proving by Dan Velleman of Amherst College.
A Solution to the Three-Door Problem and the Negative Ramifications of the February 17, 1991 Parade Magazine Column by Marilyn vos Savant by Domenico Rosa of Teikyo Post University.
A Different Look at Introductory Algebra by Herbert Nichol of Drexel University (retired).
Fermat Surfaces by Gerard Coutu of the Hartford Graduate Center and Domina Eberle Spencer and Wallace W. Bowley of the University of Connecticut.

Student Papers

Eulerian Cycles in Graph Theory by Michelle B. Tourville of Fitchburg State College.
Unsolved Problems on Unusual Billiard Tables by Melanie M. Walsh of the University of Maine.
Oscillations by Christine McDonald and Beth Fitzhenry of Simmons College.
An Application of Co-Trees and Co-Cycles in Graph Theory by George Fusco of Fitchburg State College.

Special Treat

A Walking Tour of the Mathematical Sculptures of Paul Calter.

At the Business Meeting the financial report was given by the Vice-Chairperson indicating a sound financial base for the Section. Numerous items were discussed which are described elsewhere in this Newsletter. Book awards donated by Prentice-Hall and a one year membership in the MAA were given to the student presenters. The Chairperson thanked all who participated in the planning and running of the meeting.

DISTINGUISHED TEACHING AWARD

An annual award for Distinguished College or University Teaching was established and announced by the Board of Governors last spring to give recognition to extraordinarily successful teachers who foster curiosity and generate excitement about mathematics in their students. Each year each Section is to select a recipient of the Section Award; these awardees then become the official Section candidates for the National Awards. Response to the call for nominations for the first such Northeastern Section Award which appeared in the Spring 1991 Newsletter was prompt and enthusiastic. The selection committee is now in the difficult process of selecting the awardee.

For the Northeastern Section the Vice-Chairperson of the Section (or the Past-Chairperson as appropriate) will Chair the selection committee. The other members of the selection committee for the Northeastern Section Award will be the Section's Chairperson, Governor, Two Year College Representative and one at-large member of the Section. A member currently serving on the selection committee is not eligible to receive the award. This year the selection committee is as follows: Laura Kelleher of Massachusetts Maritime Academy (Chairperson), Karen Schroeder of Bentley College, Dennis Luciano of Western New England College, Helene Savicki of Dean Junior College and Dianne Haber of Westfield State College.

The recipient of the first Northeastern Section Award will be announced in the spring of 1992. It is planned that the awardee will be honored at the Section Meeting in June at Merrimack College. Recipients of the first National Awards will be announced at the Joint National Meetings in January 1993. Thereafter this is to be an annual award. A call for nominations for the next Section Award will be forthcoming in the Spring. There are many outstanding teachers in the Northeastern Section so you should be making plans to submit a nomination for a colleague for the next award.

NES/MAA IN THE 80'S

Even though not as drastic as the metamorphosis of Kafka's Gregor Samsa, the NES/MAA underwent a significant transformation during the 1980's. Early in the decade, as a move to make the Section more fiscally sound, the Section By-laws were amended to allow the Executive Committee to charge an appropriate registration fee at the Section meetings. Soon thereafter a committee consisting of Helen Bass, Bohd Gulati and Ernest Schlesinger proposed updating the Section By-laws to enable the Section (and the Association as well) to retain its tax-exempt status. The NES/MAA took this opportunity to restate in the By-laws its goal of assisting "in the improvement of the education in the mathematical sciences at the collegiate level by carrying out the purposes of the national organization". The Northeastern Section, comprised of the six New England states and Canadian Provinces of New Brunswick, Newfoundland, Nova Scotia and Prince Edward Island remained throughout the decade either first or second in size of membership in the Association.

Throughout the 80's, the Association took decisive action to achieve its objectives of nurturing student talent, increasing public awareness, and making a national commitment to excellence in mathematics in both the nation's colleges and secondary schools. In line with these objectives, the Association introduced the magazine *FOCUS* as a more effective way to communicate news and announcements to the membership, and strengthen its ties with the mathematical community. Approval voting was adopted in an effort to encourage more people to take part in the election process. Sections were urged to begin Student Chapters, with Thurmon Whitley appointed to direct the organization of our Section's Student Chapters. The Association began offering a number of minicourses at the national meetings. Moreover, a repository for the archives of American mathematics was founded at the University of Texas in Austin, and a week each spring was designated as Mathematics Awareness Week. Locally, Gilbert Strang and Frank Morgan began to offer a series of Boston Workshops for Mathematics Faculty and, in the fall of 1984, Tom Banchoff held an interdisciplinary symposium at Brown University in honor of the 100th anniversary of the publication of Edwin Abbott's *Flatland.*

