AWM
ASSOCIATION FOR WOMEN IN MATHEMATICS

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PRESIDENT'S REPORT

San Antonio

What a busy, bustling meeting we had at San Antonio! The activities were on par with the (exponential) growth of AWM. On Tuesday, 12 January we had the day-long Workshop for Women Postdocs and Graduate Students and the AWM banquet. On Wednesday, there were the Executive Committee meeting (at seven in the morning!), the AWM Panel, the Hay Award presentation, the Business Meeting, the Noether dinner honoring Linda Keen, and then, The Party. On Thursday, we had the Noether Lecture, and, during the entire meeting, a number of important events directly involving women mathematicians and their activities.

But most important at the meeting was the presence of a host of very young women mathematicians, who interacted at all levels and were first in line as AWM presence. They managed the best and most lively AWM information table we have ever had. Special thanks are due to all of them, and especially to Catherine Roberts (Rhode Island), for their organizational effort. We can be at ease: the new generation that will take charge eventually is there and willing to do it!

The Workshop

Nineteen women mathematicians presented their research at the already traditional nine-to-five workshop for postdocs and graduate students, this year chaired by Ruth Charney (Ohio State & IAS). Since Ruth had to fulfill her other duties as Member of the AMS Council, I took charge in the afternoon. The postdocs gave excellent twenty minute presentations on their research. During the two long breaks, as well as at the end of the session, the graduate students explained the contents of their posters, concerning their thesis problems, to many interested parties. A report on the workshop appears on page 10; information on applying for the next one is on page 24.

Jodi Beldotti's brilliant idea to have the posters as background for the information table during the rest of the meeting gave further opportunity to many more people to read them and talk with their

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AWM
ASSOCIATION
FOR WOMEN IN
MATHEMATICS

The Association was founded in 1971 in Boston, MA. The purpose of the association is to encourage women to study and to have active careers in the mathematical sciences. Equal opportunity and the equal treatment of women in the mathematical sciences are promoted.
The *Newsletter* is published bi-monthly.
The Editor welcomes articles, letters, and announcements.
Circulation: 3,100.

authors. Here I want to extend my thanks to Jodi for setting up the workshop, as well as for establishing such good contact with all the participants. Jodi recruited most of these young women to work for AWM, and, as I said above, this may have historical consequences!

Workshop Luncheon and AWM Banquet

After a luncheon well-attended by many friends of AWM, there was a panel moderated by Ruth Charney, in which Lenore Blum (MSRI and former AWM President), Carolyn Gordon (Dartmouth), and Deborah Lockhart (NSF) discussed "Launching a Career in Mathematics." As was the case in 1992 in Baltimore, the highlight was the group of alumnae from the Mills College Summer Program (Pamela Deering, Lisa Brooks, Zhou Yi, Dana Ruther, and Rebecca Hai) who talked about "Mills Gift to me."

We finished the day with the AWM banquet, where the older generation had the opportunity to mingle with the young ones. It was relaxing, and we all needed it!

The Executive and Business Meetings

They were quite busy. In the morning we had a full agenda. Also, Jodi Beldotti, our Executive Director, who could not move with the office, announced that she had taken another job and gave us notice. The Executive Committee thanked her wholeheartedly and wished her success in her new endeavors.

The Executive Committee unanimously endorsed a resolution to commend the AMS and the MAA for their timely action and efforts to find an alternate site for the 1995 annual meeting currently scheduled for Denver, Colorado. Our President, Carol Wood, was asked to write to the heads of those societies, as well as to the Governor of Colorado, expressing our support for the current boycott.

The Statement on Parental Leave that was approved appears on page 11. Thanks are due to Anita Solow for carrying this through to completion.

At the suggestion of former President Lenore Blum, we agreed to form a science advisory committee for the Mills Summer undergraduate program for women as part of the move to make this program truly national in scope.

The fiscal year was changed to end 30 June rather than 31 May. Some minor changes in the dues structure were approved.

The move to Maryland was approved. Judy Green, Treasurer, Mary Gray, Founding President, and I were asked to supervise it and put in charge of the hiring of new staff. (We three share the fortune of living in the area!)

The business meeting was brief. Thanks were extended to Judy Green for having put order in our accounts and to the Long Range Planning Committee (Gray, Green, Keen, Leggett, Sadosky and Wood) for their efforts. Lee Lorch presented a motion of recognition, passed by acclamation, of Jodi's work (see page 6). Finally, Carol presented me with an AWM mug (now constantly in use!),

in lieu of the symbolic presidential bowl (a lovely gift from the AMS on its centennial), forgotten in her room. (I have the bowl at home now, and, endowed with the attribute of power, on 1 February I became President of AWM!)

