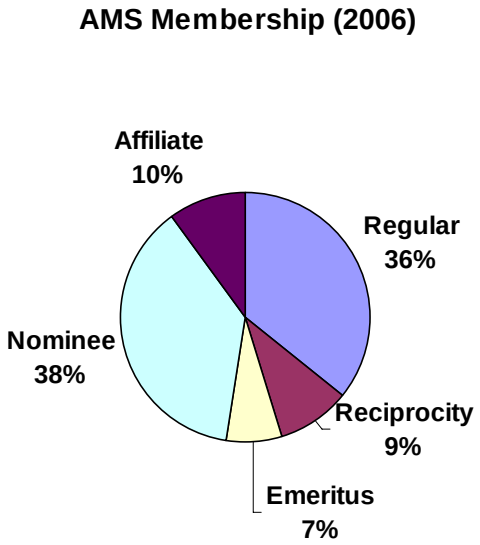
State of the AMS 2007

The AMS is a publisher. Often when people point this out, they mean it as an accusation—the AMS is a publisher and nothing more. That's not true. Looking back at past reports to the Council, I see that I often spend much of my time describing the *non*-publishing activities of the Society in order to make this point: The AMS is much more than a publisher. This year, however, I want to highlight our publishing program, not because it is more important than the rest (it's not), but because it is a part of the Society that we often take for granted.

I will begin by reminding you of all the *other* things the Society does.

Everything Else

The AMS is a moderately large society with an amazing diversity. It has more than 30,000 members, more than a third from outside North America. About a third of its members are students (mainly nominee members). Nearly 3,000 members are in developing countries (affiliate members). A similar and ever-increasing number are life, retired, or emeritus. AMS members come from every part of mathematics—pure and applied, academic and nonacademic, doctoral programs and four-year colleges.



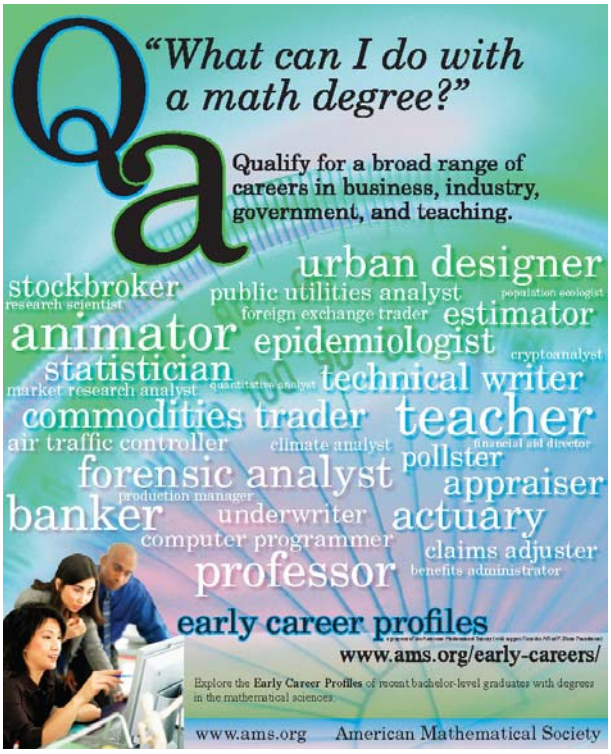
As for almost all societies, meetings play a key role in the AMS. Our annual meeting, joint with the Mathematical Association of America (and others), has grown over time, and the recent meeting in New Orleans broke all records for attendance. The eight regional meetings each year attract many mathematicians, especially young ones, from across the country. And our joint international meetings—one or more each year—have become a regular occurrence and an effective way to reach out to the rest of the world mathematical community. For many years, the summer research conferences have been

valuable to thousands of mathematicians, young and old, who attended them. They produced dozens of first-rate books as well, spreading the benefit even more widely. While those conferences will cease after the current round in 2007, the Society and its partners take pride in the quarter-century legacy we leave behind. Meetings and conferences are fundamental to the AMS.