In the 80's, the NES/MAA sponsored eleven Short Courses and several Down East Graph Theory conferences, as well as twenty Section meetings, almost equaling the number of Section meetings held in the MAA/NES's first 25 years. The format of the meetings continued to include invited speakers and relevant panel discussions, but was adjusted to include student paper sessions, contributed paper sessions, and various computer and pedagogical workshops. The Section continued to attract distinguished speakers at its meetings. In particular, the Christie Lecturers who spoke, usually without either honorarium or travel allowances, were Gian-Carlo Rota, John Tate, John Wermer, Henry O. Pollak, Phil Davis, Tom Tucker, Ernst Snapper, Reuben Hirsh, Ron Graham, and Paul Schweitzer. Bohd Gulati was instrumental in his capacity as Section Publisher's Liaison in getting a number of book publishers to display their products at the meetings. A Microcomputer Software Exchange was begun by Thurmon Whitley and Steve Snover. At the end of the decade, a Special Student Chapter Session, with an invited lecturer, was made part of the Section meeting.

All these changes would not have been possible without the dedicated guidance of the Executive Committees of the 80's. We were fortunate to not

only have the services of Ann O'Neill, Don Small, and Jim Ward as Section Governors during the 80's, but in order to implement the changes it took the able leadership of our Section Chairpersons Roger Cooke, Jim Ward, Eric Nummela, Thurmon Whitley, Steve Ingram, Dennis Luciano, and Karen Schroeder. In the 80's we became a more financially stable organization thanks to the efforts of our Secretary-Treasurers Shirley Blackett, Gordon Prichett, and Laura Kelleher, and to the Connecticut and Union Mutual Life Insurance Companies who underwrote the cost of publishing and mailing our **Newsletter** in the first half of the decade. We were also well served by our Two-Year College Representatives, Nancy Myers, Jean Smith, and Joe Menard. John Goulet, Dennis Luciano, and Joe Witkowski served as Coordinators of the Student Paper Sessions, while Gail Lange, Russ Rainville, Jim Tattersall, and Ed Sandifer served as Coordinators of the Contributed Papers Sessions. Numerous members of the Section served on program committees, local arrangement committees or as workshop organizers, while others participated as speakers or presenters in such sessions. It was a genuine effort by many throughout the decade that enabled the Section to evolve and better serve the mathematical community. It should be noted that the road had been well paved by the generation that had initially organized the Section and guided it during its first 25 years.

During the decade, the mathematical world lost the expertise of R. H. Bing, E. J. McShane, George Polya, Julia Robinson, Stanislaw Ulam, Mark Kac, Mary P. Dolciani Halloran, Gabor Szego, Bert Mendelson, Charles B. Morrey Jr., and Henry Gehman. In our Section we lost the dedicated services of L. Aileen Hostinsky, Dick Howland, Dorothy Bernstein, Parry Moon and Stephanie Troyer.

In the 80's several of the Section's members were honored for their service to the mathematical community. Marshall Stone received the National Medal of Science, Margaret Bondorew (Medway, MA) and David Daniels (Longmeadow, MA) each received a Presidential Award for Excellence in Science and Mathematics Teaching. Jean Smith received the AMATYC Mathematical Excellence Award. Charles Hadlock won the MAA Book Prize for his Carus Monograph *Field Theory and its Classical Problems.* Dennis Luciano and Gordon Prichett shared the George Polya Award. The Lester R. Ford Award was given to Stan Wagon. Marjorie Senechal was awarded the Carl B. Allendoerfer Award. Martha Zelinka of Weston, MA was named Governor-at-Large to represent the contingency of secondary school mathematics teachers. Katherine O'Brien received the Deborah Morton Award from Westbrook College honoring her for her mathematical expertise in the classroom and for her outstanding poetry. Eric Wepsic and Robert Southworth won honors representing the United States in the International Mathematical Olympiad. The MAA Certificate of Meritorious Service went to Don Small for exhibiting strong leadership, initiating innovative ideas, and his assiduous devotion in promoting NES/MAA. In addition, a room at the Association's National Headquarters in Washington, D. C. is to be dedicated to one of our founders and first Chairperson, Howard Eves.

I would be remiss at this point in my archivist duties if I did not offer an appreciative thank you to Dot Meserve, Eric Nummella, Ken Lane, Phil Mahler, and Frank Battles for editing the Section's Newsletter. They have left a wonderful paper trail that was a joy to follow.