AWM Panel and Louise Hay Award Prize Presentation

Our President, Carol Wood (Wesleyan), organized and moderated a very timely discussion, under the title "Is Geography Destiny?" with Ann Boyle (NSF), Margaret Murray (Virginia Tech), Loki Natarajan (Texas at El Paso), Edith Starr (Rice), and Bob Williams (Texas at Austin) as panelists. These mathematicians, belonging to different generations and having different perspectives, made the discussion really interesting. Not surprisingly, the problems facing the two youngest participants, and the solutions found by the self-proclaimed "oldest one," pushed the topic to the equally timely "Two-body Problem." Marge Murray is writing an extended version of her panel presentation for the May-June *Newsletter*.

Mary Ellen Rudin (Wisconsin) made the presentation of the Louise Hay Award for Contributions to Mathematics Education to Naomi Fisher (Illinois at Chicago), who is Co-director of the Mathematicians and Education Reform Network of the Universities of Illinois at Chicago and Minnesota, Director of the High School Teaching Program for the Regional Geometry Institute for the Universities of Illinois at Chicago, Rice, Texas, Utah and Washington, as well as Associate Director of the University of Chicago School Mathematics Project. Mary Ellen was brilliant, as ever, in describing Naomi's accomplishments in stretching people's thinking about mathematics. (The text of her presentation is on page 8.) AWM is particularly proud to congratulate Naomi as winner of the Award she so greatly deserves, not only for the quality of her work as an educator, but for her sharing in the spirit of Louise Hay. The Hay Award, evoking not only Louise's memory but her commitment to nurturing young people into mathematics, is presented to highlight the importance AWM assigns to mathematics education.

The Emmy Noether Lecture

The Noether Lecture was given by Linda Keen (Lehman College, CUNY). We had the double honor of enjoying another first-rate Noether Lecturer and having a former President (1985-86) fulfilling the job. Linda was introduced by Lisa Goldberg (MSRI), with whom she has collaborated, and gave a splendid lecture on her work on "Hyperbolic Geometry and Spaces of Riemann Surfaces." She focused on the interplay between analytic and geometric aspects in the study of structures on Riemann surfaces and took us on a fascinating journey from the basic definitions to the frontiers of her research.

And it all happened — for the first time — at the "big theater," where the "important" lectures take place! Mary Ellen Rudin shared with me the best anecdote of the meeting. A man sat by Mary Ellen and, unaware of who was to speak next, upon seeing the AWM banner up front, exclaimed "AWM?! Why, they used to have their lectures in a small room at the back!" "Yes," said Mary Ellen, "but that was before!"

Celebrations!

Linda was honored with a Noether Dinner on Wednesday night, just preceding the Gibbs Lecture, which was followed by ... "The" Party!

It is well-known by now that the AWM Reception is the best party of the Joint Meetings. And, thus, the best attended one! But this time, thanks to the special efforts of our incredibly magic Meetings Coordinator, Bettye Anne Case, it was an outstanding event! For starters, we unleashed more decibels than a teens' ball. When the volume was somewhat toned down, all started enjoying a really great live band, and it was shown that (some) mathematicians can even dance! The band in question is the (official) band of the Department of Mathematics of the University of Texas at Austin, including the chair, endowed chair-holders and all! Deep thanks to all these illustrious and talented colleagues, as well to the charming and talented non-mathematician singer, for the gift of their wonderful performance!

Women Mathematicians as Invited Speakers, and More on Women's Issues

At San Antonio, women mathematicians were prominent at a number of events. Ingrid Daubechies (Rutgers) directed the AMS Short Course on Wavelets and Applications. Fern Hunt (Howard) presented the William W. S. Claytor Lecture organized by NAM. Three other Invited Addresses were

MEMBERSHIP AND NEWSLETTER INFORMATION

Membership dues

Regular: $40
Family: $55
Base fees: $25 and $40
Prize Fund add-on: $5
General funds add-on: $10
Student, unemployed, retired: $8
Contributing: $100
Institutional:
Level 1 (two free basic ads and up to three student memberships): $80
Level 2 (two free basic ads and up to ten student memberships): $120

Subscriptions and back orders

Individual and institutional members receive a subscription to the newsletter as a privilege of membership. Libraries, women's studies centers, etc., may purchase a subscription for $30/year. Back orders are $6/issue plus shipping/handling ($5 minimum per order).

Ad information

AWM will accept advertisements for the *Newsletter* for positions available, programs in any of the mathematical sciences, professional activities and opportunities of interest to the AWM membership and other appropriate subjects. The Executive Director, in consultation with the President and the Newsletter Editor when necessary, will determine whether a proposed ad is acceptable under these guidelines. *All institutions and programs advertising in the newsletter must be Affirmative Action/Equal Opportunity designated.*
Institutional members receive two free basic ads as a privilege of membership. For non-members, the rate is $60 for a basic ad (eight lines of type). Additional lines are $6 each.

