

**AMERICAN MATHEMATICAL SOCIETY
EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES
MAY 17-18, 2002
ANN ARBOR, MICHIGAN**

MINUTES

A joint meeting of the Executive Committee of the Council (EC) and the Board of Trustees (BT) was held Friday and Saturday, May 17-18, 2002, at the Campus Inn Hotel in Ann Arbor, Michigan.

The following members of the EC were present: Hyman Bass, Robert L. Bryant, Robert J. Daverman, David Eisenbud, David R. Morrison, Hugo Rossi, and Karen Vogtmann.

The following members of the BT were present: Roy L. Adler, Hyman Bass, John B. Conway, John M. Franks, Eric M. Friedlander, Linda Keen, and B. A. Taylor. Carol S. Wood was unable to attend.

Also present were: Gary G. Brownell (Deputy Executive Director), John H. Ewing (Executive Director), Ellen H. Heiser (Assistant to the Executive Director [and recording secretary]), Jane E. Kister (Executive Editor/Mathematical Reviews), James W. Maxwell (Associate Executive Director/Meetings and Professional Services), Donald E. McClure (Associate Treasurer Designate), Constance W. Pass (Chief Financial Officer), and Samuel M. Rankin (Associate Executive Director/Government Relations and Programs).

Donald G. Babbitt (Publisher) was present for the Friday-afternoon session.

President Bass, President Elect Eisenbud, and Board Chair Keen each presided over certain portions of the meeting.

Items occur in numerical order, which is not necessarily the order in which they were discussed at the meeting.

0	CALL TO ORDER AND ANNOUNCEMENTS
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0.1 **Opening of the Meeting and Introductions.**

President Bass convened the meeting and everyone introduced themselves.

0.2 **Housekeeping Matters.**

Executive Director Ewing informed the ECBT about several housekeeping matters related to the present meeting.

1C EXECUTIVE COMMITTEE CONSENT ITEMS

1C.1 Resolution for Martin Gardner.

In late January 2002, the Executive Director (ED) was made aware of an informal gathering that is held every few years in early April to celebrate Martin Gardner and his work for mathematics. The ED contacted the Secretary, and they agreed that it would be appropriate for the AMS to formally recognize Gardner's achievements over the years. The Secretary therefore asked the EC to approve the following resolution by email. Ronald Graham presented the resolution to Gardner on behalf of the AMS.

The EC affirmed the action taken by email approving the following resolution:

During more than half a century Martin Gardner has written books about mathematics, educating and enticing both amateurs and professionals with over 65 books and hundreds of articles. His monthly columns in Scientific American drew many professional mathematicians into their careers. His books have been read by thousands of mathematicians around the world. For all that he has done for mathematics and for mathematicians, the American Mathematical Society expresses its deep appreciation and sincere gratitude, and hereby awards Martin Gardner an honorary lifetime membership in the Society.

1I EXECUTIVE COMMITTEE INFORMATION ITEMS

1I.1 Secretariat Business by Mail. Att. #3.

Minutes of Secretariat business by mail during the months October 2001 - April 2002 are attached (#3).

2 EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES ACTION/DISCUSSION ITEMS
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2.1 Report on Long Range Planning Committee.

LRPC Chair Robert Bryant reported on the May 17, 2002, LRPC meeting as follows:

- The LRPC had a preliminary discussion on focused planning (see item 2.2 below) and looked with favor on the focused planning documents and look forward to seeing the information that is generated as a result of this planning process.

- The LRPC had a brief discussion (because of time limitations) of the concerns that have been expressed by Council members and others that Council members don't feel deeply involved in the important decisions of the Society. The new type of discussion session (on the topic of the AMS role in graduate and postdoctoral mathematics education) that took place at the April 2002 Council meeting was also briefly discussed. The LRPC plans to discuss this topic again at its next meeting in November and hopes to make a definite proposal to the November 2002 ECBT.
- The LRPC considered whether to look into the governance issue of how various (mostly ex officio) committees are formed and decided to do so at its next meeting.

While the LRPC is considering ways to involve Council members more deeply in the important decisions of the Society, the ECBT asked that, as an experiment, the Secretary arrange for there to be a "featured" policy committee at the January 2003 Council meeting (i.e., an in-depth report from one policy committee and time for questions and discussion by Council members).

2.2 Focused Planning. Att. #1 and Att. #2.

Strategic planning had been discussed (once again) at the May 2001 meetings of the Long Range Planning Committee and the ECBT. At that ECBT meeting, the Executive Director proposed engaging in a different kind of planning focused on specific parts of the Society's operations. The ED also proposed that staff would consider which areas were most important for planning and bring the list to the May 2002 ECBT.

Att. #1 contains five "planning documents," each describing the importance of one area as well as an outline of possible planning. Att. #2 contains last year's document discussing strategic planning.

The ECBT reviewed the process that led to these planning documents and had an extended discussion about setting priorities for carrying out the planning over the coming years. In general, the ECBT was very pleased with the planning documents, although some members were of the opinion that the volunteers should have been more involved in this initial preparation. It was the consensus, however, that the first areas of focus should be membership and meetings. The ECBT requested that the focused planning documents be forwarded to the relevant policy committees.

2.3 Report on Committee on the Profession (CoProf).

The ECBT was informed that CoProf held its most recent meeting in September 2001, and a report on that meeting was included in the November 2001 ECBT minutes. CoProf's next meeting is scheduled for September 21, 2002 in Chicago. The 2001 Annual Report on CoProf activities has been filed with the Council and is also posted on the AMS website (<http://www.ams.org/ams/cprof-home.html>).

2.4 Report on Mathematical Reviews Editorial Committee (MREC).

The ECBT was informed that the MREC has not met since the last ECBT meeting. At this time, there is nothing new to report. The next meeting is scheduled for September 23, 2002.

2.5 Report on Committee on Publications (CPub).

The ECBT was informed that CPub has not met since September 2001 and consequently there is little new to report. A subcommittee will review the electronic-only journals during the current year and report to the full Committee at its meeting on September 14, 2002.

2.6 Report on Committee on Meetings and Conferences (COMC). Att. #4.

The ECBT received the attached report (#4) on the April 6, 2002 COMC meeting.

2.7 Report on Committee on Education (COE).

The ECBT was informed that the next COE meeting will be held October 25-26, 2002, in Washington, DC and received the following report on some activities since the last COE meeting:

- COE Chair Roger Howe, Herb Clemens and Judy Roitman -- as a result of their testimony on the National Assessment of Educational Progress (NAEP) 2004 draft framework, presented by Clemens in public session to NAEP in September 2001 -- were invited to rewrite the introductions to the sections of the framework dealing with Number, Algebra, and Geometry (three of the five subject areas for NAEP). COE commented on the rewrites via email discussions.
- COE sponsored an address at the January 2002 Joint Mathematics Meetings in San Diego by Lee Stith, President of the National Council of Teachers of Mathematics.
- The Chair of COE, the President, and staff are currently discussing a grant-supported project to foster consultation between K-12 policy makers and the mathematical research community.

2.8 Report on Committee on Science Policy (CSP). Att. #26.

The ECBT received the attached report (#26) on the April 26-27, 2002 CSP meeting.

2.9 Washington Office Report. Att. #5.

The ECBT received the attached report (#5) on Washington office activities.

2.10 Report on the Joint Policy Board for Mathematics.

The Executive Director reported that the next meeting of JPBM will take place on June 24, 2002. This meeting will be organized by the Mathematical Association of America (the previous meeting was organized by SIAM, and the AMS organized the one before that). Meetings now involve more than just discussion of Washington affairs and policy, including an exchange of information about current activities of all three member organizations and their future plans.

2.11 Report from the President. Att. #7.

The ECBT received the attached report (#7) from President Bass.

2.12 2003 Journal Pages and Prices.

The ECBT approved the following numbers of pages, and the BT approved the following prices, for 2003 journal subscriptions:

	# of pages	list price
<i>Abstracts of Papers Presented to the AMS*</i>	620*	\$112
<i>Bulletin of the AMS</i>	640	\$357
<i>Conformal Geometry and Dynamics</i>	200	\$25 (individual)
<i>Current Mathematical Publications*</i>	3,794*	\$588
<i>Electronic Research Announcements</i>	200	free
<i>Journal of the AMS</i>	1,000	\$246
<i>Mathematical Reviews*</i>		
Issue pages	9,887*	
Annual index pages	5,088*	
Total MR pages	14,975*	
MR Products		
Paper		\$501
MR Sections		\$143
Data Access Fee		\$6,509
MathSciDisc		\$1,921
MathSciNet		\$1,921
MathSciNet & MathSciDisc		\$2,678
<i>Mathematics of Computation</i>	2,000	\$411
<i>Memoirs of the AMS</i>	3,200	\$555
<i>Notices of the AMS</i>	1,550	\$382
<i>Proceedings of the AMS</i>	3,720	\$909
<i>Representation Theory</i>	500	
<i>St. Petersburg Mathematical Journal*</i>	1,208*	\$1,472
<i>Sugaku Expositions</i>	240	\$165

	# of pages	list price
<i>Theory of Probability and Mathematical Statistics*</i>	324*	\$564
<i>Transactions of the AMS</i>	5,000	\$1,490
<i>Transactions of the Moscow Mathematical Society*</i>	259*	\$398
*the numbers of pages for these journals are not completely within the staff's control, so these figures represent the staff's best estimates for inclusion in the version of the 2003 budget presented at this meeting.		

The 3,720 pages approved for *Proceedings of the AMS* is an increase of 200 pages over the 2002 allocation. The ECBT also approved, in principle, an additional 200 pages for 2004, and asked that the Chair of the *Proceedings* Editorial Committee provide a progress report on reducing the backlog to the May 2003 ECBT.

The 2,000 pages approved for *Mathematics of Computation* is an increase of 250 pages over the 2002 allocation. This is a one-time increase; it is expected that the page allocation will return to 2,750 for 2004. The ECBT asked that the Chair of the *Mathematics of Computation* Editorial Committee provide a progress report on reducing the backlog to the May 2003 ECBT.

2.13 2003 Individual Member Dues.

The ECBT set 2003 individual dues at \$144 for the high dues category, and set the break point between low and high level dues at \$75,000.

2.14 2003 Institutional Member Dues.

The ECBT approved an average increase in dues of 3% for institutional members in North America, and a comparable increase for the international program members, for 2003.

Staff plan to review the dues setting process for international institutional members over the summer and may bring a proposal for adjusting it to the November 2002 ECBT. The current process was established in 1999 by adapting the complex model used to set dues for institutions in the U.S. and Canada into a simplified process. There is a need to review the way the process is actually working for the institutions that have joined over the past three years to assess whether or not it is meeting the objectives for which it was created.

2.15 Registration Fees for the January 2003 Joint Mathematics Meetings.

The ECBT reviewed budget summaries for both the Baltimore joint meeting and the exhibits, as well as a description of the new procedure for setting registration fees that was adopted by the AMS-MAA Joint Meetings Committee.

Based on this information, the BT voted to advise the Joint Meetings Committee that the member pre-registration fee for the January 2003 meeting be set at \$190.

2.16 Financial Guidance: Current Assets and Liabilities.

At each of the next few meetings, the Chief Financial Officer will provide a brief presentation on an aspect of the Society's finances. The goal of such presentations is to make the ECBT aware of certain aspects of the finances, concentrating on those things that are often viewed as technical but have a large impact on AMS operations.

At the current meeting, the presentation focused on current assets and liabilities.

2.17 Changing ECBT Nominating Committee Charge. Att. #12.

The ECBT Nominating Committee (ENC) is charged with the task of nominating certain officers: Secretary, Treasurer, Associate Treasurer, and Associate Secretaries. The nominations are submitted to the ECBT and then to the Council for approval.

By tradition, a search committee is formed by the ECBT when an officer is not being nominated for reappointment. The search committee tends to report directly to the ECBT, rather than to the ENC, largely to streamline an already cumbersome process. The ENC is therefore made superfluous in this case.

On the other hand, one of the key purposes of the ENC is to gather information and make recommendations in case of reappointments of officers. It seemed sensible to modify the charge to the ENC to cover precisely these cases (reappointments) rather than all nominations.

The ECBT reviewed the current charge and discussed a proposed new charge. The new charge that was agreed upon is attached (#12).

2.18 Task for the 2002 ECBT Nominating Committee.

The Secretary reported that the 2002 ECBT Nominating Committee consists of John B. Conway, Eric M. Friedlander (Chair), David R. Morrison, Karen Vogtmann and Steven H. Weintraub. Its expected task will consist of recommendations on (re)appointments of the Associate Secretaries of the Central and Western Sections for the 2004-2005 term. Its report should be submitted to the Secretary by October 25, 2002, for inclusion in the November 2002 ECBT Agenda.

Since one of the 2002 Committee's tasks is to consider whether to reappoint Associate Secretary Susan Friedlander, Eric Friedlander recused himself as Chair of the Committee. It was agreed that Friedlander would continue on the Committee, but that John Conway would serve as Chair for 2002.

2.19 2003 ABC/ECBT Meetings.

The ECBT approved the following dates and sites for 2003 ABC and ECBT meetings:

ABC	March 21, 2003 (Friday)	by conference call
ECBT	May 16-17, 2003 (Friday-Saturday)	Providence, Rhode Island
ABC	October 10, 2003 (Friday)	Providence, Rhode Island
ECBT	November 21-22, 2003 (Friday-Saturday)	Providence, Rhode Island

It was noted that the members of the ABC in 2003 will be: Bryant, Daverman, Eisenbud, Franks, Friedlander, and McClure.

2.20 Motions of the Secretary.

The Secretary presented the following resolutions, which were unanimously approved by the ECBT:

Be it resolved that the Executive Committee and Board of Trustees of the American Mathematical Society accept the retirement of Donald G. Babbitt with deep appreciation for his faithful and exceptional service over the past ten years.

During his two-year tenure as Executive Editor of Mathematical Reviews, he laid the foundation for the transition of MR to the web version now known as MathSciNet.

His eight-year tenure as Publisher has been a time of fundamental change in scholarly publishing. Don guided every part of the Society's publishing program through that change with wisdom and skill, bringing the AMS journals into the digital age and vastly expanding the book program. In the highest and broadest sense, Don has fulfilled the Society's mission to further the interests of mathematical research and scholarship.

The members of the Executive Committee and Board of Trustees appreciate all that he has accomplished for the Society and for the greater mathematical community, and offer Don their special thanks and heartfelt good wishes for a happy and well-deserved retirement.

The Executive Committee and Board of Trustees take great pleasure in sending greetings on behalf of the American Mathematical Society to Professor Everett Pitcher on the occasion of his Ninetieth Birthday.

Professor Pitcher's service and dedication to the AMS as its Secretary for twenty-two years is fondly remembered. His statesmanship has served as a model and an inspiration for those who have succeeded him.

For all that he has done for mathematics and for mathematicians, the American Mathematical Society expresses its deep appreciation and sincere gratitude, and wishes him the very best on this most happy occasion.

2C EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES CONSENT ITEMS

2C.1 November 2001 ECBT Meeting.

The ECBT approved the minutes of the meeting of the Executive Committee and Board of Trustees held November 16-17, 2001, in Providence, Rhode Island. These minutes include:

- ECBT open minutes prepared by the Secretary of the Society,
- ECBT "open" executive session minutes prepared by the Secretary of the Society,
- BT closed executive session minutes prepared by the Secretary of the Board.

2I EXECUTIVE COMMITTEE AND BOARD OF TRUSTEES INFORMATION ITEMS

2I.1 Digitizing the Mathematical Literature - Update. Att. #18.

The November 2001 ECBT was informed about a proposal to carry out a major project over the next ten years, digitizing a large portion of the mathematical literature. An essay outlining the rationale for such a project and the problems associated to carrying it out was presented at that meeting, and an updated version will appear in the *Notices* later this year (see Att. #18).

More recently, a group at Cornell University has received a grant from the National Science Foundation to hold two planning meetings for further work on the project (which is now referred to as the "World Mathematics Library"). The first meeting will take place in July of this year. The AMS Executive Director will participate in these meetings.

The project has also been discussed by the Committee on Electronic Information and Communication of the International Mathematical Union, which is likely to provide oversight. A number of funding agencies in Europe, Russia, Canada, and the United States have expressed interest in the project.

2I.2 Travel Awards for ICM-2002, Beijing, China, August 20-28, 2002.

The National Science Foundation has awarded a grant of \$266,650 to the AMS to provide support for U.S. mathematicians to attend the 2002 International Congress of Mathematicians (ICM-2002). 256 applications for support were received in October 2001. Awards were made in February 2002 to 135 mathematicians, of whom 47 were Invited Speakers. Among the 88 awardees who were not Invited Speakers, 41 were mathematicians who received their doctorate after January 1, 1996. The award amount for each of these "junior mathematicians" was \$2,250, and the award amount for all others was \$1,900. Peter Li (University of California, Irvine) chaired the 20-member selection panel.

2I.3 2002-2003 AMS Centennial Fellowships.

The AMS Centennial Fellowship Committee has announced fellowship awards granted to Albert C. Fannjiang (University of California - Davis), Wee Teck Gan (Princeton University), and Ravi Kumar Ramakrishna (Cornell University). All have accepted. The amount of each 2002-2003 fellowship award will be \$55,000, with an additional expense allowance of \$1,650.

There were 41 applicants for the awards whose dossiers the Committee viewed as complete. Overall, there were between 50 and 60 applicants, depending on how incomplete dossiers are counted. By way of contrast, there were only eight total applicants for the 2001-2002 Centennial Fellowships, which were governed by different criteria.

2I.4 State of the AMS. Att. #24.

The Executive Director's annual report to the spring Council is attached (#24).

2I.5 Actions of the Agenda and Budget Committee (ABC).

At its March 25, 2002 meeting by conference call, the ABC took the following actions:

- set the schedule for the May 2002 ECBT meeting
- decided that a separate item in Section 3 of the ECBT agenda reporting on budgeted staffing levels is no longer needed, since this information appears in the Fiscal Reports.

2I.6 Report on AAAS Meeting. Att. #19.

A report on the AMS-supported activities at the 2002 annual meeting of the American Association for the Advancement of Science (AAAS) is attached (#19).

2I.7 American Astronomical Society-AMS-American Physical Society Public Service Award.

The third year awards were presented April 10, 2002, at a reception in the Dirksen Senate Office Building in Washington, DC, to Senator Barbara Mikulski, chair of the Senate Appropriations Subcommittee on VA, HUD and Independent Agencies, and Congressman James Walsh, chair of the House Appropriations Subcommittee on VA, HUD and Independent Agencies. Both subcommittees have oversight for NSF funding. The AMS Washington Office handled the logistical arrangements for this joint award.

2I.8 American Association for the Advancement of Science-AMS Mass Media Fellowship.

The AMS will sponsor one fellow in the summer of 2002. Kathy Paur, a mathematics graduate student at Harvard University, will spend her fellowship summer at the *Chicago Tribune*.

2I.9 AMS Presence at the Annual Meeting of SACNAS. Att. #20.

The AMS has provided \$5,000 toward support of the mathematics program at the past three national meetings of the Society for Advancement of Chicanos and Native Americans in Science (SACNAS). The first two years of AMS support came from the Program Development Fund. This outreach activity is now viewed as a part of the regular annual budgeting process and support is built into the annual budget. Associate Executive Director Maxwell and Public Awareness Officer Emerson represented the AMS at the most recent meeting held last October in Phoenix. Att. #20 provides a report of the mathematically related activities at this meeting.

SACNAS has shown itself to be highly effective at nurturing talented undergraduates from within their target communities to successful completion of graduate degrees in science and mathematics. AMS's presence at the SACNAS national meetings since 1997 has enabled strong ties to be built within this community of scholars committed to excellence.

3 BOARD OF TRUSTEES ACTION/DISCUSSION ITEMS
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3.1 Discussion of Fiscal Reports.

The BT received and discussed various fiscal reports. Approval of the 2003 budget will be requested at the November 2002 ECBT meeting.

3.2 Capital Expenditures - 2002 Capital Purchase Plan.

The BT received a report on the 2002 capital purchase plan.

3.2.1 Capital Expenditures - Approval of Specific Purchases.

This item is reserved for requests for authorization to make specific large purchases (items costing \$100,000 or more). No such requests were made at this meeting.

3.3 Investment Committee Report.

The BT received a report on the May 17, 2002 Investment Committee meeting. The only item requiring action by the BT is in item 3.6 below. (See also the next item.)

3.4 Audit Committee Report. Att. #27.

The Audit Committee met on May 17, 2002 with the auditors (with and without staff present) to hear a report on the 2001 audit and to review the audited financial statements for the years ended December 31, 2001 and 2000. These statements are attached (#27).

The BT was also informed that a proposal to change the composition of the Audit Committee, and possibly the Investment Committee as well, would be presented at the next BT meeting.

3.5 Short-term Investments. Att. #21.

A report summarizing the Society's cash management policies and short-term investment performance during 2001 is attached (#21).

To allow for more flexibility in investing the net cash inflow from operations in a changing economic environment, the BT approved increasing the limit on money market funds to \$5,500,000.

The BT modified the limit for fixed-income bond funds (currently Vanguard bond funds) to state that, if the limit is exceeded solely due to reinvested dividends and/or market increases in the share values, it shall not be deemed to be a violation of the limit so long as the excess is brought to the attention of the Treasurer and Associate Treasurer in a timely manner, and to the full Board of Trustees at its next meeting.

3.6 Economic Stabilization Fund (ESF) Increment.

The BT was informed that, during 2001, the ESF base and supplemental portions decreased by \$2,096,906 and \$1,465,873, respectively. These decreases resulted from overall losses on the long-term investment portfolio in 2001.

At December 31, 2001, the Society's ratio of current assets to current liabilities is 2:1. A ratio of 1.5:1 is generally considered to be a financially prudent ratio to maintain. Accordingly, the operating investment portfolio has funds available to transfer to the long-term investment portfolio totaling \$2,000,000. Further, the base portion of the ESF has dropped from 129% of the Minimum Target to 114% in one year. If the \$2,000,000 is added to the base portion of the ESF and all other assumptions remain the same, this fund would be restored to approximately 126% of the Minimum Target by the end of 2002.

The BT approved staff's recommendation that \$2,000,000 be transferred from the operating investment portfolio to the long-term investment portfolio, with the entire amount added to the base portion of the ESF.

3.7 Trustee Reports on Divisions.

Section VI of the 2001 operating plan (Report on Projects and Activities) had been sent to the BT separately, and each Trustee reported on the Division(s) with which he or she has liaison. The Trustees were favorably impressed with the activities of every division and were in agreement that things are going very smoothly.

Now that the 2001 Operating Plan is complete, a copy of it will be attached to the record copies of these minutes (Att. #28).

3.8 Meeting of MR, Inc.

In 1983, when the building that currently houses Math Reviews was purchased, a Michigan non-profit corporation was formed in order to obtain exemption from local property taxes in Ann Arbor and from sales and use taxes in Michigan. In order to maintain these exemptions, the corporation (MR, Inc.) must be maintained by holding an annual meeting at which the Officers and Directors of the corporation are elected.

The AMS BT meeting was therefore temporarily adjourned so that the AMS Trustees could convene as the Board of Directors of MR, Inc.

The Board of Directors of MR, Inc. elected the following officers:

President of the Corporation: Linda Keen
Treasurer of the Corporation: John M. Franks
Secretary of the Corporation: John B. Conway
Directors of the Corporation: Roy L. Adler
Hyman Bass
Eric M. Friedlander
B. A. Taylor
Carol Wood

The meeting of the Board of Directors of MR, Inc. then adjourned, and the meeting of the AMS BT reconvened.

3C BOARD OF TRUSTEES CONSENT ITEMS

3C.1 Retirement Plan Amendment. Att. #22.

The BT approved the attached retirement plan amendment (#22).

3C.2 Resolutions for Retirees.

The BT approved the following resolution for the employees noted:

Carol-Ann Blackwood for over 37 years of service
Sandra E. Scott for 39 years of service

Be it resolved that the Trustees accept the retirement of _____ with deep appreciation for her faithful service over a period of _____. The Board expresses its profound gratitude for this long record of faithful service. It is through the dedication and service of its employees that the Society is able to effectively serve its members and the greater mathematical community. The Trustees offer _____ their special thanks and heartfelt good wishes for a happy and well-deserved retirement.

(See also item 2.20 for the resolution for Donald G. Babbitt.)

3C.3 Trustees' Officers.

The BT named Eric Friedlander Chair of the Board, and Carol Wood Secretary of the Board, for the period February 1, 2003 - January 31, 2004.

3C.4 Procedures for Appeals for Discounted Subscriptions.

The BT approved continuing to use the following guidelines for 2003:

- Minimum price for MR Data Access Fee (DAF) of \$200 applicable to institutions in countries found in the two poorest World Bank country listing. Staff can provide this level of discount even if the country does not have a national DAF.
- The discounted price for MR DAF for domestic institutions would not be lower than the greater of 40% of a list price DAF or 40% of the institution's mathematical sciences serials budget, not to exceed regular list price for a DAF.
- The discounted price for MR DAF for non-domestic institutions not included in the first category above would not be lower than 40% of a DAF. To the extent possible, information about serials budgets would also be collected, and, if desired, staff would provide information on publishing activity at the institution.
- For MR derived products, allowable prices would be regular list price for paper, 50% of list for MathSciDisc (provided SilverPlatter goes along), and lowest published price for MathSciNet.
- For other AMS journals, the lowest allowable price would be marginal cost, applicable to the most desperate cases.

3I BOARD OF TRUSTEES INFORMATION ITEMS

3I.1 Transfer from Operations to Temporarily Restricted Net Assets.

The long-term investment portfolio has suffered losses in both 2000 and 2001. Accordingly, some of the more recently created true endowment funds had allocated investment values that were less than the original gift amount. Generally accepted accounting principles and the laws of the District of Columbia require that an organization's operating funds transfer such amounts to true endowment funds to maintain the original gift amount. In 2001, operations were charged with approximately \$84,000 to make certain endowment funds equal to their original gift amount. Should the allocated investment values of these funds improve in the future, operations may recoup this amount.

3I.2 Activities Supported by Program Development Funds.

The activities supported by Program Development funds in 2001 and the 2002 budget are as follows:

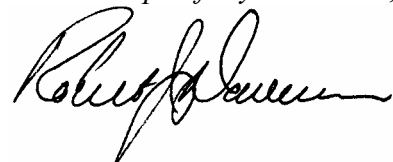
	2001 Actual	2002 Budget
Public Awareness – <i>Discoveries and Breakthroughs</i>	\$ 25,000	
Young Scholars Program	75,000	\$75,000
MathJobs Project	10,000	10,000
DB – Underrepresented Minorities (completion)	<u>2,341</u>	
Totals	<u>\$112,341</u>	<u>\$85,000</u>

3I.3 Changes in Fringe Benefits.

The November 1996 BT authorized the Executive Director to approve changes in benefit plans (except for those changes which would significantly enhance or degrade the Society's financial health or relations with its employees) and asked that these changes be reported to the Board of Trustees when appropriate.

There are no such changes to report at this meeting.

Respectfully submitted,



*Robert J. Daverman, Secretary
Knoxville, Tennessee
June 27, 2002*

Attachment 1 – May 2002 ECBT

American Mathematical Society

Focused Planning

Friday Evening Discussion

May 17, 2002

Documents Included

Focused Planning (general description).....	2
List of retreat participants.....	7
Four ways to measure success	8
Planning document: Meetings.....	9
Planning document: Membership	13
Planning document: Publication production	17
Planning document: Paper to electronic	21
Planning document: Data collection and delivery	26

Focused Planning—Process

Strategic planning was discussed at the May 2001 meeting of the Long Range Planning Committee, as well as the Executive Committee and Board of Trustees. It was not the first time these groups had engaged in such a discussion. In fact, since the 1991 strategic plan, there had been a cyclic review of the need for strategic planning, always with the same outcome—to reconsider the matter in two years. This seemed to be a good time to stop the cycle

The essay included with last year's agenda, *Strategic Planning Rerevisited* (attached), reviewed past strategic planning, described the Society's ongoing annual planning, and then proposed a different kind of planning—planning that seemed more relevant to the Society's present needs. Here is a brief description of that proposal.

The mission statement is as valid today as it was 10 years ago and serves as the basis for the overall activity of the AMS. We do not have to revise our annual planning process, nor do we need to rethink our mission. We can, however, supplement and refine both.

The primary way to supplement our annual planning is with concrete and tangible business planning, aimed at a particular segment of our operations. A good example of this is the planning carried out several years ago for journals in which we examined data about the current environment, made an attempt to consider possible changes in the future . . . , and laid out some possible alternatives for action. This kind of “business planning” is valuable precisely because it tries to step outside the annual cycle of operations, and it is likely that it should be carried out in other areas.

The ECBT/LRPC agreed that the staff would spend the coming year preparing a list of specific areas for planning, and bring that list to its May 2002 meeting for discussion.

Process

Planning requires stepping back to view the the Society from a broad perspective, and it's not easy to do that when immersed in day-to-day activities. Early on, we decided to try an experiment: Senior staff would go on a short retreat to focus only on planning. The retreat took place in March of this year at the Whispering Pines Conference Center of the



University of Rhode Island (rustic, deep in the woods, quiet). The retreat was organized by Deputy Executive Director Gary Brownell, and ran from Thursday noon until late Friday afternoon. During that time, 18 members of staff engaged in general discussion and small group work. There was free-association about

future trends, debate about measuring success, and intensive work by groups to formulate planning documents for specific areas. Everyone (including a previously-skeptical ED) viewed the retreat as a success.

The purpose of the retreat in March was to consider all aspects of the Society's operations and to decide which were amenable to focused planning (a better term than "business planning"). The retreat was meant to produce a list of topics, a description of the importance of each area to the overall health of the Society, and an outline of the steps necessary to carry out planning. The information had to be sufficient to set priorities and allow staff to prepare for planning in each area. The resulting documents were not meant to be fully-formed plans but rather sketches of plans.



To assemble a list, the entire group first considered major trends and issues that would affect the Society in the next 10 years. From common elements in the list, we settled on six major topics. Finally, the group was divided into three working groups that considered two topics each, with the Executive Director and Deputy Executive Director circulating among the groups. (One topic was eventually set aside because it seemed both less consequential and less amenable to planning.) Carrying this out was hard work, for everyone.

In addition to making the list, participants in the retreat considered refining the mission of the Society, as described in the *Strategic Planning* document from the May 2001 LRPC meeting. Here is a brief excerpt from that document that summarizes the focus of the discussion:

The refinement of the mission is more subtle and requires more explanation. The mission statement sets forth the general purposes of the Society — promoting research, transmitting mathematical knowledge, supporting education, advancing the profession, and advocating for the profession. Year by year, our actions are meant to accomplish these purposes and (one hopes) to work on all of them from time to time. In *every* organization, however, it is necessary to set priorities.