What else does the AMS do in support of mathematics? There is a long list of things, both large and small. Here is a sample, organized into categories.

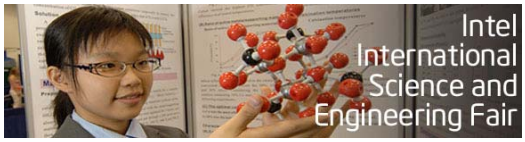
The Society does many things related to employment, especially for young mathematicians.

- The annual survey covers over 1,500 mathematical sciences departments, and provides detailed information about employment and salary.
- The Conference Board on the Mathematical Sciences oversees a survey of educational issues in mathematics every 5 years, but the survey work itself is done by the AMS. Data extends back to 1965—a phenomenal collection.
- *Employment Information in the Mathematical Sciences* has been a standard location for advertising job postings for many years.
- The *Employment Center* takes place at each Joint Meeting, and contains not only the standard "registry" for scheduled appointments, but an increasingly popular self-scheduled section. This is jointly sponsored with the Mathematical Association of America.
- *MathJobs* is a new service provided by the AMS in cooperation with the mathematics department at Duke University. It allows departments, applicants, and reference writers to exchange information electronically in a secure environment.
- *Early Career Profiles* provide a central way to link to profiles of recent mathematics majors in a large group of departments, showing prospective majors what kinds of careers they might expect.



The Society awards prizes, grants, and fellowships of various kinds each year.

- The Society gives away prizes—lots of them, including the three Steele prizes, the two Cole prizes, the Birkhoff, Bôcher, Conant, Doob, Eisenbud, Moore, Satter, Robbins, Veblen, and Whiteman prizes.
- The AMS awards *Centennial Fellowships* each year to one or two young mathematicians, giving them a full year to work on research without interruptions.
- The *Ky Fan Fund* makes awards each year to facilitate the exchange of mathematicians between North America and China, providing travel for brief visits.
- The *Trjitzinsky scholarships* are awarded to mathematics majors in departments of institutional members, rotating among them (there are nearly 500). About eight scholarships of $3000 each are awarded each year.
- The *Menger prizes* help to fund prizes and judging at the International Science and Engineering Fair each year, where the most talented high school students compete. Mathematics student are often among the most highly ranked.



- The Society provides monetary support for the annual meeting of the *Society for the Advancement of Native American and Chicano Students (SACNAS)*. This meeting hosts both undergraduate and graduate students.

- The *AMS Young Scholars program* provides approximately $80,000 in grants to summer programs for talented high school students throughout North America. (The Epsilon fund is being created to endow and expand this program in the future.)
- Recently, the AMS has added two new awards to recognize programs. One is the *Award for an Exemplary Program*, given to an outstanding mathematics department each year. The other is an award given by the Committee on the Profession to *Programs that Make a Difference*, which highlights the exceptional minority-serving programs, especially those that can be replicated.

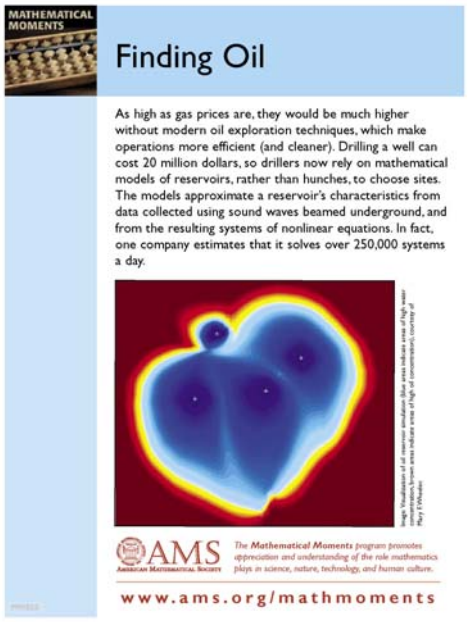
The AMS has more than a third of its members outside North America, and many activities involve international outreach.

