From the AMS Secretary

Report of the Executive Director, 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.

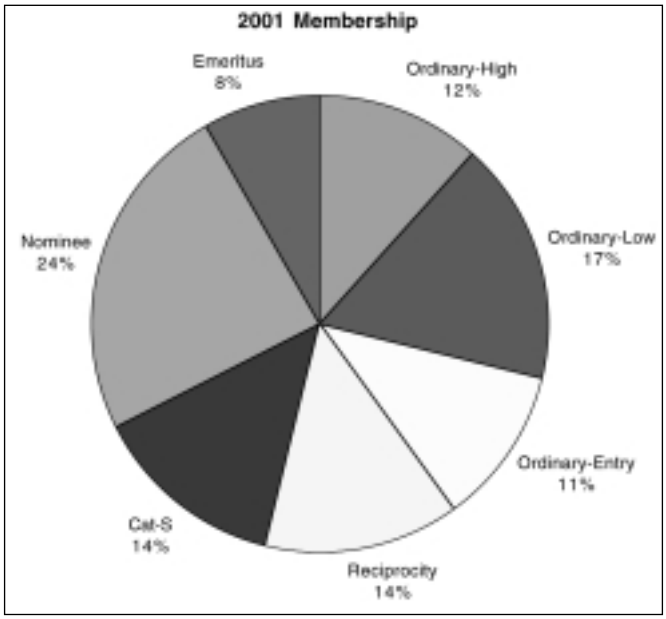
Two years ago I outlined a proposal to create a public awareness office and explained the rationale. The AMS had tried for years to carry out public awareness projects, with only partial success (that was never sustained). The key to long-term success, I argued, was to have staff whose sole responsibility 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.

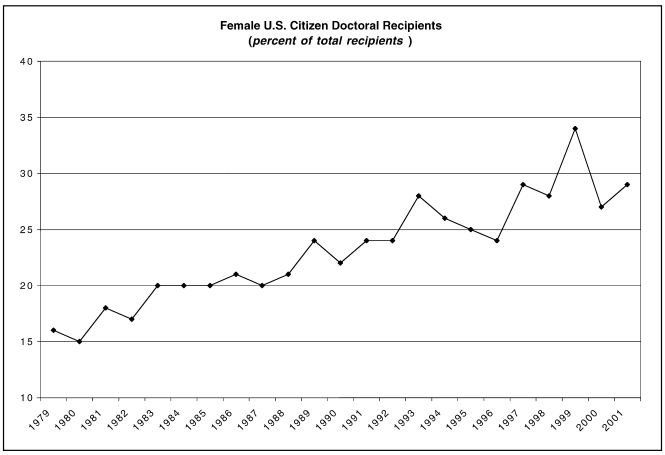
Meetings are closely connected to membership, and our meetings recently have been increasingly successful. The annual joint meeting with the MAA (as well as other organizations) has grown; our sectional meetings are healthy and robust; and our joint international meetings have become a steady occurrence, 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 master's degree workshops.

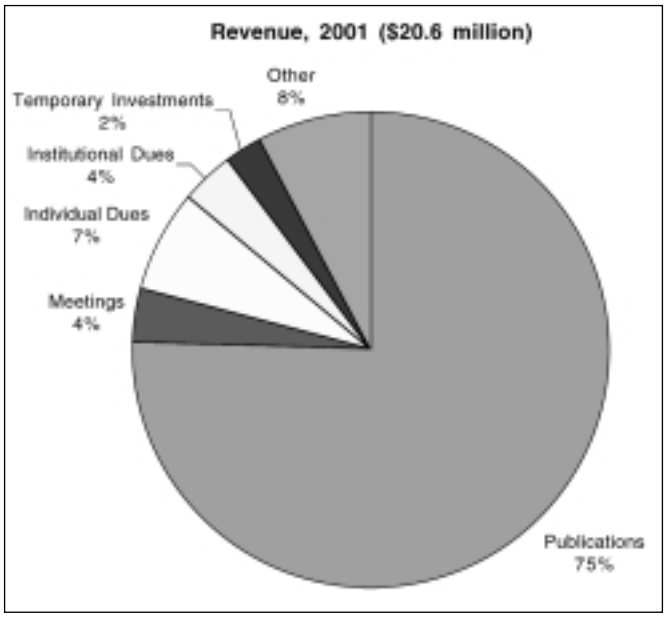
- Employment services, which serve young mathematicians at the beginning of their careers. The Employment Center at the annual meeting is the best known of these, but everything from the AMS cover sheet to the more recent Math Jobs Web application are part of the Society's effort to provide a broad range 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 nonsubscribers 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

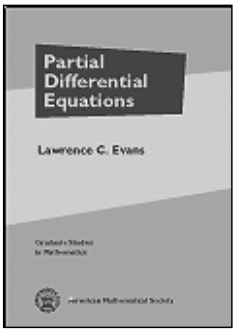
remarkable feat at a time when subscriptions to scholarly journals are steadily decreasing.

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: Some 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 book 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.

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 website (`http://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 nonmathematicians what mathematicians do. It's giving everyone, mathematicians and nonmathematicians 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 sixteen *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, `http://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* in the November 2001 issue.

The office continues to produce *Mathematical Moments*; there are now twenty-one.

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 nonmathematics 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 prizewinners 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 $2,000 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's 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 fifteen 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 $2,000 (which seems to get the attention of high school students).

Local reporter with winner in San Diego.

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 because Mike Breen is a witty 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 (`http://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 (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 PA 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 two to three months in the summer working at some media outlet: newspaper, magazine, television, or radio. The AMS has supported one or two 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

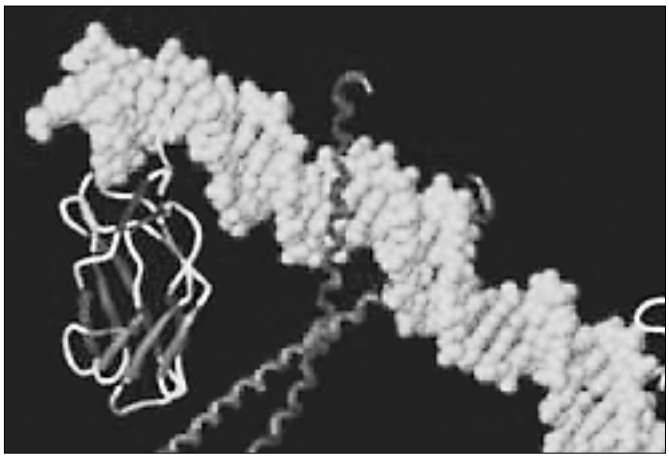
This syndicated series of science stories (12 per month) is produced by the American Institute of Physics (AIP) for local TV newscasts. The AMS is one of several societies that share funding of the series, although the bulk of the funding is provided by AIP. The PA Office suggests story ideas and monitors 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 Lectures

These lectures for high school students are given once each year, normally in the spring, and are funded by an endowment from Paul Sally. 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 (`http://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.



"Math and the Genome", Math Awareness Month 2002.

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

postgraduate 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 Trjitzinksy awards ($4,000 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, DC, 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 also arranged for the AMS to underwrite one night of the local PBS 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 *Rhode Island Monthly* magazine 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 *the Notices of the AMS* was mentioned as the source where film director Ron Howard first saw a review by Dave Bayer of the play "Proof"; Bayer later became the mathematical consultant for the movie.)

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