Setting priorities does *not* mean deciding which parts of the mission are unimportant; it means deciding how one wants to measure success in order to make choices.

There were four ways suggested to view success:

- operational excellence
- product and program leadership
- member and customer intimacy
- advocacy effectiveness.

(Bulleted lists describing each of these are included as an attachment.)

While every association tries to be successful in each of the four categories, it was emphasized that setting priorities means deciding *which* category was most important. What are the standards by which we want to be judged by members and customers? Which of the four perspectives should dominate? This is a fundamental policy decision, and ultimately is decided by the Council and Board, but we tried to consider the discussion in advance as part of general planning.

In one respect, this part of the discussion was a failure. The aim was to force people to decide on *one* of these perspectives as predominant for the Society. But everyone insisted that *each* perspective was important for some part of the AMS and none could be eliminated without distorting our mission. On the other hand, operational excellence pervaded *every* part of the Society, and therefore it had a different character than the others. Implicitly, we take operational excellence as a goal for everything we do.

There was so little controversy about this conclusion that it seems unlikely there will be controversy among the leadership.



Planning documents

What did the retreat produce? The five major areas of the Society's operations that appear to be good candidates for planning are:

- Membership
- Meetings
- Publications production environment
- Paper to electronic
- Data collection and information delivery: Running our business

The choices do not mean that the Society faces crises in these areas or even that something is dramatically wrong in these areas. The areas were selected because each is involved in considerable change over the coming 10 years and each will require major decisions. Some of these topics involve high-level policy (membership); some are almost

exclusively business decisions (production, data collection); some combine both aspects (meetings, paper to electronic). All are important to the Society's well-being.

At the retreat itself, the groups sketched an outline of the importance of each topic and the steps necessary for planning. Subsequent to the retreat, the same groups worked to refine that outline, creating a separate planning document for each area. Those documents are attached to this material.

These are meant to be only *outlines* of plans; they are not meant to be complete; they are not meant to be final. Rather they are intended to show the importance of the area and to sketch the variety of steps that might be carried out in systematic planning.



The documents speak for themselves, but *one* area—data collection and business practices—deserves special mention and explanation. On the one hand, this appears to be a routine business decision about upgrading our underlying business database and the software applications that surround it. On the other hand, it is not only a complicated *technical* decision but a complicated *business* decision as well. It is a decision that is intertwined with almost every part of the Society's operations.

Our business database is immense. The relational database intertwines approximately 600 tables, including information on almost 250,000 customers, and recording complex information about more than a million orders. It contains more than 500,000 records pertaining to membership history; more than 600,000 records about payment history; more than 700,000 records for subscriptions. There are about 100 reports for orders produced each day involving about 75 programs, and about 30 reports per day for the publication production stream. There are dozens of interactive applications, queries, and customizable reports, using more than 800 different screens. The database contains information about proformas and members, wire transfers and reviewer coupons, manuscripts and inventory. Our business database is a large, complex application built to manage a 7.5 GB collection of business information.

Over the past twenty years, that application has evolved as our business practices and policies have changed. Because the Society is inherently complicated, and because it traditionally tries to meet almost every need of members and customers, business practices became increasingly intricate. As a consequence, it is virtually impossible to replace the database application with one that accommodates all our current practices. A fundamentally technical decision therefore becomes intimately connected to a broad business decision—one that cuts across every part of the Society.

A systematic review of the Society's business practices will benefit more than the database project. We have become more efficient in recent years, reducing staff and cutting costs in many areas. If we want to continue that process, it is essential to review our business practices with the aim of appropriately simplifying those practices. That does *not* mean eliminating individual attention to customers or members. But simplifying and rethinking business practices will almost surely make it possible to do more with less. It's a healthy (although painful) exercise.

Because it depends on a thoroughgoing analysis of our entire business operation, the database project is the largest of these planning efforts, by a wide margin.

Friday Night Discussion

The purpose of the discussion on Friday evening is to review the process that led to these planning documents, to endorse the idea of systematic focused planning, and to set priorities for carrying out that planning over the coming years.

I will make some additional comments about the five areas at that meeting, but the goal of the meeting is to solicit feedback from the ECBT about priorities for planning.

For that reason, I'd like to ask each member of the ECBT to propose his or her own list of the three most important areas in order of importance, along with a brief indication of the reasoning.

Is this the right approach to planning? Are these the right areas? Do some of the questions posed in the planning documents have obvious answers? Are the outlines of planning sufficient?

John Ewing

Artsy Photo taken by
Deputy Executive Director



Retreat Participants

Retreat Participants

Don Babbitt, Publisher Emeritus
Carol-Ann Blackwood, Manager,
Membership and Customer
Services
Diane Boumenot, Manager, Professional
Services
Gary Brownell, Deputy Executive
Director
Drew Burton, Manager, Systems (Ann
Arbor)
John Ewing, Executive Director
Sergei Gelfand, Director, Acquisitions
Ellen Heiser, Assistant to Executive
Director
Beth Huber, Associate Publisher

Nancy Kaull, Director, Systems and
Operations
Jane Kister, Executive Editor
Maria Lebron, Associate Publisher
Jim Maxwell, Associate Executive
Director, Meetings and
Professional Services
Anne Orens, Director, Marketing
Connie Pass, Chief Financial Officer
Sam Rankin, Associate Executive
Director, Washington Office
Diane Saxe, Director, Meetings and
Conferences
Barbara Veznaian, Director,
Management Information
Systems

Four Ways to Measure Success

Operational Excellence

- Deliver a combination of quality, price and ease of purchase no one else can match
- Execute extraordinarily well
- Commitment: Guaranteed value of our products
- Cost efficiencies
- Large volumes to reduce costs
- Quality customer service
- Rapid, responsive fulfillment

- Not product or service innovators
- Do not (necessarily) cultivate one-to-one relationships with customers

Product and Program Leadership

- “Leading edge” programs
- Programs that expand existing boundaries
- New applications of existing programs
- Commitment: Best products/programs
- Being creative and inventive
- Entrepreneurial culture; reward risk
- Mechanism to identify potential new programs
- Program development process designed for speed

- Key idea: Have to be willing to leapfrog your own latest program with something new, even when old program still works.
- Innovation drives the process

Customer/Member Intimacy

- Build bonds and relationships
- Know customer needs for products and services
- Cultivate our greatest asset: Customer loyalty
- Message: We take care of your needs, no matter what the cost
- Relationship building capabilities (tools)
- Member database supports customization
- Delegate authority to those closest to customer.

- Overall, this approach delivers products and services designed for the individual, not the market.
- This demands a culture that embraces deep and lasting relationships over all else.

Advocacy Effectiveness

- Advocate the interests of the profession
- Maintain relationships with decision-makers
- Position interests of profession with those of decision-makers
- Become recognized as a source of valuable information to decision-makers
- Anticipate evolving issues
- Timely knowledge of proposals, opinions, and world views of others.

- Ultimately, excellence in advocacy requires convincing members that advocacy for the profession is a “member benefit” --- one of the reasons they should join the organization.

Focused planning area: Membership

Writers

James Maxwell, Diane Boumenot, Diane Saxe, Ellen Heiser, Carol Ann Blackwood, Sam Rankin

Our existence as a membership society is dependent on a steady influx of new members and our ability to retain our existing members. And it is important for staff and leadership to consider, from time to time, the importance of membership to our entire operation. The community we serve is changing, and the AMS must be alert to new needs and expectations within that community.

How are we adjusting to the aging of our membership?

What are we doing to attract the new generation of mathematicians and to make membership important to them?

How are we utilizing the internet both to perform services and to build our membership?

The goal of this planning effort is to identify which segments of the mathematical community should be better represented in AMS membership and appropriate methods for increasing membership.

Trends and Issues

Nothing is more central to the AMS than its members. Almost everything we do requires support from the mathematics community in one way or another. The existence of almost 30,000 individuals who identify with the goals of the AMS and want to contribute to them makes us what we are. Of course, the world, our members, and mathematics itself change all the time. Keeping up with those changes and meeting the needs of our members and future members is an ongoing responsibility.

The AMS Task Force on Membership recommended in December, 1999 that “other committees and the ECBT keep membership clearly in mind when considering new and current programs.” In order to effectively implement this, we do need to step back from time to time and purposefully examine how successful we are at attracting and keeping members, and what else needs to be done. Currently, among dues-paying membership categories, membership levels are stable, showing no significant increases or losses in the last 5 years. If we are to improve the situation, or avoid the decline in membership that many professional societies face, it is important to understand what we are doing right and wrong in this regard.

One problem we cannot avoid is that our membership “target” is in motion. The demographics of the U.S. mathematical community are shifting. First of all, the community is aging. The rate of retirement among mathematics faculty has doubled in the last decade. The number of AMS Emeritus members (a free membership level available to longtime members who retire) continues to grow each year, along with the average age of our members. When we examine AMS membership among faculty, we find that the older the faculty member, the more likely they are to belong to the AMS. Has this always been true? What are the reasons for lower membership levels among newer faculty?

There are many ways in which the new generation of mathematicians will be different from the one retiring now. For one thing, they are much more likely to be born outside of the U.S. In 1998, 46 percent of faculty below age 40 at Ph.D.-granting departments were born in the U.S., while for those faculty older than 40, the figure was 70 percent. The same 1998 study showed that foreign-born mathematics faculty are less likely to belong to the AMS. Why is this?

Membership

The percentage of women receiving Ph.D.'s in mathematics, having grown steadily over the last 20 years, is likely to keep growing as time goes on. Are women more or less likely to join the AMS than their male counterparts? How can the AMS be sure that it is the mathematical society for all mathematicians?

We represent a community that is becoming increasingly diverse and mobile. Utilizing these new strengths is the key to a meaningful future. Could the AMS do more to encourage participation by mathematicians at a variety of institutions, and at all stages of their careers? About half of the full-time faculty in Ph.D.-granting departments are AMS members, even less for faculty at bachelors or masters-granting departments. Has this been true for many years? Could we do better?

In addition to changes among mathematicians, we face broader changes in the mathematics community. There will always be a cycle of ups and downs in the academic mathematics world; currently there is some evidence that our community is shrinking. The Annual Survey shows a decrease in new Ph.D.'s over the last 4 years. What is a potentially more serious shift is that Ph.D.-granting mathematics departments show a declining percentage of tenure-track faculty in the last decade. While Ph.D. production will likely reverse itself at some point, how will decreasing job stability impact membership levels?

Since early-career mathematicians are our potential future stronghold, should we reach out to younger members in new ways? The AMS has had a long-standing connection with graduate students through our nominee member program, which brings them into membership early in their careers. More recently, a half rate program for the first five years of ordinary membership has helped to keep the former nominees in the AMS. But could the AMS make more of an effort to get younger members involved in the Society and its range of committees and elected positions? During the 1990's, senior mathematicians watched in dismay as their former students struggled to find work in a declining job market. The opinions and concerns of younger mathematicians were given a great deal of attention. How are we doing in the current decade?

How important are programs and services to membership levels? Services are generally targeted to specific groups, such as students, job seekers, retiring members, international members, etc. Which programs are most critical to membership? Are there areas where we should be doing more, in order to improve membership levels?

Inside the AMS, business practices are changing rapidly. The internet is increasingly viewed as a free source of information, competing with services formerly offered only to members by professional societies. Also, societies are under pressure to offer more electronically in many respects, and member services is no exception. The use of the internet to communicate with our members (e.g., membership renewal, CML updates) has both improved service to the members and reduced cost. Overall, how well are we utilizing the internet both to perform services, and to build our membership?

These are serious questions that deserve exploration. The effectiveness of our future endeavors depends on an involved and committed membership.

General outline of the planning process for this area

We envision one planning process which will cover all the issues and trends mentioned above, since placing importance on various issues will be an early step in the process.

The Staff Membership Council will be responsible for overseeing the planning process. This group consists of the Associate Executive Director for Meetings and Professional Services, the

Membership

Manager of the Membership and Customer Services Department, the Manager of the Professional Services Department, and one of the Public Awareness Officers. Since the Membership planning and development function is not centralized, they will need to draw on staff from various departments to complete each task.

Analyze historical trends (1 to 2 months)

Historical trends should be analyzed in order to establish our current bearings correctly. For instance, what percentage of academic mathematicians are currently AMS members? What was the percentage 25 or 50 years ago? Data of this sort can be gathered from AMS records. Additionally, work done in the past, such as membership surveys, should be reviewed.

Gather ideas and comparisons with other societies (1 to 2 months, could be concurrent with step above)

Another important initial step is to compare ourselves with professional societies in the U.S. that have some similarities to the AMS. Information about the membership practices of comparable societies should be gathered by staff through direct contact with the other societies, and via the web and printed materials. Member benefits will be considered as well as larger issues. When contacting upper level staff at the other societies, we might ask about some key issues such as changing demographics, the use of the web for members-only services, and ways of recruiting and retaining younger members.

Communicate with AMS leadership about the issues (1 to 2 months)

The next step would be to prepare background material leading to a discussion with the AMS Committee on the Profession (CoProf). The purpose of the discussion would be to identify the most important needs and expectations of the community. Material to be offered in advance of this discussion would include some historical background information on membership, current practices and issues in membership services, and ideas about possible future activities to enhance membership development. Coming out of the meeting, we hope to have a clear direction for which particular groups or issues to focus on. This will determine the specific goals of the rest of the project. CoProf may want to appoint one or two members to be available to staff in the final steps of the process.

Collect data from key groups (4 months)

We need to choose methods for gathering some information from members and from non-members. Written surveys and focus groups should be considered as means of gathering information on the needs of our members and potential members. Data gathering efforts will be directed at targeted groups, and may be concerned with very specific issues, as determined in the previous steps. It should be easiest to consult those at the early and later stages of their careers (since many are members); those in mid-career who choose not to join will be the most difficult to reach, and may require a more creative approach to information gathering.

Analyze data and formulate plans (2 months)

The data gathering process should affirm or discourage the various ideas and possibilities being considered. It may also bring up possibilities for new AMS activities. Staff should consolidate the best ideas for changes in our current practices into a set of proposals, consulting leadership where appropriate (for instance, the Secretary, and Coprof representatives if appointed). These proposals should go first to CoProf, and then on to the Council and Board of Trustees. Ultimately, the staff would be responsible for implementation.

Membership

Proposed Timetable

<i>Analyze historical trends</i>	<i>1 to 2 months</i>
<i>Gather ideas and comparisons with other societies</i>	<i>1 to 2 months, could be concurrent with step above</i>
<i>Communicate with AMS leadership about the issues</i>	<i>1 to 2 months</i>
<i>Collect data from key groups</i>	<i>4 to 5 months</i>
<i>Analyze data and formulate plans</i>	<i>2 months</i>

The process as outlined would require about 12 months to complete; however, the final step of showing the report to CoProf may have to occur somewhat later, depending on a decision to communicate with them by mail or in person for the final report.

Estimate of staff and volunteer time required for planning

The project would likely take between 600-800 hours of staff time. The volunteer time will consist of normal committee work time, supplemented by hours spent by a few CoProf members serving on a subcommittee (if appointed). Their time would be spent communicating with staff; no travel would be involved.

Focused planning area: Meetings

Writers

Jim Maxwell, Diane Saxe, Diane Boumenot, Ellen Heiser, Carol Ann Blackwood, Sam Rankin.

Introduction

Since its beginning, the AMS's program of meetings has been a central means whereby the Society fulfills its mission to "further the interests of mathematical research and scholarship." AMS meetings provide a forum for mathematicians, members and nonmembers alike, to hear current research results, collaborate with other mathematicians, and keep current on the broader issues that affect the profession. Meetings are, in many ways, how the members put a human face to the Society.

The environment within which the AMS conducts its meetings and conferences is not a static one. Periodically there is a need to take a deeper look at the challenges that the Society faces in providing a resilient meetings program that is fully serving the needs of its membership. The following questions point to key issues the Society must address as it strives to maintain a vibrant program of meetings and conferences in the future.

Should meetings provide additional income to the Society?

What new online services are most important to the meeting attendees, and how can these services be provided in a cost-effective way?

How should the software systems that currently support the Society's meetings be updated to meet the needs of staff and volunteer meeting planners and the meeting attendees?

What is the future of the AMS's traditional grant-supported conferences?

Trends and Issues

If the Society is to provide its members with a healthy program of meetings over the long term, it must remain financially healthy overall. The income derived from the Society's publications program, traditionally important for maintaining many AMS products and services which are not fully self-supporting, has been relatively flat over the past five years, and there are factors that make maintaining current levels of income from publishing a challenge over the longer term. At the same time the cost to provide many of the Society's services increases with inflation while the revenues which support these services cannot be increased commensurately. In addition, from time to time the Society is called upon to consider adding new services. This makes it important that other areas of Society operations provide increased income wherever possible. The alternative is to reduce the services that are not fully self-supporting yet are often important in attracting mathematicians to join the Society and in serving the larger mathematical community.

For some professional societies, meetings are a significant source of income. In general this has not been the case for the AMS, and there are serious obstacles to making it so. A significant portion of our meeting attendees must cover the cost to attend the meeting -- registration, transportation, and housing -- from their own funds. Increasing the income through registration fee increases, beyond small annual adjustments, is not an attractive option. What other options can be found to increase meeting income? Can attendance be increased at the national meetings? Would significantly increased attendance have adverse consequences among certain segments of current meetings attendees? Are there ways to increase income from exhibits at the national meetings? Are there opportunities for new forms of AMS meetings that both serve a constituent community and offer the chance of providing income to the AMS?

Meetings

The web has become a central means for the Society to deliver information and services to meeting attendees in a timely and efficient manner. The scientific program for the national and sectional meetings is now largely produced via software systems that allow participants to submit abstracts online and staff to rapidly provide complete program information online to meeting attendees. The program information now available online to participants is much more up to date than it was when available only through the printed *Notices*.

The AMS is not alone its use of the web to support its meetings activities. The rapid expansion of the web as a tool to support meetings has led to the availability of cutting edge online systems rich in features used by meeting planners and meeting attendees. Which of these features would be most useful with AMS meetings? How important are these features to our attendees, and how costly are they to implement?

New software systems are often expensive to buy and maintain. Yet parts of the software system used by the AMS to support its current online meetings presence are built upon subsystems which were designed before the AMS had a web presence. As the technological environment continues to change, the reliability of the system becomes an increasing concern. At what point does adapting our current systems to add new features become a poor investment of our resources? And where can the resources needed to update or replace the current aging systems be found?

The AMS has a long history of supporting the advancement of research through its role as an organizer of grant-supported research conferences. For example, the AMS's Summer Research Institutes, begun in the 1950's, have often been central events in the development of the research agenda of a mathematical area. Indeed, during the period between 1950 and 1980, grant-supported conferences arranged through the AMS, both independently and in cooperation with other mathematical societies, were a principal source of research conferences in the U.S.

The creation of the Mathematical Sciences Research Institute and the Institute for Mathematics and its Applications in the early 1980's marked the start of a significant expansion in the number and forms of conference activities available to the U.S. mathematics community. In addition, the AMS's own conference organizing activities expanded with the creation of the Summer Research Conferences in the early 1980's, with SIAM and IMS joining as cosponsors soon after. Outlets for conferences will expand further with the recent funding of several new institutes. Indeed, the newly created Pacific Institute of Mathematical Sciences is devoted exclusively to a year-round program of small research workshops.

In the conference-rich environment of today, is there still a conference organizing role for the AMS? Is there a need for certain types of conferences that is not being met? If so, could the Summer Research Conferences be shifted in their focus to fill such a need?

Outline of the Planning Process

Task 1. Prepare materials to inform the Society's volunteer leadership concerning the issue "What role should the Society's meetings program play in providing additional income to the Society?"

- Prepare a report on the role that meetings play in the finances of a set of other scientific societies considered to be comparable to the AMS.
- Prepare a review of the role of AMS meetings in Society finances over the past ten to fifteen years. Lay out the ways that the income from the meetings might be increased and the pros and cons of each.
- Have a discussion of this issue, by the ECBT, on which approaches for increasing income are acceptable and which are not acceptable.

Meetings

Estimate of time interval over which the work will be done: 4 months

Staff involved: Meetings & Conferences Department, Fiscal Department

Volunteers involved: Committee on Meetings and Conferences, Secretariat, ECBT

Task 2: Prepare a report on how the meeting attendees value the various components of the national meeting. Which components are most valued and which are least valued? Are there new components AMS members are interested in seeing?

- Review the existing body of information from meeting attendees, including previous surveys, to identify information that bears on these questions.
- Identify what issues require new information, or updating of previous information.
- Determine how best to gather the information from the appropriate segments of the membership.
- Gather the information and prepare a report for presentation to Committee on Meetings and Conferences.

Estimate of time interval over which the work will be done: 4 months

Staff involved: Meetings & Conferences Department, Professional Services Department

Volunteers involved: Committee on Meetings and Conferences

Task 3: Determine the best web practices used by professional societies in support of the scientific part of their meetings and conferences.

- Create a profile of other professional societies who use of the web to support the scientific side of the meetings and conferences, through industry association information and direct contact with meeting professionals that are leaders in this area.
- Determine up to three societies whose use of online resources is judged to be the most advanced and to have the potential to be adopted by AMS and schedule site visits to their offices and possibly to one of their meetings.

Estimate of time interval over which the work will be done: 2 months

Staff involved: Meetings & Conferences Department

Task 4: Based upon Task 3, investigate the feasibility of replacing the current abstract and meetings software.

- Develop design specifications for a replacement system for the current in-house abstracts processing system.
- Determine the costs to update the current in-house system to meet the design specifications of the new system.
- Identify any outside vendors of systems that meet the design specifications for a new system, and request preliminary cost estimates for any viable systems identified.
- Present the options and their associated costs, from the most basic to the most advanced to the Executive Director.

Estimate of time interval over which the work will be done: 3 months

Meetings

Staff involved: Meetings & Conferences Department, Management Information Systems Department, Electronic Products Development Department, Executive Director

Task 5: Gather information on the type and frequency of conferences now and ten years ago.

- Gather the relevant information from the current institutes, with historical data ten years ago, where available.
- Gather relevant information on conference funding from the Division of Mathematical Sciences of the National Science Foundation for the past ten years
- Evaluate the information to determine the growth in the number of conferences annually by conference type.
- Identify areas of conference activity that may be under served by current environment.
- Present a report based on this study to Secretariat, Committee on Meetings and Conferences, and ECBT.

Estimate of time interval over which the work will be done: 2 months

Staff involved: Meetings & Conferences Department, Professional Services Department, Government Relations and Programs

Volunteers involved: Committee on Meetings and Conferences, Secretariat, ECBT

The completion of the various tasks described above would most likely take place over a period of between ten and twelve months.

Estimate of staff and volunteer time required for planning

Staff time required to carry out the tasks listed are estimated to range between 500 and 700 hours, with most of this time coming from staff in the Meetings and Conferences Department. Time required from volunteers would most likely fit within the usual time spent on their volunteer roles, with the possible exception that an extra meeting of the Committee on Meetings and Conferences might be required in the fall of the year of planning.

Focused Planning Area: Publications Production Environment

Members of the planning group: D.G. Babbitt, D.R. Burton, S. Gelfand, E.A. Huber, J.E. Kister, M.L. Lebron

This document provides a synoptic background of the AMS production process for books and journals, and highlights some of the salient trends that affect these areas. For the purposes of this document, the production environment is defined as the activities carried out from the time an accepted manuscript is received at the AMS through the printing and/or online distribution of the publication, and the systems necessary for those processes to work. Three possible focus areas have been identified: increasing workflow efficiency, file formats and the archiving of digital publications, and the print shop.

Key questions:

1. The AMS has a strong reputation as an author-friendly publisher. What can and should we do to make authors' experiences better while at the same time increasing efficiency?
2. The archiving of publications, especially digital publications, is a critical issue for the future advancement of scholarly disciplines. How can we ensure that the AMS archive of digital publications will be accessible and available as needed in the future?
3. The AMS owns a printing facility. How can we remain competitive in this area as the needs of our Publications Program change?

Common to all these issues are the larger management questions: How much do we want to keep functions in-house or outsource them? What is desirable? What is reasonable? What constraints do we have? How do we define quality? How can we make processes more efficient without losing quality? Which quality issues matter and which can we forego?

Trends and Issues:

The AMS has a major commitment to its publications program. In keeping with that commitment, the AMS has conducted, and continues to conduct, periodic analyses of various aspects of its program. For example, in 1994 the Long Range Planning Committee considered the publications program. There have been two in-depth studies of the printing facility, and detailed analyses of the book (1999-2000) and journal (1998) workflows were conducted. Periodic discussions of the feasibility of archiving files in SGML have taken place. And in 2002 the AMS is conducting an overall analysis of the Book Program.

While it may seem at times that questions have been answered once and for all, it is important that we keep abreast of new developments in the publishing industry, and periodically revisit issues where new ideas or different approaches to old problems can strengthen our position as a publisher. For example, the 1999-2000 book workflow analysis provided a series of recommendations to make this a more efficient operation. Many of those recommendations have been implemented and now we are building on that enhanced workflow to reach higher levels of efficiency. There have been other times where we have concluded that, after a new analysis, it was appropriate for us to maintain the current operation or process. This has happened twice with the print shop. This type of validation is as important as recognizing the need to make changes.

Based on the previous studies and developments in the publishing industry at large, we have identified three areas in production that could benefit from a new analysis: increasing workflow

efficiency, file formats and the archiving of digital publications, and certain improvements in the print shop.

Increasing workflow efficiency: As publishers, having good relationships with authors is very important to us; authors are the lifeblood of our publications program. We want to keep attracting quality authors to AMS publications and can do this in a variety of ways. Making the author's experience a good one is an important component of reaching this goal. To this end we are working in 2002 on an author resource center that will make information readily accessible to authors. Similarly we are developing a web-based upload tool that will allow journal authors to send their manuscripts more efficiently to the AMS.

Another way to enhance author satisfaction is to accept various dialects of TeX, and provide clean proofs and publications, as is our goal. There are times, however, when the TeX submissions, especially for books, are difficult to process and re-keying the document could be a more cost-effective option. Multiple cycling of the manuscript back and forth between the author and the AMS, as we have experienced, may be necessary to obtain a workable file. Many mathematicians, however, do not wish to have their documents re-keyed or converted to another non-TeX format, because this has the potential for introducing errors. Under those circumstances, how can we work with our authors so we can process the manuscript in the most cost-effective way?

File formats and archiving of digital publications: TeX and LaTeX are the primary file formats for submission of manuscripts to the AMS. They will continue to be the primary file formats because they provide the robustness needed for the accurate representation of mathematics, and the mathematics community has adopted TeX as the standard for authoring books and journal articles. Our production procedures and archive are based on TeX/LaTeX. These procedures have served the AMS well to date, but it may be appropriate to revisit them in view of the changes occurring in the publishing industry.

The issues of file repurposing (reusing an existing file for a new purpose) and long-term archiving of digital publications are critical for scholars, librarians, and publishers, because they address the concepts of availability and accessibility of information in the future. Archiving in TeX/LaTeX, as we do now, is an option. This option, however, carries additional overhead with it. For example, we need to identify the version of TeX/LaTeX used to create the original document, and maintain a permanent archive of these versions of TeX/LaTeX (2e, 2.09, 1.1, 1.0, AMS-TeX) and their environment in order to recreate the documents in the future.

Other scholarly publishers who deal with mathematics accept multiple file formats (Word, WordPerfect, LaTeX) for submission, but normalize these to a device-independent tagged format for production and archiving. Many in the industry have adopted XML as the desired tagged format for this. The ability to repurpose XML-tagged content (e.g., use the same source file for Web display and a print product) makes this appealing. A question for the AMS is whether other types of structured files could be a desirable (i.e., more desirable than TeX) and economically feasible element of our future as a publisher, and if so, how can we position ourselves now to take advantage of this later on.

Print shop: Over the last few decades most publishers have migrated to full outsourcing of printing needs. The AMS has not. Instead, we have followed a strategy of acquiring older, less costly, reliable sheet fed presses and other related equipment that meet the first-printing demands of our journal and book program. This approach has resulted in a cost effective and efficient printing facility. If faced with replacing our current inventory of printshop equipment with more modern equipment, the operation might no longer be cost effective.

Publications Production Environment

The demand placed on the Shinohara, our only color press, continues to increase. Purchased in 1987, the press was originally intended to address simple limited color for journal covers. We have expanded its use to multi-color book covers and some color promotional work. The press is at peak capacity and the increase in color pages within our publications is now being outsourced.

As the book program matures the number of titles in need of reprinting is increasing. Many titles are reprinted in quantities that are not efficiently addressed by our main Miller presses. A significant amount of our short run reprinting is now handled by our new XEROX 480 digital high-speed printer; however a gap exists in our ability to efficiently address mid size print runs as well as ultra-short runs (single copy).

With the growth in the program we are running tight on warehouse space. We have explored print on demand technology in the past, and it requires a sizeable capital investment. We do not believe we have the volume of work necessary to operate such equipment efficiently. There is excess print on demand capacity in the commercial printing industry that can be bundled with distribution of the printed single book. Incorporating this scheme into our operation could provide a partial solution to our long-term warehouse space needs.

General outline of the planning process for this operational area:

Project Management:

A Project Steering Committee will lead the project. The activities of the Steering Committee will be supplemented, as needed, by resources from the following departments: Fiscal, Production, Electronic Product Development, Mathematical Reviews, Acquisitions, and the Printing Department.

Work Plan:

This review will include the process from that point in the production process when the author or editor is introduced to the AMS production environment through output of the finished product. The project, estimated to span a 1-year period, is broken down into several phases:

PHASE I. Information gathering (elapsed time: six months)

Internal:

- **Document and Analyze the Current Workflow:** The analysis of current workflow (books, journals), building on the analyses carried out in 1998 and 1999/2000, is underway in the Production Department and is scheduled to be completed in the summer of 2002. An updated journal production workflow was created in November 2001 and will be refined.
- **Other activities:**
 - Analyze and document the current structure of our book and journal files
 - Document and analyze the cost structure associated with the current workflow.
 - Document and analyze the cost structure associated with potential modifications to the workflow.

External:

- **Gather additional information from the industry and individuals.** Contact publishers that share the common element of high-level mathematics with the AMS and exchange information with them. For example, two societies with

which we have been in contact in the past are potentially good candidates for site visits: the American Physical Society and the American Institute of Physics. Some of their journals carry high-level mathematics, they accept multiple file formats including TeX for submission, and as publishers they are now in the process of revamping their production process and migrating their files to XML/MML. Discuss recent publishing experiences with authors and editors of journal articles and books including AMS authors and editors as well as those who publish with competing publishers. Gather additional information, with special focus on what they perceive to be benefits from competing publishers.

PHASE II. Analysis (elapsed time: three months)

- **Evaluate the information collected**
Evaluate the information collected above. Have we identified additional gaps in our data? If yes, collect additional information. Map out possible modifications to processes.
- **Project finances associated with the possible modifications**
Determine, for each of the areas identified, what the direct and indirect financial implications are; create “what if” scenarios to project potential financial impact on the AMS.
- **Develop implementation schedule**
Determine a possible implementation schedule for the various options available.
- **Recommend the path to follow**
Steering Committee will make a recommendation to Senior Management regarding which options are advisable for the AMS’s current and future operations.

