NORTHEASTERN SECTION

NEWSLETTER

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FUTURE SECTION MEETINGS

Keene State College
June 2-3, 1989
See this bulletein for details

College of the Holy Cross
November 17-18, 1989
Local Arrangements Chair : Leonard C. Sulski
Program Co-Chairs : Melvin Tews and Thomas Cecil,
College of the Holy Cross

Roger Williams College
June 8-9, 1990
Local Arrangements Chair : John O'Connell

Framingham State College
November 16-17, 1990
Local Arrangements Chair : Thomas Koshy
Program Chair : Thomas Moore, Bridgewater State College

A MESSAGE FROM THE CHAIR

American mathematics has continued to be newsworthy even after our festive bicentennial. However, some of the most recent print was not that flattering and is difficult to dispute. The International Assessment of Mathematics and Science, sponsored by the Education Department and the National Science Foundation, placed the students in the United States dead last in mathematics when compared to 11 other countries and Canadian Provinces. American educators are used to reading that Japanese and Korean students lead the mathematics academic parade while the Americans fall in the rear, somewhere between Grenada and Kokomo, the Beach Boys ficticious island. They are usually quick to respond that our country sends a high proportion of its students to high school and college, so the mathematical abilities of our average students should not be compared with the high achievers of the other countries. But no longer! The most recent study involved 13-year-olds. The report's authors called the American results "distressingly low and unacceptable, especially in view of the requirements of today's and tomorrow's technological environments." It is easy to criticize the curriculums and teachers., but the problem is hardly that simple. It runs much deeper than that, and sadly enough reflects the heart beat of our society. The International Assessment Investigators asked students how they thought they were doing in mathematics. Only one-fourth of the leading Koreans were pleased with their performance, while two-thirds of the Americans were quite content. With expectations like these no wonder we are the cellar dwellers in the mathematics league. A necessary, but not a sufficient, condition for success in mathematics is high goals and hard work. Do you really believe in differences in innate ability? Or do we grow and develop our abilities based on events of daily life, as Asian philosophy dictates? Well, certainly the work of Phillip Uri Treisman and Jaime Escalante indicates the latter.

I wish I had 2^n dollars for the n persons I have been introduced to as a professor of mathematics who responded "I never could do math." I don't know about you but I sure am tired of the socially acceptable term "math anxiety." It is like a license that allows you never to do mathematics. Renewing this license closes the gate to employment not only in the sciences, but also in economics, engineering, business, and some of the arts. Please don't misunderstand me. Math anxiety is real. Yet it is a by-product of our educational systems, which means we control its destiny. Why don't we read about "English anxiety" or "history anxiety?" Let me confess that in the mid-sixties I had a very bad case of "poetry anxiety." I suspect a better work ethic would have cured me!

The deterioration of mathematics education in America is not going to be turned around over night. One could pray for another "Sputnik Effect," and there are subtle hints that it may occur. This past fall our plight even made *Parade Magazine*, a Sunday newspaper supplement that is read by millions of people. The headline was "Help Wanted: Math Majors," and with the help of Ed Connors the short information piece identified seven important concerns. Recent reports by the Carnegie Commission and the Holmes Group recommend abolishing the undergraduate major in education as a necessary first step for reinjecting quality in public schools. These recommendations are based on two laudable objectives: to ensure that teachers are well grounded in the subjects they teach, and to attract able students to careers in teaching. Since mathematics is taught throughout the entire 13 years of school (K-12), this may mean we can no longer expect elementary school teachers to teach all subjects and that it will be necessary to educate mathematics specialists who would be responsible for the teaching of mathematics and the sciences in elementary school grades. These specialists would no longer teach in the present mode, but would teach in an integrated, discovery-based environment.

The college level mathematics professors have seized the calculus as its initial area for reform. Rightfully so considering that students across the United States are not succeeding at a remarkably high rate: Of approximately 300,000 students who start calculus each year, only 140,000 complete it with a grade of "D"or better. The fault is as much with how calculus is taught as it is with the subject's inherent difficulty. As John Kenelly, the previous NSF program director for coordinating this reform effort,

said "Calculus is the gate to everything." He added that, in modern mathematics education calculus "sits there and chokes up the system." Calculus textbooks and their publishers certainly share the responsibility for our failure. To a publisher "lean and lively" means more color, smaller margins, and smaller print. Are we directing the publishers or are they directing us? It will take a tremendous amount of work and ingenuity to change the way that calculus is taught, but it will be done. As Lynn Steen said, "Calculus should be a pump not a filter."

The Fall Meeting of our Section at Rhode Island College was very successful from all points of view. It drew approximately 225 participants and its program featured some very prominent mathematicians. The lectures over the two days were collectively the best I have ever attended, and it was personally gratifying to me that it occured during my tenure as chair. Special thanks to James J. Tattersall, Chair of the Program Committee, Frank Ford and Mary Russell, all of Providence College. The local arrangements played a major role in the success of the meeting; thanks to Fred Harrop, Barry Schiller and Helen Salzburg of RIC. There was a record number of student papers (10), each with excellent content and with the delivery of a seasoned professional. Congratulations to the students and the Coordinator, Joseph Witkowski of Keene State.

Elections were held at this meeting for Section Officiers with the following results:

Vice-Chairperson	Karen J. Schroeder Bentley College
Secretary-Treasurer	Laura L. Kelleher Massachusetts Maritime Academy
Two-Year College Representative	Phillip H. Mahler Middlesex Community College

Since then, Phil Mahler has been awarded a sabbatical leave and is thus unable to fill the above named position. Joseph Menard of the Community College of Rhode Island has agreed to take his place.