J. J. Tattersall
Providence College
Historian/Archivist

NORTHEASTERN SECTION OF THE MAA
FALL MEETING: NOVEMBER 22-23, 1991
PROVIDENCE COLLEGE
PROVIDENCE, RHODE ISLAND

All the Friday Sessions, the Student Paper Session and the Contributed Paper Session will be held in Moore Hall but the main Saturday talks will be held in Slavin Center. See the Campus Map on Page 12.

Friday, November 22

2:00-6:00	Registration: **MOORE HALL**
2:30-3:30	Executive Committee Meeting
3:45-4:15	Meeting for Coordinators of Local Dinner Meetings
3:00-5:00	**SUMMA Workshop** Florence Fasanelli, Associate Director
3:30-4:50	**Workshop on Graphing Calculators in the Mathematics Classroom** Mary Margaret Grubbs, Columbia University
5:00-6:00	**Areas and Iterations and Matrices and Determinants** Gilbert Strang, Massachusetts Institute of Technology
6:00-7:00	Social
7:00-8:15	Banquet
8:15-8:20	Welcoming Remarks Dr. F. Patrick MacKay Vice President for Academic Administration
8:20-9:20	**Mathematical People** Gerald Alexanderson, University of California, Santa Barbara
9:20	Reception

Saturday, November 23

8:00-10:30	Registration: **SLAVIN CENTER**
8:00-9:00	Student Papers
8:00-3:00	Book Exhibits

9:00-10:30	Student Chapter Session (Part I): **Mathematical Models for AIDS and Lyme Disease** Sonja Sandberg, Framingham State College
9:15-10:15	**Constructing the Regular Heptadecagon: Ingenuity or Just a Lucky Gauss** William Dunham, Hanover College
10:15-10:45	Coffee Break Tour of Book Exhibits
10:45-12:00	**Christie Lecture** **Combinatorics of Integer Partitions: A Few Gems, Old and New** Rodica Simion, The George Washington University
12:00-12:30	Business Meeting
12:30-1:30	Buffet Luncheon Student Swap Session Community College Teachers Dialogue
1:45-2:45	**Women in Mathematics: What's Love Got To Do With It?** Claudia Henrion, Middlebury College
2:00-3:00	Student Chapter Session (Part II): **Mathematical Models for AIDS and Lyme Disease** Sonja Sandberg, Framingham State College
3:00-4:00	**Sculpting: Free Form 3-D Modeling and Its Underlying Mathematics** John Forbes Hughes, Brown University
3:00-4:00	**Workshop on Teaching Calculus and Linear Algebra** Gilbert Strang, Massachusetts Institute of Technology
3:00-4:00	Contributed Papers

PROGRAM COMMITTEE:

Alan Gorfin, Western New England College, Co-Chair

Richard Pelosi, Western New England College, Co-Chair

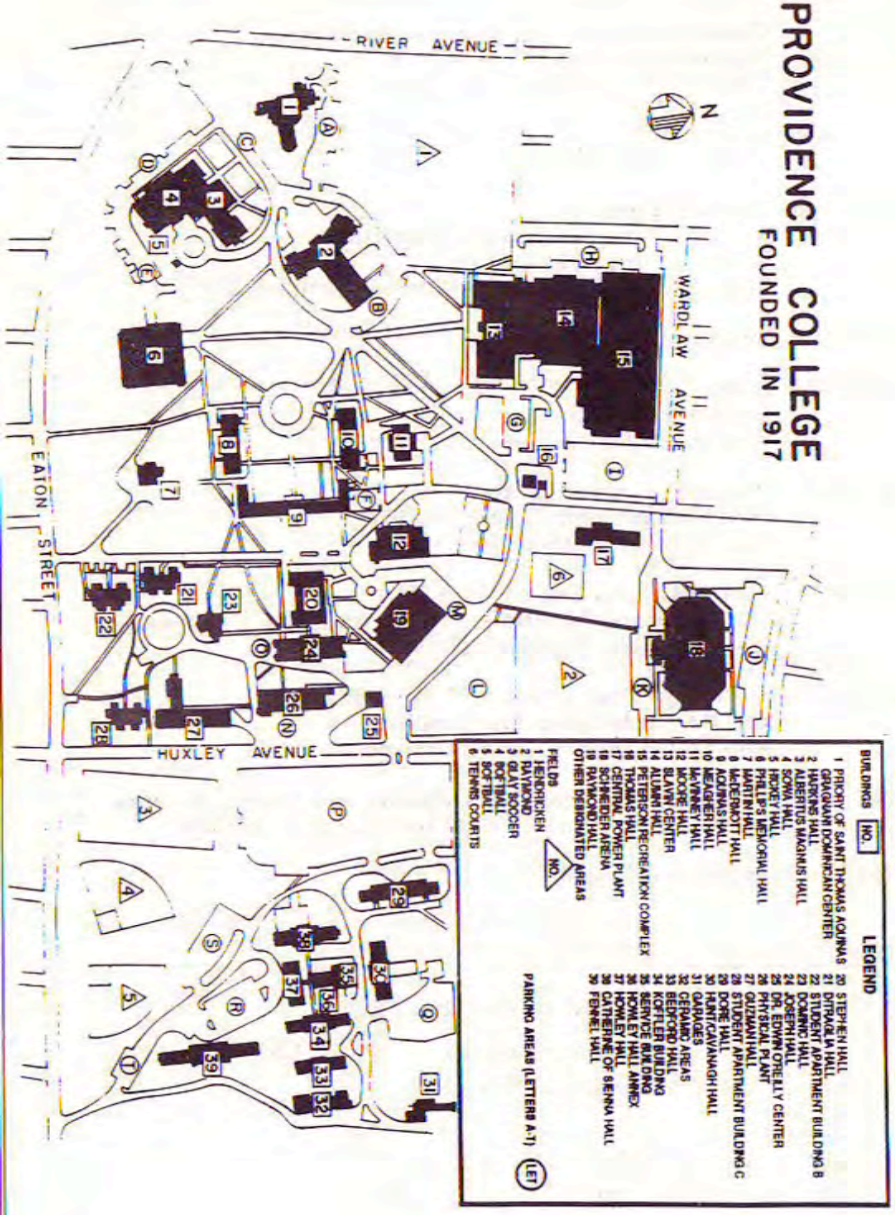
Barry Schiller, Rhode Island College

Premjit Singh, Fitchburg State College

LOCAL ARRANGEMENTS COORDINATOR:

Frank Ford, Providence College

CAMPUS MAP



SUMMA Workshop

Florence Fasanelli, Associate Director

This two-hour workshop is organized by the MAA Strengthening Underrepresented Minority Mathematics Education (SUMMA) project. The participants will work with materials developed by SUMMA to assist mathematicians in establishing middle school and high school intervention projects for minority students, including methods in developing projects, funding sources and proposal writing. In addition, materials will be available from various government agencies in order to facilitate applications. The workshop will also provide information for teacher enhancement projects. The SUMMA office will continue to work with the participants as they prepare proposals to be submitted utilizing its national network of former government program officers.

Dr. Florence Fasanelli, who will lead the proposal writing workshop received her Ph.D. in Mathematics Education from the American University. She is currently on the staff of SUMMA at the MAA headquarters and was previously a Program Officer at the National Science Foundation in the Science and Engineering Directorate. Her interests include mathematics and art and the history of mathematics.

Workshop on Graphing Calculators in the Mathematics Classroom

Mary Margaret Grubbs, Columbia University

It is an acknowledged fact that many students are entering college with weak abilities in basic mathematical skills. In addition, Kevin Collis reports that many students entering college are not in the formal-operational stage of cognitive development as defined by Piaget, but are still in the concrete-operational stage. Ms. Grubbs has carried out research in which the scientific graphing calculator is brought into the elementary college algebra classroom to be used by this type of student. Significant gains between pre- and post-testing have been shown by the experimental group using the TI-81 "hand-held computer" over the control group taught in the traditional lecture manner.

Participants will be given the opportunity to join Ms. Grubbs in a demonstration of the graphing calculator. She will show how these calculators can encourage students to make, test, refine, and support conjectures. Calculators will be provided for use during the workshop.

Mary Margaret Grubbs received her B.S. in mathematics at the University of Texas, and her M.S. in Applied Operations Research at Sacred Heart University. She is currently working on her Ph.D. in Mathematics Education at Columbia University. She has served as a mathamatics technology consultant in schools in Connecticut and New York. She has presented her research results at conferences in Texas, Ohio, Oregon, New York, and in Great Britain.

Areas and Iterations and Matrices and Determinants

Gilbert Strang, Massachusetts Institute of Technology

We begin with an unexpected relation between the areas of vertical strips, horizontal strips, and polar triangles. This leads towards other areas (especially polygons). The integral of x dy − y dx is given a geometric

meaning. Also, we hope to display a polynomial of degree 2^{100}. Then calculus is linked to linear algebra by the derivative of a determinant. The second derivative shows that the logarithm of the determinant is concave downward - which we need and use.

Professor Strang has been at MIT since 1959, when he joined the faculty as a Moore Instructor. He was a NATO Fellow in 1961, a Sloan Fellow in 1966, and a Fairchild Scholar in 1981. Most recently, he has been appointed to be the Vice President for College and University Affairs of the Society for Industrial and Applied Mathematics. In this position his principal goal will be to improve mathematics education, which is something that he has already been involved in for many years. He has been conducting the Boston Workshop for Mathematics Faculty for the past four years and he has published three undergraduate textbooks: *Linear Algebra and Its Applications, Introduction to Applied Mathematics* and *Calculus*. Professor Strang says that his goal is "to involve good students more directly and actively in applied mathematics."