PHASE III. Report writing (elapsed time: three months)

- **Report Writing**
Prepare report for ECBT describing conclusions and changes made or to be made.

Estimate of staff time required for this activity:
1500-2500 hours

Focused Planning Area: Publications, paper to electronic-only publication.

Members of planning group: D. G. Babbitt, D. R. Burton, S. I. Gelfand, E. A. Huber, J. E. Kister, M. L. Lebron

Introduction

Many of the AMS publications that have traditionally been published in paper form are now available in both paper and electronic form. It is likely that at some time in the future, for some of the AMS publications, publication of the paper version will no longer be in the best interests of the AMS and the mathematical community. For each publication or group of publications, it is necessary first to determine whether paper publication should be discontinued and if so, to determine the timetable and necessary steps leading to that discontinuation.

Key questions

1. What value does the mathematical community place on paper journals that duplicate electronic journals?
2. Are electronic books a viable alternative to paper books or are they better viewed as adjuncts?
3. What should be the timetable for discontinuing each of the paper MR-related publications, primary journals, reference titles?
4. What would be the impact on revenues of discontinuing each of these publications?
5. What cost savings could be realized by such discontinuations?

Trends and issues

Over the last 20 years, many of the AMS publications have moved from paper format to dual paper-electronic format:

In 1982, the Mathematical Reviews Database (MRDB) from 1980 forward was first made available electronically, through vendors in the US (Dialog and BRS), Europe (CERN) and Japan and as tape loads at individual institutions. Over the last 20 years, the entire MRDB from 1940 forward has been digitized, in a uniform TeX format, and made available first in CD-ROM format and since 1996 on the Web as MathSciNet. The AMS continues to publish data from the MRDB in the original publication format, paper *Mathematical Reviews*, and the related paper publications *Current Mathematical Publications* and paper *MR Section Sets*, along with the various electronic publications derived from the MRDB.

Increasingly over the last decade, publishers have begun to make their serials and monographic books available in electronic format, primarily on the Web (although early on online vendors such as Dialog and then the CD-ROM format were common modes of delivery). The AMS' first journal to appear in electronic form was the *Bulletin* in 1992. The *Notices* went online in 1995. The other

primary journals, *Transactions*, *Journal*, *Proceedings* and *Mathematics of Computation*, were made available on the Web starting in 1996.

Recently, a number of AMS books originally published in paper format have been made freely available electronically (e-books); currently 15 are available, ranging from G. D. Birkhoff's 1927 *Dynamical Systems* to Marc Levine's 1998 *Mixed Motives*. Most of these books are monographs; however, currently one collection volume (*Algebraic Groups and Discontinuous Subgroups*, 1966) is also available.

The AMS also publishes a number of reference titles, some of them annually or even more frequently. These include the *Combined Membership List*, *Employment Information in the Mathematical Sciences*, *Assistantships and Graduate Fellowships* and the *Mathematical Sciences Professional Directory*. The first three are also available electronically. This collection of publications has features in common with those based on the MRDB.

The question of whether the AMS should now move from dual format to electronic-only format for selected publications naturally arises. Although the four types of publication described above should not be considered as similar in this context, there are certain common issues that will need to be considered in each of the four cases, as discussed below.

As more material (both scholarly publications and other printed matter such as newspapers and reference works) becomes available electronically, and an increasing percentage of the mathematical community is adept on the computer, publications available both in paper and electronically will be accessed electronically (rather than on paper) with greater frequency. The ease of desktop access combined with the searching and linking that is enabled in electronic publications in many instances seem to make the choice of paper vs. electronic an obvious one.

Paper books and journals generate sales and subscription revenue that is critical to the total revenue of the Society. Even though the number of subscribers to paper *MR* has been decreasing significantly each year for the past several years, paper journal subscriptions to *MR*, *CMP* and *MR Sections Sets* generated revenues of \$668,089 (over 3% of total revenues) in 2001 (not including the associated DAFs for subscribers to *MR* who did not subscribe to *MathSciDisc* or *MathSciNet*); non-*MR*-related journal subscriptions generated \$3,772,670 in operating revenues (almost 18% of total revenues), but note, however, that the pricing of the primary journals does not allow the revenue from paper subscriptions to be separated from that for the electronic subscriptions. Book sales generally account for about 15% of total revenues. Paper publications also generate substantial advertising revenue. On the other hand, there are expenses in producing paper products, some of which are considerable, for example, the printing of paper *MR* and the *Notices*. Distribution and warehousing also add to the cost of paper publications. Although much of the pre-printing production of each publication is independent of the format of the end product, there are some steps that are paper specific. Moreover, the production process for each publication has for the most part been modified from that used for a paper-only publication. The move to electronic-only publication might allow a major redesign (and consequent cost-saving changes) in the production pipeline. It is

clear that a detailed analysis of revenues and costs is needed before any decisions can be made.

The fact that the journal subscription revenues and book sales are considerable seems to suggest that the community (or, at least, those who make the decisions on library purchases) still wants paper publications, even when an electronic version may in many ways, and to many people, be more desirable. To what extent this is a consequence of the pricing policies for the paper and electronic versions rather than a sense that paper is “better” than or a desirable adjunct to the electronic product is unknown. For example, how many subscribers to paper *MR* do not also subscribe to MathSciDisc or MathSciNet? How many MathSciNet subscribers also subscribe to paper *MR*? How many subscribers to the primary journals subscribe only to the electronic version? Is this a decision made by the end user or by the decision maker who pays for the subscription? In any event, with increasing pressure on library budgets and space, it seems likely that the number of paper subscriptions will go down in future.

Although it seems clear that mathematicians, especially the younger ones, are increasingly accessing electronic products, what is less clear is the extent to which individual articles and reviews are being printed once an item of interest is identified. Surely a mathematician who wants to read a paper thoroughly and understand the details of the proofs will print a copy (or make a copy from the paper journal). This is feasible for a short article but may not be worth the effort for a monographic book. Even for database products, the paper products are arguably better for browsing, say, a given subject section. In any event, for short items, such as journal issues, it may be in the AMS’s interests for the printing to be done by the user on an as-needed basis rather than by the publisher.

One of the differences between paper and electronic versions of any of the four types of AMS publications is that the files used to create the electronic product must be well structured whereas the same level of structure is not strictly necessary for a paper publication. The *MR* Database is well structured and the AMS journals are necessarily somewhat well structured (material submitted by authors and reviewers may require considerable massaging to achieve these levels of structure); authored book files are not well structured. A related issue is that of archiving. It is clear that a well-structured file is essential for effective archiving and considerable detail concerning the environment in which the file was constructed needs to be archived along with the file itself. Also, journal subscribers may be reluctant to discontinue the paper subscription until they are assured that the archiving question has been successfully addressed.

Any decision to discontinue production of a paper product must be made well in advance of the date on which the publication is actually discontinued. This is both to minimize alienating the subscribers and give them time to plan for electronic-only access, and to avoid abrupt changes in revenue flow.

Issues relevant to each of the four types of AMS publications to a greater or lesser extent have been discussed in this section, but the detailed planning will be carried out for each of the four types separately as the detailed statistics, and decisions based on them, will vary considerably.

General outline of the planning process for this operational area

Project Management

The Project Steering Committee will lead the project. The activities of the steering committee will be supplemented by:

Staff: When the work plan is finalized the steering committee will call upon specialized staff resources and create four (probably 4- or 5-member) staff groups each with PVD and MR representation and with each responsible for one of the following areas:

- MR paper products (paper MR, CMP, MR Section Sets)
- Primary and member journals (PAMS, JAMS, TAMS, Math of Comp, BAMS, Notices)
- Books
- Other administrative publications (AGF, CML, MSPD, EIMS)

Consultations: Consultation with the AMS Editorial Committees and representatives from the library community will be conducted on an ad hoc basis.

Work Plan:

The project will span a 1-year period ending in time to report to a November ECBT meeting. The project will be broken down into three phases:

Phase I. Data gathering (3 months elapsed time)

- *Revenue:* Gather information on revenues associated to paper products (where separable from revenue from corresponding electronic product) in the years since the e-products became available
 - Subscriptions
 - Book Sales
 - Advertising
- *Customer information:* Gather detailed customer use information, including trends over the last five years for each of the AMS publications, with particular attention paid to (i) the number of subscribers who subscribe to two forms of the same data; (ii) the number of individuals who subscribe to a paper product for whom access to the electronic version of the data would be considerably more expensive; and (iii) web usage statistics.
- *Production Costs* (specific to paper products that would be eliminated with move to paper only distribution)
 - Staff time
 - Printing
 - Distribution

Learning from the industry and individuals (4 months, concurrently with the data gathering)

- Web survey of end-users, of subscribers (across a range of institution types) and of authors (different surveys) to determine, among other things,
 - the uses of the paper and electronic product in their environment
 - how different pricing models might affect subscribers' desire to continue the paper subscription in addition to the electronic subscription
 - how electronic-only publications on a mathematician's list of publications are viewed by the research community, deans, etc.

Careful development of the survey questions will be crucial; professional advice, from, e.g., Market Measurement, should be considered.

- Determine practices of publishers that share common elements with the AMS and learn what they are doing with reviewing journals, primary journals, books, and administrative publications. Some of this can be gleaned from web sites. Potential contacts include STIPUB members.

Phase II. Analysis (3 months)

Effects of migrating to electronic only on some products

- Projection of subscriber loss if a paper publication is discontinued
- Projections of revenues for the modified product
- Projection of additional development and production costs for the modified product (note that the 2002 MR Operating Plan includes such planning for MR)

Analyze the advantages (and disadvantages) of discontinuing paper for each dual publication or group of publications.

- Financial
- Member and customer response

Develop models for alternative ways to price dual products

The pricing of a publication published both in paper and electronically is not in most cases readily adaptable to a pricing structure for an electronic-only publication. Pricing models to cover the period when a paper publication is phased out are essential (once it has been determined that discontinuation should be considered) and will need to address such questions as the resulting revenue stream and the possible alienation and loss of subscribers to the electronic as well as the paper product. Note that such models will affect the projections described above.

Phase III. Report writing (2-3 months)

Estimate of staff and volunteer time required for this activity:

1500--2000 hours staff time

Focused Planning Area: Data Collection and Information Delivery: Running our Business

Group members:

Nancy Kaull; Anne Orens; Connie Pass; Barbara Veznaian

INTRODUCTION

To support its mission in the most effective, efficient manner possible, the AMS needs a robust, accessible, and flexible technology infrastructure. The technology environment is changing rapidly and the business demands being made of our technology infrastructure are expanding.

Therefore, at some time in the future, we will need to make investments in our technology infrastructure so that the systems can continue to meet the Society's business needs.

What are the operational and technological factors to consider that will enable us to get the most out of our systems and human resources investment?

- *What is the correct balance between meeting customer needs and controlling costs, and to what degree do our current business rules and practices reflect that balance?*
- *What types of databases and applications will support our needs and enable us to maintain our customer need/cost balance as our specific activities change?*
- *What level of technological expertise and training will our staff require?*

How can we approach this major development activity in a cost-effective, controlled fashion, determining appropriate development priorities and phases?

TRENDS AND ISSUES

As the following trends are discussed, it is important to understand that there are two major Society database installations, one in Providence and one in Ann Arbor. The MR database is used to store and manipulate the data used by MR, with numerous delivery mechanisms. This plan is concerned with the Providence 'operational' database, which contains most of the Society's data, including data related to customers, members, publications, etc., as well as most of the transactions and activities related to them.

1) Our products, services, and transactions - changes and complexity

The structure of the database and the major applications were developed over 15 years ago, based on then-current business practices. As products and services have grown and changed over the years, the AMS has augmented its database and applications while maintaining its commitment to meeting the needs of each of its constituencies, however small the group.

As a result, the Society, a relatively small entity, has extremely complex, and in many cases, exception-driven operations and processes. One small example is our practice of personally choosing and shipping author copies of books from the Providence office, instead of including them with the bulk warehouse shipments. We want to maintain our commitment to meeting customer needs; at the same time we need to examine how we can simplify our business rules and practices wherever possible.

We have made incremental enhancements to our processes to reflect changes in individual business practices. However, neither the business processes nor the implementation of those policies within our data structure and applications has been globally re-examined or overhauled.

For example, we originally designed processes and systems to address the then-current marketplace, primarily prepaid individual and library orders. Since we did not expect the A/R portion to be heavily used, sophisticated credit management and monitoring tools were not put in place. It has become more time consuming, and therefore costly, to manage the receivable balances of our large commercial customers, now a considerable part of our business.

There are other examples of enhancements and changes we have made to our processing over the years – such as implementation of the MR Data Access Fee (DAF) and consortia pricing for MR products. We now need to take a global look at the policies that underlie our business processes, and re-examine how the applications will support those policies.

2) Information that drives our business operations

To get relevant information in a timely manner, staff needs data access that is flexible and desktop-driven. To use that access to best advantage, staff at a variety of levels need to be able to formulate appropriate data-driven questions, understand where the right data reside, and possess the appropriate level of technological know-how to run the queries.

Historically, AMS senior management and department managers have worked through the MIS group for access to the data, and for specific reports that could not be produced using the standard MIS report packages and query tools. Interfaces that were developed individually for use with ascii terminals connected to central computers were not written to work with each other or with current MS Office tools.

And as we have stated previously, we have complex data structures with strong connections between the individual fields in our customer-, member-, product- and service-related data. While this integration gives us better information, the complexity of the data structure can be difficult to penetrate, and has resulted in the perception of a ‘wall’ between some users of the information and data itself.

MIS has served the AMS as the group with the technology skills, and the group with the most detailed understanding of the intricacies of the data. However it is the individual departments that are making decisions about the products and services that the Society offers, and it is within the business groups that accountability lies. If the departments are to manage their functions properly, they must understand the data stored in the database,

the relationship between the data and the business process, and the information that can be derived from both.

3) Customers and the electronic environment

We are beginning to put into place web-based interfaces that enable authors and members to deal directly with the Society. These have been enthusiastically received. Internally, the demands for integrated account management, particularly for our commercial accounts, are increasing.

Authors can track the status of their manuscripts via a web-based system. Members can carry out a variety of activities electronically, including dues renewal, the updating of their membership directory, and signing up for forwarding of electronic mail.

Commercial accounts have a variety of billing, shipping, credit and discount arrangements. AMS customer service representatives need to be able to easily access the status of orders, credits, returns, address or account status changes, and to communicate those findings to our commercial accounts in a form they can use.

We are already working on satisfying many of the individual requirements for external access and for the internal interfaces that will enable us to streamline our customer management. To set overall priorities and determine a framework for clean, security-driven access and account management, we need to clarify our own priorities within the context of how our competitors and sister societies are meeting their customer needs.

4) Long-term viability and portability of our software systems

The AMS aims to have a computing infrastructure that is robust, cost-effective, and maintainable. Over the years we have made incremental upgrades based on changes in the technology marketplace and our goal of providing for the long-term viability and portability of our software systems. At this point in our technology review, we need to broaden the scope of our inquiry so that our examination of the various components of this infrastructure helps us determine how to migrate to the next generation of business applications.

The Ingres relational database management system, currently owned by Computer Associates (CA) is powerful and reliable; it has served the Society's needs well for more than 15 years. Although it is no longer a market leader, staff knows of no current or future CA plans to cease support of Ingres.

The application software that accesses the database has been written in-house. It was originally written in COBOL or in Ingres's 4GL and ran on the VMS operating system. Although VMS was once a market leader in operating systems for mini-computers, leadership now belongs to UNIX. Thus, we are moving away from our dependence on VMS, and by extension, migrating or replacing the COBOL code, which cannot move very easily from VMS to UNIX.

The Providence office has now settled on Solaris as its UNIX operating system, and the physical database was moved from VMS to UNIX years ago. New development is now generally done in C, and, more recently, has been given a web-based interface.

The current plans in place, reducing dependencies on VMS and COBOL as requirements permit and building more user-friendly interfaces, may be appropriate for the short-term, but they do not address the eventual required replacement of our most basic and important operating applications. While, we don't know when that 'eventual' will become more immediate, it is clear that the replacement will occur at some point.

We have several alternatives for replacement, including outsourcing, re-analysis and re-implementation, migration of existing programs and systems, and packaged software. We need to make long-term, global plans for the next generation of business applications in order to execute them in an efficient and cost-effective manner

THE PLANNING PROCESS

Phase One: Business Review (Ten to thirteen months)

Task One: Gather and document AMS business practices

Task Two: Gather competitive information

Task Three: Review and simplify AMS business practices

Phase Two: Technology Review and Priority Setting (Five to ten months)

Task Four: Investigate types of available technology solutions

Task Five: Determine criteria for setting development priorities

PLANNING DETAILS

- Who should be involved
- ❖ Estimate of time involved

Phase One: Business Review

Task One: Gather and document AMS business practices

What are our business practices, and how are they reflected in our data systems? What is the correct balance between meeting customer needs and controlling costs?

- Gather information and prepare a report on our current customer needs and business practices.
- Determine the relationship between the need being met and the related business practice.
- Identify must-have and nice-to-have customer needs and business practices.
- Identify the processes that no longer relate to a current practice or that require a large amount of 'exception' processing.
- Review business practices for gaps and discrepancies and determination of how policies for one group affect other departments.

- Senior management of AMS, steering committee, department heads, selected staff

- ❖ Elapsed time: Four to six months

Task Two: Gather competitive information (done concurrently with Tasks One and Three)

Determine the best practices used by professional societies and small publishers for their business practices and technology solutions. What level of technological expertise and training is required of their staff?

- Create a profile of relevant practices and technologies of societies and publishers using industry information and their web-based and printed materials.
- Determine which organizations have practices and systems we may want to examine more closely.
- Gather information on the applications and technology infrastructure they use as well as the benefits and trade-offs they have experienced.
- Determine which practices and solutions have the potential to be adopted by the AMS and schedule site visits to their offices if possible.

- Steering committee, selected staff, MIS staff

- ❖ Elapsed time: Three to four months

Task Three: Review and simplify business practices

To what degree do our business practices reflect the desired balance between meeting customer needs and controlling costs? How can we simplify our business practices while continuing to meet the needs of our customers?

- Identify which practices have the potential to be simplified or modified.
- Prepare report with proposed list of revised set of business practices – determining technology and organizational requirements for their implementation.
- Review impact of making these changes upon other groups within the Society and upon the Society's customers and members.
- Discuss the report and the proposed changes with senior management of Society and department heads.
- Determine which changes can be implemented immediately in the current environment and which have organizational or system development requirements.

- Steering committee, department heads, selected staff

- ❖ Elapsed time: Four to six months

Phase Two: Technology Review and Priority Setting

Task Four: Investigate types of available technology solutions

What are the features a system must include, and what are the 'non-technological' factors that will determine whether a system is viable for the AMS? What are the benefits and trade-offs of the various types of systems?

- Research the types of systems and approaches AMS might take, using published industry and trade sources, attendance at technology conferences, and interviews with vendors.

Data: Running our business

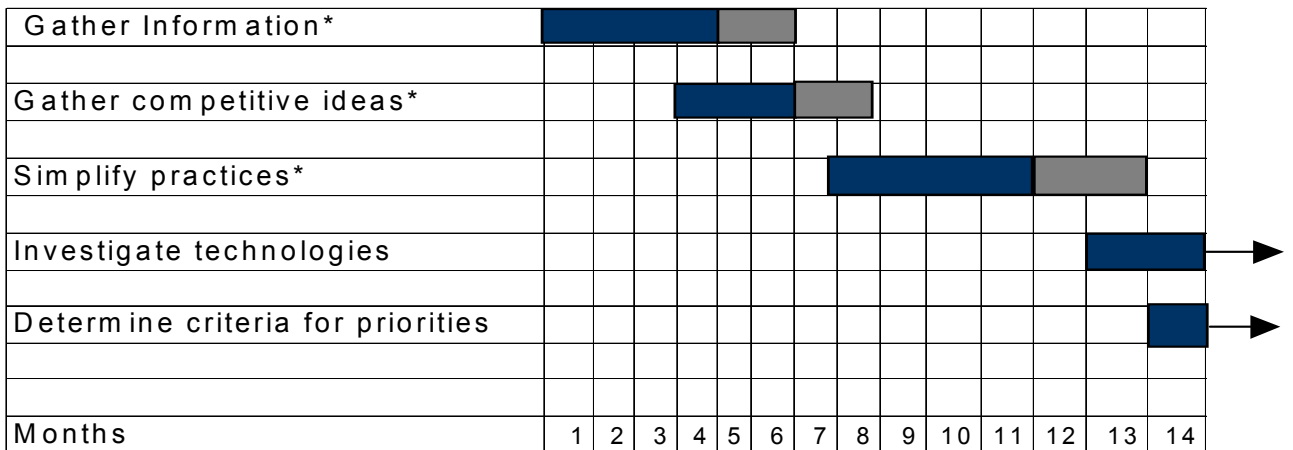
- Analyze types and classes of available technology solutions in light of our business needs and priorities, and trade-offs inherent with each class of solution.
- Revise list of must-have and like-to-have features in light of the solutions currently available, and the experience of relevant societies and relevant vendors.
- Department heads, internal technology group managers and staff, steering committee for review
- ❖ Elapsed time: Four to six months

Task Five: Determine criteria for setting development priorities

How can we stage the development activities in a cost-effective and controlled fashion, keeping in mind the need to maintain current operations?

- Prepare report on factors that will enable us to segment the project by reviewing competitive and vendor information.
- Determine which pieces of the solution naturally ‘cluster’ together, based on our business practices and available solutions.
- Internal technology group managers and staff, external technology consultant, software vendors, steering committee for review
- ❖ Elapsed time: Four to five months

Preliminary Timeline



*Activities have been given a range of time. Black bars indicate minimum elapsed time; grey bars indicate probable ‘stretch’ time in the range.

Strategic Planning Rererevisited

(from May 2001 LRPC/ECBT meeting)

The Society carried out an elaborate process of strategic planning about ten years ago. Guided by an outside consulting firm, the process included surveys, interviews, lengthy discussions, and retreats. It resulted in a strategic plan that was brought to the ECBT and Council, and that was formally approved by both. Indeed, the goal was ratification rather than mere introspection. At the conclusion of this process, there was a call to carry out strategic planning again, roughly every 3-5 years.

The Long Range Planning Committee revisited strategic planning in 1997, considering whether to engage in another round. Because many of the recommendations from the previous plan had been implemented only recently, they decided to wait and to reconsider the matter in 2 years. When it reconsidered in 1999, the LRPC once again saw no reason for another major planning effort and decided to reconsider in 2 *more* years. It is now 2 years later.

Should we repeat the strategic planning process? Rather than endlessly procrastinating two years at a time, this seems to be a good time to consider planning more generally. Ten years have passed, and with the passage of time we are better able to understand the accomplishments of the last effort as well as its shortcomings. We ought to judge not merely *whether* to carry out planning, but *what kind* of planning will benefit the Society most.

The purpose of this document is to review some of the background of the 1990-91 strategic planning process, to point out the major changes that resulted from that plan, and to make recommendations for future planning.

There is nothing magical about strategic planning, and neither obscure language nor lengthy retreats solve problems by some mysterious process. Ten years ago, the Society benefited from a healthy reevaluation of its mission. We are a different society now, however, with different needs. We have little to gain from an elaborate strategic planning effort led by outside consultants. On the other hand, there are some concrete steps we can take to augment our annual planning cycle, and there are refinements we can make to our statement of mission. The goal is not an extensive agenda for approval, but rather thoughtful introspection and sound business planning.

For background information, a number of documents have been attached at the end of this essay. The strategic plan itself (essentially, the article from the July/August 1991 *Notices*) describes the strategic planning process as well as its outcome. The list of goals and strategies in the 1992 (the first) annual operating plan provides contrast to the more recent operating plans. The list of guidelines, schedule, and "Cliffs Notes" show how annual planning is accomplished today. Finally, the main document from the Journal Planning effort of two years ago provides an example of how specific business planning might be done in the future.

What is strategic planning?

Those who were engaged in the 1990 strategic planning effort had a specific goal in mind, and they hinted at that goal in the July/August 1991 *Notices* article that unveiled the final plan:

... the Society's mission has been interpreted in a way that allows the AMS to respond thoughtfully to current issues relating to mathematical research and scholarship. In fact, the Society has for some time been grappling with the issues raised in the strategic plan, but its efforts have been hampered and fragmented by a lack of clear focus and direction. Now, armed with a plan that incorporates concerns of the membership, reflects the thinking of leaders from the mathematical sciences community, and carries the approval of the ECBT, the AMS leadership and staff can begin to plan specific activities and programs to address these issues.

Indeed, the strategic plan was seen as a means to clarify which programs the Society should invest in, and which actions should be taken to achieve certain goals.

Strategic planning is accomplished in a process that is often obscured by its own language. Here is a description taken from materials provided by the consultants in the 1990-91 effort.

The process begins with a *mission* statement describing the purpose and aspirations of the organization. After gathering comments from various constituencies about current issues (the *strategic issues*), one formulates a *vision* statement, a current interpretation of the mission statement. From the vision statement, one creates specific *goals* – broadly defined but measurable (in the sense that one can determine whether or not one actually accomplished the goals). To attain the goals, one defines *objectives*, which are smaller, concrete goals. And to attain the objectives, one determines specific actions, which are *strategies* that can be carried out by designated people.

The vision statement, goals, objectives, and strategies are all viewed as time dependent, interpreted in terms of the mission statement and the strategic issues of current concern. The vision statement and goals may be applicable for several years, but they are supposed to be reviewed periodically to evaluate their relevance to current concerns. Objectives and strategies may change from year to year as operating plans are formulated, but their purpose remains the same — to implement the goals. This is the rationale for carrying out strategic planning every 3-5 years.

There are many different kinds of planning, however, each with different time horizons, and the description of *strategic planning* above combines several kinds. *Action planning* (represented by our own annual operating plans) is the regular cycle of planning for the next 1-2 years. It's usually tied to budget, and the aim is to set specific priorities. *Strategic planning* (the vision and strategies above) extends over 3-5 years. Beyond this, *critical assumptions* are meant to cover 5-10 years in the future, looking at the major trends in the real world that are likely to affect the organization. Finally, *core ideology* covers the next 10-30 years, and concerns the basic purpose and values of the organization. The mission statement is meant to embody that purpose and those values.

While much of the focus of planning is on *strategic planning* (3-5 years), the other components are equally important.

The 1991 strategic planning process engaged in many kinds of planning without explicitly recognizing the distinctions. Here is the list of 7 strategic issues that were “synthesized from interviews, surveys, and other information”, covering almost every time horizon.

1. Examine the future of publications, meetings, and membership
2. Resolve uncertainty about other AMS programs
3. Define the role of the AMS in facing external challenges to the profession
4. Examine the vitality of the profession
5. Address the fragmentation of the mathematics community
6. Provide more opportunity to members for participation in AMS
7. Improve interactions between staff and volunteer leadership

On the other hand, there was little effort made on *critical assumptions* (business planning), and most of the effort during that time was spent on *core ideologies* (formalizing a mission statement), *strategic planning* (trying to set forth goals for the next few years), and *action planning* (laying out a detailed operating plan for 1992).

What did the 1991 strategic plan accomplish?

When strategic planning began in 1991, the Society was still debating the breadth and scope of its mission. The passage above outlining the goals of the strategic plan hints at the difficulty in reaching closure. In one area (*core ideologies*) the planning process achieved its goal: The strategic plan enunciated the mission of the AMS concisely:

The AMS, founded in 1888 to further the interests of mathematical research and scholarship, serves the national and international community through its publications, meetings, advocacy and other programs, which

- promote mathematical research, its communications and uses,
- encourage and promote the transmission of mathematical understanding and skills to ensure the continued vitality of the profession,
- support mathematical education at all levels,
- advance the status of the profession of mathematics, encouraging and facilitating full participation of all individuals,
- foster an awareness and appreciation of mathematics and its connections to other disciplines and everyday life.

It’s easy to forget how much debate was behind this statement, and how much the attitudes of members have changed over the past years. The Society had an earlier (briefer) mission statement, but the new one was broader and more detailed than the

original — which was part of its purpose. It was intended to expand the Society's horizons and to keep them expanded for many years in the future.

The vision statement (meant to interpret the mission statement in terms of current issues) listed some of the challenges faced by the Society in carrying out its mission, including disseminating an increasing volume of mathematical literature, finding ways to link with other disciplines, embracing mathematics education, dealing with employment issues, and expanding efforts at public awareness. To deal with these challenges, the vision statement indicated that over the next three years, the Society should set six goals:

- articulate and advocate an agenda for providing the resources necessary for mathematical research,
- position the publication program for the future,
- make mathematicians more aware of the importance of activities that contribute to mathematics education,
- enhance the participation of underrepresented groups,
- promote public awareness of mathematics,
- renew AMS organization, management, and governance.

While these are admirable goals, their vagueness and generality reflect a desire to have uniform agreement rather than to have a blueprint for future action. The 21 objectives and many associated strategies (meant as an illustration for future operating plans) were often equally vague.

More than providing a statement of mission, however, the strategic plan engendered a sense that annual operating plans were useful. That, along with the mission, may be its most important legacy.

How did the operating plans evolve?

Immediately following the publication of the strategic plan, the Society began to assemble its first operating plan. A list of the objectives and strategies (without the detailed descriptions) from that first plan is included below.

The first operating plan was an attempt to organize the varied activities of the Society, and it relied on the six goals as the basic organizational tool. The operating plan was overly ambitious in places:

- Dampen the variations in the employment demand for mathematicians and avoid the damaging effects of wide fluctuations on mathematics.
- Review existing and impending technological developments and practices to identify those which threaten the viability of existing Society publications, and develop proposals for adaptation to these circumstances.

In other places, the operating plan recommended actions that may not have been so desirable:

- Engage a Staff Advisory Committee and employ a management expert ... [to implement] a form of total quality management

But the seeds for many of the fundamental changes in the coming years were contained in the list of proposed actions, including:

- Establish an office of the AMS in Washington, D.C.
- Charge the AMS Committee on Science Policy to develop a long-range plan that articulates an agenda for the Society ...
- Develop a broad marketing strategy that coordinates AMS acquisition and marketing efforts.
- Study the feasibility of producing an annual publication reporting new achievements in mathematics.

The Washington Office, the Federal Policy Agenda, the reorganized publication division, and the enhanced *Notices* (along with *What's Happening*) all were justified by statements in these early operating plans.

The initial planning process was not well integrated in the Society, however. Because the 1992 operating plan was organized around the six goals, it was difficult to assign responsibility to specific departments or people.