Another change is the Chair of the Contributed Papers Session. James J. Tattersall, Providence College, has asked to step down so that he can more fully pursue other professional interests. During his tenure as chair the number of papers and their quality has dramatically increased. On one hand, the path he has paved will make it easy for his successor, while on the other hand, the high standards he has set will certainly offer a formidable challenge. C. Edward Sandifer, Western Connecticut State University, has taken on that challenge and I am confident that he will prove to be a worthy successor. If the occasion arises, offer Jim thanks for the role he has played in our Section over the years. I cannot think of anyone who has contributed more to the well-being of mathematics in the Northeastern Section than he has.

Thurmon Whitley, University of New Haven, has volunteered for the position of Coordinator for Student Section Activities for the Northeastern Section. Presently in the MAA there are 33 Student Chapters from 18 sections, and 233 inquiries. If you are interested in starting a chapter at your institution contact Thurmon.

Joan Ferrini-Mundy, University of New Hampshire, and her committee have put together an interesting and attractive program for the Section Meeting this spring. I hope to see you at Keene State College, June 2-3.

Dennis M. Luciano, Chair
Northeastern Section of the MAA

GOVERNOR'S REPORT

The second, as well as the first, derivative of the programmic life of our Association is very, very positive. The "booklet" of Committee and Task Force Reports prepared for the Board of Governor's Meeting at the Phoenix, AZ Meeting was 160 pages in length (the Meeting lasted over 8 hours!). I am pleased (relieved) to report that the financial life of our Association improved drammatically over the past 6 months. The combination of several good things happening and the failure of many potentially bad things to happen turned a predicted $150,000 deficit into a $60,000 surplus for 1988. Noteworthy in the "good things category" was a 19% increase in the sale of books to a record high of $449,015. Also in this category is the growth in membership to 27,671 (increase of 1,402). More important than the 1988 positive "bottom line," is the fact that valuable lessons were learned from the financial "mess" of the last few years during which deferred maintenance of our buildings subsidized underfunded programs. In the future, the service and programmic costs of the Association will be separated from building maintenance. The real estate activity will be budgeted to be self-sustaining and member dues will only be for support of programs and services. As a result of the financial "turn-around" last year and the new budget process, a decision was made not to undertake a fund drive in support of building renovations. (I am confident, however, that a donation would be accepted if it were accompanied by a short note requesting that it be applied to building renovation costs.)

In 1985, the National Research Council established the Mathematical Sciences Education Board (MSEB) as a unique national leadership mechanism, concerned with the full gamut of issues in the teaching of mathematics. The MSEB has spent three years in assessing the state of mathematics education nationwide, formulating a philosophy, and a national action plan for reform and revitalization in the teaching of mathematics. The extensive ground work will be reflected in four major reports :

Jan. '89 : Everybody Counts - *A Report to the Nation of the Future of Mathematics Education,* MSEB
Mar. '89 : *Curriculum and Evaluation Standards for School Mathematics,* NCTM
May '89: *Philosophy and Framework for School Mathematics,* MSEB
Fall '89 : *Strands of the Mathematical Curriculum,* MSEB

These reports should be **MUST** reading for each of us as well as **MUST** topics for departmental discussion and **ACTION.** Surely we are "part of the problem" and the time is now for us to become "part of the solution."

Don Small
Governor

SUPPORT AIM

I thank all of you who have given your support to the Applications in Mathematics Project (AIM) either locally or through presentation of the materials at the NCTM state conventions. At the New England annual meeting of the National Council of Teachers of Mathematics in Boston during December, the videos were made available to a large audience. If you have not viewed the materials, please do. I believe you will be impressed with them. Those involved with remedial programs in either trigonometry or algebra may find these applications offer a welcome change of pace. Support us by encouraging your local secondary schools to consider these materials as a supplement to their upper level courses. The videos and instructor/student resource booklets may be reproduced without charge. Contact either me or the national headquarters of the MAA for further information.

Homer Bechtell
Mathematics Department
University of New Hampshire

MINUTES OF THE LAST MEETING

The Fall Meeting of the Northeastern Section was held on November 18-19, 1988 at Rhode Island College in Providence, Rhode Island. There were 219 registrants.

Invited Addresses

Mathematicians, Bald Eagles and Dinsoaurs by Edward A. Connors, U. of Massachusetts.

The Air France Cup and Skew Regular Hexahedra : A Course Study by Thomas Banchoff, Brown University.

What is Transfinite Induction? by Donna Beers, Simmons College.

Christie Lecture : *Universal Cycles for Combinatorial Structures* by Ron Graham, AT&T Bell Laboratories and Rutgers University.

Complexity in Statistical Computations Involving Discrete Data by Jenny Baglivo, Boston College.

A Roll of the Dice by Persi Diaconis, Harvard University.

Contributed Papers

PROLOG : *Theory and Applications* by Robert Gray, Prime Computer Company.

Swedish Programs to Encourage Students to Enter Technical Fields by Ann Moskol, Rhode Island College.

Cost Allocation in a Modeling Course by David Houseman, Worcester Polytechnic Institute.

A Calculus Lab with Computers and Graphing Calculators by John Williams, University of Hartford.

Hybrid Bucket Sort : An O(n) Sorting Algorithm by Gary Hyslop, University of Rhode Island.

Bi-level Geometric Programming by Richard Segall, University of Lowell.

143 Years of Controversy about the Electrodynamic Force Law by Peter Graneau, Center for Electromagnetic Research, Northeastern University.

The Calculus Companion : A Computerized Tutor and Computational Aid by Diane Johnson, University of Rhode Island.

Pure Strategies for "Mastermind" by Janet Prichard, University of Rhode Island.