- The *AMS book and journal donation program* matches donors with recipient institutions, especially those in the developing world, and pays for the freight to send donations. This is funded by donations from the Stroock Family Foundation.
- For many years, the Society has collected donations from its members to the *Special Development Fund* of the International Mathematical Union. This money pays for young mathematicians in developing countries to attend the quadrennial International Congress of Mathematicians. Donations from the AMS constitute a major portion of the funding.

- Our affiliate memberships allow mathematicians in developing countries to join the Society for $16 annual dues, which are often paid from the points earned by writing two reviews for *Mathematical Reviews*. This allows approximately 3000 such mathematicians to receive the benefits of membership at nominal cost (to them).

In recent years, the AMS has devoted considerable effort and resources to public awareness. A small sample of activities includes:

- *Mathematical Moment*s are one-page promotional pieces that have a common theme—mathematical research affects our everyday lives. There are more than 50 of these now, and some have been translated into multiple languages.

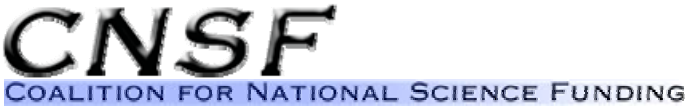


- The *Math in the Media* and *Feature Column* areas of our public awareness pages are spectacular examples of high-quality mathematical exposition, which reaches a broad spectrum of interested readers.
- The game show *Who Wants to be a Mathematician* travels to approximately eight venues around the country each year. High school students compete for a $2000 grand prize—and often win.
- The *Arnold Ross Lecture*s bring a prominent mathematician to a science museum each year, to talk to groups of high school students and to inspire their interest in mathematics. The lecture is now coupled with a presentation of the game show, Who Wants to be a Mathematician. These are supported through an endowment created by Paul Sally.
- *Headlines and Deadlines* is a monthly electronic newsletter that updates mathematicians about news and upcoming events. A new version was recently created for students.

The Society engages in advocacy for mathematics (and science more generally) in various ways.

- The Committee on Science Policy holds a *science policy forum* each year to exchange views between mathematicians and representatives of various other groups. The meeting attracts department chairs as well as members of the committee.
- A similar forum is held by the Committee on Education each fall, and again attracts many department chairs.
- Recently, the Committee on Science Policy has devoted part of its annual meeting to visiting congressional offices in order to promote mathematical research and the support of science.

- The Washington office of the AMS hosts a *congressional luncheon* each year in which a mathematician address a specific issue for twenty minutes, talking to an audience of congressional staff and, occasionally, members of Congress.
- The AMS now supports a *congressional fellow* each year. This person works full time in a congressional office, and while he or she doesn't work for the Society, they help to represent the mathematical scientific viewpoint.
- The Society has sponsored one or two *AAAS Mass Media Fellows* each summer for a number of years. These are usually mathematics graduate students who spend a summer working for a newspaper, magazine, or other media outlet.
- The Washington Office has played a key role in the *Coalition for National Science Funding* (Sam Rankin serves as chair), which brings together more than 100 organizations to support the National Science Foundation.



The Society provides services to other organizations, especially the agencies, in dealing with funding for mathematicians.

- For many years, the AMS has managed the panel that selects recipients of the National Science Foundation postdoctoral fellowships, a process that selects and brings together 15 panelists to consider more than 150 applications and award about 30 fellowships each year.
- The Society manages a similar process for the National Security Agency, which selects a panel that considers over 200 applications for NSA awards.
- Every four years, the AMS administers the NSF-funded travel grants to the International Congress of Mathematicians. For the 2006 congress, this involved almost 250 applications and approximately 120 awards totaling about $250,000. Not only does the Society expend some of its own money in administering this program, but it also makes the program more effective by implicitly underwriting travel support in case more people than expected accept awards.