In the following year, the operating plan was reorganized, refined, and greatly expanded. It was organized around 10 Planning Units (PUs). Each unit was headed by designated staff leader (PUL), and appointments from the Board of Trustees (BT) and Council (CL) were added. The process was carried out in three major phases, with a total of 13 subphases and resulted in an operating plan of over 100 pages! Because the operating plan was more closely associated with natural parts of the Society, it became easier to assign responsibility for tasks to individual units. On the other hand, the number of objectives and strategies grew as their comprehensibility shrank.

By 1994, the operating plan involved 14 Planning Units, including all members of the Board and 20 members of the Council as liaisons. There were many phases. An effort was made to tie the planning process to budgeting by starting earlier. In addition, planning was intended to move from the “creative” mode to “maintenance”, that is, from a process that concentrated on mainly *new* programs and projects to one that concentrated on the continued operations of the Society.

During this time, the planning process was refined and conducted largely by a professionally-trained planner, whose main responsibility was planning. That made it possible to piece together a detailed and comprehensive plan each year, with many objectives and strategies for each unit. On the other hand, it sometimes moved the planning process (or at least what was written in the plan) further from the staff who were directly responsible for carrying it out. For example, here is a paragraph from the 1993 operating plan addressed to book publishing:

The planning model will enable series planning and allow quota decisions to be made far in advance and before many authors have actually started writing. Thus

the Society can solicit proposals, which match the planning model, and contact authors early in the process, working with them on editorial style as they develop their manuscripts. In this way the AMS can develop products which are better suited to the current needs of the mathematical community and have books that are more efficiently produced, which should make them more economical.

With the departure of the professional planners, the planning process was streamlined and simplified. After a transition period, the final structure of both the process and the plan itself has been stable for several years. Planning units are now replaced by the natural divisional/departmental structure of the Society. The operating plan itself is structured in a way that allows parts of the plan (mission statement and ongoing activities) to be carried forward each year without substantial change. Other parts (trends and issues) are changed as needed. Those parts that are most closely tied to the budget (new projects and financial implications) are placed at the end, and written in a concise form that is meant to be comprehended easily. Finally, an annual report that evaluates the outcome of the plan is added at the end, after the year is complete. The aim is to make the planning process easier to accomplish and comprehend, while connecting planning, budgeting, and the annual report.

Material used to carry out this annual process is included at the end of this document, including the guidelines, the current schedule, and some notes for those preparing the various sections.

In a sense, each operating plan combines *action* planning for the coming year with a little *strategic planning* for the next few. The ongoing activities in section (ii) are meant to give an overview of the department or division. The new projects in section (iv) are meant to be concrete and verifiable — the goal is to list a few (2-4) high-priority projects rather than dozens of small ones. Together, they provide a view of the coming year. The trends and issues in section (iii), however, are meant to look further afield, both outside the Society and to the future. In this way, the sequence of operating plans provides a sliding window for strategic planning.

What kind of planning do we need now?

The 1991 strategic plan gave the Society two things — a sense that annual operating planning was beneficial and a clear statement of our expanded mission. The annual planning process has evolved into a useful process, largely integrated into our general operations. It drives the budget and forces every division to look ahead on a regular basis. The mission statement is as valid today as it was 10 years ago and serves as the basis for the overall activity of the AMS. We do not have to revise our annual planning process, nor do we need to rethink our mission. We can, however, supplement and refine both.

The primary way to supplement our annual planning is with concrete and tangible business planning, aimed at a particular segment of our operations. A good example of this is the planning carried out several years ago for journals in which we examined data about the current environment, made an attempt to consider possible changes in the future (the *critical assumptions* mentioned above), and laid out some possible alternatives for action. This kind of “business planning” is valuable precisely because it tries to step

outside the annual cycle of operations, and it is likely that it should be carried out in other areas.

During the second half of 2001, senior staff will consider specific areas of the Society's operations in which we can carry out business planning in the coming years. That list will be brought to the May 2002 LRPC for consideration and possible action.

The refinement of the mission is more subtle and requires more explanation. The mission statement sets forth the general purposes of the Society — promoting research, transmitting mathematical knowledge, supporting education, advancing the profession, and advocating for the profession. Year by year, our actions are meant to accomplish these purposes and (one hopes) to work on all of them from time to time. In *every* organization, however, it is necessary to set priorities. Setting priorities does *not* mean deciding which parts of the mission are unimportant; it means deciding how one wants to measure success in order to make choices.

There are four ways in which an association can be successful:

- *Operational Excellence* — executing all services extraordinarily well, delivering a combination of quality and price that no can beat, and making a commitment to guaranteed value on all products and services.
- *Product and Program Leadership*— providing leading edge programs, providing innovative new services at the cutting edge, and being in the forefront of new developments.
- *Member and Customer Intimacy* — building long-term relationships with members, knowing members and customers, delivering precisely what they want (and knowing it in advance), and cultivating a sense of loyalty.
- *Advocacy Effectiveness* — advocating the interests of the profession, maintaining personal relationships with leading decision-makers, and earning recognition for the discipline.

Nearly every association tries to be successful in each of these categories, and the AMS is no exception. *Setting priorities means deciding how to order these measures of success*, that is, deciding how one wants the association to be judged by members and customers. Which is most important? Which is least? It may be possible to be excellent in more than one category, but it is unlikely that any organization will excel in all.

Unlike some parts of strategic planning, this is more than an abstract academic exercise. As the broad mission statement for the Society took hold during the past 10 years, there have been more and more requests and opportunities for new services, programs, and outreach. Should we invest in major new employment services for departments and applicants? Should we develop expensive new software to integrate our phone and online support for members? Should we invest in Congressional fellows in Washington? The resources of the Society, both human and financial, cannot support all worthwhile projects, and it is necessary to make choices. While making those choices often requires merely balancing costs against benefits, there has to be some over-arching principle that guides the Society in deciding how to invest its resources wisely.

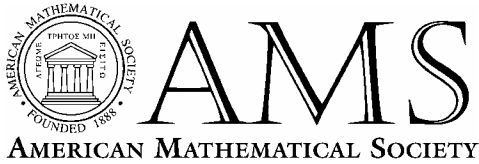
The Long Range Planning Committee, with advice from the ECBT, should consider how to weight each of these measures of success, and should routinely review this weighting.

The process of considering how one measures success for the Society, and periodic review of the outcome, is the most effective way to give the staff a clear sense of direction.

Conclusion

These recommendations may seem prosaic; business planning and measures of success are not especially daring or glamorous. They are, however, exactly the kind of planning from which the Society can profit at the moment. Unlike 10 years ago, no one senses a need to make great changes in the mission of the AMS. Unlike 10 years ago, we have in place an annual planning process that has evolved into an integral part of our operations. We can supplement that process by occasional in-depth studies of specific operations, as well as periodic review of our priorities. But there seems to be little need for a major new strategic plan. Planning and generating new ideas as a steady activity, year by year, seems to be far more effective than great spurts of new ideas once every decade.

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**SECRETARIAT
Business by Mail
November 1, 2001**

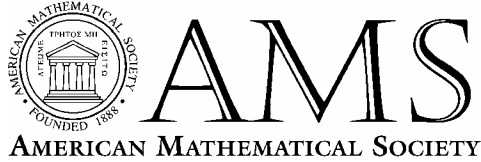
MINUTES

from the Ballot dated October 1, 2001

There were **five** votes cast by John Bryant, Robert Daverman, Susan Friedlander, Bernard Russo and Lesley Sibner.

1. Approved electing to membership the individuals named on the list dated September 20, 2001.
2. Approved an Eastern Sectional Meeting on April 12-13, 2003, at Courant Institute in New York City, New York.
3. Approved the minutes of the Secretariat Business by Mail from the ballot dated October 1, 2001.

Robert J. Daverman



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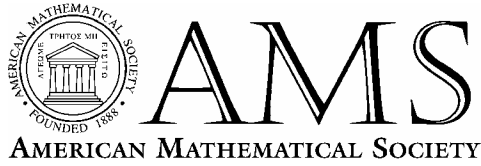
**SECRETARIAT
Business by Mail
December 1, 2001**

**MINUTES
from the Ballot dated November 1, 2001**

There were **five** votes cast by John Bryant, Robert Daverman, Susan Friedlander, Bernard Russo and Lesley Sibner.

1. Approved electing to membership the individuals named on the list dated October 20, 2001.
2. Approved the minutes of the Secretariat Business by Mail from the ballot dated November 1, 2001.

Robert J. Daverman



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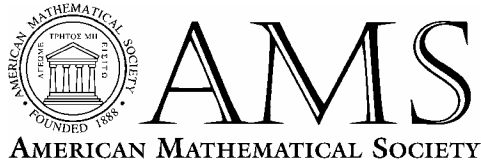
**SECRETARIAT
Business by Mail
January 2, 2002**

**MINUTES
from the Ballot dated December 1, 2001**

There were **four** votes cast by John Bryant, Robert Daverman, Bernard Russo and Lesley Sibner.

1. Approved electing to membership the individuals named on the list dated November 20, 2001.
2. Approved the minutes of the Secretariat Business by Mail from the ballot dated November 1, 2001.

Robert J. Daverman



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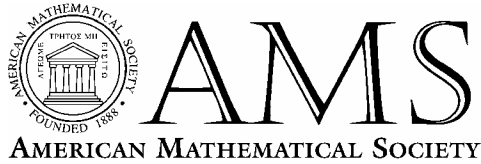
**SECRETARIAT
Business by Mail
February 1, 2002**

**MINUTES
from the Ballot dated January 2, 2002**

There were **four** votes cast by Robert Daverman, Susan Friedlander, Bernard Russo and Lesley Sibner.

1. Approved electing to membership the individuals named on the list dated December 20, 2001.
2. Approved the minutes of the Secretariat Business by Mail from the ballot dated December 1, 2001.

Robert J. Daverman



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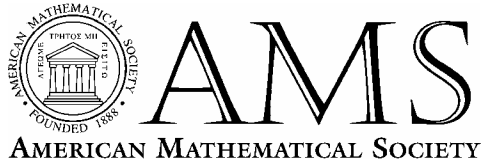
**SECRETARIAT
Business by Mail
March 1, 2002**

**MINUTES
from the Ballot dated February 1, 2002**

There were **four** votes cast by Robert Daverman, Susan Friedlander, Michel Lapidus and Lesley Sibner.

1. Approved electing to membership the individuals named on the list dated January 20, 2002.
2. Approved a Joint International Meeting between the AMS and various Indian Mathematical Societies -- the Indian Statistical Institute and other premier scientific and scientific institutions -- to be held at Goa, India, December 17-20, 2003.
3. Approved holding the Spring 2003 AMS Western Section Program Committee meeting on May 3-4, 2003, at San Francisco State University in San Francisco, CA.
4. Approved the minutes of the Secretariat Business by Mail from the ballot dated January 2, 2002.

Robert J. Daverman



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**SECRETARIAT
Business by Mail
April 1, 2002**

**MINUTES
from the Ballot dated March 1, 2002**

There were **five** votes cast by John Bryant Robert Daverman, Susan Friedlander, Michel L. Lapidus and Lesley Sibner.

1. Approved electing to membership the individuals named on the list dated February 20, 2002.
2. Approved the minutes of the Secretariat Business by Mail from the ballot dated February 1, 2002.

Robert J. Daverman

Committee on Meetings and Conferences
Meeting on April 6, 2002

Highlights

Report of the Secretariat. AMS Secretary Robert Daverman gave a report of the Secretariat meeting. The Secretariat recommended to the Committee on Meetings and Conferences (CoMC), and after some discussion CoMC approved, the following motion:

The ten-year-rule for Invited Addresses at sectional and national meetings will be separated into two disjoint ten-year rules, one for sectional meetings and one for national meetings.

Report of the Subcommittee to Review Cosponsorship of Meetings and Conferences of Other Organizations and the Conference Program. This subcommittee was composed of Dominic Clemence (chair), Rick Miranda and Irene Fonseca. As part of the review on conferences, the committee collected materials from the Notices and final reports collected over the past five years. The subcommittee found that the AMS conference program is useful and should be continued and found that the SRC's have been quite successful in spite of the low number of proposals submitted. They noted that attendance at these conferences approximates the target of 40% young mathematicians, but that the definition of "young" is a stretch. They also noted that statistics on race and ethnic background of participants are not available, and recommended that such statistics be collected consistently. As to co-sponsored meetings and conferences, the subcommittee felt that such co-sponsorships are very valuable, allowing for interaction and dialogue across disciplines. They suggested that an explanation of co-sponsorship be put on the co-sponsored meetings web page.

In connection with these recommendations, CoMC took two actions:

- The committee unanimously approved a motion to encourage the SRC committee to consider varying the format of the SRCs, for example, having a two-week institute followed by a related one-week conference. The SRC committee and its advisory committee are also encouraged to actively solicit proposals.
- The committee recommended that while CoMC itself should not actively solicit co-sponsorships, it should encourage others to do so. Information on how to propose a co-sponsored meeting should be posted on the web, which should include a listing of AMS's expectations regarding cosponsored meetings.

Review of Selected Activities. The committee moved that a review of the Short Courses at National Meetings would be added to the 2004 review of Special Lectures Series and Special Projects, as requested by the chair of the Short Courses committee.

Report on the San Diego Focus Group. Hema Srinivasan moderated the CoMC Focus Group discussion, along with co-chair Karen Collins, in San Diego. The comments and suggestions from the Focus Group were discussed at the meeting during Hema's oral report, but no formal CoMC action was taken. It was reported that in response to the Focus Group question: "Do you view meetings as a valuable part of your AMS membership?", the answer was yes and the values mentioned fell into three main categories:

- Research exposure and stimulation
- Meeting new people and reunions with old friends
- Employment Center activities (at the national meeting only).

Special Session on Current Events in Mathematics. CoMC discussed a new type of Special Session, proposed by David Eisenbud to be presented at the National meeting. This short Special Session will feature 3 to 4 prominent mathematicians talking about recent significant new work of others in their fields, as in the Bourbaki model. The committee agreed to approve the proposed special session as an experiment for the 2003 JMM only, including reimbursement for the speakers, with a review by CoMC at the next CoMC meeting. A subcommittee consisting of Bob Daverman, Hema Srinivasan, Karen Vogtmann and Carol Wood was formed to study the issue further.

Invited Addresses. There was concern expressed in a letter by an AMS member that the AMS did not have any female Invited speakers during the JMM in San Diego. The Secretary will research Invited address invitations and acceptances and this topic will be reintroduced at the next CoMC meeting.

Other Informational Items. CoMC's topic for annual review for 2003 is to be Sectional meetings. A subcommittee consisting of Irene Fonseca (chair) and Craig Huneke and Richard Randell will prepare a report on this topic for the next CoMC meeting.

CoMC will host a focus group at the Baltimore meeting scheduled tentatively for Thursday morning, January 16, 2003, 7-9 am. Colin Adams agreed to moderate the focus group.

The next meeting of the committee is scheduled for the O'Hare Hilton on March 29, 2003.

Prepared by Karen Vogtmann and Diane Saxe 4/17/2002

Washington Office Report
Samuel M. Rankin III
April 18, 2002

Government Relations

The AMS annual reception at the BMS Department Chairs Meeting, organized and hosted by the Washington Office, was held November 10, 2001.

On November 29, 2001 the annual Washington Office reception for science policy colleagues was held at the Tabard Inn. Over seventy-five people attended including the NSF director, Rita Colwell. This event is anticipated each year by Washington science policy colleagues.

The office handles the logistical support for the CSP activities at the Joint Mathematics Meetings. This year Jim Schatz (National Security Agency) was the government speaker, drawing a large crowd to hear him speak about mathematics at the National Security Agency. A reception followed his talk.

On February 27, 2002, our Congressional Lunch Briefing was for the first time jointly sponsored with the Mathematical Sciences Research Institute, Berkeley, California. Now in its fifth year, the intent of the series is to present mathematics of interest to Congressional staff. Professor Ingrid Daubechies, Princeton University, drew a capacity crowd to the House Science Committee hearing room in the Rayburn House Office Building. David Eisenbud, MSRI and President-Elect of AMS, welcomed guests and James Schatz, National Security Agency, introduced Professor Daubechies. Our Congressional sponsors were Congressman Rush Holt and Congressman Vernon J. Ehlers, both of whom attended the briefing, Ehlers making a brief statement. A copy of the invitation is attached. A report, with photographs, is posted on the AMS website, www.ams.org/government.

The seventh annual Congressional Visits Day event was held on March 5-6, 2002. Approximately 200 scientists, mathematicians, and engineers arrived in Washington for meetings with Congressional Offices to advocate for federal support for research. The DC office participated by sponsoring three mathematicians' visits, providing logistical support to the event, and developing materials for the event. Jane Hawkins (University of North Carolina and CSP Chair), Sherman Riemenschneider (West Virginia University), William Fitzgibbon (University of Houston), along with Sam Rankin, visited a total of ten congressional offices. This group concentrated on advocating for a 15 percent increase for the NSF FY 2003 budget. Several visits included meetings with the staff of Members who serve on the VA-HUD and Independent Agencies Appropriations Subcommittee, the committee responsible for the NSF budget.

On March 20, 2002 the AMS Washington Office organized and sponsored a breakfast in Washington for the secondary teachers receiving the Presidential Award for Excellence in Mathematics Teaching. Seventy-five people attended the breakfast: the fifty teachers who won the award, along with representatives from mathematics organizations and the NSF. Later in the day Monica Foulkes displayed AMS materials and talked with both secondary and elementary teachers as part of an information exchange for the award winners.

In March Sam served on the AAA Mass Media Fellowship selection panel. Kathy Paur, a graduate student in mathematics at Harvard University, was selected as the AMS-AAAS Mass Media Fellow. She will spend her fellowship term at the Chicago Tribune. Kathy did her undergraduate work at MIT.

Also in March Sam Rankin was asked by AAAS to write the chapter on federal funding for the mathematical sciences in the FY 2003 budget request, to be published in the 27th annual AAAS Research & Development Report. This annual report is a comprehensive analysis of the funding for science, engineering, and mathematics for the next fiscal year budget request.

The third American Astronomical Society–American Mathematical Society–American Physical Society Public Service Award reception was held on April 10, 2002 in the Dirksen Senate Office Building. The 2002 award winners were Senator Barbara Mikulski of Maryland and Representative James Walsh of New York. Senator Mikulski is chair of the Senate VA-HUD and Independent Agencies Appropriations Subcommittee, while Representative Walsh is the chair of the House VA-HUD and Independent Agencies Appropriations Subcommittee. Each has been very supportive of increasing the NSF budget. Seventy people attended the event, with a large contingent representing the National Science Foundation, including the NSF director, Rita Colwell. David Eisenbud, President-Elect of the AMS, presented Mr. Walsh with his award.

April 16, 2002, Hyman Bass, President of the AMS, met with the NSF Director Rita Colwell, and made visits to several congressional offices along with the presidents of the American Chemical Society, the American Physical Society, and the Federation of American Societies for Experimental Biology. Their purpose was to demonstrate support for NSF funding. This is the fourth year the presidents of these four societies have participated in Washington events together. In previous years they gave joint testimony before the House Appropriations Subcommittee.

Washington Leadership Activities

The Washington Office continually works collaboratively with many societies and organizations in Washington on matters of science policy. The Office is increasingly looked to for leadership and facilitation of many science policy activities, as well as serving as an informational resource. For example, Sam Rankin is the current chair of the Coalition for National Science Funding (CNSF), an activity that has involved an increased amount of Washington Office time this year.

CNSF is an alliance of over ninety-five science, engineering, and mathematics societies, professional organizations, and universities united by a concern for the future vitality of the national science, mathematics, and engineering enterprise. CNSF supports the goal of increasing the national investment in the National Science Foundation's research and education programs. As chair, Sam is responsible for organizing and chairing the monthly meetings, arranging for visitors from the NSF (recent visitors were Curt Supplee, David Stonner, Rita Colwell), Administration officials (OSTP officials, OMB officials), and congressional staff (from Senate Budget Committee, House Science Committee, House and Senate VA-HUD and Independent Agencies Appropriations Sub-committees). Sam led the development of the CNSF annual

budget statement published in February. He is also involved in organizing the annual CNSF Capitol Hill Exhibition (this year on May 15), and other CNSF activities.

The CNSF Exhibition has become an important Hill event as each year over thirty scientists exhibit their NSF supported research. Many Members of Congress attend this event, speaking and interacting with the scientists at their booths. This year the AMS will sponsor an exhibit by Andrea Bertozzi of Duke University, who will exhibit NSF supported work on “Liquid films and image inpainting.”

A recent additional CNSF activity that impacted the AMS Washington Office was a reception held in honor Members of the House Committee on Science. The Washington Office handled all the logistics for this event, including arranging for Representative Sherwood Boehlert, chair of the Committee on Science, to attend and speak. Several Members of Congress attended this reception, as did many staffers. This was a way to show the science community's appreciation for the Committee's work and to form and solidify important working relationships.

Currently Sam is orchestrating visits by CNSF members with the staffs of Members who are responsible for the NSF Authorization Bill. The purpose of these visits is to encourage these Members to include a NSF budget authorization for FY 2003 that is 15% over the FY 2002 budget for the NSF.

Education

The office handles the logistical support for the Committee of Education session at the Joint Meetings. This year the COE speaker was NCTM president Lee Stiff (North Carolina State). His talk was titled “A Conversation with the NCTM President – Facing the Challenges of U.S. Mathematics Education Together”.

The Washington Office organized and supported the October 26-27, 2001 COE meeting, which included many speakers interested in mathematics education who were from outside the professional mathematics community. Several representatives of K-12 book publishers gave presentations on the development process for K-12 textbooks.

December 6-9, 2001 Sam Rankin participated in the first workshop of the AMS-MER, NSF funded project, “Excellence in Undergraduate Education: Confronting Diverse Student Interest.” This first workshop, held at Arizona State University, concentrated on mathematics for the non-science student needing to satisfying general mathematics requirements. The second workshop, to be held at Washington University, St. Louis, May 2-5, 2002 will concentrate on the non-traditional mathematics major. In all, six workshops will be held over the life of the grant.

The Washington Office again organized a workshop for chairs and leaders of doctorate-granting departments of mathematics at the Joint Mathematics Meetings, January 2002, in San Diego.

Report from the AMS President to the ECBT May, 2002

My activities form several densely interwoven strands, which are sometimes hard to separate, not to mention keep track of. In the background are the usual activities of doing mathematics, teaching courses (in both mathematics and education), working with students, and doing educational research. The latter has lately taken on increased momentum and amounts of time. The organizational/institutional work is mainly related to the AMS, ICMI (International Commission on Mathematics Instruction), and various related organizations, particularly those that play a role in mathematics education.

The main public themes/arenas of these activities fall into the following categories:

- Resources for mathematics research. Support for the NSF.
- The public image of mathematics and mathematicians. The social and economic and cultural importance of mathematics.
- Mathematics education:
 - K-12; improving teaching and learning of school mathematics.
 - Teacher education and professional development
 - University level instruction. Mathematics majors.
 - Improving the PhD programs.
- International aspects of mathematics and mathematics education.

I shall comment briefly about each of these areas, and follow that with an annotated calendar of activities since my last report in November, 2001.

The Washington Scene. I continue to be impressed with how well our Washington office, under Sam Rankin's management, and with the help of Monica Foulkes, is functioning. Sam has achieved a widely known and respected presence in Washington, and he has accomplished a lot to make mathematics a significant player in the political and policy arenas. He, along with John Ewing, have been staunch and consistent advocates of the AMS stance of petitioning Washington for support of basic science, and particularly the NSF, and not so explicitly for the specific needs of mathematics. In this way, mathematics has so far received favorable treatment in recent NSF budgets without seeming to be pleading for special interests.

On April 16, together with the presidents of ACS (chemistry), APS (physics), and FASEB (experimental biology), I met with Rita Colwell to discuss the NSF budget, now and future. The physicists are really hurting in the present budget, in ways familiar to mathematicians from the past, and they wanted us to plead for special attention to physics needs in future budgets. Sam firmly, and effectively, resisted that impulse, and we presented a continuing united front in support of the NSF as a whole.

Though the budget doubling rhetoric has been abandoned in Washington, Colwell said that this was just as well, since the needs were far more than that. She did a rough estimate of what was needed in various categories (while Sam took notes and did the arithmetic), and it emerged that

something like a budget tripling was more appropriate. She suggested that, as the political agenda unrolls in Washington, 2004 should be the year for a decisive increase in the NSF budget.

We are constantly reminded that letters to members of congress are of great importance.

Mathematics and Society. Slowly, but steadily, mathematics seems to be infiltrating the public consciousness and culture. The movies have played a role in this. Some of you may not be happy with how mathematics and mathematicians are represented, but even having people talk and think about such things is probably to our benefit.

In December, 2001, an international symposium was held at the National Academy of Sciences on Quantitative Literacy. Many views were heard there that situated the learning of quantitative skills outside mathematics as a discipline, and as a school subject. We would do well to remain alert to the trends of this ongoing debate, and movement.

The status of mathematics in the schools has been under assault in some countries. Former Minister Allegre in France took the position that computers made mathematics largely irrelevant, and proposed to diminish its standing. This provoked heated out cry that has not completely subsided. In Japan, the Education Ministry felt that students were too oppressed with harsh regimes of study, and needed a more humane kind of school experience. One conclusion drawn was to substantially reduce the number of hours of study of mathematics. Again, our mathematical colleagues in Japan lamented this unwise policy.

Events like these remind us that the beauty and value of our subject are not widely appreciated, and there is no one but ourselves to change that condition, and its consequences in public policy.

Mathematics Education.

K-12: This is an enormous enterprise, in urgent need of fundamental improvement, and in which increasing numbers of mathematicians, myself among them, have become involved in diverse ways. The arenas of work include things like: developing standards or frameworks; developing and critiquing curriculum materials; developing and critiquing assessment instruments; contributing to teacher education courses and professional development workshops; and participating in research or policy studies.

The important roles that mathematicians can play in these kinds of work are becoming more widely known and appreciated. But there is not at present any systematic way for mathematicians, or people who desire their services, to make productive and well regulated connections. Together with Roger Howe, Deborah Ball, John Ewing, and Sam Rankin, we have been discussing a possible NSF funded project to create some infrastructure to network and support mathematicians who want to become involved in such work.

Teacher Education and Professional Development. This has come to be recognized by virtually everyone involved as the most crucial, and most difficult, challenge to improving mathematics teaching and learning in this country. The core problem is teachers' knowledge of

mathematics for teaching. I deliberately added the last two words, because there is strong evidence that the kinds and forms of mathematical knowledge that are useful and usable for teaching is significantly more than, and sometimes different from, the traditional knowledge of topics in the curriculum. And I mean mathematical knowledge, not just knowledge of students or of cognition. The nature of this mathematical knowledge for teaching is the focus of the research that Deborah Ball and I are doing.

The relevance of this to mathematicians is that teachers learn most of the postsecondary mathematics that they study in our own mathematics departments. Thus, much as we may lament how little mathematics these teachers know or understand, it is we who have taught them.

The MET report squarely addresses this issue, and a number of workshops and other activities are being initiated in response to it. I have been involved in some of this activity.

University Instruction; Mathematics Majors. Even the best mathematics departments are suffering low numbers of mathematics majors. (A few outstanding liberal arts programs have reversed this trend.) Moreover, there is a persistent problem of articulation between the diverse high school curricula, and the introductory courses of instruction in the universities. AP calculus is virtually required for admission to some universities, yet it is often not used to move into more advanced courses, and even when this does happen, the AP calculus courses rarely provide the depth of understanding skill that university courses would like to expect. This problem is hard to regulate, since so many independent agents (each high school, with its own curriculum; the AP program; the College Board; the university admissions offices; the university mathematics departments) have controlling parts to play.

Another piece of this picture is the intersection with the previous issue: teacher education. Most departments have a set of mathematics courses specifically for elementary and secondary teacher education students. Surprisingly large numbers of our undergraduates will become schoolteachers at some point. The curricula and quality of instruction in these courses demand serious attention.

The PhD. There are widely acknowledged problems here. The programs need improvement to provide more professional development and versatility, given that the need for mathematics PhD's now goes well beyond academic research settings. Further, there is a severe shortage of U.S. citizen graduate students. Two initiatives in this area are significant. One is the VIGRE Program from NSF. This has had dramatic effects on many departments, both those with VIGRE grants, and those without them. This program is now a subject of vigorous analysis and debate.

The other initiative is the Carnegie Initiative on the Doctorate (CID), from the Carnegie Foundation for the Advancement of Teaching, led by Lee Shulman. This is a large, long term, project to explore improved models for PhD programs in research universities. As a start, they have selected about half a dozen disciplines on which to focus, of which mathematics is one. The first step is production of some commissioned essays for each of these disciplines, to stimulate initial discussions. I have been asked to write one of these, for mathematics. I welcome any thoughts that any of you may have in this regard. Following publication and

discussion of these essays, a small number of departments in each of the selected disciplines, that are willing to commit to some experimental reform of the doctorate program, will be enlisted to participate in this initiative, facilitated by the Carnegie Foundation.

The International Scenes. The AMS is already to some extent an international organization. It has many foreign members. Its publications serve a world market. Mathematical Reviews is a unique resource for the profession, worldwide. The AMS conducts bi-national regional meetings in many countries, and these, in my opinion, have been a great success.

But there are some organizations, with much more lightweight infrastructure, that are intrinsically international in character. The idea of mathematics as an international enterprise was first articulated surprisingly late, at the end of the nineteenth century, at which time the first international congress of mathematicians was held. Following WWII, the international scientific unions were formed, generally attached to the national academy of sciences, or some equivalent, in each country. The main activity of the IMU (International Mathematical Union) is to organize the International Congress of Mathematicians every four years. In each country there is a national liaison committee, in our case the U.S. National Committee on Mathematics (USNCM), based at the NAS (National Academy of Sciences).

There is a sub-commission of IMU devoted to mathematics education, the International Commission on Mathematics Instruction (ICMI). This actually predates the IMU, and goes back to the turn of the last century, when its first president was Felix Klein. At the 1900 ICM, the section titled “History and Teaching of Mathematics” featured a talk called “Mathematical Problems,” by one D. Hilbert.

By the 1960’s, when Freudenthal was president of ICMI, this education section of the ICM was seen to be far too limited a venue to present the range and complexity of matters pertaining to mathematics education that were drawing increased worldwide attention. Freudenthal launched the first International Congress on Mathematics Education (ICME) in Lyon. These ICME’s are now staged every four years, and have become even larger than the ICM’s. The last one was in Japan, in 2000. The next one, in 2004, will be in Copenhagen, where they expect on the order of 4,000 participants.

I am currently the president of ICMI. The last American president was Hassler Whitney. In this role I am brought into extensive international contacts – with IMU, with ICSU (International Council of Scientific Unions), with UNESCO, etc. This entails a host of activities that I won’t elaborate here.

Calendar of Activities, November, 2001 – May, 2002

Long term:

- Oversight Board for the Park City Mathematics Institute (**PCMI**) (run by the Princeton IAS). I am also a participant in the educational programs of PCMI.