The Force Between Moving Charges and the Edwards Effect by Domina Spencer, University of Connecticut.

The Steigert Configuration for Discriminating Between the Ampere, Grassman and Riemann Forces by Shama Uma, University of Connecticut.

The Ampere, Grassman and Riemann Forces in the Vicinity of a Square Loop by Philip Mann, University of Connecticut.

Summation of Harmonic Numbers by Dominic Y. Savio, University of Rhode Island.

Student Papers

Multiprocessor Simulation Considerations by Horace Dediu, Tufts University.

Semi-Direct Products of Cyclic Groups by John Joseph Yered, Boston College.

The Use of Bootstrapping by Joseph Gregorio, Eastern Connecticut State University.

Boxicity in Graphs by Robert C. Rossow, Eastern Connecticut State University.

Segments Can Meet in Fours in Energy-Minimizing Networks by Mark A. Conger, Williams College.

Plotting Self-Similar Fractals by Saunders Whittlesey, Trinity College.

Allocation Methods for Cooperative Games by Lori Jew, Worcester Polytechnic Institute.

An Actuarial Internship by Robert Allen, Keene State College.

Regions of Convergence Under Newton's Method for Cubic Polynomials by Megan Kerr, Wellesley College.

The Academic Component of Bowdoin Admission Process : A Preliminary Statistical Analysis by Susan Anderson, Bowdoin College.

At the business meeting, the Program Committee chaired by James Tattersall of Providence College and the Local Arangements Committee directed by Fred Harrop of Rhode Island College were thanked for a job well done. The Section Chair acknowledged the contributions of Thurmon Whitley of the University of New Haven and Steve Snover of the University of Hartford in establishing and running the Software Exchange Program for the past seven years. This was of benefit to many in the past, but due to the increased availability of good commercial software, this program is being discontinued. The Chair asked for interested volunteers to serve on the Ad-Hoc Committee for Special Programs. An election for Section officiers was held. (See Page 2 for results.) The treasurer's report indicated that the main expense since the last report was the newsletter and that a small profit was made on the June Meeting held at St. Michael's College. The ten student presenters named above were awarded student membership in the MAA. In addition, each will be receive a book award donated by Prentice-Hall.

Laura L. Kelleher
Secretary-Treasurer

MAA STUDENT CHAPTERS

You are undoubtedly aware that the MAA has recently (1988) begun the process of forming MAA Student Chapters at colleges and universities throughout the country. By now, all college and university mathematics departments should have received information about this. If you have not received such information about this, let me know, and I will get it to you.

Also, each MAA section has been asked to appoint a coordinator for student chapter activities within the section. Dennis Luciano has asked me to serve in this capacity for the Northeastern Section.

So that I can have something to coordinate, I would appreciate each mathematics department within the Northeastern Section dropping me a note with the following information :

a) Does your department have a Math Club/MAA Student Chapter?
b) Faculty advisor - name, address, telephone number;
c) List of Student Officiers;
d) Suggestions for inter-chapter activities within our Section.

I plan to use the the above information to prepare a *Student Chapters Directory* to help promote activities between chapters.

If your school does not yet have a Math Club, let me encourage you to start one. The only requirement for membership in a MAA Student Chapter is interest in mathematics. If your Math Club has not yet registered as an MAA Student Chapter, encourage them to do so right away. All student chapters who register by June 30, 1989 will be designated as *Charter Chapters*, and will receive a certificate to that effect at the 75th Anniversary Meeting of the MAA, August, 1990 at Ohio State University.

If you have any questions about MAA Student Chapters, please contact: Thurmon Whitley, Department of Mathematics, University of New Haven, 300 Orange Avenue, West Haven, CT 06516; Telephone : (203)-932-7296.

EULER'S IDENTITY?

$$e^{i\theta} = (e^{i\theta})^{\frac{2\pi}{2\pi}} = (e^{2\pi i})^{\frac{\theta}{2\pi}} = (1)^{\frac{\theta}{2\pi}} = 1$$

DAN EDWIN CHRISTIE (1915-1975)

Dan E. Christie, for whom the Northeastern Section's **Christie Lecture** is named, was a slight modest man.

> *There was not an ounce of pretense in Dan's makeup. He was amicable, not familiar; conversable, not effusive; companionable, not intrusive. He was genuinely friendly, full of concern for the welfare of his associates.*

Because of his quiet, gentlemanly nature, it was easy for those who knew him to forget just how well known he was in the mathematics community.

> *Dan Christie was everywhere dense among mathematicians.*

A founding father of the Northeastern Section, Dan served as its chairman and twice as its representative on the board of governors. His MAA activities were not confined to the Northeast, however. In 1963 he was appointed to the MAA Committee on the Undergraduate Program in Mathematics, in 1965 to the Committee on an Intership in Mathematics Education, and in 1972 to the Committee on Assistance to developing Colleges. He also served on several other MAA panels and committees during his 32 years of MAA membership.

A native of Dover-Foxcroft, Maine, Dan graduated summa cum laude and Phi Beta Kappa from Bowdoin College in the Class of 1937. During the 1937-38 academic year, he was a Henry Fellow at St. John's College of Cambridge University. After receiving his A M and Ph D degrees from Princeton, he returned to Bowdoin in 1942 as an instructor in Physics and Mathematics, and he remained at Bowdoin throughout his entire career. During World War II, he was a civilian lecturer in the Army Air Force basic pre-meteorological program and the Naval Officiers pre-radar school at Bowdoin. He worked up through the academic ranks to hold the chair of Wing Professorship of Mathematics and he was Chairman of the Department from 1964 to 1972.