Mathematical People

Gerald Anderson, University of California, Santa Barbara

Some stories from current and future volumes of *Mathematical People*. Those interviewed and treated in an upcoming volume or in upcoming issues of the *College Mathematics Journal* are Ivan Niven, Richard K. Guy, Leon Bankoff (a Beverly Hills dentist by profession), Béla Bollobás, and Freeman Dyson. Some common threads will be explored. How many were prodigies? Did their parents love mathematics? Are they more than usually interested in music? In politics? Is it true that mathematicians don't enjoy fishing?

Gerald L. Alexanderson is Valeriote Professor of Science at Santa Clara University. He is currently Secretary of the Mathematical Association of America, having served for a number of years on the Board of Governors and as First Vice-President. Most recently he was Editor of *Mathematics Magazine*, and earlier served as Associate Editor of the *American Mathematical Monthly* and the *Two-Year College Mathematics Journal*. He is also Associate Director of the William Lowell Putnam Mathematical Competition. he is author, co-author or co-editor of eleven books and numerous articles. His research is in combinatorial geometry and number theory. His most recent books are the two volumes of *Mathematical People, The Pólya Picture Album*, and *Discrete and Combinatorial Mathematics*. Currently he is working on the manuscript of a fifth edition of *A First Undergraduate Course in Abstract Algebra*.

Mathematical Models for AIDS and Lyme Disease

Sonja Sandburg, Framingham State College

AIDS and Lyme disease are two epidemics that were discovered quite recently and are still causing much concern. This workshop will explore the use of mathematical methods to analyze specific questions about these epidemics. A system of differential equations will be developed to predict the future course of the AIDS epidemic. A matrix model will be constructed to describe the role of mice and deer in the propagation of Lyme disease. Probability will be used to discuss the utility of screening programs for the AIDS virus.

Sonja Sandberg received a S.B. in mathematics from MIT and a Ph.D. from the University of Texas Health Science at Dallas. She is an Associate Professor in the Department of Mathematics at Framingham State College in Framingham, Massachusetts. Her research interest is in applying mathematical tools to problems in health care. She is presently spending her sabbatical year at the Bunting Institute at Radcliffe College modeling Lyme disease.

Constructing the Regular Heptadecagon: Ingenuity or Just a Lucky Gauss

William Dunham, Hanover College

In this talk we examine the 1796 argument in which young Carl Friedrich Gauss established the astonishing fact that a regular 17-sided polygon could be constructed with compass and straightedge alone. Although mathematicians had studied geometric construction since the time of the Greeks, no one before Gauss had the least suspicion that regular 17-gons were constructible. His proof – which required him to veer unexpectedly into the realm of complex numbers – stands as one of the genuine classics of mathematics.

Professor Dunham received a 1969 B. S. from The University of Pittsburgh and a 1974 Ph. D. from the Ohio State University, where he wrote a dissertation in general topology under Norman Levine. He has since taught at Hanover College in Indiana and as a visiting professor at Ohio State.

Over the years his interests have shifted to mathematical history. Twice he directed summer seminars on this topic for the National Endowment for the Humanities and he was the first recipient of the Humanities Achievement Award for Scholarship from the Indiana Humanities Council. In 1990 he authored *Journey Through Genius: The Great Theorems of Mathematics* (John Wiley & Sons). A second book, jointly written with wife and colleague Penny Dunham, is in the works.

Combinatorics of Integer Partitions: A Few Gems, Old and New

Rodica Simion, The George Washington University

The simple concept of an integer partition, that is, expressing an integer as the sum of positive integers such as $14 = 6 + 3 + 3 + 2$, occurs in an impressive number of different mathematical contexts. Since Euler's work, the investigation of partitions has developed into a rich theory whose many facets include connections with number theory, group representations and combinatorics. In this self-contained presentation, we will attempt to sample some of the many beautiful results and tantalizing open problems concerning primarily the combinatorial aspect of the theory of partitions. Our illustrations of questions, results and techniques will range from classical to very recent work and are adaptable for inclusion in a variety of courses.

Rodica Simion is a graduate of the University of Pennsylvania where she received her Ph.D. in 1981. She is currently on the faculty of the Department of Mathematics at The George Washington University where she conducts her research in combinatorics and teaches courses at all levels. Her

published work is in combinatorial enumeration, structural theory of partially ordered sets and graph theory. Her mathematical interests include relations between combinatorics and theoretical computer science, algebra, number theory and topology.