- Work on a Panel of **RAND/OERI** on planning for programmatic research in mathematics education. The first draft was just released for public feedback.
- President of **ICMI** (International Commission on Mathematics Instruction, the mathematics education analogue of the IMU, which organizes quadrennial international congresses, among other things.)
- Consultant on the revision of the CMP curriculum, at Michigan State U.
- Advisory Board for the Show-Me Middle School Mathematics Curriculum Center.
- Advisory Board for a HS curriculum project at the Educational Development Center (**EDC**) in Cambridge, MA.
- PI on an NSF project at the Univ. of Michigan: Developing a Practice-Based Theory of Mathematical Knowledge for Teaching.
- PI on an NSF proposal to create a digital library of records of practice for research and professional development work on mathematics teaching.

Annotated Chronology:

Nov 2-4, **MET** Summit, Tysons Corner, VA

This meeting publicly launched the Mathematics Education of Teachers (MET) report, sponsored by CBMS. With Deborah Ball, I gave a plenary talk on teacher content knowledge, and also a breakout session on some new approaches to mathematical methods courses.

Nov 5, **JPBM**, DC

Nov 16-18, **ECBT**, Providence

Nov 30 – Dec 2, International Symposium on Quantitative Literacy, National Academy of Sciences, DC. I gave the closing summary remarks for this.

Dec 7-9, **CBMS**, DC

Jan 4-9, **AMS/MAA Joint Meetings**, San Diego.

Jan 9-14, **MEFT** Workshop, San Diego

This “Mathematics Education of Future Teachers,” workshop, organized by Ed Dubinsky, Deborah Ball, and myself, was an outgrowth of the MET agenda. It was targeted for mathematicians in mathematics departments who are teaching mathematics for future teachers, mainly elementary. The workshop piloted some ideas and methods that Deborah and I have been researching which propose to use practice itself as a curriculum resource for the content instruction of teachers. This was vividly implemented in our workshop by actually running a live class, in “fishbowl” format. Its students were locally recruited undergrad education students, and it was taught each morning by Deborah, and videotaped. The workshop helped plan the lessons, observed their enactment, and participated in post lesson analysis. The focus in all of this was on the mathematics entailed.

Jan 15-16, Video Case Professional Development Project, La Jolla
Consultant.

Jan 25-27, **AMTE**, San Antonio

At this meeting of the Association of Mathematics Teacher Educators, I participated in a presentation on “Developing mathematical knowledge for teaching.”

Feb 2-4, Show-Me Middle School Curriculum Center, Dulles, VA

Meeting of the Advisory Board

Feb 14-16, U. Arizona, Tucson, AR

I gave a math colloquium on zeta functions of graphs, and, with Deborah Ball, an education seminar on content knowledge for mathematics teachers.

Feb 16-18, **Inter-union Education Meeting**, Research Triangle, NC

I met with officers of several international scientific unions – pure & applied chemistry, pure & applied physics, biology, and biochemistry & microbiology – to discuss educational programs of the different unions, and possible cross disciplinary collaboration or cooperation. This was sponsored by UNESCO, which was representative there by Dr. Alexander Pokrovsky. I promoted some of the work of ICMI, and initiated some promising contacts with UNESCO to support this work.

Feb 21, **VIGRE Professional Development Seminar** at UM for graduate students. I gave a talk about the AMS.

Mar 1-3, **AMS Regional meeting** at Ann Arbor

Mar 3-8, MTLT Book Retreat, Goderich, Ontario

This retreat of our research group at U. Michigan was devoted to collective writing of a book on the demands of teaching at the beginning of the school year.

Mar 17-19, Review of **USC Mathematics Department**

With George Papanicolau, I reviewed the University of Southern California Mathematics Department. These occasions are good opportunities to communicate to administrators and faculty from other departments something about mathematics, as a discipline, and as an academic profession.

Mar 30 – Apr 5, **AERA**, New Orleans

This was the annual meeting of the American Educational Research Association, which, to education research (not only mathematics education) is what the AMS is to mathematics research. I helped prepare several UM based presentations for this meeting.

Apr 11-14, **IMU EC**, Paris

With Bernard Hodgson, Secretary of ICMI, I attended the meeting in Paris of the IMU Executive Committee, in order to discuss some ICMI related matters. Most notable among these is the slate of nominees for election of the ICMI Executive Committee. This will be presented to the General Assembly of the IMU, meeting in Shanghai in August. The ICMI EC had developed a slate, and we were now negotiating with the IMU EC for its acceptance, with modest changes. This meeting was cordial and productive, I think. For the dinner, they agreed to invite Michele Artigue, VP of ICMI, and Jean-Pierre Kahane, former President of ICMI. I reported on this meeting to both the USNCMI and the USNCM, which appoints the U.S. delegation to the IMU General Assembly.

Apr 15-16, VA-HUD Appropriations, DC

Following recent tradition, Sam organized a gathering of four scientific society presidents – AMS (mathematics), APS (physics), ACS (chemistry), and FASEB (Federation of Societies of Experimental Biology). In the past we have delivered prepared coordinated statements in support of NSF, which we presented in testimony to the VA-HUD Interagency Appropriations Committee, which encompasses the NSF Budget. Though friendly to our cause, this year they accepted only written testimony. So we used the time

instead to have a series of face-to-face meetings, first with Rita Colwell at NSF, and then with congressional staff on the Hill.

Apr 19-24, **NCTM**, Las Vegas

At this annual meeting of the National Council of Teachers of Mathematics, I was invited, as president of the AMS, to offer a plenary presentation. I chose to do this jointly with Deborah Ball, on our work on teacher content knowledge, in part to illustrate one model of collaboration between mathematicians and educators. I also participated in a report on activities USNCMI and ICMI

In addition I participated in a session about the US/Japan Workshop on Lesson Study, which I helped organize following the International Congress on Mathematics Education in Makuhari Japan in August, 2000.

Apr 20, **USNCMI**, Las Vegas

Apr 25-27, **AMS, CSP**, DC

Apr 27, **USNCM**, at NAS, DC

Apr 27-30 **NAS**, DC

This is the annual meeting of the National Academy of Sciences.

May 3-4, **VIGRE Workshop**, Reston, VA

This is a workshop to explore the effects, good and bad, of the VIGRE Program.

May 4, **CBMS**, DC

May 4-6, **CSSP**, DC

This Council of Scientific Society Presidents meets twice a year in DC, with an intense program providing expert discussions of many issues affecting American science.

May 15, Tribute to **Philippe Tondeur**, NAS

This is an occasion to pay tribute to the excellent work that Philippe Tondeur has done as Director of the Division of Mathematical Sciences (DMS) at the NSF. Philippe will be stepping down at the end of this term.

May 16-18, **AMS, ECBT**, Ann Arbor

May 24-28, **CMESG**, Queens U., Kingston, Ontario

This annual meeting of the Canadian Mathematics Education Study Group focuses on a few main presentations and then an in-depth study and analysis of their themes over a few days. Deborah Ball and I have been invited to give the first main talk this year.

PROPOSED CHARGE TO THE ECBT NOMINATING COMMITTEE

The standing committee of the EC and BT, called the ECBT Nominating Committee, consists of the second and third year elected members of the BT, the fourth-year and second-year elected members of the EC, and the Chair of the Council's Nominating Committee. The chair is the senior trustee.

1. Associate Secretaries: This Committee evaluates current Associate Secretaries and receives recommendations about these positions. It should consult the Secretary about these appointments. It should report on its recommendations for reappointments to the November ECBT for forwarding to the January Council meeting a full year before the term expires.

2. Associate Treasurer: When considering the Associate Treasurer position, the Committee is augmented by the Treasurer. This augmented Committee evaluates the current Associate Treasurer and receives recommendations about this position. It should report on its recommendations for reappointment to the November ECBT for forwarding to the January Council meeting a full year before the term of office expires.

3. Secretary: When considering the Secretary, this Committee is augmented by the Treasurer. This augmented Committee evaluates the current Secretary and receives recommendations about this position. It should consult the President. It should report on its recommendation for reappointment to the November ECBT for forwarding to the January Council meeting a full year before the term of office expires.

4. Treasurer: When considering the Treasurer, this Committee is augmented by the Secretary. This augmented Committee evaluates the current Treasurer and receives recommendations about this position. It should consult the Associate Treasurer. It should report on its recommendations for reappointment to the November ECBT for forwarding to the January Council meeting a full year before the term of office expires.

When it is expected that any of these officers will not be recommended for reappointment, a Search Committee should be formed by the ECBT to seek a replacement. Insofar as possible, just as with recommendations about reappointments, all such Search Committees make recommendations concerning any replacement to the November ECBT for forwarding to the January Council meeting, a full year before the term of office expires.

When considering reports on officers and making further recommendations to the Council, the EC and BT will consist of one Committee and voting will be by majority (i.e., the EC and BT will together form the nominating committee for these positions).

The September 1992 Council requested that the ECBT Nominating Committee provide the Council with a review of the performance of the individuals it recommends for reappointment.

CURRENT CHARGE TO THE ECBT NOMINATING COMMITTEE
*(as adopted by the August 1991 Council and
modified by the January 1996 Council and September 1992 Council)*

The standing committee of the EC and BT, called the ECBT Nominating Committee, consists of the second and third year elected members of the BT, the fourth-year and second-year elected members of the EC, and the Chair of the Council's Nominating Committee. The chair is the senior trustee.

1. Associate Secretaries: This Committee would evaluate current Associate Secretaries and receive recommendations for this position. It would report on its recommendations to the May ECBT for forwarding to the August Council meeting in the year when the term expires. When it is expected that a sitting Associate Secretary will not serve again, this Committee should attempt to nominate a replacement at least one year in advance of the end of the term so that the replacement can serve a break-in period of about one year. This Committee should consult the Secretary concerning these appointments.
2. Associate Treasurer: When considering the Associate Treasurer position, the Committee is augmented by the Treasurer. This Committee would evaluate the current Associate Treasurer and receive recommendations for this position. It would report on its recommendations to the May ECBT for forwarding to the August Council meeting in the year when the term of office expires. When it is expected that a sitting Associate Treasurer will not serve again, this Committee should attempt to nominate a replacement at least one year in advance of the end of the term so that the replacement can serve a break-in period of about one year. This Committee should consult the Secretary concerning this appointment.
3. Secretary: When considering the Secretary, this Committee is augmented by the Treasurer. This Committee would evaluate the current Secretary and receive recommendations for this position. It would report on its recommendations to the May ECBT for forwarding to the August Council meeting. When it is expected that a sitting Secretary will not serve again, this Committee should attempt to nominate a replacement at least one year in advance of the end of the term so that the replacement can serve a break-in period of about one year. This Committee should consult the President concerning this appointment.
4. Treasurer: When considering the Treasurer, this Committee is augmented by the Secretary. This Committee would evaluate the current Treasurer and receive recommendations for this position. It would report on its recommendations to the May ECBT for forwarding to the August Council meeting. When it is expected that a sitting Treasurer will not serve again, this Committee should attempt to nominate a replacement at least one year in advance of the end of the term so that the replacement can serve a break-in period of about one year. This Committee should consult the Associate Treasurer concerning this appointment.

When considering the report and making further recommendations to the Council, the EC and BT will consist of one Committee and voting will be by majority (i.e., the EC and BT will together form the nominating committee for these positions).

The September 1992 Council requested that the ECBT Nominating Committee provide the Council with a review of the performance of the individuals it recommends for reappointment.

Twenty centuries of mathematics: Digitizing and disseminating the past mathematical literature

John Ewing, Executive Director, American Mathematical Society

"If you have built castles in the air, your work need not be lost; that is where they should be. Now put the foundations under them."

-Henry David Thoreau, Walden, Chap.18

Mathematicians have talked quietly for some time about the need to digitize the past mathematical literature. During 2001, the conversations became more intense as several new digitizing projects were announced. Should we coordinate those projects? Could we integrate the recent literature that is already in digital form? How could we digitize far greater amounts of older material? The goal was to create a virtual library containing much of the past literature--a library that could eventually grow into a "World Mathematics Library"

In a conversation in mid-2001, Philippe Tondeur (the Director of the Division of Mathematical Sciences at NSF) outlined his vision for such a library. While I was sympathetic, I pointed out that one needed a plan, or at least an outline, and that even with a plan there were many obstacles. Philippe persuaded me to write this "concept paper" based on our conversation, and consequently turned my pessimism into a proposal.

Since that time, a group headed by Cornell University was awarded a planning grant to consider the next steps in carrying out a massive digitizing project. Mathematicians and agencies from other countries have expressed interest in an international effort. And the impossible sums of money needed for funding seem almost possible (even if most of the other obstacles remain).

The opinions expressed in this paper are the author's, and do not necessarily represent opinions of the American Mathematical Society.

Mathematics has always relied on its scholarly literature. From the time of Euclid's Elements¹ (about 300 BC), mathematics thrived because key literature was passed from generation to generation. In modern times, the process accelerated, changing the way mathematicians carry out research. Because it is impossible to study and digest all relevant literature in a broad area, mathematicians find themselves navigating the literature--moving from one paper or book to another, perusing results and proofs, and relying on references in order to link to the next item. The linking process has become

¹ "The *Elements* form, next to the Bible, probably the most reproduced and studied book in the history of the Western World. More than a thousand editions have appeared since the invention of printing, and before that time manuscript copies dominated much of the teaching of geometry." [Struik, Dirk J. *A Concise History of Mathematics*, 4th ed, Dover, New York, 1987, p. 49.]

more important as the literature has grown, and it is one of the reasons electronic publication has great potential benefit for mathematical research.

Reliance on past literature is common to all disciplines, but time scales differ. In some areas of science, literature more than a few years old has value mainly for historical reference. For mathematicians, work from ten, twenty, or even one hundred years ago is relevant and useful in research. Like all scientists, working mathematicians will use and reference more recent work the most, but having the ability to access the older literature is of essential value to research mathematicians. Even when only a small fraction of the references come from literature in the distant past, those references may be the key to successful research.

As the scholarly community moves forward into the digital age, more and more of the current (and recent) literature will be available in electronic form online. The more that is available, the more the community will derive value from the ability to navigate easily from item to item.² But for mathematics, navigation will have limited value as long as the bulk of the *past* literature is accessible only in paper form. In mathematics, making the past 20 centuries of scholarly literature available online can have a profound effect on research, both now and in the future.

This concept paper outlines a possible mechanism for making much of the past mathematical literature available online for everyone. Such a large project has a number of potential difficulties. But in many respects it is a tractable project with a well-defined goal and clear benefits to the research community. On the one hand, it is the sort of effort that might be undertaken in any discipline. On the other hand, mathematics is an ideal discipline in which to test such a project, both because it is relatively modest in size and because the need for digitizing the past literature is so clearly understood. The international mathematical community understands that need, which makes this suited for international cooperation as well.

For mathematics, this is a project that ties the past to the future in a way that is consistent with the present transition in scholarly publishing. All mathematicians will benefit.

Overview

There are three goals for this project: (i) digitize a preponderance of scholarly mathematical literature that is not already in digital form, (ii) set technical standards for making digital mathematical literature accessible online, (iii) negotiate a protocol for making future digital mathematical literature available in the future. While many people will view the first goal as the essence of the project, achieving the other two goals is essential to make the project worthwhile.

² Linking was a persistent theme at the Second UCSU-UNESCO International Conference on Electronic Publishing in Science, which took place in February 2001. The Proceedings can be found at <http://associnst.ox.ac.uk/~icsuinfo/>.

The entire mathematical literature consists of approximately 50 million pages contained in books, journals, and various other publications.³ There are many ways to digitize the past literature (that is, literature that is not already in digital form), but the only cost effective way⁴ is to combine scanning with partial optical character recognition, creating a combination of scanned page image and associated text file (for searching). There is more to the process, of course. Relevant bibliographic data about each item must be captured (usually by keyboarding); items have to be studied and categorized to understand the various parts (articles, chapters, etc.); proofreading of critical data has to be carried out. Estimates for the cost of carrying out these steps in a large scale operation vary, but a rough approximation is \$2 per page⁵, making the total cost to digitize 50 million pages about \$100 million.

At the moment, many projects are underway to digitize past scholarly literature. One of the first of these is JSTOR⁶, which provides complete runs of a collection of journals (including about two dozen in the mathematical sciences) to institutions as a package. Several other groups are formulating projects to scan entire collections of journals⁷. Individuals are encouraged to scan and to make available their own papers and books.⁸ All this coincides with the explosion of *recent* mathematical literature that has gone online in a great variety of digital forms (and which will become *past* literature in the near future). Many different groups, with many different formats, with many different interfaces. Almost all have the same goal--to make the mathematical literature accessible to mathematicians--but without coordination and standards the effort will founder. Creating a basic set of standards for digital mathematical literature is essential in order to keep all these efforts from merely producing a Tower of Babel.⁹

The call for standards in electronic publishing is not new, and there have been many attempts to set standards for large communities of scholars.¹⁰ An attempt to negotiate standards in this project must necessarily take into account the work that has gone before, which has not always led to wide adoption. In this case, however, it is much more likely that adoption will spread throughout the community. The standards are aimed at a single discipline, and the project will focus attention on the need for standards.

³ This estimate has been made by Keith Dennis, based on past bibliographic studies. The phrase "mathematical literature" is not defined precisely here, which is the first difficulty mentioned below.

⁴ The term "cost effective" is relative, of course, but the alternative of keyboarding material would likely increase costs by a factor of 5, taking into account the basic bibliographic work that would still be necessary.

⁵ Other estimates have been made that are far lower. See [Odlyzko, Andrew. "The economics of electronic journals", *First Monday* 2(8), August 1997, <http://firstmonday.org/>, and *Journal of Electronic Publishing* 4(1), September 1998, <http://www.press.umich.edu/jep/>].

⁶ <http://www.jstor.org/about/>

⁷ The latest is the Electronic Mathematics Archiving Network Initiative (EMANI) involving a consortium of libraries and the publisher Springer-Verlag. A number of other efforts are underway in Europe, all with suitable acronyms such as BNF, DIEPER, and NUMDAM. Individual publishers (for example, Elsevier) are already committed to creating their own collections of past literature in digital form.

⁸ A recent call to authors, endorsed by the Executive Committee of the International Mathematical Union urges all mathematicians to create their own "collected works"; see <http://www.mathunion.org>.

⁹ Genesis 11:1-9.

¹⁰ For one of the best known, see <http://www.openarchives.org>.

Creating a collection of past literature requires that one update the collection in the future. Because this means dealing with individual publishers and organizations who disseminate the literature initially, and because the mathematical literature is especially diffuse, it is essential to outline a protocol for updating the collection over time. This will likely be different for books than for journals, and it may be only an ideal rather than an enforceable protocol.¹¹ It is essential to attempt such negotiation, however.

One important aspect of the digitizing project is *missing* from this description--distribution of the material after the project is completed. Its absence is deliberate, and in fact, it is a key ingredient for the success of the project. While it is possible in principle to create complicated distribution arrangements that involve collecting fees, distributing these to publishers or authors will almost surely burden the project with huge overhead costs. Negotiating these arrangements and maintaining them will consume much energy, which otherwise could be directed at carrying out the project itself.

Rather than complicated distribution arrangements negotiated by the project, the free market can provide ample distribution. The underlying philosophy of this project is to make the raw material available to the entire community, and then to encourage organizations (publishers, scientific societies, libraries, and other groups) to create a variety of mechanisms to access the material along with auxiliary indexing and organization. The raw material (bibliographic data, scanned images, associated text files, and other digital material) will be largely unstructured. Providing useful access to that material will require considerable effort, and neither grants nor a single organization can sustain that effort over long periods of time. But *many* organizations can sustain the effort indefinitely. Some will find ways to distribute the material as a service to the community; others will find ways to add value by indexing or adding other features, and they may charge for the service. All providers will promote their services, making access for the community easier and better suited to individual needs. The market approach guarantees that the material will be available in many ways, in many places, for many years. It also provides a robust mechanism for archiving, similar to the mechanism that has worked well in the past.

Organization and timing

Administration of such a project requires more than volunteers and committees--it requires a small staff with central control of the many groups working on the project, perhaps distributed throughout the world. That staff may be under the administrative control of one or more existing organizations (to minimize overhead), but it needs to be dedicated solely to carrying out the project. While details are hard to specify in advance, there needs to be a director, administrative assistants, technical advisors, and legal consultants (see below).¹²

¹¹ Currently, a window of 5 years has been proposed for journal articles; that is, publishers release their material to such projects after 5 years. For books, the time limit is much more difficult, and many publishers view books that are even 20 or more years old as valuable intellectual property.

¹² Budget estimates are difficult to make at this level of detail, but a rough estimate is that total administrative cost will be approximately 20% of the total project cost.

The job of the central staff is to administer and coordinate digitizing projects (either its own or those carried out by other groups), to oversee the work of various advisory committees, and to negotiate about permission to digitize and disseminate the final work. Carrying out this work will require a director with full responsibility for all aspects of the project, advised by committees but with considerable authority to act and to make independent decisions.

During the first phase of the project (likely 1-2 years), three committees will need to be established--content, technical, and advisory. The first will have responsibility to decide which material is to be included in the project. Its work will be ongoing throughout the duration of the project. The second will make decisions about technical standards both for the bulk of the project's work and for the community at large. Its work will be ongoing as well and will be closely connected with archiving, mentioned below. The third (smaller) committee should represent the mathematics community, providing overall advice on major decisions for the project. For example, this committee will have responsibility for establishing protocols for adding material to the collection in the future.

Work on digitizing older literature will continue for approximately 8 years following the initial 2-year period. During this time, material from the project will be made available to the various organizations disseminating it to the community, with the understanding that it will be added to their collections as soon as possible. Because several different groups may be involved in both funding and carrying out the work, quality control on the additional material will be coordinated by a central body under the authority of the central staff. When digital material is available from more than one source, the advisory committee will make decisions based on recommendations of the staff, as well as other considerations.

As the main phase of the project continues, agreements about future additions to the project will be negotiated. Protocols for adding material will be adopted. A process for specifying and modifying standards will be put in place. The aim is to establish a system for ongoing oversight of the project by one or more organizations, with independent financial support for that oversight.

The overall goal of this project is to create a collection of material that represents "past" mathematical literature along with a mechanism for sustaining that collection and keeping it current. At the end of the ten-year period, this should be a system that is sustained by many organizations around the world, each with individual interests but with a common interest to foster mathematical research. Adding material to the collection will become a normal part of the publication process, made cost effective by standardization. Administering the collection will be small scale, and (one hopes) taken on by a small group of organizations.¹³

¹³ Such administration can be patterned on the administrative efforts of other standards setting groups, such as the World Wide Web consortium (<http://www.w3c.org>). These function by soliciting modest donations from supporting organizations along with volunteer help.

Major problems

There are four major problems in carrying out such a project and sustaining it once it is complete. Solving these will not be easy, but finding solutions will be essential to success. These four problems ought to be the central focus of initial planning.

(1) *Content*. People involved in indexing mathematical literature (like the staff at *Mathematical Reviews* or *Zentralblatt*) recognize the difficulty in selecting what should be included in such a collection. At *Mathematical Reviews*, approximately 110,000 items are considered for inclusion each year; only about 75,000 are actually added to the database. Deciding which to include is agonizingly difficult. The mathematical literature is far more diffuse than most people realize.¹⁴ Not only are there hundreds of current journals, but many journals publish mathematics mixed with economics, psychology, physics, etc.. Deciding to include only full runs of journals means either that a large amount of the mathematical literature will be missed or that a large amount of the added material is not mathematics (in any sense). Deciding to include selections of articles from journals adds enormous editorial costs to the project.

The situation for books is even more complicated. Should one include textbooks? What level is appropriate? What about books that are at the boundary of mathematics and another area? Again, making individual decisions is costly.

And for both kinds of material, making decisions is a highly charged, often political process (as any reviewing and indexing journal can attest.) What languages should be included? What if an item is known to have major errors? How are multiple editions handled? Are unpublished works included (and what is meant by "published work")? Deciding the content is far more complicated than asking a committee to decide which journals or publishers should be included--it is a process that requires careful thought in advance, and careful administration later in order to avoid massive additional costs.

(2) *Copyright*. This is often misunderstood and underestimated by people thinking about such projects. When undertaking to digitize runs of journals from specific publishers, obtaining permission to digitize the work merely requires obtaining a handful of signed agreements from publishers (who are known in advance). In seeking to digitize an entire field, dealing with copyright issues requires understanding complicated legal issues, often with international copyright law, which is notoriously complex. It means dealing with hundreds of publishers, many of whom are not easily identifiable or who are no longer in business. It means dealing with thousands of authors or their heirs for the rights to reproduce books, which in many instances include material (for example, photos) with uncertain copyright status. This adds an enormous administrative cost to the project.

¹⁴ *Mathematical Reviews* corresponds with thousands of sources for the material it reviews, and lists nearly 600 journals that are covered from cover to cover.

All this has been made far more difficult by recent changes in U.S. and international law. The magnitude of the problem is described in an article by Clifford Lynch¹⁵. In the chapter "Converting older books to digital form," he writes:

The legalities of such conversions are a much more serious barrier, and one about which the public remains unaware. Roughly speaking, at least in the United States, any book published before the early 1920s is in the public domain (the details of precisely what is in the public domain are very complicated, and aren't crucial here). If you can find a copy, you can scan it, or, if you are willing to pay the labor costs, you can even re-keyboard it with added structural markup into a more sophisticated digital representation. Whether you obtain a new copyright for your converted digital version of the work seems to be legally murky¹⁶, and seems to depend significantly on how much value you add in doing the conversion. This is important because it has implications for the availability of investment capital to convert public domain materials, and for how these materials need to be protected as they are made available, if they need to generate a revenue stream.

For more recent material, Lynch goes on to say in that same article:

The cost of clearing rights for these works is likely to be hundreds of times greater than the costs of actually digitizing the works.

We can learn a great deal by examining projects that are already in place. JSTOR, for example, has a far easier task of dealing with legal issues because they negotiate with known publishers about complete runs of (usually) several journals at a time. Nonetheless, they expend a large amount of administrative time dealing with legal issues, and employ their own legal staff.

One possible response to the copyright problem is to decide only to include literature that is clearly in the public domain, or for which permission is easily obtained. A rough estimate indicates that more than 90% of the 50 million pages of mathematics remains under copyright. It is likely that half of this requires search and negotiation concerning copyright. Solving the copyright problem by ignoring it therefore requires a major compromise in the original goal of the project--to make a preponderance of the mathematical literature accessible.

(3) *Initial Format*. Of course, setting standards for content that is *already* in digital form is a well known (if not well understood) problem. This will require hard work and substantial negotiation. But even the apparently simple problem of deciding the format of scanned material is extremely difficult. Not long ago, many people would have suggested using some form of compressed TIFF files encapsulated in Adobe PDF format. But,

¹⁵ Lynch, Clifford. *The Battle to Define the Future of the Book in the Digital World*, http://firstmonday.org/issues/issue6_6/lynch/index.html

¹⁶ For example *The Bridgeman Art Library v Corel Corporation* (97 Civ.6232 (LAK) New York Southern District Court), case, which found that there was no new copyright in images of out-of-copyright artworks.

although PDF is widely supported at the moment, support for certain operating systems (Unix) has become problematic. More importantly, there are new, extremely effective formats for scanned images that reduce the size of files by a factor of 3-8 (or more). The most notable of these is DjVu¹⁷, a format developed at AT&T Labs (using wavelets for superior compression and a progressive algorithm for decompressing images, presenting an immediate image that gradually improves). Products implementing DjVu are now owned and sold by LizardTech. Like PDF, DjVu requires special software to view the images within browsers. But the technology is open source and the advantages over more traditional technology are considerable.

Selecting the right initial format--possibly a proprietary format--in an environment that is constantly changing, for a project that lasts over 10 years, is a nearly impossible task. This is closely connected with the next problem, archiving, but it is not the same. (The right initial format for presentation may not be the right format for archiving.)

(4) *Archiving*. This is not so much a problem for the project as it is for those sustaining the collection after the project is complete. Once again, it is a problem that is often misunderstood by people, including experts (precisely because there *are* no real experts in an area like digital archiving, where no one has much experience).¹⁸

Until recently, there wasn't as much need to consciously archive scholarly journals or books--archiving was (almost) automatic because many copies were distributed to institutions at various locations. One counted on the laws of probability to ensure that at least one copy would be extant years in the future. That one copy could be used to reproduce more copies at a time many years after initial publication.

Two things have changed with electronic publication. First, the copies may not be widely distributed, but rather often reside at one or two sites in electronic form. This is the problem of "robustness", and it's the issue most people think of when discussing archiving. Second, even if a copy of a file is extant many years in the future, it may not be possible to produce copies of the "work", that is, fully functional copies that are identical to those in existence years before. This is because electronic journals and books often consist of files embedded in a larger system that makes use of programs, auxiliary files, and even hardware to render the work. In short, the context in which the work is embedded is often essential to making a faithful copy, and archiving requires being able to reproduce that context. This is often referred to as the problem of "format", but the language makes it sound pedestrian, as if it were merely a problem of presentation. It is, in fact, the central problem of archiving.

There are several simple schemes for ensuring robustness, including the simple device of replication to create multiple copies (just like paper). Because electronic media may degrade more rapidly than paper, however, there has to be an added step of routine

¹⁷ Extensive information can be found at <http://www.djvuzone.org/>.

¹⁸ See, for example, <http://www.oclc.org/oclc/new/n226/ea.htm>.

replication to produce fresh copies.¹⁹ Fortunately, making electronic copies is far easier than making paper copies, which compensates partially for the extra step. Routine replication also addresses the problem of changing media, since a copy can move to whatever medium is currently in use.

One might hope that the format issue can be solved in a similar way--regularly change formats as new come along. There are two reasons this doesn't work. First, "changing formats" is *not* equivalent to making a copy. While making copies is routine and easily done for large volumes of material, changing formats requires special intervention, at least for a fraction of the material. The difficulties depend on the *old* format (something we know in advance) as well as the *new* (something unknown when we create the archive). Even if only a small fraction of the material needs special intervention by technical personnel, this can be enormously costly for a large collection. Those who deal with small personal collections often ignore this point.

There is a second, more subtle reason that changing formats is not a solution to the format problem. The format problem is more than merely preserving the format of a work; it is deciding what information about the environment in which a work is presented should be saved initially and then deciding at each subsequent stage of archiving what information is passed along. It is virtually impossible to save *every* piece of information about the environment. (For example, we likely rely on the ISO standards for recognizing characters and assume conventions about line feeds and returns.²⁰) Archiving requires decisions about *which* information will be necessary in the future, and those decisions must be made in the absence of detailed knowledge. Indeed, at the moment, and for some years to come, those decisions must be made without experience as well. There are many, many examples of incorrect decisions made in the past 20 years, resulting in lost work; there is no reason to believe we can avoid incorrect decisions in the future.