Under Dan's leadership in the early 1960's, Bowdoin adopted a unique plan designed to select as new members of the mathematics faculty, teachers with research interests concentrated in a particular area, rather than employing people representing a cross-section of the research specialties. As a result, Bowdoin developed as large a group of specialists in algebra as would be found in many universities. This plan greatly expanded the department's algebraic research capability and its ability to offer young, well-trained mathematicians career opportunities to match those in large universities.

From 1965 to 1969 Dan was the director of four Academic Year Institutes (AYI) at Bowdoin. The AYI program, supported by the National Science Foundation (NSF), enabled selected secondary school teachers to earn A M degrees in mathematics by completing a year of in-residence studies and attending courses at a NSF summer institute.

Dan was involved in efforts to promote mathematical research, too. He investigated forms and levels of support for research in mathematics as a member of the National Academy of Sciences-National Research Council's Committee on Support of Research in the Mathematical Sciences (COSRIMS). He was also Director of Bowdoin's Advanced Science Seminars, a series of NSF summer programs designed to stimulate postgraduate education and research in mathematics, from 1965 to 1971.

> *I think Dan Christie's most striking contribution was the sequence of Advanced Science Seminars in Algebra, which he created single-handed. ...There have been no other instructional institutes in mathematics that have compared in the high level of achievement and excitement. Research mathematicians still refer to the Bowdoin Advanced Science Seminars in Algebra as a standard against which any other summer program is to be measured. These seminars had their origin in Dan Christie's imagination and uncommon good sense; they were maintained through his energy and devotion.*

Dan's interests were not confined to research mathematicians, however.

> *Dan Christie believed so strongly that no one could claim to be a literate person unless he has a sense of what mathematics is; not merely that he should know a bit of algebra and a bit of geometry, but that he should be aware of what living mathematicians are doing just as he should be aware of what living poets are writing, and what living philosophers are saying. It was this basic belief that lead Dan to imagine, create and implement a new course...designed particularly for the non-specialist, designed to show young people that in their world mathematics must play a part.*

When Dan died in 1975, the MAA Board of Governors passed a resolution which included the following statement :

> "Dan Christie's legacy to mathematics is reflected from many facets - his intellect, his integrity, the students and colleagues whom he inspired, the summer institutes and seminars that he organized, his personal demonstration that small colleges can foster a high level of scholarly work in mathematics, and his devoted service in the councils of this Association, including CUPM, and two terms on the Board of Governors."
>
> *His dedication quickened our efforts, his wisdom guided our deliberations, and his friendship lightened our days. We mark his parting in sadness, and we speak our gratitude for the time he shared with us.*

In honor of Dan Christie's contributions, the Northeastern Section inaugurated the **Christie Lecture** in 1979. The list of Christie Lecturers over the years reads like a *Who's Who* of mathematics : John Milnor, Gian-Carlo Rota, John T. Tate, John Wermer, Henry O. Pollak, Philip Davis, Thomas Tucker, Ernst Snapper, Rueben Hersh and Ron Graham.

(The italicized quotes are from remarks made at a memorial service for Dan Christie in 1975.)

James E. Ward
Bowdoin College

1989 MAA/NES SHORT COURSE - CHAOS AND DYNAMICAL SYSTEMS

This year's short course is on *Chaos and Dynamical Systems* and will be held at the University of Maine June 19-23, 1989. The lecturer is Robert L. Devaney of Boston University. His goal will be to introduce some of the main ideas of dynamical system theory. Ten morning lectures will be devoted to such topics as chaos, iteration, Julia sets, fractals, attractors, and elementary bifurcation theory. Computer experiments which yield the fascinating images from dynamics will be used to illustrate dynamical concepts.

Afternoon sessions will be used to discuss pedagogical issues including how to incorporate ideas from dynamical systems theory into calculus and precalculus classes, the role of computer graphical experimentation in dynamics, and student projects in dynamics. Participants will be invited to give presentations related to the topic of the short course on Monday and Tuesday evenings.

After morning classes on Wednesday the group will take the usual trip to Acadia National Park for a picnic lunch and an afternoon of sightseeing, followed by a pizza party and curriculum discussion. A lobster/steak banquet is planned for Thursday evening. The course will end after lunch on Friday.

The cost of the short course, including room, board, trip, pizza, and banquet is just $225 for MAA members. Family accomodations are available. For further information contact : Clayton Dodge, Mathematics Department, University of Maine, Orono, ME 04469-0122. Telephone : (207)-581-3908.

NORTHEASTERN SECTION OF THE MAA
SPRING MEETING
KEENE STATE COLLEGE
KEENE, NEW HAMPSHIRE
June 2-3, 1989
PROGRAM THEME : CURRENT ISSUES IN MATHEMATICS PEDAGOGY

Friday June 2

2:30-6:00 pm	Registration	Science Center Lobby
3:00-4:15	Executive Committee Meeting	Science 125
4:30-5:30	*Calculus and the Curriculum* John Kenelly, Clemson University	Waltz Lecture Hall (Science 101)
5:45-7:00	Social Hour	TBA
7:00-8:15	Banquet	Dining Commons
8:15-8:30	Welcome President Judith Sturnick Keene State College	Waltz Lecture Hall
8:30-9:30	*Soap Bubbles and Teaching Mathematics* Frank Morgan, Williams College	Waltz Lecture Hall

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Saturday June 3

7:45-11:00 am	Registration	Science Center Lobby
7:30-8:30	Breakfast	Dining Commons
8:00-9:20	Student Papers	Science 125
9:30-10:30	*The NCTM Curriculum and Evaluation Standards and Their Implications/ Obligations for Collegiate Mathematics* John Dossey, Illinois State University	Waltz Lecture Hall