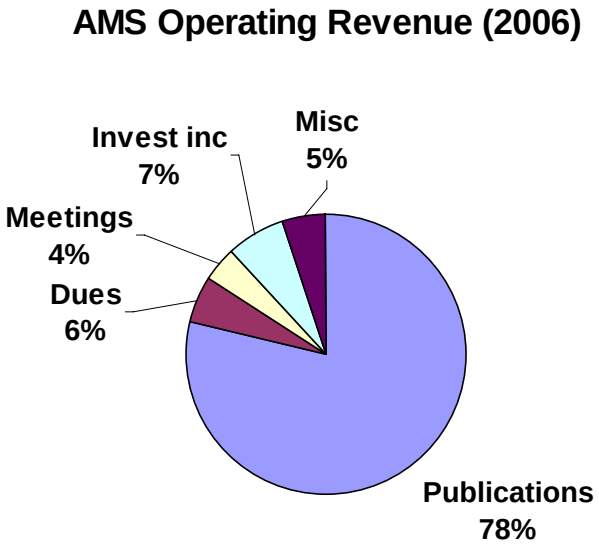
This is a sampling of "other" activities done by the AMS—that is, the things that have little to do with our publishing program.

Publishing at the AMS

Given this long list of activities, it may seem surprising that *most* of the "resources" of the Society are devoted to publishing. Most of the staff (about 160 of the 210 employees) work directly on publishing activities, and many of the rest work indirectly to support publishing. The AMS maintains its own printing plant and warehouse, with several presses, a bindery, a print-on-demand facility, and almost a million volumes on the warehouse shelves. We have our own graphic arts group, our own promotions and marketing departments, our own customer services operation, and multiple distribution channels throughout the world. Indeed, 56% of our publications sales are international

(only 26% of our dues revenue is international). Among all other countries, Japan is number one in publication sales (although all of Europe has the largest sales); India and China are in seventh and eighth place.

The AMS is a professional publishing company, not on a scale of the giant commercial publishers, but with many of their abilities. We compete with those commercial publishers in many areas, and indeed that competition is *part* of the reason for the AMS publishing program to exist—to put pressure on all publishers to serve the interests of mathematics, moderating prices, treating authors fairly, and implementing policies that serve the interests of the scientific community. The per page price of AMS journals is a fifth that of many commercial journals (which have moderated their price increases in recent years); the AMS forever-in-print policy for monographs attracts many authors, and has forced other publishers to be more careful about letting books go out of print too soon; the Society's "liberal" copyright policy, established in the early 1990s, gives authors and users great latitude in how they use published material, and has influenced the policies of many other publishers. Of course, the competition between *Mathematical Reviews* and *Zentralblatt* has benefited the entire mathematics community, as both products strive each year to improve their products and better serve their users. Having a large publishing program makes it possible to influence the rest of mathematical publishing.



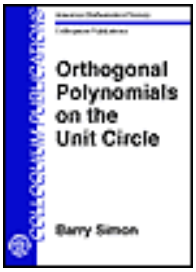
But the second reason for having a large publishing program is to generate revenue. The AMS would be able to carry out only a small fraction of the activities listed in the preceding section if it did not have a large and profitable publishing program. In 2006, publishing accounted for 78% of the Society's revenue! We structure our meetings program so that it "breaks even" (roughly); individual dues don't come close to covering member benefits, and in any case amount to only 6% of our revenue; almost *every* grant costs the Society money in the sense that the activity it sponsors costs more than the grant

itself. Publishing and (more recently) investment income are the primary sources of revenue to fund the Society's programs.

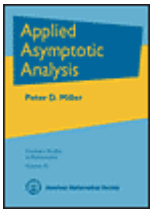
Our publishing program is divided into three parts—books, journals, and the *Mathematical Reviews* database.

Books

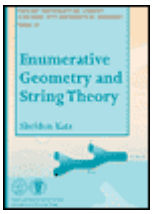
The AMS book program is the newest part of our publishing. While the Society's *Colloquium* series has its roots in the famous 1893 lectures of Felix Klein, the AMS book program remained relatively small and narrowly defined throughout most of the twentieth century. Just twenty years ago, sales of indices (mainly for Math Reviews) were comparable to the sales of all books in series.