She has served as research conference and symposia chair and organizer, Guest Editor for *Discrete Applied Mathematics* and Associate Editor for the *American Mathematical Monthly*. Professor Simion is currently spending her sabbatical year visiting the Institute for Mathematics and its Applications in Minneapolis, the University of Quebec at Montreal, the Mittag-Leffler Institute in Stockholm and the University of Bordeaux.

Women in Mathematics: What's Love Got To Do With It?

Claudia Henrion, Middlebury College, Middlebury, Vermont

Women are now almost half of our undergraduate majors, yet most have never seen nor heard of a woman mathematician. Furthermore, there is national concern with the limited participation of women and people of color in mathematics, at all stages of the pipeline. But how do we go about improving the situation? This talk will address both of these issues. It is based on my research on contemporary women mathematicians. The talk will be both biographical, and an analysis of the current climate for women in mathematics, including recommendations for the future.

Professor Henrion received her Bachelor of Arts and Sciences in 1980 from Stanford University as a double major in Mathematics and Philosophy. In 1982 and 1985, respectively, she received her Master of Arts and Doctor of Philosophy, both from Dartmouth College. Her dissertation, *Subtle Ideas on Subtle Ideals*, was written under the direction of James Baumgartner. She has been teaching at Middlebury College since 1985 and has made many presentations and published many articles in both set theory and the cultural and historical aspects of mathematics. She is the recipient of grants from the U. S. Department of Education, the American Association for University Women Research and Projects, in addition to being awarded a Middlebury College Faculty Development Grant and a Danforth Fellowship. She is also a referee for *Mathematics Magazine*.

Workshop on Teaching Calculus and Linear Algebra

Gilbert Strang, Massachusetts Institute of Technology

This workshop will combine a presentation and a discussion. We all hope to be effective teachers, and that requires attention to content and approach and psychology and more. It is important for students to take an active part – what they remember is what they do themselves. Graphs are useful (sometimes with computing and/or work in small groups – students can actually talk about mathematical ideas). We also concentrate on the established syllabus, emphasizing the *purpose* of what we teach.

The discussion will be open to all opinions and suggestions. We have problems, but we also have good things and a community to share them with.

CALL FOR CONTRIBUTED PAPERS

Participants are invited to submit contributed papers for either the Fall or Spring Meeting. We are particularly interested in papers pertaining to teaching, new courses, new techniques and in research you or your students have done relating to classroom material. We encourage you to share your experiences with our colleagues. Your presentation should be approximately 15 minutes in length. Please send a typed abstract, together with a list of any special equipment you may need to: Ed Sandifer, Department of Mathematics and Computer Science, Western Connecticut State University, Danbury CT 06810. Telephone (203)-797-4310 or BitNet at SANDIFER@CTSTATEU. The deadline for the Spring Meeting is October 31 and for the Spring Meeting is May 23.

CALL FOR STUDENT PAPERS

Students (and recent graduates) from the Northeastern Section are invited to present papers at the Fall Meeting on topics in mathematics, statistics, or computer science. The presentations will be 15 to 20 minutes in length, on either expository work, research projects, employment experiences, or problems from math periodicals. Prizes will be awarded and the registration fee and the cost of meals will be waived for **one** student presenter per paper at the Fall Meeting.

Almost every college/university has students working on projects, problems, and mathematical research. The success of a student paper session depends primarily on faculty members identifying prospective papers, encouraging their students and arranging departmental financial support when possible. If there are no potential student papers on your campus for the Fall Meeting, we urge you to initiate student projects now for presentation at the Spring Meeting.

Interested students should send an abstract and current address, with phone number, by Tuesday, November 5 to: Joseph C. Witkowski, Department of Mathematics and Computer Science, Keene State College, Keene NH 03431. Telephone (603)-358-2555. All proposals will be reviewed by department faculty members.

PROVIDENCE COLLEGE

Providence College is primarily a coeducational, four-year, undergraduate college of the liberal arts and sciences. The College will be celebrating its 75th anniversary in 1992. The College is under the auspices of the Dominican Friars and shares in the rich 700-year tradition of this Roman Catholic religious order.

The Department of Mathematics and Computer Science administers majors in Mathematics, Computer Science and Mathematics-Education. About 2-3% of Providence College graduates graduate with one of these degrees. Providence College has a strong liberal arts core curriculum and the Mathematics Department teaches courses in this core curriculum for all students. Members of the Department are actively researching in Differential Equations, History of Mathematics and applications of mathematics to Cancer Research. Department members are active in AMS, MAA and ACM and are involved in programs for gifted high school students. The Department sponsors an annual Computer Programming Contest for high schools in Rhode Island and nearby Massachusetts.