To sustain this project, one has to find a way to pay for the potentially large costs to update the format in the future, as well as to make reasonable decisions about what information to pass forward. Maintaining collections at many sites, each with either professional or financial interest in the material, ensures that a large group will want to share those large costs. It will be in everyone's interest to make certain that reliable decisions are made when formats change. Nonetheless, these are issues that extend over long periods of time (often exceeding the careers of individuals involved), and there must be a mechanism to guarantee that archiving issues are dealt with on a continuing basis.

Competition and cooperation

The great advantage of the approach described above is that it effectively balances competition and cooperation. The balance is essential for a project that is international in scope and that spans a decade or more. And the balance is crucial to ensure the effort is sustained once the initial project is complete.

¹⁹ Recent studies suggest that magnetic media have a lifetime of 10-30 years. Optical media appear to have lifetimes of 100 years or more, but studies are inconclusive.

²⁰ <http://www.iso.ch/iso/en/ISOOnline.frontpage>

Rather than a few centralized institutions for dissemination of the material, the proposal calls for competition among many organizations to provide access in ways that address a variety of needs. Libraries, societies, universities, commercial publishers can all compete to add value for the community. This is healthy competition that provides incentives for many people to carry out the work and to sustain it in the future.

On the other hand, there are key areas in which cooperation is essential. Without uniform standards, access to large collections of digital material will be difficult or impossible. Without such standards, the kind of healthy competition above becomes impossible. And without standards, archiving the literature becomes enormously costly, possibly exceeding the resources of even a large group of interested parties.

Cooperation in all phases of this project can be made even more tangible by inviting representatives from many segments of the international mathematical community to serve on the various advisory committees. In addition, many countries have funds available for digitizing collections of scholarly literature. It is possible (and desirable) to divide the job of digitizing the older literature into several large collections, each of which can be done by a separate organization or country. This kind of cooperation, however, requires oversight from a central body, and it will be necessary to coordinate all work using a single body as indicated above.

Initial planning

This document is intended to describe a concept, providing only an outline of the scope of the project, a possible underlying philosophy, and the major issues one must resolve for successful completion. To carry out such a massive project, a small group of interested people (including potential international partners) must engage in far more detailed planning. That planning might be accomplished through a planning grant, administered by a single organization but involving representatives from institutions, libraries, scholarly societies, and publishers.

This project will revolutionize the way in which mathematicians conduct research--it is hard to imagine any single change that will have a greater influence. It remains a dream, of course, but an ideal dream on which to build foundations.

American Association for the Advancement of Science

SECTION ON MATHEMATICS (A)
Warren Page, Secretary

wxpny@aol.com
(914) 476 - 6446

To: ECBT
Subject: AMS-support at the 2002 AAAS Annual Meeting
Date: March 24, 2002

Overview The AAAS annual meeting, considered by many to be the showcase of science, features a variety of presentation formats. In addition to more than one hundred 3-hour symposia on themes of contemporary interest, there are individual topical area lectures and plenary lectures. Because Section A's budget is too meager to support speakers, the generous annual support of the AMS has been centrally important in enabling Section A to offer programs and speakers that effectively communicate to general scientific audiences and the press (ergo, the public at large) the nature, excitement, and usefulness of mathematics.

February 15 – 19, 2002 AAAS Annual Meeting in Boston, MA Summarized below are Section A's sponsored symposia and talks presented at this meeting.

Robot Arm Manipulations: Geometric Challenges, organized by Robert Connelly
Opening Arms from Cauchy to Robots, Robert Connelly
Chain Reconfiguration: A Computer Science Perspective, Sue Whiteside
Locked and Unlocked Polygonal Chains, Eric Demaine
Planning Robot Arm Motion with Pseudo-Triangulations, Ileana Streinu

This was a well planned, coordinated symposium consisting of four talks. Attendance was more than 25 people for each presentation, and a lively discussion followed each of them. All of the talks were mainly concerned with linkages in the plane of rigid segments attached at one or both ends to one or more similar segments, the connections being free pivots. The relevance to 'robots' was minimal, although many of the configurations could be models of robotic arms. In only one talk (Ileana Streinu) was it shown how such an arm could be maneuvered through a field of obstacles from one position to another. The demonstration was shown dynamically and it was quite pleasant. The material is a combination of computational geometry and computer science (algorithms and complexity). Bob Connelly discussed Cauchy's Arm lemma (why a convex arm holds its shape under certain motions), the Erdos Flip (on opening a polygonal arc to a straight segment), and the Carpenter's Rule Problem. Sue Whiteside discussed problems of chain reconfiguration and, in particular, an NP-complete ruler folding problem. Erik Demaine discussed the problem of deforming three types of polygonal chains (arcs, polygons, trees into a straight line segment, a convex polygon, a linear configuration, respectively). Herbert B. Keller

Show Me the Data! Wanted: More Accuracy in Media, organized by Leon H. Seitelman
The Minefield of Reporting Scientific Data; What's Needed and Why?, Leon Seitelman

A Mathematician Reads the Newspaper, John Allen Paulos
The Saga of the U. S. Radium Toxicity Studies, Constantine J. Maletskos
The Use of Surrogate Outcomes in Experiments of Anthrax Vaccines, Donald Rubin
The Legal Reception of Statistical Evidence in the Implant Cases, Michael O. Finkelstein
Science in the Media, Terrence Moran

This was a wonderfully informative, interactive symposium that throughout involved more than 100 people, including a good number of people from the press. Leon Seitelman emphasized the need for those who report on scientific issues and issues involving statistical analyses to spend enough time to educate themselves about the matters on which they report in order to communicate in a more accurate and well informed manner. Paulos' presentation, which was based on his book, examined some of the many mathematical aspects of topics in the news and some of the problems in model making and using dubious data. Constantine Maletkos used the U.S. radium toxicity studies to illustrate the complexities and pitfalls that must be surmounted from both scientific and regulatory standpoints. The denouement is that we now know that there is a radium dose below which cancers do not occur. Donald Rubin discussed critical design issues for using a combination of randomized Anthrax vaccine experiments with human volunteers (using only surrogate outcomes such as antibody levels) and others with macaques (using both surrogate and survival outcomes). Michael Finkelstein discussed the findings (no evidence of a casual link between breast implants and autoimmune disease) of three federally appointed panels involving the massive litigation against Dow Chemical over silicon-gel breast implants. The lessons learned from this epic litigation is that respect for scientific truth must compete with other values in the legal system. The recognition of this should lead scientists to adopt more preemptive strategies for scientific issues in the courts of law. It should be noted that the large audience at this symposium was at the expense of the other two concurrent symposia that are summarized below. It was indeed regrettable that these three symposia competed for the same, or similar, audiences.

Articulation in Mathematics: Smoothing the Bumps from School to College, organized by Bernard L. Madison

CBMS2000 and the Transition from High School to College Mathematics, David Lutzer
Articulation in Mathematics: Smoothing the Bumps to College, S. Pace Marshall
Recommendations from the K-12 Community: NCTM's Principles and Standards for School Mathematics, Joan Ferrini-Mundy

This session went very well. David Lutzer reported on the CBMS2000 Survey as it related to articulation, focusing on issues like remedial enrollments, dual credit enrollments, and placement test policies. Stephanie Marshall discussed the report of the NRC Committee to Study Advanced Science and Mathematics Courses in American High Schools (namely, AP and IB). That report, which appeared in the New York Times the day of this symposium, was reasonably harsh on AP and IB, and indirectly on first year science and mathematics courses. Since Joan Ferrini-Mundy was ill and had to cancel her presentation, I discussed some issues in articulation – as, for example, curricula and pedagogy, use of technology, communication of standards and expectations. We had a reasonable audience of 30 – 50 people, and there were lively discussions of the issues, which I had to cut off because we ran out of time. The timeliness of the reports made this session very worthwhile for many attendees. Bernard Madison

Living with Data: Achieving Quantitative Literacy, organized by Lynn A. Steen
Quantitative Literacy and Statistics: The New Basics, Richard L. Schaeffer
What Mathematics Should “Everyone” Know and be Able to Do?, Arnold Packer
Quantitative Literacy at the College Level, Joan Leitzel

Richard Schaeffer noted that the recent successes in statistics education are due to an emphasis on data analysis rather than classical statistical theory. Teachers and students are fascinated with data, and this can provide motivation for studying other topics in the mathematical sciences. Arnold Packer made a case for using case studies to teach more relevant mathematics as used in the workplace. Joan Leitzel observed that the key to successful education in quantitative literacy is to get mathematics and statistics programs to enlist the support of other academic entities, much as a program in writing across the curriculum. Lively discussions, among the speakers and approximately 30 attendees, followed each presentation. It was clear that many educators in the sciences want students to learn the basics (algebra and perhaps calculus) well, and do not want to see a watered down curriculum. Others, however, felt that quantitative literacy is an essential life skill that can also be the basis for stronger skills in mathematics. The discussions overall favored a stronger emphasis on quantitative literacy in high school and college curricula. Richard L. Schaeffer

Mathematical Models of Movement and Aggregation of Cells and Organisms, organized by Hans Othmer
Models of Cell Motion, Alex Mogilner
Localization in Models of Reinforced Random Walks, Kevin Painter
Traveling Wave patterns in Colonies of Self-organizing Species, Angela Stevens
Consequences of Relative Spatial Scales on Resistance and Host-Pathogen Associations, Claudia Neuhauser
The Role of Long-Distance Dispersal in Population Dynamics, Mark Lewis

This was an interesting symposium of well presented talks attended by approximately thirty people. Alex Mogilner described the association of cell motility with the actin cytoskeleton. He went on to show how nonlinear mechanochemical models of the actin cytoskeleton solved on a free boundary re-create cell-like shapes, movements, and forces that advance our understanding of the principles of cell movement. Kevin Painter discussed a class of reinforced random walks on a lattice in which a complete existence and stability analysis for all possible steady state solutions is possible. Angela Stevens looked at traveling wave patterns that occur in self-organizing species just before the final change in the population’s organization takes place. She considered the dependence of such traveling waves on changes of movement behavior due to external signals as well as to the direct interaction between the individuals. Claudia Neuhauser introduced a general model of host-pathogen interactions that mimics a range of resistance modes. She then discussed the role of relative spatial scales of host and pathogen dispersal on maintaining genetic diversity.

Waves, Patterns, and Turbulence, organized by Walter Craig
The Wigner Transform in Statistical Theories of Nonlinear Dynamics, Walter Craig
A Case Study of the Defect Formation in Patterns Far From Threshold, Nick Ercolani
Wave Propagation Without Hyperbolicity, Barbara L. Keyfitz
On Asymptotic Stability of Solitary Waves for Nonlinear Schroedinger Equations, Catherine Sulem

The symposium took place on Tuesday morning, at the end of the meeting. This timing was responsible for a relatively low attendance of about a dozen people. The talks were varied, and it was interesting to observe how the different speakers interpreted their mission to give a presentation for a general scientific audience. Based on the questions from the audience at the end of each talk, we all succeeded, at least to some degree. Walter Craig speculated on analogies between general Hamiltonian systems and the Boltzmann equation. He illustrated his talk with the example of water waves, and showed throughout how pursuing the analogy might lead to insights into turbulence. Nick Ercolani explored a number of models for dislocations (a phenomenon in striped patterns, such as occur in convection or in clouds) and showed how different models produce, more or less successfully, the patterns observed in nature. Barbara Keyfitz described some equations used in modeling two-phase flows (such as bubbly liquids) and showed how these equations, even though they fail to be mathematically well-posed in the classical sense, nonetheless predict wave-like patterns which one expects in some two-fluid flows. Catherine Sulem showed how to obtain asymptotic corrections to the nonlinear Schrodinger equation, important in nonlinear optics. Gene Wayne discussed vortex patterns in fluid flow. He contrasted two-dimensional flows, which are idealized but mathematically tractable, with three-dimensional flows. Since many flows of great interest, such as the earth's oceans and atmosphere, are essentially two-dimensional, his results help to explain the stability of some well-known vortices, of which perhaps the most famous is Jupiter's red spot. Barbara L. Keyfitz

Bioconsensus: Bringing Social Choice Theory to Biology, organized by Fred Roberts
Median and Mean Social Choice Consensus Methods and Molecular Sequences, Fred Roberts
From Preferences to Trees (From Social Choice to Biology), Fred R. McMorris
Use and Abuse of Consensus Methods in Phylogenetic Studies, Francois-Joseph Lapointe
Desiderata for Consensus Supertrees in Comparative Biology, Mark Wilkinson

Although the symposium's topic is relevant and the key concepts are interesting and accessible to a general scientific audience, the overabundance of material presented in too rapid a pace reduced the audience to a handful by the time the symposium concluded. Fred Roberts showed how the Kemeny-Snell median/mean procedure from social science could be applied to molecular biology, where we are often given a variety of possible molecular sequences and are asked to obtain a single sequence that is in some sense a consensus these different alternatives. Fred McMorris discussed Arrow's Impossibility Theorem of social choice theory (under certain reasonable axioms, there can be no "social welfare function" or "group consensus function" for preference relations). He extended the ideas to various types of trees that have arisen in evolutionary biology and classification theory. Francois-Joseph Lapointe discussed the use and abuse of consensus trees in phylogenetic studies, and how to make the best of consensus

methods. Mark Wilkinson provided an overview of the field of supertree construction (supertrees are synthesized from sets of tree sources). He identified possible desiderata of supertree methods from the perspectives of potential producers and users of supertrees (namely, phylogeneticists and other comparative biologists).

Topical Talk: Prime Numbers and Cryptography, Carl Pomerance

Carl Pomerance's topical talk was attended by more than 100 people throughout the 8:00– 8:45 time slot on Saturday morning. This is particularly noteworthy because the same time slot featured a topical talk by a Nobel prizewinner in a nearby room. Carl described and compared the RSA cryptosystem (based on the difficulty of factoring large numbers) and the Diffie-Hellman and El Gamal systems (based on the difficulty of finding the power that a generator of a cyclic discrete system must be raised in order to hit a given target member of the system). His well paced presentation was lucid, and it was clear that the audience appreciated his presentation.

February 13 – 18, 2003 AAAS Annual Meeting in Denver, CO Section A's Committee is currently working to produce an informative blend of mathematically-related symposia for this meeting. Potential proposals, based on current efforts, include the following.

Predictability and Randomness in Geophysics (Cecile Penland, Prashant Sardeshmukh, Matthew Newman)

Incentive Compatibility in Internet Computation (Joan Feigenbaum)

Mathematical Models for Traffic Flow (Paul Nelson)

International Studies Can and Should Inform Policy and Practice (Patricia Wang-Iverson, Richard Askey)

Mathematics in Industry (Brenda Dietrich, Fadil Santos)

Graph Theory and Scaling for the Internet and World Wide Web (Jennifer Chayes)

Phase Transitions in Combinatorics and Computer Science (Jennifer Chayes)

Mathematics and Neuroscience

Chaos in the Heart: Arrhythmias and Related Issues

Optical Communication

Inverse Problems

The officers of Section A gratefully acknowledge AMS's generous annual support for these important initiatives

Report to: American Mathematical Society

From: Condensed from email from Professor Ricardo Cortez, Department of Mathematics,
Tulane University, received on 29 January 2002.

A) Total conference attendance for SACNAS 2001, Phoenix, Arizona, was 1,559

B) SACNAS 2001 Mathematics Participants, by Participant Type
(Numbers are based on the data from participants who have provided information on their
field of study – approximately 80% of all participants.)

Total number of mathematics participants:	113
Student (undergraduate and graduate) mathematicians:	70
Postdoc mathematicians:	3
K-12 educator mathematicians:	10
Faculty and professional mathematicians	27
Mathematics-related exhibitors:	3

C) Mathematics-related sessions offered at the 2001 SACNAS
National Conference and K-12 Teacher Workshops.

1. Keynote Address Speaker

Carlos Castillo-Chavez, Ph.D.
Professor of Biomathematics, Department of Biometrics
Director, Mathematical and Theoretical Biology Institute
Cornell University

“Mathematics, Germs, Drugs, Disease, Globalization and Politics”

2. Scientific Symposium Session

“Trends in the Mathematics of the New Millennium”

ABSTRACT: The last century changed the classical divisions of Mathematics with the
introduction of dynamical systems, biomathematics, computational algebra, knot theory,
etc. As we enter the new millennium, we are learning about more important connections
between mathematics and other sciences. The four speakers will shed light on modern
areas of mathematics.

Ricardo Cortez, Ph.D., Session Chair
Assistant Professor
Tulane University

Maria E. Calzada, Ph.D., Associate Professor
Loyola University New Orleans
Design and Robustness of Some Statistical Quality Control Tools

Concha Gomez, Ph.D., Assistant Professor of Mathematics
Department of Mathematics and Computer Science
Middlebury College
Definable Sets: A Model-Theoretic Tool in an Algebraic Setting

Monica M. Romeo, Ph.D., Research Associate, Mathematics Dept.
Duke University
Dynamics of Intracellular Calcium Waves

Ivelisse M. Rubio, Ph.D., Assistant Professor of Mathematics
University of Puerto Rico, Humacao
Some applications of Groebner Bases Methods

3. K-12 Teacher Workshops Sessions

3.1 WORKSHOP: "BUILDing for Students success: Engineering Constructions Challenges for Middle School Students"

This workshop is designed for middle school teachers who are interested in using an integrated, hands-on approach for the teaching and learning of science content and process skills through the context of engineering design and construction challenge problems. Participants in this hands-on workshop will be actively involved in mini-sessions focusing on different aspects of the space station challenge problem. They will employ the components of the BUILD framework in order to address the particular question of the heating and cooling of the "SMILE Observation Module" of the International space Station – a module with both living and equipment areas. Participants will investigate energy transfer by conduction, convection, and radiation. They will look at the role of the shape of the module, the size of the windows in the module, and at the color of the interior. Because the microgravity environment of space is counter-intuitive to our everyday experience, participants will be asked to modify design elements in consideration of what happens in space.

Ryan Collay M.S., Chair
Programming and Evaluation Coordinator
The SMILE Program
Oregon State University

3.2 Mayan Culture: An Excuse to Think About Arithmetic
Reading, writing and arithmetic, these are symbols of a civilized society. Here in the Americas, 1700 years ago, the Mayans had these attributes. In this workshop we will investigate their writing and arithmetic and apply it to modern day classrooms.

William Y. Velez, Ph.D.
University Distinguished Professor of Mathematics
University of Arizona

D) Allocation of AMS sponsorship funds

Total amount of sponsorship applied to speaker lodging, airfare and registration (meals) costs for one scientific symposia session (Trends in Mathematics) and one keynote address (Dr. Castillo-Chavez) in mathematics: \$4,690.14. The remaining \$309.86 was used for general conference costs associated with offering the mathematics session, such as AudioVisual and room rental.

AMERICAN MATHEMATICAL SOCIETY

To: JHE, GGB
From: CWP
Subject: Operating Fund Portfolio Management Report

Date: April 25, 2002

SUMMARY RETURNS:

The purpose of this memorandum is to summarize the Society's cash management policies and report on the operating portfolio's investment income performance during 2001.

Investment earnings results by type and in total and other pertinent portfolio information for 2001 and the preceding five years are as follows:

	<u>2001</u>	<u>2000</u>	<u>1999</u>	<u>1998</u>	<u>1997</u>	<u>1996</u>
Overnight Repurchase Agreements	N/A	N/A	N/A	2.0%	2.7%	2.0%
Money Market Funds	4.2%	5.2%	4.9%	5.3%	5.3%	5.2%
Vanguard Fixed Income Mutual Funds	6.7%	13.7%	(2.4%)	9.3%	9.5%	3.6%
High Yield Bond Funds (from 5/97)	(0.7%)	(6.9%)	5.6%	1.4%	11.3%	N/A
Vanguard Convertible Securities (from 1/98)	(3.1%)	4.2%	30.4%	2.5%	N/A	N/A
2 Year Treasuries (from 6/97)	N/A	N/A%	5.8%	5.7%	4.2%	N/A
Certificates of Deposit & T-Bills	6.0%	6.4%	5.4%	6.0%	5.8%	5.7%
Common Stock	(25.47%)	0.0%	(2.5%)	(8.5%)	42.8%	N/A
Annual total portfolio return	4.4%	6.4%	5.1%	5.5%	6.8%	5.1%
AMS benchmark - Avg 3 month CD rate per Wall Street Journal	3.6%	5.5%	4.9%	5.0%	5.2%	4.9%
AMS returns versus benchmark	0.8%	0.9%	0.2%	0.5%	1.6%	0.2%
Wkly Average Operating Portfolio (in 000's)	\$11,510	\$9,525	\$8,800	\$8,300	\$6,900	\$4,600
Annual Investment Income (in 000's)	\$509	\$611	\$452	\$467	\$472	\$233

At 12/31/01 operating fund investments equaled approximately \$13,949,000, an increase of \$1,601,000 over the previous year. Operations provided significant cash flows in 2001, and no transfers to the long-term investment portfolio occurred during the year.

At the May 1996 ECBT meeting it was agreed that the Society should have as a goal an accumulation of current assets such that they exceed current liabilities. To help achieve this objective, at the May 1997 ECBT meeting a plan for the creation of an intermediate term investment portfolio was adopted. Increases of \$1,000,000 (to \$4,000,000) in our money market funds, \$1,000,000 (to \$2,000,000) in our Vanguard fixed income funds, and \$500,000 (to \$1,500,000) in Treasury Notes were approved. In addition, we established a \$1,500,000 combined limit for other mutual funds, consisting of high yield and convertible bond funds. This strategy has occasionally resulted in greater volatility, but overall has generated an appreciable increase in the earnings of our operating fund investments. By shifting a larger portion of operating fund investments into slightly riskier investment vehicles we have increased our earnings over the last few years. In May 2000, the limits for money market funds, fixed income funds and the high yield/convertible funds were each increased by \$500,000.

The return for 2001 is 80 basis points above the benchmark (the average CD rate per the Wall Street Journal). The CD rates earned were greater than the target, as we locked in rates in the last quarter of 2000, just prior to commencement of the significant decreases by the Fed in 2001. The Vanguard bond funds continued with solid performance in 2001, with most of the volatility seen in the Long Term Treasury Fund. The Convertible Securities fund more closely follows the equity markets, although it did not fare as poorly as the major equity indices. This is expected, due to the hybrid debt/equity nature of the underlying securities. The high-yield bond fund continued to be adversely affected by market jitters, and the continued Fed rate decreases took their toll on share values. See the I section of the Green pages for additional information.

DISCUSSION AND RECOMMENDATIONS:

Changes in the Cash Management Environment:

The equity markets had a dreadful year in 2001. Weaknesses in the economy became more obvious by the end of the first quarter, and the third quarter was particularly bad due to the events of September 11th. Although the losses that occurred immediately after 9/11 were recouped by year end, all equity indices were in loss territory for the year. The S&P 500 lost 11.9% for the year, and the NASDAQ Composite lost 21.1% for the year. The Fed reduced interest rates to historic lows in 2001. However, to date, this has not spurred any significant recovery in the equity markets. Our short-term portfolio fared well in this environment, as we locked in higher CD rates when they were still going up in 2000 and the convertible securities fund was not as adversely affected as true equities. Also, the Vanguard bond funds did well in the decreasing interest rate environment, with the usual increased volatility seen in the longer term portfolio. The high yield bond fund continued its losses, as the extent of the economic woes in this higher risk type portfolio could not be overcome by interest rate decreases.

Cash management at the AMS:

The following rules govern AMS's management of cash:

- 1. Availability and Liquidity:** The placement of investments in the operating portfolio is coordinated with the Society's immediate and estimated future cash requirements, which are based on actual and projected revenue and disbursement streams. Cash needs to be available at the appropriate times to cover the operating expenses of the Society as they are incurred - payroll, payroll taxes and other withholdings, and vendor liabilities comprise the bulk of our cash needs. Adequate portfolio liquidity is the ability to turn investments readily into cash without suffering undo loss of principal.
- 2. Income:** Cash in excess of immediate operating needs should be invested so as to optimize returns. The Society is intentionally accreting such excess cash, so that current assets equal or exceed current liabilities.
- 3. Preservation of principal:** Safety is of prime concern in investments of operating capital. Diversifying investment vehicles and monitoring investment maturity dates and market value fluctuations greatly reduces an investment portfolio's exposure to risk. Maximum allowable positions should be established for different types of investments.

The investment vehicles currently used by the AMS are:

- High Yield and Convertible Bond Mutual funds. During the spring of 1997 the BT authorized these new investment vehicles for use by the operating funds of the Society. Currently the maximum investment allowed is \$2,000,000 in any combination of high yield bond and convertible securities accounts. At December 31, 2001 we had \$1,627,000 invested in these vehicles (see following table). Gains or losses technically are not realized on these funds until they are redeemed, although, for financial statement purposes, the Society records these investments at market.

Issuer	Strong Funds and Vanguard
Risk of default	Medium to High
Risk of market decline	Sensitive to movements in the equity markets
Maximum Amount	\$2,000,000
Comments	Total returns often parallel those of equity markets.

- Fixed Income (Bond) Mutual funds. The BT has authorized a maximum investment of \$2,500,000 in fixed income mutual funds, and at the end of 2001 we had \$2,461,000 invested. All of these investments are with the Vanguard Group of Valley Forge, Pa. A combination of three funds is used: the High Grade Short-Term Corporate Bond portfolio, the GNMA portfolio, and the Long-Term US Treasury portfolio. Historically, most of the volatility in the Society's short-term portfolio has been the result of market valuation adjustments on these investments (they are marked to market monthly); however, gains or losses technically are not realized on these funds until they are redeemed. As interest rates declined during 2001, these funds increased in market value due to interest rate differences and the relative safety of the underlying investments.

Issuer	The Vanguard Group
Risk of default	Minimal
Risk of market decline	The longer the maturities of underlying Investments, the higher the risk.
Maximum Amount	\$2,500,000
Comments	Market value will decline as interest rates rise and increase as rates fall.

The Chief Financial Officer recommends that the limit be modified to state that, if the limit is exceeded solely due to reinvested dividends and/or market increases in the share values, it shall not be deemed to be a violation of the limit so long as the excess is brought to the attention of the Treasurer and Associate Treasurer in a timely manner; and to the full Board of Trustees at its next meeting.

- US Treasury Notes. The BT has authorized a maximum investment of \$1,500,000 in US Treasury Notes. A loss of market value may be incurred on these investments in a rising interest rate environment if funds are needed before maturity and have to be sold; however this risk is slight as the Society's liquidity is deemed extremely adequate. Treasury Notes can be an attractive investment when interest rates are expected to decline and the yield curve is fairly steep. During 1997 we purchased four \$100,000, 2 year Notes yielding an average of

about 6%. These were retained in 1998 and matured in 1999. No further purchases were made due to the interest rate environment.

Issuer	U.S. Government
Risk of default	None
Risk of market decline	None if held to maturity
Maximum Amount	\$1,500,000
Comments	Best used just before interest rates decline

- Certificates of Deposit. As in prior years, a large percentage of the Society's operating investment portfolio has been invested in certificates of deposit, averaging 35%-40% of the total portfolio during 2001. However, in the last two months of the year, the interest rate differential between the CD's and money market funds, as well as treasuries, was reduced to approximately 30 basis points. This, in combination with the low actual rates, did not support the added administrative burden in the purchasing of CD's as compared to the purchase of money market funds. Also, two issuing banks were taken over by the FDIC (one in December, the other in January 2002). Our principal investment was recouped, but the accrued interest is probably not recoverable. Staff became more skeptical of issuers with higher than average rates and placed the funds received during November and December in money markets.

We generally purchase "jumbo" CD's of federally insured savings institutions and commercial banks that are assigned an acceptable safety rating by a weekly bank rating newsletter. Current investment policies limit the amount of each CD to \$100,000 (exclusive of accrued interest) per S&L and \$400,000 per large commercial bank. In practice, the Society has only invested amounts up to \$100,000 in any one financial institution and its affiliates. There is no limit to the total amount of CDs that can be held by the operating investment portfolio.

Issuer	Banks & Savings and Loans
Risk of default	None - federally insured
Risk of market decline	None
Maximum Amount	\$100,000 per bank or S&L, Unlimited in total

- Money market funds. The BT has authorized a maximum investment of \$4,500,000 in money market funds. At the end of 2001 the balance in money markets approximated \$6,030,000, principally in Vanguard's Money Market Prime portfolio. Yields on the funds averaged about 4.2% for the year. There is very little risk to principal because the valuation of the initial investment is not subject to change. Balances in these funds are generally maintained only at levels needed for short-term operating needs in excess of short-term maturities, since they under-perform alternative authorized investment vehicles.

The balance in these funds was in excess of authorized limits at year end. This occurred because staff felt the interest rates available in CDs were not sufficiently in excess of money market rates to warrant the additional administrative burden required to purchase and track them, and concerns arose for the safety of accrued but unpaid earnings in the smaller issuing banks (which generally offer the higher rates). Also, operations in 2001 provided additional cash flow for the year, particularly in the last two months of the year (average total operating portfolio balance increased \$2,000,000 over 2000). The Treasurer and Associate Treasurers have been informed and have agreed with the decision for the near term.

Based upon the increased average value of the operating portfolio, and the need to maintain flexibility at year end when there is a large cash inflow, the Chief Financial Officer recommends that the limit on money market funds be increased to \$5,500,000.

Issuer	Vanguard, Fidelity and Paine Webber
Risk of default	Minimal
Risk of market decline	None
Maximum Amount	\$4,500,000

- Treasury Bills. T-Bills are convenient to use when we have a large planned expenditure for a predetermined future date, such as contributions to the Economic Stabilization Fund; however, better rates are available on alternative forms of short term operating investments. Treasury Bills have no market risk associated with them because they are backed by the full faith and credit of the US government, and they are highly liquid; accordingly, there is no limit to the total amount of T-Bills we hold in our portfolio.

Issuer	U.S. Government
Risk of default	None
Risk of market decline	None if held to maturity
Maximum Amount	Unlimited

- Cash and repos (repurchase agreements). The AMS uses a concentration account at Citizens Bank - Massachusetts into which all receipts are automatically deposited and from which all disbursements are made. In prior years, cash above a minimum balance was "swept" on a daily basis and invested overnight in repurchase agreements. Under a repurchase agreement, the AMS purchased government securities and the bank agreed to "repurchase" them the following day. The rate on these depends on the dollar amount of the repo; it is generally very low in comparison to rates available on other investment vehicles. We therefore limited funds available for overnight investment to only those that are deemed necessary for immediate operations. During 1996 the AMS increased its minimum balance requirements to provide a larger earnings base against which the bank offsets its fees. This resulted in a significant decline in activity in this account during 1996 through 1998, as well as lower bank fees. In 1999, we cancelled the repurchase agreement, as any activity occurred only when adjusting the long term portfolio and the monthly fee to maintain the agreement was significantly greater than any earnings.