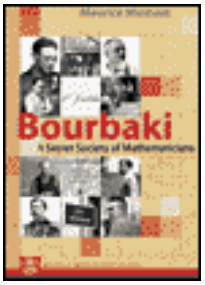
Early in the 1990s, the Society made a carefully reasoned decision to expand its book program. New series were created, including *Graduate Studies in Mathematics* and *The Student Mathematics Library*. The AMS collaborated with outside organizations to copublish more series; the emphasis shifted from proceedings to monographs; more acquisitions editors (always mathematicians) were added to aggressively pursue manuscripts from a variety of new sources. As a consequence, the book program has greatly expanded in recent years so that we are now publishing more than 100 new titles each year.



More importantly, the mixture of books has changed during this time. The emphasis is now on authored books rather than proceedings. The proceedings we *do* publish are high quality, in part because they are selected competitively. There are more books at a lower level, including some textbooks for undergraduates. The AMS has also published more books that address professional issues, and even books that are aimed at the general (scientifically minded) public.



Publishing slightly more than 100 books a year may not sound like a lot, but it is. Acquiring books is painstaking work—building relationships, reviewing manuscripts, negotiating contracts, nudging authors, and moving the submission through the production process (which, alas, is unique to each book). These are the parts of book publishing most mathematicians think about. But publishing books is far more complicated still. Few books are sold by standing order these days, and book sales have become ever more complicated. Books need to be promoted. Marketing arrangements with distributors and agents have to be managed. And every order has to be fulfilled, often one book at a time, and shipped out as quickly as possible. Book sales are among the most complicated sales arrangements, and creating a first-rate marketing system is a major factor in the success of any book program. The AMS has paid particularly close attention to this part of our program, and we continue to improve it year by year.



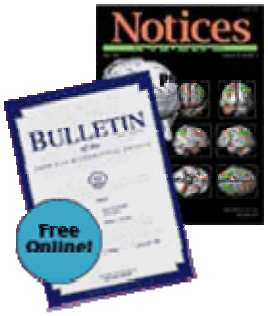
Perhaps the greatest strength of our book publishing program is its breadth. The Society has more than 3000 titles in print (and, by the way, all 3000 are searchable online through the Google book program, and soon will be through the comparable Microsoft book program as well). The AMS has this staggering number of titles because it pledges to keep every authored monograph in print—forever. We do not let authored books go out of print (but, of course, we *do* let proceedings go out of print). This is a policy that serves both our authors *and* the community well. Until recently, it was a difficult policy to administer because it meant printing small quantities of books that only sold a few copies each year. We now have a full-featured print-on-demand program, however, that allows us to produce *one* copy of a book, at moderate price and high quality. We will expand this program in the coming years.

Journals

While books are the newest part of our publication program, journals are the oldest. The *Bulletin* goes back to the very earliest days of the Society, and the *Transactions* was founded in 1900. Over the years, the journal program has grown, and the Society now has 12 journals that annually publish more than 20,000 pages combined. Those journals are distributed around the world, and indeed nearly 60% of the subscriptions are outside the United States.

The 12 AMS journals fall into four categories:

- Member journals: The *Bulletin* and the *Notices* have been rejuvenated over the past ten years. They are the most widely distributed (and read) high-level mathematics journals in the world. Each has its own special character, which evolves over time. In fact, that evolution is an important part of the "rejuvenation", which places a strong chief-editor in charge of each publication and encourages that individual to try out new things. These two journals are unusual in another respect as well: they are both *open access*—freely available online to everyone. This is unusual for member journals, and has been controversial because these journals are often considered our premier member benefit. On the other hand, precisely because they are open access, these journals have become the standard way to disseminate the most important mathematical news and information, and hence they provide a crucial service to all mathematicians—a service provided not only *to* but *by* our members.