DIRECTIONS TO PROVIDENCE COLLEGE

1. FROM BOSTON AND POINTS NORTH
   Follow I-95 to Providence; leave expressway at Exit 23 (Charles Street). Turn right onto Charles Street and proceed 1/4 mile to flashing yellow lights, just over the bridge. Turn left onto Admiral Street and continue to the second set of traffic lights (approximately 3/4 mile). Continue on Admiral Street straight ahead up the hill (approximately 0.2 mile). Turn left onto Huxley Avenue and proceed to the College.

2. FROM CONNECTICUT, NEW YORK AND POINTS SOUTH
   Follow I-95 into Providence. Take Exit 23 ("State Offices"). Take a right off the ramp and bear right at the fork onto Douglas Avenue (Route 7). Follow Douglas Avenue for approximately 1 mile then turn left onto Eaton Street (at the Mobil Station). Continue on Eaton Street at the first traffic light turn right onto Huxley Avenue and proceed to the College.

3. FROM FALL RIVER, NEW BEDFORD AND CAPE COD
   Follow I-195 to Providence, to its junction with I-95. Bear right onto I-95 NORTH. Take Exit 23 ("State Offices") and proceed as in the second set of directions.

4. FROM HARTFORD, WATERBURY AND CENTRAL CONNECTICUT
   Follow I-84 to I-86. Leave I-86 at Exit 100 and follow Route 44 East into Providence (Route 44 will become Smith Street). At the intersection of River Avenue and Smith Street, turn left and proceed 1/4 mile to the traffic light at the intersection of Eaton Street and River Avenue, turn right up the hill on Eaton Street and go to the first traffic light. Turn left onto Huxley Avenue and proceed to the College.

5. FROM WORCESTER, WOONSOCKET AND THE MASS TURNPIKE
   Follow Rhode Island Route 146 to Providence; leave the expressway at the Admiral Street Exit. Turn right onto Admiral Street and continue to the second set of traffic lights (approximately 3/4 mile). Continue on Admiral Street straight ahead up the hill (approximately 0.2 mile). Turn left onto Huxley Avenue and proceed to the College.

ACCOMMODATIONS

A block of rooms has been set aside at

Holiday Inn (Downtown Providence)
21 Atwells Avenue
Providence RI 02903
(401)-831-3900

The hotel rate will be $58.00 per room per night (single or double) and the room tax is 12%. Reservations should be made with the hotel directly. Mention the MAA when making the reservation. All reservations must be guaranteed with the first night's deposit or a major credit card. The hotel is on the edge of downtown Providence in the Federal Hill section of the city. Many excellent Italian restaurants are nearby and Trinity Theater and the Providence Civic Center are within a few blocks. Providence College is about a mile from the hotel.

UPCOMING MEETINGS

In addition to those listed on the inside front cover, the following meeting dates and locations are tentatively scheduled:

The University of Massachusetts/Dartmouth
June 11-12, 1993
Local Arrangements: Ronald Tannenwald

Westfield State College
November 5-6, 1993
Local Arrangements: Dian^{2}e Haber and Maureen Bardwell

Please note the date of the Fall 1993 Meeting! This meeting will be held several weeks earlier that usual to avoid conflict with the national meeting of AMATYC which will be held in Boston at a time that overlaps our usual meeting dates. We are in need of people to serve on program committees for these meetings. If you are interested in serving on such please contact the Chairperson whose address appears on the inside front cover. Get involved!

NEWS FROM THE TWO-YEAR COLLEGE REP

Along with the annual meeting of the New England Mathematics Association of Two-Year Colleges, NEMATYC is also hosting the national meeting of the American Association of Two-Year Colleges in November of 1993 which will be held in Boston. I have been serving as director for this meeting but have been forced to resign due to personal reasons. Jack Keating of Massasoit Community College is now serving in this capacity. We all wish Jack the best of luck and those of us who have ever worked with him, know that he, and the rest of MCC's mathematics department, will due a splendid job! Everyone is invited to help Jack in this tremendous undertaking.

At the meeting of NES/MAA in Providence, I hope to have a specially designated table set aside for those of us who teach in the community college setting. I hope that during lunch we can share our mutual problems, solutions and ideas. See you in Providence.

Helene Savicki
Dean Junior College
Two-Year College Representative

NEWS FROM NEMATYC

The annual meeting of NEMATYC will be held at the Lowell, MA campus of Middlesex Community College on Saturday, March 14, 1992. Program Co-chairs are Philip Mahler and Regina Goodwin.