10:30-10:55	Coffee Break	Science Center Lobby
10:55-11:55	*Who Should Take Statistics-* *Who Should Teach Statistics-* *What Statistics Should Be Taught?* *Panel Discussion* John D. McKenzie, Jr., Babson College Rosemary A. Roberts, Bowdoin College Thomas J. Marx, Marx Social Science Research Inc.	Waltz Lecture Hall
12:00-1:30 pm	Luncheon-cookout	TBA
1:30-2:30	*Karmarkar's Linear Programming Algorithm and Its Extensions* Michael Todd, Cornell University	Waltz Lecture Hall
2:30-2:45	Business Meeting	Waltz Lecture Hall
3:00-4:00	Contributed Papers	Science 125
3:00-4:00	*Enhancing the Learning of Linear Algebra and Differential Equations Using Computers.* Lee Zia and Homer Bechtell, University of New Hampshire	Computer Lab

Program Committee :
Joan Ferrini-Mundy, University of New Hampshire, Chair
Richard Pelosi, Western New England College
Phillip Mahler, Middlesex Community College
Local Arrangements :
Joseph Witkowski, Keene State College

CALL FOR CONTRIBUTED PAPERS

There will be contributed paper sessions at the both spring and fall meetings. We are specifically interested in papers pertaining to new courses which you have developed, successful techniques you have found useful in teaching, or research you have done related to your classroom material. We urge you to make a presentation and to let others know what you are doing. This is also a good time to start planning a presentation for the Fall Meeting. Your presentation should be approximately 15 minutes in length. Send a typed abstract, together with a list of any special equipment you may need, by May 12, to : Ed Sandifer, Department of Mathematics and Computer Science, Western Connecticut State University, Danbury, CT 06810. Telephone (203)-355-9401.

CALL FOR STUDENT PAPERS

Students (and recent graduates) are invited to present papers at the Spring 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 is waived for student presenters at all section meetings.

Almost every college/university has students working on projects, problems, and minor 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 Spring Meeting, we urge you to initiate student projects now for presentation at the Fall Meeting.

Interested students should send an abstract and current address, with phone number, by May 19 to : Joseph C. Witkowski, Department of Mathematics and Computer Science, Keene State College, Keene, NH 03431 Telephone: (603)-352-1909. All proposals will be reviewed by department faculty members.

ABSTRACTS/SPEAKERS

Calculus and the Curriculum

John Kenelly, Clemson University

Computing devices should change mathematics instruction and hand-held units will have a very special role. Freshmen who enter college experienced with graphing calculators and symbol manipulating units will expand their calculus experiences and understanding. Teaching and testing experiences will be highlighted.

John Kenelly is an alumni professor of mathematics at Clemson University. Dr. Kenelly was the previous National Science Program Officer in charge of the Calculus Program and Past Chairman of the College Board Academic Council. He currently holds the title of Director of Reading for the Educational Testing Service Advanced Placement Program. He is the president-elect of Mu Alpha Theta and the Junior Audit and Budget Officer of MAA.

Soap Bubbles and Teaching Mathematics

Frank Morgan, Williams College

Soap bubbles provide an easy way to illustrate deep mathematical principles to audiences from research mathematicians to elementary school children. Soap bubble shapes have been admired for centuries, but mathematics is just now catching up. Current workers range from mathematics professors to undergraduate students. Mathematics, demonstrations, and a contest with prizes will all be part of this after dinner talk.

Frank Morgan went to MIT and Princeton, where his thesis advisor, Fred Almgren, introduced him to soap films, minimal surfaces, and geometric measure theory. Since then he has taught at MIT, Rice, Stanford, and now Williams. His book, *Geometric Measure Theory*, just appeared last year. Currently he is serving on the NSF Advisory Subcommittee on a new Geometry Initiative, the advisory committee for the new Undergraduate Mathematics Education TRENDS, and the MAA Committee on the Undergraduate Program (CUPM). Again this year he is coorganizer of the Third Boston Workshop for Mathematics Faculty.

The NCTM Curriculum and Evaluation Standards for School Mathematics and Their Implications/Obligations for Collegiate Mathematics

John Dossey, Illinois State University

The publication of the *Curriculum and Evaluation Standards for School Mathematics* by the National Council of Teachers of Mathematics in Spring, 1989, culminated a two-year period of drafts, hearings, and planning for the direction of U.S. K-12 mathematics over the next decade. If implemented, they will require changes in collegiate teaching of mathematics and in collegiate mathematics support to our nation's schools. The session will discuss these opportunities and obligations.

John Dossey is a professor of mathematics at Illinois State University. His major areas of study deal with mathematics curriculum from an international viewpoint and effective mathematics teaching. He was President of the NCTM from 1986 until 1988, during the major development of the *Standards*. Currently he serves on the MAA Board of Governors and is a member of the Mathematical Sciences Education Board of the National Research Council. Dr. Dossey is nationally recognized for his leadership and scholarly activities in mathematics education.

Who Should Take Statistics- Who Should Teach Statistics- What Statistics Should Be Taught? A Panel Discussion.

John D. McKenzie, Jr., Babson College; Rosemary A. Roberts, Bowdoin College; Thomas J. Marx, Marx Social Science Research, Inc.

Several different contexts will be represented in this discussion of issues related to elementary statistics. Appropriateness of various curricular approaches and content choices for different student audiences will be discussed. The SLAW Report (Statistics at Liberal Arts Colleges) will be addressed as part of the discussion.

John D. McKenzie, Jr. is Associate Professor of Quantitative Analysis at Babson College, where he joined the faculty in 1978. He holds an AB in mathematics from Amherst College, an MA in mathematics and an MA in statistics from the University of Michigan, and a PhD in statistics from the University of Michigan. His current interests are in statistical software and education. In 1987 Dr. McKenzie served as Chair of the Council of Chapters of the American Statistical Association. Currently he is Co-editor of the Minitab Users Group Newsletter.