Issuer	Citizens Bank - Massachusetts
Risk of default	Minimal
Risk of market decline	None
Maximum Amount	\$1,000,000
Comments	Collateralized by US Gov't securities

Summary of Operating Portfolio Investments, December 31, 2001:

<u>Description</u>	<u>Value at 12/31/00</u>	<u>Board Limit</u>	<u>Excess of Limit</u>
Money Market Funds	\$6,029,701	\$4,500,000	1,529,701(1)
Certificates of Deposit	3,798,000	\$100,000 per inst.	NA
Treasury Notes		1,500,000	NA
Vanguard Bond Funds:			
GNMA Portfolio	1,089,562		
Short-term Bond Portfolio	449,154		
LT US Treasury Portfolio	<u>921,819</u>		
Subtotal	<u>2,460,535</u>	2,500,000	(2)
High Yield and Convertible Funds:			
Strong High Yield	863,921		
Vanguard Convertible	<u>763,002</u>		
Subtotal	<u>1,626,923</u>	2,000,000	
Common Stock	<u>33,519</u>	Source is Unrestricted gifts	NA
Total	<u>\$14,148,678</u>		

- (1) See discussion and recommendation above.
(2) See recommendation above.

**FIRST AMENDMENT
TO THE
AMERICAN MATHEMATICAL SOCIETY RETIREMENT PLAN**

WHEREAS, the American Mathematical Society (the "Institution") has heretofore adopted the American Mathematical Society Retirement Plan (the "Plan") effective January 1, 1989; and

WHEREAS, the Institution reserved the right to amend the Plan from time to time pursuant to Section 9.1 of the Plan, and

WHEREAS, the Institution amended and restated the Plan effective as of December 31, 1999 to comply with the changes to the law made by new laws including the General Agreement on Tariffs and Trade, the Uniformed Services Employment and Reemployment Rights Act of 1994, the Small Business Job Protection Act of 1996 and the Taxpayer Relief Act of 1997 (collectively known as "GUST"); and

WHEREAS, the Institution desires to further amend the Plan to comply with additional GUST legislation; specifically the Community Renewal Tax Relief Act of 2000.

NOW, THEREFORE, the Plan is hereby amended, effective as of the dates set forth below:

1. Effective as of January 1, 1999, the following new definition is hereby added to Article I of the Plan:

"Employee means any person employed by the Employer. Employee shall not include any individual who is either (i) engaged by the Company as an independent contractor or (ii) not reflected on the payroll records of the Company as a common law employee solely on account of the reclassification of such individual by the Internal Revenue Service, a court or administrative agency as a common law employee."

2. Section 4.8 is hereby amended, effective January 1, 2001, by the addition of "132(f)(4)" after "§125".
3. Section 11.2(b) of the Plan is hereby amended, effective January 1, 2001, by the addition of "132(f)(4)" after "125".

State of AMS, 2002

Each year, I report on the Society from a different perspective—balance sheet, programs and services, operations. The motivation for varying perspective is to make annual reports informative, as well as to focus on aspects of the Society that are especially interesting at the moment. This year, rather than reporting from a single *perspective*, I want to focus on a single *program*—public awareness.

Two years ago, I outlined a proposal to create a public awareness office and explained the rationale. The AMS had tried for years to carry out public awareness projects, with only partial success (that was never sustained). The key to long-term success, I argued, was to have staff whose sole responsibility was public awareness. The staff would work with volunteers, reporters, and other organizations to carry out projects, but they would have ultimate responsibility for the success of the program. Today, I want to describe what's happened in the succeeding two years.

First, however, here is an overview of the Society to set the stage for my remarks about public awareness.

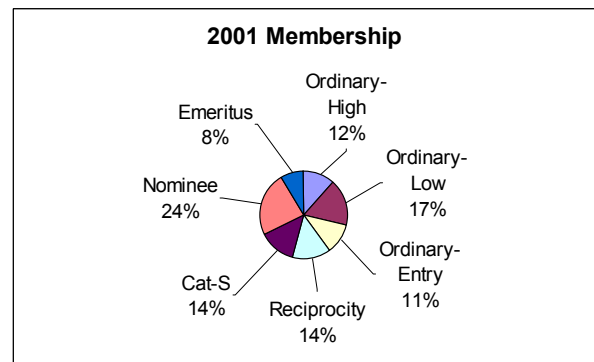
Overview

The AMS has more than 27,000 members, including ordinary members, emeritus, nominee, reciprocity, and category-S (mathematicians in the developing world who pay greatly reduced dues). Our member journals, the *NOTICES* and the *Bulletin*, reach more mathematicians than any other research-level publications in the world. By any measure, we are a large membership organization, and this is how many people think of the Society. Our members are the key to our identity as an organization.

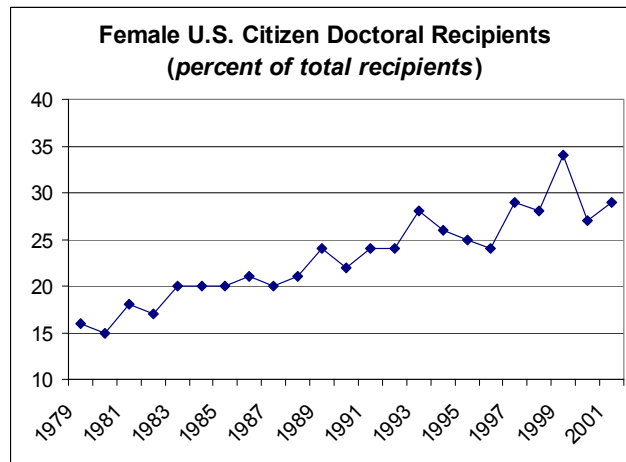
Meetings are closely connected to membership, and recently have been increasingly successful. Our annual joint meeting with the MAA (as well as other organizations) has grown; our sectional meetings are healthy and robust; and our joint international meetings have become a steady occurrence, held in countries from France to South Africa, and Mexico to Hong Kong. Meetings are the means by which many members relate to the AMS, and healthy meetings pay dividends to all parts of the Society.

Programs and services are closely connected to membership as well. While many of these activities serve the entire mathematical community, they are carried out in the name of our members, and supporting *all* of mathematics ultimately supports our members. Here is a sample of such programs.

- The Washington office, which represents the interests of the mathematical community both to government and to other scientific organizations. Through formal meetings and informal day-to-day contacts, the office gives mathematics a presence in the Washington science community that benefits all mathematics. The Washington office also runs many special projects, such as the Media Fellows program, Chairs workshop, Preparing Future Faculty, and Masters' degree workshops.



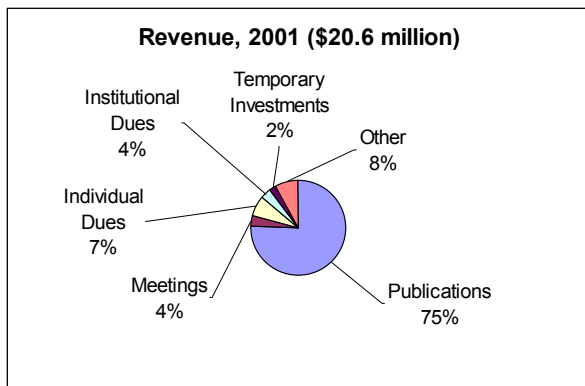
- Employment services, which serve young mathematicians at the beginning of their careers. The Employment Center at the annual meeting is the best known of these, but everything from the AMS Cover sheet to the more recent Math Jobs web application are part of the Society's effort to provide a broad range of services.
- The annual survey, which provides detailed and extensive information about the state of the mathematics profession. This survey gathers and analyzes data about jobs, salaries, and diversity each year, and the accumulated reports make the mathematics profession one of the best-understood in science.



- Prizes and awards, which are given every year for mathematical research, exposition, and service. The number of prizes has grown in recent years, and the frequency of awards has increased as well.
- The Young Scholars program, which provides grants to summer programs for talented high-school students. Although this program is relatively new, it has already provided substantial support for such programs, some of which are struggling.
- Public Awareness, which is discussed in detail below. Public Awareness has become one of the key services provided by the Society on behalf of its membership.

This sample gives a glimpse of the services provided by the AMS, and it is not meant to be inclusive. Programs such as the Arnold Ross lectures, travel grants, book and journal donations, the Centennial fellowships, Trjitzinsky scholarships, and research tools for authors were mentioned in last year's report. There are many more.

How do we pay for such programs? Endowments support some (in particular, prizes and scholarships); contributions support a few others (Centennial fellowships and Young Scholars); and grants support occasional travel award programs; and for the first time this year we are using investment income from our reserves to fund some of our programs. Most, however, are supported by income from the Society's operations. That income doesn't come from individual dues, which make up only \$1.4M (7%) of our \$20.4M operating revenues. Nor does it come from meetings, which in 2001



earned \$870,000 (4%) of our revenue (designed to roughly match the expenses of meetings). The income that funds programs and services comes from publications, which provides the greatest portion of AMS revenues—\$15.6M (76%). And it is the operating income (revenues less expenses) from publishing that largely pays for the services and programs we offer to the mathematical community.

Publishing

There are three major components to our publication program.

(1) *Mathematical Reviews* is the largest part, and in many ways the most successful. The Mathematical Reviews database covers the mathematical literature since 1940, and currently adds approximately 75,000 items and 55,000 reviews each year. It has a number of unique features, including author identification and forward citations. Most recently, for selected journals, Math Reviews has been adding the original reference list with links to MR entries.



The database is delivered in three formats—paper, disk, and web (MathSciNet). Increasingly, the web version is preferred, especially since the Society has added extensive linking to the product, including almost 200,000 links to original papers. By any measure, MathSciNet is a success, making it possible to do in a few minutes things that previously required many hours.

In addition to the products themselves, the pricing and distribution of Math Reviews has been a success as well. The National Data Access Fee allows countries in the developing world to gain access to MathSciNet at greatly reduced prices, and the program is now catching on. Because of consortia pricing (which allows non-subscribers to join with present subscribers at greatly reduced rates), many hundreds of additional institutions have been able to access MathSciNet. In the past ten years, the number of institutions with access to *Mathematical Reviews* has increased by more than 50%—a remarkable feat at a time when subscriptions to scholarly journals are steadily decreasing.

(2) *Journals* continue to play a crucial role in the publishing program. The four primary journals (*Transactions*, *Proceedings*, *Mathematics of Computation*, *Journal of AMS*) are healthy and vigorous. While there is steady attrition of subscriptions (a trend everywhere in scholarly publishing), attrition continues to be slight. In some cases in recent years, the number of *subscribers* has gone up, even as the number of *subscriptions* has gone down.



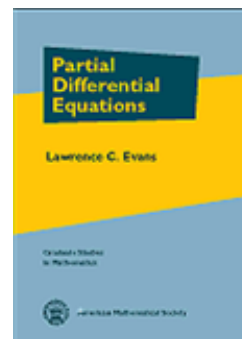
(Explanation: Institutions with multiple subscriptions gave up all but one, and other institutions subscribed or re-subscribed.) Our electronic-only journals (*Electronic Research Announcements (ERA)*, *Journal of Representation Theory*, *Journal of Conformal Geometry and Dynamics*) are scientifically healthy, although not commercially successful. *ERA* is free, and the other two are largely provided to subscribers of the primary journals as a bonus.

All journals are available electronically, and gradually (very gradually) subscribers are shifting to the electronic format. We are thinking of ways to nudge users in that direction over a period of years, possibly using new consortia agreements to make electronic-only access more attractive.

(3) *Book publishing* has consumed an ever larger part of the Society's publication effort in recent years. We published 100 new titles in 2001, roughly matching the output in each of the preceding three years. We are increasingly competitive in attracting the best authors, and we have some best-selling titles (including some books out-of-series, like *Chaotic Elections* by Don Saari.)

Unfortunately, books are among commodities that are viewed as "discretionary," and the downturn in the economy hurt books sales more than other parts of our operations last year. Sales were about 14% below budget, and unit sales fell for the first time in many years.

We spent the past year analyzing the book program, even before the recent downturn. We are currently working on everything from distribution arrangements and marketing to production and author services. In spite of a bad year for sales, the book program is fundamentally healthy and poised for continued growth.



Of course, publishing is more than just a revenue source: Disseminating mathematical research and scholarship is one of the key ways in which the Society carries out its mission. But publishing is the business side of the AMS, and it is a moderately complex business. These three components of our publishing program require the full-time attention of nearly 150 of the Society's 220 employees, and use part of the time of many of the others (for example, fiscal and administration). Because publishing is essential to fund the Society's activities, it is in a real sense an essential part of our programs and services. And that is especially true for public awareness.

Public Awareness

For many years, everyone viewed public awareness as essential. It was, people suggested, one of the ways in which the AMS could carry out its mission to support mathematical research and scholarship. And for years, people tried various approaches--special projects, special committees, special publications. Some approaches were successful, but only to a limited extent, and most were not sustained. Public awareness has been a low-key activity for the Society in the past.



Mike Breen,
Annette Emerson

AMS Public
Awareness Officers

In my report to the Council two years ago, I outlined both the argument for increased attention to public awareness and a proposal for creating a Public Awareness Office (PA Office). That office began its work in late 2000 and has now been active for a little more than a year. The office is not large, consisting of two public awareness officers, Mike Breen and Annette Emerson. Mike is a mathematician by training; Annette used to head our promotions group (and as a consequence, knows a great deal about the culture of mathematics). They have spent the past

year launching new efforts, enhancing the old, and planning for the future. The *best* way to appreciate what they have accomplished is to visit the public awareness page of our web site (www.ams.org/public-awareness). The Office has accomplished an amazing amount in a short time.

The goal of public awareness is more than just making the layperson understand (or love?) mathematics. It's making people realize that mathematics is a field of research, just like physics, chemistry, or biology. It's helping other scientists to realize this as well. It's providing mathematicians with material that allows them to better explain to non-mathematicians what mathematicians do. It's giving everyone, mathematicians and non-mathematicians alike, a pride in mathematical accomplishments. And it's promoting the Society's accomplishments, both to the mathematical community and to the world beyond.

Here are some of the ways in which the PA Office has begun the job during the past year.

Mathematical Moments

Mathematical Moments are one-page promotions that foster an appreciation and understanding of mathematics in everyday life. Their goal is to show that mathematics research is ongoing, vital, and beneficial. This past August the PA Office mailed the first 16 Moments to U.S. mathematics department chairs. Moments were displayed at the Joint Mathematics Meetings in San Diego, as were large posters advertising the program. The entire series can be viewed and downloaded at the AMS website, www.ams.org/ams/mathmoments.html.

Over the course of the past year the *Mathematical Moments* program was promoted on the Association for Science and Technology Center listserv for museum educators in April 2001, on the Special Libraries Association listserv in April 2001, in *MathForum's Internet News* in August 2001, and in *District Administration* November 2001 issue.

The Office continues to produce *Mathematical Moments*; there are now 21.

Publicizing Mathematical Meetings

The PA Office sent out news releases about the Joint Meetings and hosted a Press Room where representatives from the local newspaper, local television stations and national scientific publications gathered information, conducted interviews and planned their coverage of the Meetings. Most of the local, and some of the national, coverage resulted from a lengthy release containing brief summaries of talks that were chosen to appeal to the non-mathematics media: addresses by retiring presidents, talks on mathematics and sports, talks on mathematics education, and the game *Who Wants To Be A Mathematician* (see below). In addition, news releases for prize winners and invited speakers were sent to each individual's institution.

Two San Diego television stations featured segments on *Who Wants To Be A Mathematician* on their evening newscasts. (The winning student received \$2000 from the AMS for knowing the smallest natural number that can be written as the sum of two cubes in two different ways.) The



winner of the grand prize, his parents, his teachers, and PA Officer Mike Breen appeared on the stations' evening news broadcasts.

The *San Diego Union Tribune* interviewed Felix Browder and published a lengthy article on the Meetings. Subsequently, articles related to presentations at the Joint Meetings have appeared in *Science*, *New Scientist*, *USA Today*, *Business Week*, *The Chronicle of Higher Education*, *Reuters*, *BBC News*, *MSNBC.com* and *The Herald* (a U.K. newspaper).

In addition to publicizing the national meeting, the PA Office prepares news releases for all upcoming sectional meetings. These releases contain information on the meeting, on the host institution's departmental participation and on the Society, and are emailed to the host campus' news office.

Who Wants To Be A Mathematician

Patterned on the popular television show, this event has contestants (normally, high school students) answer a series of 15 multiple-choice questions with increasingly valuable prizes. Each contestant can ask the audience, ask a teacher, or ask for fifty-fifty, but only once per round. The top prize is \$2000 (which seems to get the attention of high school students).



During the past year, the PA Office conducted this popular game five times. At the Joint Meetings in San Diego, an overflow audience, including many mathematicians and busloads of classmates, cheered the contestants. The game was held twice in Rhode Island, as part of Mathematics Awareness Month in 2001 and last month as a "Pi Day" celebration (3/14). The game also took place after the Arnold Ross Lecture on April 11 at the Boston Museum of Science.

The game is challenging and entertaining, especially Reporter with winner in San Diego and humorous emcee. After every game the AMS PA Office receives rave reviews from students, teachers and mathematicians, some of whom request copies of the game for their own special events. In response, the PA Office has developed a sample set of multiple-choice questions to post on the web for teacher-only access.

In order to show how teachers can use the game themselves, the PA Office held the game with teachers as contestants in Montana, where it was the keynote address at the state's National Council of Teachers of Mathematics (NCTM) meeting. The game will be presented at the national NCTM meeting at the end of April, again with teachers as the contestants.

What's New in Mathematics

This web page (www.ams.org/new-in-math/) is managed by the PA Office and incorporates the monthly Feature Column, Math Digest, and Math in the Media. These are wonderful resources that are relatively unknown (and we are looking for ways to change that).

In February, Tony Phillips retired after three years of service as the editor of the Feature Column. The PA Office is working with AMS publications staff to publish a book of Tony's best Feature Columns. The new monthly Feature Column writer is Joe Malkevitch (CUNY).

Tony Phillips continues to write a monthly column on Math in the Media; Allyn Jackson, Deputy Editor of the *NOTICES*, edits Math Digest (which is a compilation of short summaries of articles on mathematics in the popular and scientific press). Some recent examples of topics include "how a missing minus sign explained a discrepancy between experimental results and theoretical predictions in particle physics (the Standard Model was saved)" and "the discovery of the largest known Mersenne prime ($2^{13,466,917} - 1$)."

Contact with the Media and AMS-AAAS Media Fellows

The Office takes calls from reporters who need a particular question answered or who would like to find an expert for a story. For example, after the collapse of the World Trade Center, a reporter from the *Washington Post* called to ask about the claim that most Americans had no more than six degrees of separation from at least one victim of the attack.

Mike Breen answers mathematics questions from journalists and others directly — one of many reasons to have a mathematician on staff in the PA Office. Occasionally, the TV game show *The Weakest Link* calls to check on mathematical questions that are being written for the show. (The most recent proposed question was: What branch of mathematics beginning with "a" has expressions involving variables? The show hoped that algebra was the only answer.)

AAAS Mass Media Fellows are science graduate students who spend 2-3 months in the summer working at some media outlet—newspaper, magazine, television, or radio. The AMS has supported 1-2 fellows every year for several years. The PA Office maintains a relationship with current and past Media Fellows following their summer internships. At the Joint Mathematics Meetings, fellows assist with the press room and write summaries of talks or events to post on the AMS website.

Discoveries and Breakthroughs Inside Science

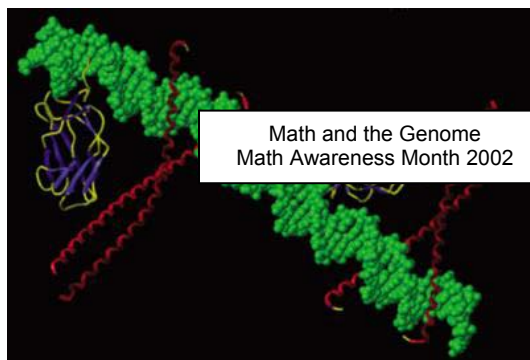
This syndicated series of science stories (12 per month) is produced by the American Institute of Physics (AIP) for local TV newscasts. The AMS is one of several societies that share funding of the series, although the bulk of the funding is provided by AIP. The PA Office suggests story ideas and monitors the stories produced in the series. Stories with a mathematical theme that have appeared on the air are: Mathematical Schedules, Brain Mapping, Better Five-Day Forecasts and Shower Mystery.

Promoting the Arnold Ross Lecture

These lectures for high school students are given once each year, normally in the spring. They are aimed at the best students. Earlier this month the Arnold Ross Lectures were held at the Boston Museum of Science. The speaker this year was Curt McMullen, Fields Medalist from Harvard. After the lecture, the PA Office hosted the game *Who Wants To Be A Mathematician*. The announcement of the game and the qualifying test were included on the Lecture invitation, and for the first time ever we had to turn away students who wanted to come because we exceeded the capacity of the lecture hall (300). The PA Office again provided supplemental materials for teachers and students: Math Awareness Month posters and postcards, *Mathematical Moments* information, and the flyer for High School Students and Teachers.

Mathematics Awareness Month 2002

Mathematics Awareness Month is sponsored by the *Joint Policy Board for Mathematics*, but responsibility for carrying out the details rotates among the three member societies (AMS, MAA, and SIAM). The AMS is the official organizer of MAM 2002, with the theme “Mathematics and the Genome.” The PA Office wrote the text for the poster and



the theme essay, *Mathematics and the Genome*, and managed the posting of the various MAM web pages. Annette Emerson managed the effort, and all promotional materials and the website

(www.mathforum.org/mam/02/) were ready in December (earlier than in recent years). As a result, we've been able to fill all advance requests from departments and individuals for information and materials. The Chair of the MAM 2002 Advisory Committee, Dan Burns

(University of Michigan) obtained endorsement letters from Francis S. Collins (Director, National Human Genome Research Institute) and Harold Varmus (President, Memorial Sloan-Kettering Cancer Center and former Director of the National Institutes of Health); both letters are posted on the MAM website. Burns also arranged to have the MAM announcement posted in the International Society for Computational Biology e-newsletter in January.

Promoting Awareness of the Society and Membership

Late last fall the PA Office produced *A Report of the American Mathematical Society*—an eight-page, four-color booklet that describes the mission of the Society along with the major programs and activities that support the mission. The AMS Report was mailed to U.S. mathematics department chairs in January. The Report was used as the basis for a new AMS Membership brochure, which gives an abbreviated description of the Society's major activities. A special version of the membership brochure was adapted for mathematicians in foreign countries, and it will be brought to upcoming international meetings in Pisa, Beijing and Seville. The brochure will also be enclosed in an AMS membership promotion to individuals in countries with mathematical societies that have reciprocity agreements with the AMS.

Annette, working closely with Diane Boumenot (Professional Services Manager) produced revised flyers for high school students, teachers and undergraduates. They revamped the old *Graduate Students Services* brochure, creating an *Employment and Career Services* brochure to support the interests and needs of both graduate students and post graduate mathematicians. The high school flyer—based on the web page developed by Diane—has been in demand by teachers.

The PA Office generated news releases about the Society's eight Trjitzinsky awards (\$4000 scholarships), giving details about the winners, the award, Professor Trjitzinsky, and the Society. These were sent to the institutions of each recipient. More generally, the

PA Office publicizes each newsworthy action of the Society, including awards and prizes.

The AMS Member Newsletter

The PA Office has produced and mailed four quarterly *Member Newsletters*, which give members a closer look at the Society's programs and services. Annette Emerson serves as the Newsletter's editor, and each issue focuses on one aspect or department of the Society. The Newsletter provides a way for members to see the range of the Society's activities and to understand better the organization they support. To date Newsletters have covered the launching of the PA Office and some functions of the Washington, D.C. office; programs of the Professional Services Department; a behind-the-scenes look at the Meetings and Conferences Department; and a look at how the MR database is developed and produced. The spring 2002 issue will cover the AMS Book Program.

Local Activities

As noted above, the PA Office sponsored *Who Wants To Be A Mathematician* in Rhode Island (for which two companies donated gift certificates for pies on "Pi Day"). The PA Office has also arranged for the AMS to underwrite one night of the local PBS TV station's auction, and worked with the TV station to produce a 30-second spot on the AMS that will be aired four times during the night (and can be used for other purposes afterwards).



Who Wants to be a Mathematician at Rhode Island College

PA Officer Mike Breen is available to visit math classes in local high schools to talk about the applications of mathematics in our lives. This summer, students participating in the RI Summer-Bridge program will visit the AMS to learn what the Society does and what mathematicians do; the PA Office will coordinate the tour and presentations.

Annette and Mike were interviewed by the *Rhode Island Monthly* regarding mathematics and the Society. The article appeared in the July 2001 issue.

Of course, this list of activities captures only part of the work of public awareness. Like the Washington Office, the PA Office serves as a liaison between the AMS and other science societies. The public awareness officers worked closely with the Conference Board of the Mathematical Sciences at its National Summit on the Mathematics Education of Teachers, worked with the Society for the Advancement of Chicano and Native American Scientists by promoting their annual meeting, and participated in the Park City Mathematics Institute by conducting a forum on public awareness. They maintain close contact with the public awareness office at the National Science Foundation, giving them information about mathematics and helping them to contact the community.

In all its work, the PA Office looks for opportunities—finding out what other organizations are doing, letting them know what's happening in mathematics, and

encouraging others to use our office as a resource. This is a steady, quiet, ongoing effort that must be made over a long period of time to be successful.

And opportunities, even small ones, come at unexpected times. When set designers for the movie *A Beautiful Mind* contacted the AMS for props in a professor's office, the PA Office suggested some Chelsea volumes and a mock award certificate, which you can see on the office wall in one scene. (It is interesting to note that in recent issues of *The New Yorker* and *Science*, the *NOTICES of the AMS* was mentioned as the source where film director Ron Howard first saw a review of Sylvia Nasar's biography.)

Has the Office been successful? After a little more than a year, it's hard to give a definite answer. But when the NSF included *Mathematical Moments* in its recent publications promoting the benefits of research, the feedback from people in higher education to middle school was uniformly enthusiastic. Here are just a few of those comments.

"This collection is a brilliant example of the role mathematics plays in nature, technology, and human culture as a queen of all branches of science."

"These are great. I plan to use these as one of many ways to 'educate' my students in a 'liberal arts math class' as well as some of our math majors that math is **more** than just numbers that math is **not** a stagnant discipline [and] that math is fun and exciting."

"Bravo on the Mathematical Moments!! Our department just received your mailing. We have them displayed on several different bulletin boards. We believe that they will...attract a lot of attention for mathematics. Thank you very much for your effort."

We continue to learn the most effective ways to carry out public awareness. It is hard work, with many small achievements rather than a few grand triumphs. But the PA Office has created a good foundation on which to build our future effort ... and it has already made a difference.

John Ewing

**AMS Committee on Science Policy
Report on meeting held April 26-27, 2002, Washington DC**

CSP traditionally meets as the appropriations process is gearing up in Washington, therefore a large portion of the meeting is devoted to visits by Congressional and Administration insiders knowledgeable about the federal budget process. New this year was a representative from the National Institutes of Health, and a Saturday session intended to get committee members involved in grass roots strategies for contacting their Members of Congress. Several department chairs attended, in addition to science policy representatives from other mathematical organizations. For the first time, members of the Coalition for National Science Funding were invited to attend some of the briefings.

Highlights:

James Cassatt, Director of the Division of Cell Biology and Biophysics, National Institute of General Medical Sciences, talked to CSP about opportunities for mathematicians at the National Institutes of Health, outlining the many funding mechanisms available in addition to investigator initiated grants. Cassatt said that science has entered a new era with the mapping of the human DNA, and the growth of genetics data banks. Science is now increasingly interdisciplinary, collaborative, data intensive, may not be hypothesis-driven, and may require mechanisms other than the traditional research grant. Cassatt pointed to the NIGMS/NSF biomath initiative as an example of new funding opportunities for mathematicians.

Philippe Tondeur, Director of the Division of Mathematical Sciences, National Science Foundation, was happy to report that recent increases in the division's budget have been dramatic, and mathematics is now funded at a comparable level with other sciences. Tondeur spoke briefly of the NSF budget request for FY 2003. (For an overview of federal funding for mathematics in the President's FY 2003 budget request, see table at end of this report.) The current DMS portfolio includes individual investigator grants, research groups, national institutes, and vertical integration of research and education. He reported positive results from the VIGRE program (dramatic increases in REU participation and significant increases in mathematics majors), and provided information about the Career/PECASE awards and focused research groups. A new NSF venture is BIRS (Banff International Research Station), based in Alberta, Canada, with joint funding by some Canadian provinces and agencies. NSF awarded funding to MSRI for support of US visitors to this center over four years. Pointing out that NSF – although the major funding agency for mathematics research – is only part of the picture, Tondeur pointed to the increasing role of NIH as a source of funding (e.g., the opportunities in math-bio). He encouraged the profession to look to NIH and also the Department of Energy as important sources. Tondeur is concerned that the Department of Defense research budget is incomparably smaller than it was 20 years ago.

Hyman Bass, AMS President thanked Tondeur on behalf of AMS and CSP for his optimism and vision as DMS Director. Bass said the mathematical community owed Tondeur a great deal and urged NSF to try to find a replacement as soon as possible to continue the momentum resulting from his wonderful work. There was a standing ovation.

Jill Harper, of the office of Congressman Rush Holt, and **Ashwin Vasavada**, from Congressman Vernon J. Ehlers's office, talked with CSP about their experiences working on Capitol Hill as AAAS Science Fellows. Both have the good fortune of working with former scientists, which is not usual for the fellows. Vasavada said that about a third of the fellows go back to academia after their fellowship, and a third stay in Washington in government work. Both visitors felt that Members of Congress get bombarded with scientific advice, sometimes bolstering two opposing positions; the main source of unbiased information is still the National Academies of Science.

James Turner, Chief Counsel, Minority Staff, House Committee on Science, talked about how Congress gets scientific information. Agreeing with the science fellows that there is no shortage of scientific advice, Turner said the challenge is to get Members to hear it. Scientists should realize that Congress thinks completely differently than academia. Turner advised CSP to learn to tell stories, anecdotes, and remember that politicians are great at public relations. A smile is not a commitment; Members need to hear your argument at the right time, i.e. at the time of the vote. Himself a former fellow, Turner gave CSP a somewhat different perspective on the benefits of the experience to the fellow, to the Member of Congress in whose office the fellow resides, and to the sponsoring organization. Turner had been asked to provide CSP with background on the demise and possible revival of the Office of Technology Assessment. He felt that the absence of this source of objective technical information, tailored to the needs of Congress, was being felt and there was a shift in the opinions of the former opponents of OTA. As usual, Turner gave a crisp analysis of the prospects for science funding in the FY 2003 appropriations process. He felt the NSF budget was a work in progress. In the very near future there would be a bipartisan effort in the House and Senate to introduce bills calling for a 15 percent increase for NSF for the next five years, but that the chances of that much being appropriated were miniscule. However, he thought the support signaled by authorization bills, and those such as Rep. Rush Holt's, was important because the bills force the appropriators to pay attention to the fate of NSF. He predicted there would eventually be a compromise between President Bush's request and the calls for 15 percent increase.