- Primary Research Journals: The four primary research journals are (in order of their founding) the *Transactions of the AMS*, the *Proceedings of the AMS*, *Mathematics of Computation*, and the *Journal of the AMS*. The *Transactions* has a companion publication series, the *Memoirs*, which publishes 24 or more separate issues each year—lengthy articles in book form that serve an almost unique purpose in mathematics. Together, these

journals published about 15,000 pages and nearly 1000 articles in 2006. While this is only a fraction of the total mathematical research, the primary AMS journals set standards for other journals. The *Journal of the AMS* is consistently among the highest ranked mathematics journals. All four are high-quality journals with moderate prices, and help to moderate prices of other journals as well. In order to maintain that effect, the number of pages for the first three of these journals are being increased by 20% over the next two years, without passing along the increased costs to subscribers.

- Translation journals: Many people are unaware of the Society's four translation journals, *St. Petersburg Mathematical Journal, Sugaku Expositions, Theory of Probability and Mathematical Statistics,* and *Transactions of the Moscow Mathematical Society* (published jointly with the London Mathematical Society). *Sugaku* contains selected articles translated from the Japanese journal of the same name; the other three are all translated from Russian. The Society has a long tradition of publishing translation journals, and until 12 years ago published many other Russian translation journals as well. While many mathematicians in the rest of the world are writing papers in English, there is still an important need for translation journals.

- Electronic-only journals: The Society also publishes two e-only journals, *Conformal Geometry and Dynamics* and *Representation Theory*. These were originally thought of as the initial phase in a large program of electronic specialty journals, all published only in electronic format. While these journals have been a scientific success, they were less of a commercial success, even though they had a very small price. Access to these journals is now given to any subscriber of the primary AMS journals, and hence they have wide circulation.

All but one of these journals is online. (*Sugaku* publishes a single issue each year and remains in printed form only.) The primary journals went online in 1996, twelve years ago, and they were among the first mathematics journals online. Making older journals material available online has been a high priority for the AMS from the beginning. In order to make material available quickly, the Society joined the JSTOR project at its inception. JSTOR now makes hundreds of thousand of pages of AMS material available to a large number of institutions (well more than 2000) around the world. We are currently digitizing the entire history of the *Bulletin* in a cooperative project with the Mathematical Sciences Research Institute, and the full *Bulletin* will be available online and searchable (for free) later in 2007.

The Society also was an early participant in *Portico*, a cousin of the JSTOR project, aimed at archiving electronic journals and making them available to libraries in case this becomes necessary.

Over the years, the AMS has led the community in formulating sensible policies that benefit both the Society as publisher and the mathematical community, which is meant to be the ultimate beneficiary of journals. Even before the web existed, the Society adopted a forward-looking copyright policy that allows authors to post articles wherever they please. The AMS also adopted a policy of making its own journal material freely available after 5 years. And the AMS makes not only abstracts and bibliographic material freely available, but also the complete list of references. This means that mathematicians can frequently determine whether an article is useful (and perhaps write to the author), even without a subscription.

Mathematical Reviews

Mathematical Reviews is a phenomenal product—a huge database of more than 2.2 million items (more than 80,000 new items each year), combined with a sophisticated piece of software, *MathSciNet*, that puts this information at one's finger tips. In fact, the *MR* database is not one database but several. In addition to the collection of publications, *MR* maintains a database of authors, and another of journals, and more recently yet another of citations.

Here are some facts about these databases.

- There are more than 470,000 authors indexed, and almost all are uniquely identified by a team of specialists (a process that began in 1940).
- *MR* currently covers about 1,800 journals, sometimes choosing all articles from a journal, but often selecting only articles that are of interest to mathematicians. *MR* has constructed more than 800,000 links to original articles in those journals.
- *MR* also includes items about more than 85,000 monographs and 300,000 conference proceedings.
- The new citation database now contains more than 2.6 million items from reference lists, each matched to an item in the *MR* database. These refer to more than 142,000 authors, who were uniquely identified as described above, and to about 2,400 distinct journals.