Proposals are invited for papers and workshops on the theme **Teaching in a Changing Environment**. This includes, but is not limited to, the impact of electronic media, mathematical software, the NCTM *Standards*, "critical thinking" and "problem solving", and increased emphasis on statistics and discrete mathematics. Proposals should be postmarked by Friday, December 20, 1991, and sent to Philip Mahler, Department of Mathematics, Middlesex Community College, Springs Road, Bedford, MA 01730. If you are not a member of AMATYC but would like to receive an announcement of the NEMATYC meeting, please send your name and address with the words "NEMATYC Mailing List" to the address indicated above.

DINNER MEETINGS

The Regional Dinner Meetings Committee has prepared a set of guidelines to assist local coordinators in planning local dinner meetings. The following colleagues have already volunteered to serve as local coordinators: Indu Anand (Norwich) for Vermont, Bill Roberts (Plymouth State) for New Hampshire, Edwin Wolf (Keene State) for Southern New Hampshire, Peter Christopher (WPI) for Eastern Massachusetts, Lucy Dechene (Fitchburg State College) for Western Massachusetts, Frank Ford (Providence College) for Rhode Island, Sally Keating (Eastern Conn. State) for Central Connecticut, and Jean Sells (Sacred Heart) for Southern Connecticut.

Volunteers are still needed for New Brunswick, Newfoundland, Nova Scotia, Prince Edward Island, Northern Maine and Southern Maine. If you are interested in being a local coordinator for any of these regions, please contact me soon.

To kick off this exciting program, at least three spring dinner meetings are being planned: J. J. Callahan, "How the Computer Can Redefine Calculus," Keene State College, April 9; G. Strang, "Mathematics After Dinner," WPI, April 19; R. A. Rosenbaum, "Generalizations," Eastern Connecticut State University, April 23. A brochure containing more details about the various dinner meetings will be mailed to members early in 1992.

Thomas Koshy
Framingham State College
Regional Dinner Meetings Coordinator

EDITOR'S MESSAGE

Thursday, March 12, 1992 is the date by which all material for inclusion in the SPRING 1992 issue of this newsletter must be in the hands of the editor. See the inside front cover for the address.

Tom Moore of Bridgewater State College, who served as Program Co-chair for our meeting last fall at Framingham State College, has been named the recipient of the DiNardo Award for excellence in college teaching. This award, which is given to one faculty member per year, is a campus wide award covering a multitude of disciplines and involves several hundred faculty.

Many thanks to J. J. Tattersall for writing a decade by decade history of the Section for this Newsletter, the last installment of which appears in this issue. His history of the Section in all its detail is to be published elsewhere.

(A note from the "Assistant Editor": Please excuse any irregularities that may appear in this issue of the Newsletter since the editor, Frank Battles, was not able to do his usual fine tuning and polishing. In mid-September Frank suffered a myocardial infarction. He is now on the road to recovery (and asking for the "Problems Sections" of his favorite Journals!). If you would like to send a card or a note to wish him well you can use the address inside the front cover and I will see to it that he gets it. Thanks very much. LLK)

PRE-REGISTRATION FORM

FALL MEETING OF THE NORTHEASTERN SECTION-MAA

NOVEMBER 22-23, 1991 **PROVIDENCE COLLEGE**

Mail Registration Form to: Frank Ford
Department of Mathematics
Providence College
Providence RI 02918

Checks should be made out to: **NES/MAA**

You may register at the meeting if you wish; however, it would facilitate the organization of the meeting if you pre-register by mail **and** it will save you money in that on site registration fees are five dollars more than preregistration fees. In any case, meals and housing cannot be guaranteed unless reservations are received by Friday, November 8, 1991. Spouses and guests are welcome at all meals and socials.

REGISTRATION:

Name _____

Institution _____

Address _____

City, State, Zip _____

Telephone (O) ( ) _____ (H) ( ) _____

PRE-REGISTRATION FEE:

MAA Member ($10.00)
Non-member ($15.00)
Student or unemployed ($5.00) } $_____

MEALS:

Banquet 7:00 p.m. Friday
Number ( ) x $16.50 $_____

Luncheon 12:30 p.m. Saturday
Nummber ( ) x $11.50 $_____

TOTAL $_____

☐ Please check if you plan to attend the student-chapter swap session at 12:30 p.m.

☐ Please check if you are a student-presenter.

☐ Please check if you plan to attend the community college dialogue at 12:30 p.m.

See page 18 for information regarding lodging.

Northeastern Section MAA
Department of Basic Sciences
Massachusetts Maritime Academy
P.O. Box D, Buzzards Bay, MA 02532-1803

NON-PROFIT
ORGANIZATION
U.S. POSTAGE
PAID
BUZZARDS BAY, MA
02532
PERMIT NO. 2