David Goldston, Chief of Staff, Majority Staff, House Committee on Science, provided a majority view of legislation affecting science. HSC chair, Rep. Sherwood Boehlert, took over with three priorities: education, energy, and the environment; later he added terrorism. Goldston outlined current legislation focused on these priorities. Bill HR.1858, passed in 2001, included President Bush's mathematics and science partnership proposals. Bill HR.3130, the Technology Talent Act, has bipartisan support and Sen. Joseph Lieberman has introduced a companion bill in the Senate. Aimed at increasing the number of science, mathematics and technology degrees by offering incentives to universities, grants would be made to institutions who introduce innovative methods to increase, and retain, the number of science and technology majors; applicants would be accountable for producing their predicted increase in majors. Bill HR. 3394 would create new programs within NSF and NIST on cyber security. Hearings will be held in June on the extent to which security issues as a result of 9/11 impact the conduct of scientific research, and there will be a follow-up on the research into the implications of the collapse of the World Trade Center towers; NIST is planning a \$16M investigation. A bill will

be introduced to permanently change the way the government carries out these post investigations.

A reauthorization bill would soon be introduced, aimed at doubling the NSF budget and calling for a 15 percent increase for each of the next three years. Boehlert intends moving on this bill by the end of April. This sends a strong signal that the House intends to go above the President's budget request for NSF. However, authorizing is the easy step; afterwards will come the hard work with the appropriators. Goldston reminded CSP that appropriations are done every year for each federal agency. The HSC is also laying the groundwork for appropriations in future years. Goldston thought that the House would pass its NSF appropriations bill by the end of July.

Goldston had a different take than Jim Turner on the question of the Office of Technology Assessment, insisting that it had been abolished not because of politics, but for budgetary reasons. He felt it was a dead issue; OTA had been just one of many different sources of science information to Congress. But the fact that the idea of re-creating OTA had emerged reflected recognition by Congress that many of their questions require scientific knowledge.

David Radzanowski, NSF Budget Examiner, Office of Management and Budget, turned CSP's attention to the Bush Administration's proposed investment criteria for R&D, and its management agenda for allocating resources. In an attempt to improve management performance at federal agencies, a tentative "score card" had been drawn up which, CSP was amused to see, rated NSF as the only agency receiving a green (ie good) sticker. Three criteria are proposed for all R&D programs: 1) relevance (to Presidential priorities, agency missions, fields of science and "customers"); 2) quality; and 3) performance (on-schedule and cost effective). After finalizing the criteria OMB will work with federal agencies to apply them. CSP members expressed some skepticism about the scheme, John Ewing noting that two types of evaluation were compounded in the plan -- evaluation of the agencies and their management of their funds, and evaluation of the research funded. Radzanowski acknowledged that there was ongoing debate at OMB about that, and also how to evaluate "blue sky" research. He thought that the plan would be implemented at NSF very differently than at other agencies.

Joel Widder, Professional Staff, Senate Appropriations Subcommittee on VA, HUD and Independent Agencies, noting that CSP had heard all the nice things the authorizers were going to do, brought a sobering note to the meeting. He delivered a lesson about the world of appropriations in which NSF lives (i.e., vying with VA and HUD, the two elephants in that particular world), as he went over the numbers in the President's FY 2003 budget request, which he flatly described as "bogus" because it is based on assumptions that Congress would take actions to generate savings via controversial changes to veterans' medical care and federal retirements -- actions that Widder thought hugely improbable. The President requests a 5 percent increase for NSF, but one third of that increase consists of proposed transfers of programs (and their budgets) from other agencies into the NSF budget. This was an idea cooked up by OMB, not by NSF, and Widder seemed to think it would not fly in Congress. He told CSP that this year the Senate Subcommittee could not be as generous as the House (apparently because the House salted away money for the National Service Program -- money that was not spent). Widder said that Senators Mikulski (chair) and Bond (ranking Democrat) are both amazingly supportive of NSF. They want to put the agency on a doubling track, and would try to

do better this year than last, but at this point they just do not have the money. Last year, in the end NSF did well because Mikulski and Bond, and Representatives Walsh and Mollohan, got together and decided they should put what money they had into NSF. However, this year Widder predicts a long hot summer of appropriations battles that would go into fall and the numbers would not look very good. When asked for advice on making the voices of the science community heard, he advised against counter-productive strategies such as the recent environmentalists' broadcast fax assault on the appropriations subcommittees fax machines. Widder said the House would move their authorization bill before the appropriations committee moves their bill, which is the ideal sequence, but in the Senate the likely sequence this year would be that the authorizing committee would not have submitted a bill by the time the appropriators were ready to move, but would let the appropriators know the numbers they want.

Michael Stephens, Professional Staff, House Appropriations Subcommittee on VA, HUD and Independent Agencies (Joel Widder's counterpart in the House) gave a more optimistic perspective on the House appropriations for FY 2003, noting that it is the job of appropriations staff to "build down" expectations.

However, he agreed with Widder that if one examines the hard numbers in the President's budget, NSF is really getting a 3 percent increase, rather than the published 5 percent. The real question in Congress this year is how much better than the President's budget they can go, because there is bi-partisan and bi-cameral support for giving more. Running swiftly over what the House would probably have to do with the President's budget proposals regarding political "red flags" such as VA medical costs and legislation to change the way federal retirement costs are accounted for, Stephens said the House would turn down this legislation, which would free up \$9B. He thought that, if there was agreement to use this \$9B on the domestic side (Defense could give them a hard time on this) the money would be used for discretionary spending. Stephens felt there was momentum on the appropriations committee, especially from Representative Walsh and his staff, to work hard to give NSF a 7 percent increase. An emerging concern Stephens had noticed within his Members, is whether NSF's focus on priority areas comes at the expense of core scientific research. There is a sense that, for the second year, investigator-initiated projects are under-funded and Stephens foresees a move to redress the balance. Asked about the effects of an authorization bill calling for 15 percent for NSF, Stephens thought it would help the appropriators get 7 to 10 percent, but he did not see 15 percent happening, primarily because the budget surplus of the last few years has now disappeared. As to the timeframe for FY 2003 appropriations, Stephens expects his subcommittee to spend May figuring out the big picture, before marking up the VA-HUD bill around mid-June. The Senate will probably mark up in July. The bills will go to conference in September.

William Berry, Director, Basic Research, Department of Defense Research and Engineering, described how DoD decides how to invest S&T money. The Department has just undergone its quadrennial defense review, deciding on the capabilities it needs and the operational frameworks to achieve those capabilities. These frameworks will drive the basic research program, which Berry noted only amounts to about one percent of the DoD budget. Berry ran down some S&T trends, including the University Research Initiative, involved in infrastructure, education (via fellowships), and multi-disciplinary research. Strategic research areas in FY 2003 will include bio-engineering science, nanosciences, multifunction materials, information dominance,

propulsion and energetic sciences, and human performance sciences. The science supported is, of course, mission-oriented.

Communicating with Congress

The Saturday sessions were devoted to "nuts and bolts" CSP work. Led by CSP chair Jane Hawkins, who guided CSP members through the techniques of making effective contacts with their Members of Congress, members discussed how to visit with Members and their science staff, and how to deliver their message. CSP members practiced making the argument for increased support for science using examples of the impact of their research, and that of their colleagues, in the Member's home district.

AMS Washington Office

Sam Rankin, Director of the AMS Washington Office, outlined some recent events he had organized to bring mathematicians into Congressional circles, and to work with other scientific societies to make the concerns of the scientific community much more visible on Capitol Hill. This spring has seen heavy activity in government relations work.

Joint Mathematics Meeting, January 2003, Baltimore

CSP chose a short-list of speakers for the Government Speaker slot, usually co-sponsored with MAA.

Proposed topics for the CSP panel slot would be discussed further by email with the full committee. As a result, CSP later agreed on the topic of Homeland Security and Mathematics.

Next meeting

CSP will meet in Washington DC on April 11-12, 2003, in conjunction with the AMS Council meeting.

Report submitted by
Monica Foulkes
AMS Washington Office

May 8, 2002

Federal Funding for the Mathematical Sciences (millions of dollars) #
in the President's budget request for FY 2003.

	FY 01 Actual	FY 02 Estimate	FY 03 Request	Change 02-03 Amount	Change 02-03 Percent
National Science Foundation DMS	121.4	151.5	181.9	30.4	20.1%
Department of Defense *					
AFOSR	32.7	32.6	32.5	-0.1	-0.3%
ARO	26.4	26.4	26.4	0.0	0.0%
DARPA	16.3	25.0	33.3	8.3	33.2%
NSA	1.7	2.3	2.5	0.3	11%
ONR	12.5	13.2	13.4	0.2	1.5%
Total DOD	88.6	99.5	108.1	8.7	8.7%
Department of Energy Applied Mathematics	27.1	32.0	36.2	4.2	13.2%
Total All Agencies	238.2	282.9	326.2	43.3	15.3%

* Budgets are estimates for FY 2002 and FY 2003; DARPA amount assumes approval of Geosciences Initiative.

Budget information from agency documents and conversations with program managers.

S. Rankin, "Mathematical Sciences in the FY 2003 Budget", AAAS Report XXVII, Research and Development FY 2003.

AMERICAN MATHEMATICAL SOCIETY

Financial Statements

December 31, 2001 and 2000

(With Independent Auditors' Report Thereon)

Independent Auditors' Report

The Board of Trustees
American Mathematical Society:

We have audited the accompanying balance sheets of American Mathematical Society (the Society) as of December 31, 2001 and 2000, and the related statements of activities and cash flows for the years then ended. These financial statements are the responsibility of the Society's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Society as of December 31, 2001 and 2000, and its changes in net assets and its cash flows for the years then ended in conformity with accounting principles generally accepted in the United States of America.

KPMG LLP

April 5, 2002

AMERICAN MATHEMATICAL SOCIETY

Balance Sheets

December 31, 2001 and 2000

Assets	2001	2000
Cash and cash equivalents (note 2)	\$ 400,373	511,733
Short-term investments (note 3)	13,948,678	12,348,162
Accounts receivable, net (allowances of \$191,032 and \$225,006, respectively)	1,180,687	1,644,914
Deferred prepublication costs	460,574	557,469
Completed books	1,416,773	1,312,616
Prepaid expenses and deposits	1,132,798	978,627
Land, buildings and equipment, net (note 4)	4,703,304	5,109,451
Long-term investments (note 5)	41,204,704	45,619,867
Total assets	\$ 64,447,891	68,082,839
Liabilities and Net Assets		
Liabilities:		
Accounts payable	\$ 1,217,921	1,184,407
Accrued expenses:		
Severance and study leave pay (note 6)	1,387,700	1,201,485
Payroll, benefits and other	1,455,410	2,312,014
Deferred revenue	10,509,962	10,542,898
Postretirement benefit obligation (note 7)	2,431,095	2,144,990
Total liabilities	17,002,088	17,385,794
Net assets:		
Unrestricted:		
Undesignated	5,249,784	4,163,022
Designated (note 8)	33,353,895	36,951,344
Invested in fixed assets	4,703,304	5,109,451
	43,306,983	46,223,817
Temporarily restricted (note 9)	1,785,630	2,209,840
Permanently restricted	2,353,190	2,263,388
Total net assets	47,445,803	50,697,045
Total liabilities and net assets	\$ 64,447,891	68,082,839

See accompanying notes to financial statements.

AMERICAN MATHEMATICAL SOCIETY

Statements of Activities

Years ended December 31, 2001 and 2000

	2001	2000
Changes in unrestricted net assets:		
Operating revenue:		
Publication:		
$\textit{Mathematical Reviews}$ and related activities	\$ 8,103,793	8,164,037
Journals (excluding $\textit{Mathematical Reviews}$)	3,772,670	3,572,020
Books	2,865,934	3,189,452
Sale of services	329,931	417,993
Other	114,970	102,448
Total publication revenue	15,187,298	15,445,950
Membership and professional services, including assets released from restrictions (note 9):		
Meetings	867,038	914,959
Dues and membership services	3,567,146	3,537,191
Grants, prizes and awards	780,856	740,341
Total membership and professional services revenue	5,215,040	5,192,491
Short-term investment income	508,973	611,478
Other	149,059	254,187
Total operating revenue	21,060,370	21,504,106
Operating expenses:		
Publication:		
$\textit{Mathematical Reviews}$ and related activities	5,317,096	5,227,559
Journals (excluding $\textit{Mathematical Reviews}$)	1,011,740	1,158,579
Books	2,463,291	2,512,389
Divisional indirect	1,256,220	1,259,138
Warehousing and distribution	683,035	649,756
Marketing and sales	154,558	274,854
Sale of services	277,699	264,032
Total publication expense	11,163,639	11,346,307
Membership and professional services:		
Dues and member services	2,728,458	2,534,715
Grants, prizes and awards	891,956	826,382
Meetings	700,899	890,533
Governance	393,892	378,653
Divisional indirect	231,670	146,995
Total membership and professional services expense	4,946,875	4,777,278

AMERICAN MATHEMATICAL SOCIETY

Statements of Activities

Years ended December 31, 2001 and 2000

	2001	2000
Transfer to temporarily restricted net assets	\$ 84,160	—
Other	(102,387)	222,442
Membership and customer services	1,043,715	1,139,074
General and administrative	2,620,203	2,350,941
Total operating expenses	19,756,205	19,836,042
Excess of operating revenue over operating expenses	1,304,165	1,668,064
Long-term investment loss in excess of amounts designated for operations (note 5)	(4,220,999)	(2,025,353)
Decrease in unrestricted net assets	(2,916,834)	(357,289)
Changes in temporarily restricted net assets:		
Contributions and grants	80,626	206,939
Long-term investment loss (note 5)	(192,926)	(29,546)
Transfer from unrestricted net assets	84,160	—
Net assets released from restrictions (note 9)	(396,070)	(337,995)
Decrease in temporarily restricted net assets	(424,210)	(160,602)
Change in permanently restricted net assets:		
Contributions	89,802	266,142
Increase in permanently restricted net assets	89,802	266,142
Change in net assets	(3,251,242)	(251,749)
Net assets as of beginning of year	50,697,045	50,948,794
Net assets as of end of year	\$ 47,445,803	50,697,045

See accompanying notes to financial statements.

AMERICAN MATHEMATICAL SOCIETY

Statements of Cash Flows

Years ended December 31, 2001 and 2000

	2001	2000
Cash flows from operating activities:		
Change in net assets	\$ (3,251,242)	(251,749)
Adjustments to reconcile change in net assets to net cash and cash equivalents provided by operating activities:		
Depreciation	647,783	626,298
Loss on dispositions of equipment	—	7,370
Net realized and unrealized losses on long-term investments	5,617,973	3,047,444
Contributions restricted for permanent investment	(89,802)	(266,142)
Changes in assets and liabilities:		
Accounts receivable, net	464,227	(214,762)
Deferred prepublication costs	96,895	96,546
Completed books	(104,157)	(86,735)
Prepaid expenses and deposits	(154,171)	59,443
Accounts payable	33,514	(100,107)
Accrued expenses	(670,389)	672,043
Deferred revenue	(32,936)	(838,741)
Postretirement benefit obligation	286,105	240,000
Net cash and cash equivalents provided by operating activities	2,843,800	2,990,908
Cash flows from investing activities:		
Change in short-term investments	(1,600,516)	21,056
Purchases of property and equipment	(241,636)	(339,288)
Proceeds from sales of long-term investments	6,801,891	11,865,693
Purchases of long-term investments	(8,004,701)	(14,991,916)
Net cash and cash equivalents used in investing activities	(3,044,962)	(3,444,455)
Cash flows from financing activities:		
Contributions restricted for permanent investment	89,802	266,142
Net change in cash and cash equivalents	(111,360)	(187,405)
Cash and cash equivalents as of beginning of year	511,733	699,138
Cash and cash equivalents as of end of year	\$ 400,373	511,733

See accompanying notes to financial statements.

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(1) Description of Business and Summary of Significant Accounting Policies

(a) *Description of Business*

The American Mathematical Society (the Society) was created in 1888 to further mathematical research and scholarship. It is an international membership organization, currently with over 30,000 members. The Society fulfills its mission with publications and professional programs that promote mathematical research, increase the awareness of the value of mathematical research to society and foster excellence in mathematics education.

(b) *Basis of Financial Statement Presentation*

The accompanying financial statements are presented on the accrual basis of accounting and have been prepared to focus on the Society as a whole and to present balances and transactions according to the existence or absence of donor-imposed restrictions.

The preparation of the financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, and disclosures of contingent assets and liabilities, as of the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

(c) *Classifications of Net Assets*

The Society's net assets and activities that increase or decrease net assets are classified as unrestricted, temporarily restricted, or permanently restricted.

Unrestricted net assets are those without any donor-imposed or other restrictions as to their use which are available for the general operations of the Society. The Society defines operating income as the net increase in unrestricted net assets derived from the activities related to the accomplishment of its mission, such as publications, programs, meetings and conferences and member services. In 2001 and 2000, only the unrestricted investment return from long-term investments is excluded from operating income.

Temporarily restricted net assets are those whose use is restricted by some donor-imposed limitation which will lapse upon the passage of time, use of the asset for its intended purpose, or the meeting of other donor-imposed stipulations.

Permanently restricted net assets are those which must be permanently invested to provide a source of support for the activities of the Society and which are commonly referred to as endowments.

The Society is incorporated under the laws of the District of Columbia and is therefore subject to the provisions of the Uniform Management of Institutional Funds Act (the Act). Under the Act, the accumulated realized and unrealized gains related to the investment of an endowment gift may legally be appropriated for expenditure by the governing body of an organization unless the applicable gift instrument indicates the donor's intention that such gains may not be expended. None of the Society's endowment gift instruments executed by donors contains such a restriction. Accordingly, the net gains on endowment gifts which contain no donor restrictions as to the use of income derived therefrom have been included in unrestricted net assets. The net gains on endowment

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gifts which contain donor restrictions as to the use of income derived therefrom have been included in temporarily restricted net assets. Only the original amount of endowment gifts has been included in permanently restricted net assets.

Permanently restricted net assets are supported by the long-term investment portfolio. The Society has two types of endowment: gifts with no donor designations as to the use of income derived therefrom (\$991,454 as of December 31, 2001 and 2000) and gifts whose donors have designated a specific purpose in the gift instrument (\$1,361,736 and \$1,271,934 as of December 31, 2001 and 2000, respectively).

At December 31, 2001, the value allocated to certain invested contributions whose donors designated a specific purpose in the gift instrument was less than the original gift amount by a total of \$84,160. Accordingly, this amount was transferred from unrestricted net assets to temporarily restricted net assets.

(d) *Contributions and Net Assets Released from Restrictions*

The Society records as contribution revenue unconditional promises to give. All other contribution revenue is recorded as received. If the contribution is made in assets other than cash, the amount of the contribution is measured at the fair value of the asset contributed at the date the contribution or unconditional promise to give is made by the donor.

Contributions of cash and other assets are reported as temporarily restricted support if they are received with donor stipulations that limit the use of the donated asset for some specific purpose or time period and as permanently restricted support if the donated asset must be invested in perpetuity.

When a donor restriction expires, that is, when a stipulated time restriction ends or purpose restriction is accomplished, temporarily restricted net assets are reclassified to unrestricted net assets and reported in the accompanying statements of activities as net assets released from restrictions.

If a donor-imposed restriction is met for the full amount of the contribution within the year, the related revenues and expenses are recorded solely in the unrestricted net assets category in the accompanying statements of activities.

The Society receives contributed services from its members, principally as volunteer leaders in the governance structure of the Society and as volunteer members of editorial committees for the Society's various publications. The latter category of contributed services qualifies for recognition as income and expense under accounting principles, as the members of the editorial committees must possess specialized skills. However, the Society has no practical way of measuring the market value of the services received from its volunteer editorial committee members and, accordingly, no such estimate is included as revenue or expense in the accompanying financial statements.

(e) *Investments and Related Income*

Substantially all of the Society's investments, both short term and long term, are carried at fair value, as determined by quoted market prices. Investments in mutual funds are carried at the quoted net asset value of the fund, which approximates market value. Certain investments, such as money market funds and certificates of deposit, are carried at cost, which approximates market value.

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The total return (interest, dividends, and realized and unrealized gains or losses) derived from permanently restricted net assets whose use of income is restricted for a specific purpose is recorded as long-term investment income in the temporarily restricted net asset category. As the purpose restriction is met, the income is reclassified to the unrestricted net assets category via net assets released from restrictions.

(f) *Deferred Prepublication Costs*

Prepublication costs, consisting of translation, editorial, composition and proofreading costs, are deferred until publication. Upon publication, prepublication costs related to books are transferred into completed books inventory and prepublication costs related to journals are expensed to offset subscription revenue for the journals.

(g) *Completed Books*

Publication costs of books, consisting of paper, printing and prepublication costs, are deferred and charged to expense as the books are sold. Completed books are recorded in the accompanying balance sheets at the lower of average cost or market.

(h) *Land, Buildings, Equipment and Accumulated Depreciation*

Land, buildings and equipment are recorded at cost less accumulated depreciation. Depreciation is provided over the estimated useful lives of the assets using straight-line or accelerated methods.

(i) *Membership Journals*

Members are provided certain journals at no charge as these journals are considered to be benefits of membership in the Society.

(j) *Revenue Recognition*

Advance collections for dues, subscriptions and publications are deferred and generally recognized as income when the services are rendered or the publications shipped. For subscriptions to current-year journals for which all of the issues have not yet been published but for which substantially all of the costs have been incurred, the Society accrues estimated completion costs and recognizes the related revenues. For sales of books and journals, revenue is recognized upon shipment. In addition, the Society reserves for its estimate of book returns.

(k) *Income Taxes*

The Society is a tax-exempt organization as described in Section 501(c)(3) of the Internal Revenue Code (the Code) and is generally exempt from income taxes pursuant to Section 501(a) of the Code. Rules and regulations regarding unrelated business income tax apply to the Society, but no activities resulting in a material amount of taxes due occurred in 2001 or 2000.

(l) *Grant Income*

The Society receives various grants, which are subject to audit by the grantors or their representatives. Such audits could result in requests for reimbursement for expenditures disallowed

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under the terms of the grant; however, management believes that these disallowances, if any, would be immaterial.

(m) Reclassifications

Certain reclassifications have been made to the 2000 financial statements to conform to the 2001 presentation.

(2) Cash and Cash Equivalents

Bank accounts and petty cash comprise the entire cash and cash equivalents balance as of December 31, 2001 and 2000. The Society's bank accounts are federally insured to a maximum of \$100,000 each.

(3) Short-Term Investments

Short-term investments consist of the following as of December 31:

	2001	2000
Certificates of deposit	\$ 3,798,000	5,398,000
Fixed-income mutual funds	2,460,535	2,306,931
Convertible securities mutual fund	763,002	787,369
High-yield bond mutual funds	863,921	870,093
Domestic corporate stock	33,519	32,838
Money market mutual funds	6,029,701	2,952,931
Total	\$ 13,948,678	12,348,162

It is the Society's policy to invest no more than the federal insured limit of \$100,000 in each financial institution's certificate of deposit. The income derived from these investments is unrestricted and used to support operations.

(4) Land, Buildings and Equipment

The following comprise the Society's investment in land, buildings and equipment as of December 31:

	2001	2000
Land and improvements	\$ 369,800	369,800
Buildings and improvements	6,023,485	6,023,485
Furniture, equipment and software	5,637,236	5,534,133
Transportation equipment	78,334	78,334
	12,108,855	12,005,752
Less accumulated depreciation	(7,405,551)	(6,896,301)
	\$ 4,703,304	5,109,451

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(5) Long-Term Investments

The Society's long-term investments are segregated into eight separate portfolios (including mutual funds), each with its own investment manager and investment objective. The overall investment strategy is determined by the Investment Committee of the Board of Trustees and is approved by the Board of Trustees annually. The primary investment objective of the long-term investment portfolio is an average real total return (net of investment fees and the effects of consumer inflation) of at least 6% over the long term. To achieve this result, the investment portfolio is allocated approximately 80% to equity investments and 20% to fixed-income investments. The equity investments are further diversified into domestic, international and real estate holdings. Additionally, the entire portfolio is diversified across economic sectors, geographic locations, industries and size of investees.

The following comprise the Society's total long-term investment portfolio as of December 31:

	2001		2000	
	Value	Cost	Value	Cost
Cash and cash equivalents	\$ 506,105	506,105	987,601	987,601
Domestic common stocks	7,639,768	6,264,356	9,458,237	6,465,804
Fixed-income mutual funds	10,700,531	10,741,005	9,864,433	9,969,318
Equity mutual funds:				
Domestic common stocks	17,904,573	17,313,063	20,156,980	17,107,344
Domestic real estate investment trusts	1,513,413	1,429,311	1,390,206	1,343,682
International common stocks	2,940,314	4,358,380	3,762,410	4,321,561
Total	\$ 41,204,704	40,612,220	45,619,867	40,195,310

The investment portfolio is allocated among the three categories of net assets as of December 31 as follows:

	2001	2000
Unrestricted net assets:		
Board-designated purposes (note 8)	\$ 33,353,895	36,951,344
Undesignated	4,005,315	4,576,583
Total allocated to unrestricted net assets	37,359,210	41,527,927
Total allocated to temporarily restricted net assets	1,492,404	1,833,652
Permanently restricted net assets:		
Unrestricted use of income	991,454	991,454
Restricted use of income	1,361,636	1,266,834
Total allocated to permanently restricted net assets	2,353,090	2,258,288
Total long-term investments, at value	\$ 41,204,704	45,619,867

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The following schedule summarizes the investment return and its classification in the accompanying statements of activities for the years ended December 31:

	2001	2000
Dividends and interest, net of management fees of \$62,132 and \$76,273, respectively	\$ 1,204,048	992,545
Net realized and unrealized losses	(5,617,973)	(3,047,444)
Total loss on long-term investments	(4,413,925)	(2,054,899)
Less amounts classified as temporarily restricted	192,926	29,546
Investment loss in excess of income designated for current unrestricted operations	\$ (4,220,999)	(2,025,353)

(6) Severance and Study Leave Pay

Certain employees of the Society receive vested rights to severance and study leave pay based upon salary and years of service. The Society provides for this obligation over the related years of the employees' service. The provision for severance and study leave pay charged to expense totaled \$259,692 and \$175,046 in 2001 and 2000, respectively.

(7) Pension and Retirement Benefits

- (a) The Society has contributory retirement plans (the Plans) covering substantially all full-time employees. The Plans are administered by, and related assets are maintained with, Teachers Insurance and Annuity Association and College Retirement Equities Fund. The Society's retirement expenses for these Plans totaled \$906,748 and \$902,156 in 2001 and 2000, respectively.
- (b) The Society sponsors a defined benefit postretirement medical plan that covers substantially all full-time employees. Under the plan provisions, employees who retire from the Society at age 62 or older with at least 12 years of service are eligible for benefits under the plan. Plan benefits consist of health insurance coverage under a Medicare Supplement Plan and reimbursement of Medicare Part B premiums. Employees who retire before age 62 may qualify for coverage under the plan according to a longer service requirement schedule established by the Society. Spouses of eligible retirees are not covered. The plan is noncontributory and is unfunded.

In 1998, this plan was amended to include the prior service of employees previously leased from the University of Michigan as eligible service when such persons become Society employees. The resulting prior service cost of these employees is being amortized over the estimated average future service period until retirement.

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The following table presents information relating to the plan for the years ended December 31:

	<u>2001</u>	<u>2000</u>
Benefit obligation	\$ 2,431,095	2,144,990
Fair value of plan assets	—	—
Accrued benefit cost	<u>\$ 2,431,095</u>	<u>2,144,990</u>
Benefits paid	\$ 27,000	24,000

The weighted average discount rate used in determining the accumulated postretirement benefit obligation was 7.75% as of December 31, 2001 and 2000.

The weighted average assumed rate of increase in the per capita cost of covered benefits (i.e., health care cost trend) for this plan was assumed to be 10.5% for 2001, 10% for 2002, and 5% thereafter. Increasing the health care cost trend rate by one percentage point in each year would increase the accumulated postretirement benefit obligation by approximately \$450,000.

Effective January 1, 2002, the Society amended the plan to include maximum reimbursement amounts on the Medicare Supplement portion of the plan only. While the Society's recent cost increase history has been consistent with current plan assumptions, the health insurance market in general has incurred increases of 10% or more in the recent past, and this trend is expected to continue for the near term. Therefore, it was decided to increase the health care cost increase trend to 10% for the next five years and decline to 5% for years thereafter, also effective as of January 1, 2002.

These two changes resulted in a net unrecognized loss of approximately \$220,000, which will be amortized into the annual postretirement benefit cost commencing in 2002.

(8) Designated Unrestricted Net Assets

The Board of Trustees of the Society has designated components of unrestricted net assets to support certain purposes. All such designated funds within unrestricted net assets are supported by the unrestricted portion of the long-term investment portfolio. The Economic Stabilization Fund is designated to provide support for the Society in future years should the need arise. The Friends of Mathematics Fund is designated to accumulate unrestricted gifts to the Society whose current use is not needed to support the operations of the Society. The Journal Archive Fund is designated to accumulate funds to support changes that may be necessary for electronic files to be available for future use due to as yet unforeseen technological changes. The Epsilon Fund for Young Scholars was created by the Board in 2000 to augment the funds in a true endowment fund that supports programs for high school mathematics students. The Russian Royalties Fund is designated to support the payment of royalties to Russian authors for work originally published in years prior to the creation of certain copyright agreements.

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The following comprise the balances in these designated funds within unrestricted net assets as of December 31:

	2001	2000
Economic Stabilization Fund – Base	\$ 19,884,126	21,981,032
Economic Stabilization Fund – Supplemental	12,608,978	14,074,851
Friends of Mathematics Fund	123,572	123,572
Journal Archive Fund	225,750	206,528
Epsilon Fund for Young Scholars	450,787	500,000
Russian Royalties Fund and other	60,682	65,361
Total	\$ 33,353,895	36,951,344

(9) Temporarily Restricted Net Assets

Temporarily restricted net assets consist of amounts restricted by donors for the following purposes as of December 31:

	2001	2000
Restricted purpose:		
Prizes and scholarships	\$ 216,690	202,979
Lectures	31,412	19,666
Fellowships	171,424	204,949
Special programs	107,230	216,287
Charitable gift annuities	191,464	189,458
Grant-supported projects	69,822	94,387
Other miscellaneous	16,434	21,077
Accumulated gains on purpose-restricted endowment gifts, principally related to the prize funds	981,154	1,261,037
Total	\$ 1,785,630	2,209,840

Assets released from restrictions totaled \$396,070 and \$337,995 in 2001 and 2000, respectively, entirely due to the accomplishment of the designated purposes.