Rosemary A. Roberts is an Assistant Professor of Mathematics at Bowdoin College. She joined the faculty at Bowdoin in 1984, after completing a PhD in Statistics at the University of Waterloo. She holds an MSc in physics from Waterloo, and a BA in mathematics from the University of Reading. She grew up in England and came to the US in 1979. She teaches statistics, calculus and finite mathematics. Dr. Roberts is part of a group of faculty from liberal arts colleges, with support from the Sloan Foundation, which is considering the role of statisticians in the undergraduate curriculum.

Thomas J. Marx is Vice President of Marx Social Science Research in Cambridge, MA. He holds an AB in English from Darmouth College and an Ed D in statistics from Harvard. He spent one year attending Columbia University Law School. Dr. Marx's research firm consults with others in the areas of law, medicine, management, and the sciences. Among their clients are the Bank of Boston and the New England Medical Center. Currently he is President of the Boston Chapter of the American Statistical Association.

Karmarkar's Linear Programming Algorithm and Its Extensions

Michael Todd, Cornell University

We will discuss Karmarkar's new linear programming algorithm and some of its recent extensions. While Dantzig's classical simplex method remains a highly efficient algorithm for practical purposes, certain variants of Karmarkar's method have proved slightly faster than a popular and widely-used FORTRAN implementation of the simplex method. At least as important to the speaker are the novel ideas that the new

algorithm employs. The simplex algorithm has as its foundation the combinatorial geometry of complex polyhedra. The new methods make explicit use of metrical properties of the feasible region, using projective transformations to ameliorate these properties. Also key are the nonlinear potential functions used instead of objective functions to monitor progress, and notions of centers of polytopes.

Michael Todd received a BA in Mathematics from Cambridge University and a PhD in Administrative Sciences from Yale. He received the George B. Dantzig Prize of SIAM and the Mathematical Programming Society. He is currently Leon C. Welch Professor of Engineering at Cornell University.

Enhanching the Learning of Linear Algebra and Differential Equations Using Computers

Lee Zia and Homer Becthell, University of New Hampshire

The presenters will use a discussion/workshop to introduce the use of computer software in differential equations and linear algebra. The introduction of computer graphics technology into the standard ordinary differential equations course, via the software, **Phaser**, will be described. Project rationale, pedagogical attractiveness of the software, implementation logistics, and examples will be included. The linear algebra example will illustrate the use of less sophisticated software as a means of enabling students to undertake problem sets that reinforce appropriate student exercises in the underlying theory. Challenges of designing appropriate student exercises will be discussed. Participant involvement will be encouraged.

Lee Zia received a PhD in applied mathematics from Brown University in 1985, and joined the UNH faculty in that year. His research interests are in mathematical modeling in population biology, including the development of pest control schemes and population dispersal problems. He has been involved in various grant-supported activity to promote computer aided instruction, and has received funding from AT&T as well as the UNH DISCovery program.

Homer Bechtell is a professor in the mathematics department at the University of New Hampshire. For over 30 years, he has been involved in both undergraduate and graduate programs with research interests in the area of finite group theory. Currently Professor Bechtell is the AIM Project coordinator for the Northeastern Section and serves on the MAA/NH-ATMNE Articulation Committee for the state of New Hampshire.

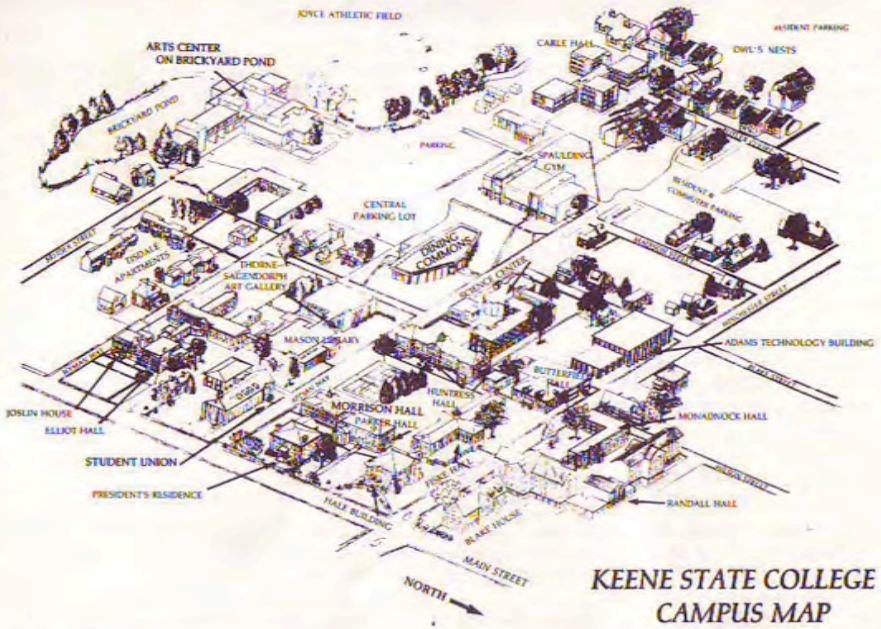
LOCAL INFORMATION

Keene State College is located on Keene's Main Street. Just a few blocks up the street from the campus you come to Central Square, dominated by the picturesque white church and town commons surrounded by shops, restaurants and office buildings. Keene, which was founded in 1753, currently has a population of 22,000. Also within walking distance of the campus is Colony Mill Marketplace. Beautifully renovated, this 150-year-old textile mill houses 40 shops of clothing, New England products, handcrafts, homemade candies, gourmet specialties, books and tapes as well as several restaurants.