The operation that assembles these databases is phenomenal as well. Creating the databases and updating the application each year requires more than 70 staff in the Ann Arbor office of the AMS. They sift through those 1,800 journals and many more books, considering well more than 110,000 items in order to find the approximately 85,000 items to include each year. Each selected item is classified, primary and secondary; each author is identified, often requiring detective work; each item is entered into the database

in a standardized form, with painstaking checking; and each item is linked, whenever links can be made. All this takes place before the reviewing process has begun.

Reviews are carried out by the more than 12,000 *MR* reviewers, and their contribution is a key part of the *MR* operation. Reviewers have to be selected, however, and then occasionally nagged, and their reviews frequently have to be edited, adding references and checking them. Finally, for many journals, lists of references are entered in a standard format and then matched to *MR* items so that they are uniquely identified.

THE MR PIPELINE

Each item passes repeatedly through five departments in a 16-step process, in addition to being sent out for review.

B = Bibliographic Services
E = Editors
P = Production
C= Copy Editors
R = Reviewer Services

PUBL→B→E→B→E→B→P→C→

R→E→R→P→C→E→E→C→P→MSN

Of course, putting together the databases is only part of the job in making *Mathematical Reviews* available to the mathematics community. The big orange volumes continue to be printed, and a modest number of institutions still subscribe to the paper version of *MR*. The disc version is still used by a number of institutions as well. But the most popular way to search the database is through *MathSciNet*, the online version. Each year, the software underlying *MathSciNet* is updated and improved. The latest version was a major overhaul, designed to highlight the multiple databases of *MR*. Other improvements are made behind the scenes each year in order to make the application run better or smarter, with work beginning many months in advance of the annual release.

In addition, the AMS markets *Mathematical Reviews* products in innovative ways, providing inexpensive access for smaller institutions (through consortia) as well as for institutions in developing countries (through the National Data Access Fee program). Even the normal pricing scheme is innovative, making one charge for the cost of assembling the database and another for each individual product. While these marketing efforts require a substantial amount of staff time in our Providence offices, they have profoundly expanded the reach of *Mathematical Reviews*: In the past ten years, the number of institutions with access to *Math Reviews* has more than doubled.

Mathematical Reviews continues to grow and improve each year and promises to provide even more service in the future. The citation database already is a worthy competitor in mathematics to the Science Citation Index. The addition of many contributed items from digitization projects has helped to make *MathSciNet* into a gateway to much of the past literature, even that older than 1940. And *MR* has added substantially more of the literature in heavily applied areas in recent years in order to broaden its coverage.

The Society has invested heavily in *MR* over the past ten years. People sometimes ask whether *Mathematical Reviews* has a future—whether free services such as Google Scholar or the ability of mathematicians to find large amounts of information online will make *MR* obsolete. But that question answers itself: The ever-increasing quantity of information online promises to grow at a quickening pace in the next few years. As it grows, high-quality and carefully maintained databases such as *Mathematical Reviews* will provide a more and more valuable service, provided their services are tailored to the needs of the community. This means investing in *Mathematical Reviews* as the world changes, as we have in past, and as we will continue to do in the future.

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Find a book, or search within a book.
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Results **1** - **10** of about **690,000** for **string theory**.

Conclusion

Is the AMS a publisher disguised as a scientific society? Surely not. The AMS does many different things for many different groups—service, awards, awareness, policy, and advocacy. The list is long and varied. There is no need for a disguise.

But the Society is indeed a publisher, and it takes pride in that fact. As a publisher, it makes money, which it uses to fund its society-like activities. It also views publishing as part of its service to the mathematical community—for its authors, editors, and readers. And finally, it uses publishing to persuade other publishers to deal fairly with the mathematical community, by competing with them on price, policy, and service.

The fact that the AMS works hard at its publishing program, making it both profitable and first-rate, means that it is a successful program—one in which members of the AMS can take pride ... for the program belongs to them.

John Ewing