Keene is located less than 20 miles from the namesake of the region, Mount Monadnock. The second-most climbed mountain in the world, it provides the physical challenge of solo climbing or the changing dynamic of a group excursion, with spectacular views at the top. Hiking, bicycling, water sports, fishing, and golfing can be enjoyed within a few miles of the campus.

For those preferring to stay off campus, a listing of area motels is given below. All phone numbers begin with an area code of **603**.

		1 person	2 persons
Super 8 Motel	352-9780	$37.88	$40.88
Ramada Inn	357-3038	$58.00-85.00	$68.00-85.00
Valley Green Motel	352-7350	$38.00	$50.00
Days Inn	new : will be open by the time of the meeting		



KEENE STATE COLLEGE CAMPUS MAP

Direction to Keene State College Campus:

FROM THE NORTH - (Routes 9 and 12) (From I-91, see 'from the west,' below) - Follow the highway to the end where it runs into a 'T' intersection and traffic light. Turn left and proceed to the second light, Main Street, and again turn left. The College is on Main Street, about ¼ mile, on your left.

FROM THE EAST - (Route 101) - Proceed on Route 101 West to Keene. At the second traffic light, Main Street, turn right. The College is on Main Street, about ¼ mile, on your left.

FROM THE WEST - (I-91 Route 9) - From I-91, (north or south), take exit #3 in Brattleboro, VT. Follow Route 9 to Keene and turn left at the third light, onto Main Street. The College is on Main Street, about ¼ mile, on your left.

FROM THE SOUTH - (Route 12) (From I-91, see 'from the west,' above) - Continue on Route 12 as it turns into Main Street in Keene. The College will be on the left, about ¼ mile past the junction with Routes 9 and 101.

FROM BOSTON - and the eastern Massachusetts area, take Route 2 to Route 140 North (in Gardner, Mass.), to Route 12 North.

TO PARK - Turn left on Wyman Way, just as you reach the campus. Proceed to the Central Lot, at the end of Wyman Way.

PUBLISHERS

The following text book publishers exhibited their latest offerings in mathematics and computer science at the fall of 1988 meeting held at Rhode Island College :

Academic Press
Addison-Wesley Publishing Company
D.C. Heath and Company
Harcourt Brace Jovanovitch
John Wiley & Sons
MacMillan Publishing Company
PWS-Kent
Saunders College Publishers
Scott-Foresman/Little Brown

We of the NES/MAA would like to express our thanks to the above. It is very helpful in terms of text selection to see so many recent titles on display and the income to the Section goes a long way toward defraying expenses associated with the meeting.

NEWS FROM NEMATYC

The annual meeting of the New England Mathematics Association of Two-Year Colleges was held at Dean Junior College on March 4, 1989 with about 150 registrants. At the business meeting, the following slate of officiers was elected :

President	Helene Savicki	Dean Junior College
Vice-President	John Jacobs	Mass Bay Community College
Treasurer	Jean Burr Smith	Middlesex Community College (CT)

Next year's meeting will be hosted by Mass Bay Community College.

BOSTON WORKSHOP FOR MATHEMATICS FACULTY

The Third Boston Workshop for Mathematics Faculty will be held at Wellesley College, Wellesley MA on June 15-18, 1989. The purpose of this workshop is to support undergraduate teaching. The emphasis is on the renewal of calculus, applied linear algebra, differential equations and algorithms. For further details contact : Gilbert Strang, Room 2-240, M.I.T. , Cambridge MA 02139. Telephone (617)-253-4383.

THE SUM OF THE PARTS

Writing about Celtic great Larry Bird and how he seems almost humdrum and not nearly so spectacular as stars like Michael Jordan and Dominique Wilkins, **Sports Illustrated** prose laureate Frank Deford draws this mathematical analogy :

> *"He seems merely the sum of little bits - a bit more clever than you or I, a bit more dedicated, a bit better on his shooting touch, a bit better with ... but certainly nothing out of the ordinary. Larry Bird is like when you first learn about fractions and you have to change everything into 12ths - 12ths! - to make it possible to add up the thirds and fourths and sixths and stuff. All the other players are so obviously whole numbers."*

WANTED : NEW MAA MEMBERS

As part of a national membership drive, the MAA has instituted a section Membership Incentive Program (MIP). Under this program, an MAA section can earn $10 for each new member. The Executive Committee of the Northeastern Section believes that MAA membership is valuable to a wide variety of mathematics professionals and that the MIP offers an opportunity to raise some additional funds for the Section. We need your help. Please give the membership form which appears below (or a photocopy thereof) to any of your friends or colleagues who are not now MAA members, but who might like to join.

James E. Ward
Bowdoin College
MIP Coordinator

JOIN MAA TODAY!

Send this application to : MAA Membership Department
1529 18th Street. N.W.
Washington D.C. 20036

Nominated by the
Northeastern Section
JAMES E. WARD
MIP Coordinator

Name _____
Mailing Address _____ Zip _____
Employer/School _____
Position(rank) _____
Employer's City/State _____
Highest Degree Earned _____ Year Degree Earned _____
Institution Awarding Degree _____
Month/Year of Birth ___/___
Have you been a member of MAA before? ☐ Yes ☐ No

Your membership may begin on July 1 or January 1. You may elect to receive any of the listed combinations of the three MAA journals. All members receive *Focus*, the MAA newsletter.

Please circle the appropriate box corresponding to your initial membership period and the selection of journals you wish to receive. (Rates are guaranteed for the indicated periods only.) Subscription prices are included with your dues (see**).

THE AMERICAN MATHEMATICAL MONTHLY	(M)
MATHEMATICS MAGAZINE	(G)
THE COLLEGE MATHEMATICS JOURNAL	(J)

	M	G	J	M+G	G+J	G+J	M+G+J
Student Membership*							
1 year(Jan.-Dec. 1990)	$30.00	$25.00	$27.00	$35.00	$37.00	$32.00	$42.00
$1\frac{1}{2}$ year(July 1989-Dec. 1990)	$44.50	$36.50	$39.50	$53.00	$56.00	$47.50	$64.00
Regular Membership							
1 year (Jan.-Dec. 1990)	$60.00	$49.00	$52.00	$73.00	$76.00	$65.00	$89.00
$1\frac{1}{2}$ year (July 1989-Dec. 1990)	$84.00	$66.50	$71.50	$103.50	$108.50	$91.00	$128.00

* Student membership available to high school and undergraduate students and to students regularly enrolled at least half-time. Enclose letter from high school or department offical confirming status. Student rates apply to unemployed persons who are seeking employment.

** Annual dues include subscription prices as follows. Regular Member $30(M), $20(J), $16(G), $5 (*Focus*). Student Member $14(M), $9(J), $7(G), $2(*Focus*).

Payment Enclosed $ _____ U.S. Funds Only (see below)
METHOD OF PAYMENT ☐ Check Enclosed ☐ VISA ☐ Master Card ☐ Bill Me
Card Number _____ Expiration Date _____ (month/year)
Interbank Number |_|_|_| (Master Card Only - located above name on card)

Signature _____

FALL MEETING 1989

Arrangements for the program for the Fall Meeting, November 17-18, 1989 at The College of the Holy Cross, Worcester, Massachusetts are in progress. The following distinguished mathematicians and expositers have already agreed to participate: Professor Robert Devaney of Boston University, who works in dynamical systems, will speak on *Chaos, Fractals, and Dynamics: Computer Experimentation in Mathematics*; Professor Michael Rosen of Brown University, a number theorist, has tentatively chosen *Averages of Number Theoretic Functions* for the title of his talk; Professor Paul Schweitzer, S.J. of Pontificia Universidade Catolica in Rio de Janeiro, who is a topologist, and differential geometer Professor David Hoffman of the University of Massachusetts will provide titles for their talks later.

MESSAGE FROM THE EDITOR

Thursday, September 14, 1989 is the date by which all materials for inclusion in the Fall 1989 issue of the Newsletter must be in the hands of the editor:

Frank P. Battles
Department of Basic Sciences
Massachusetts Maritime Academy
P.O. Box D
Buzzards Bay, MA 02532-1803
(508)-759-5761(school) (508)-224-8388(home)

A recent survey conducted by the National Office of the MAA regarding the demographic distribution of membership of the sections contains some very interesting results. Of the 29 sections we rank second in population (2149) just behind the Southeastern Section (2179). The Nebraska Section has the smallest population (147).

Our membership breaks down as follows : Students, 14.3%, K-12 Teachers, 11.4%; Two-Year College Faculty, 3.6%; Four-Year College Faculty, 17.1%; University Faculty, 24.2%; Non-Academic, 15.2%; Retired/Unemployed, 7.3%; Other, 6.9%. Should we wish to overtake the Southeastern Section, it would appear that the best area to concentrate recruitment efforts might be in the area of two-year colleges.

Rumor has it that John Gimbel, formerly of Colby College and now at the University of Alaska in Fairbanks, is hoping to institute an Alaskan equivalent to the *Downeast Graph Theory Conference* (about as far up west as possible!) in August of 1990.

Steve Kenton of Eastern Connecticut State College who has been serving as Publisher's Liason for the Section for the past few years will be on sabbatical leave the year after this. In anticipation of his absence, Sonja Sandberg of Framingham State College has agreed to assist Steve for the Fall Meeting of 1989 and will fill in for him for the Fall Meeting in 1990.

Thomas Koshy, chairman of the mathematics department at Framingham State (our host for the fall of 1990 meeting) has recently been honored by the Commonwealth of Massachusetts. On November 18, 1988, he received the **Citation for Outstanding Performance Award** from Governor Michael Dukakis.

Many thanks to Jim Ward of Bowdoin College for his very interesting article on the many contributions of Dan Christie, both to this Section and and to the mathematics community in general. Jim Tattersall of Providence College is writing an article relating to the history of the Section for next fall's newsletter. Similar articles are encouraged. Thank you to the other contributors to this issue as well as to Drs. Laura Kelleher and David Kan, both of Massachusetts Maritime Academy, for their invaluable assistance in the preparation of this Newsletter.

PRE-REGISTRATION FORM

NORTHEASTERN SECTION-MAA

SPRING MEETING JUNE 2-3, 1989 KEENE STATE COLLEGE

Mail Registration Form to: Joseph Witkowski
Mathematics Department
Keene State College
Keene New Hampshire 03431

Checks should be made out to: MAA/NES

You may register at the meeting if you wish; however, it would facilitate the organization of the meeting if you registered by mail at an earlier time. In any case, meals and housing reservations should be made by Friday, May 19, 1989. Spouses and guests are welcome at the banquet and other meals.

REGISTRATION:

Name _____

Institution _____

Address _____

City, State, Zip _____

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

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

MEALS:

Banquet (7:00 p.m., Friday)
Number ( ) x $16.00 $_____

Breakfast (7:30 a.m., Saturday)
Number ( ) x $4.00 $_____

Cookout (Noon, Saturday)
Number ( ) x $10.50 $_____

DORMITORY FEE: Friday Night, June 2
Rate : $20.00 single
$30.00 double } $_____

TOTAL $_____

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