Deadlines

Editorial: 24th of January, March, May, July, September, November
Ad: 5th of February, April, June, August, October, December

Addresses

Send all **Newsletter** material **except ads and book review material** to Anne Leggett, Dept. of Math. Sci., Loyola University, 6525 N. Sheridan Road, Chicago, IL 60626. FAX: (312) 508-3514; phone: (312) 508-3554; email: leggett@math.luc.edu; LMA24@LUCCPUA.BITNET
Send all material regarding **book reviews** to Cathy Kessel, 2520 Etna, Berkeley, CA 94704. email: kessel@soe.berkeley.edu
Send everything else, **including ads and address changes**, to Dawn Wheeler, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461. phone: (301) 405-7892

delivered by Mary Wheeler (Rice) for AMS-MAA, Sylvia Bozeman (Spelman) for MAA, and Carolyn Gordon (Dartmouth) for AMS. Women mathematician gave a number of talks at the scientific sessions (but certainly not enough, since there was many a special session without any woman speaker) and organized and participated in a number of panels on policy issues and education reform. The AMS-ASA-AWM-IMS-MAA-NCTM-SIAM Joint Committee on Women in Mathematics also met on 14 January with a heavy schedule of important topics for women in mathematics. I'll save my comments on these issues for next time.

But among the several important lectures by women, I want to single out one that made a singular impact on the attending audience and was delivered by the youngest of the invited speakers. I am referring to Carolyn Gordon's "You can't hear the shape of a drum." It was so perfect, so well polished, yet so lively, so enjoyable that it will remain with us for a long time to come. (And I hope we will soon be able to read it, too, maybe with accompanying sound track!)

Carolyn participated in the AWM workshop panel, where she mentioned having once given one of the "little" ten-minute presentations at a meeting and having benefitted greatly from a comment following it. While urging our mathematically young participants to attend Carolyn's invited address, I predicted it was going to be one of the highlights of the meeting. But I was just betting on Carolyn's weight as a mathematician. I did not know at the time that she is a true star, not only as a researcher, but as a lecturer, a communicator, a teacher in the true sense of the word. Thank you again, Carolyn, for all you did in San Antonio, for making hard problems accessible and fun, and for giving young women in mathematics a real example of excellence.

... And, Finally, The Move!

After a long search for a new home, we accepted the generous offer of space made by the University of Maryland at College Park, where we are presently getting settled. We are very thankful to President Brit Kirwan and Dean Richard Herman, both mathematicians, for their initiative in inviting us and for their constant support. Ray Johnson, chair of the Department of Mathematics, a long-time friend, also extended us his welcome, as did our new neighbor, Professor Jim Yorke of IPST. To all of them, our gratitude!

Our new address is 4114 Computer and Space Sciences Building, University of Maryland, College Park, MD 20742-2461. The telephone number is (301) 405-7892.

The new headquarters give us easy access to the federal agencies, to Congress, and to MAA headquarters, as well as to the National Academy of Sciences, AAAS, and other professional organizations.

As mentioned before, leaving Massachusetts meant losing our Executive Director. After carefully balancing the office needs with our modest budget (remember that, unlike the large mathematical

professional organizations, we are not sustained financially by a publishing enterprise), we decided to engage a full-time Administrator and a part-time Executive Director. They are, respectively, Dawn Wheeler, a graduate of Maryland, and Ginny Reinhart, also personally closely linked to the University.

We welcome Ginny and Dawn to our team and feel confident that they will provide strong support for the AWM activities.

The most important factor in AWM is people. The new team depends heavily on the ideas, initiatives and actual work of its members. We call on all those in the area to join the office in the efforts to make AWM growth really productive in advancing the cause of women in mathematics!

Last But Not Least

Thanks.

To Carol, who presided masterfully over AWM at a time when rapid growth combined with office instability (two moves, four treasurers and two executive directors in a year!) seemed a recipe for disaster. For her steadiness at the helm, for her contagious calm, for her patience with me (I am hard to train!), for her friendship. I knew that working for AWM would bring unexpected gifts. Working with Carol, and, thus, having the opportunity to become her friend, is a gift difficult to match.

To Judy. For accepting being AWM Treasurer at the worst of times. For bringing stature as well as effectiveness and good humor to the job. For being so steady, so reliable, so wonderful. For bringing me so much peace of mind.

To Mary. For being so formidable against the bad, so generous towards the good. For sharing so much. For all the support.

To Bettye Anne. For being the best meetings coordinator anybody can dream of. For her warm friendship and her unyielding good will.

To Anne. For producing, as sole editor of this *Newsletter*, the most fundamental of our organizational tools, the link that allows us to work together. For doing it so well!

To Alice. For *being AWM*! For her guidance, support, criticism, understanding.

To Lenore. For her energy as well as her charm. For her constant friendship.

To Linda. For all her examples. To her and Rhonda and Ruth, members of the last Nominating Committee. For giving me the opportunity to serve as President of AWM.

This is for me both an honor and a privilege. Our Association really makes an impact on the situation of women in mathematics. And it is a great privilege to work for something that matters. And to be able to entice young and bright people to share this privilege of working in what makes a difference!

As a Latin American and a professor at Howard University, I am particularly aware of the plight of minority women in mathematics, and I want to put this perspective to work.

Many gains have been made in the twenty-two years of existence of AWM. Still, women continue to face formidable problems in their development as mathematicians — from elementary school to graduate school to the National Academy and beyond. To successfully confront these problems we need the ideas and the work, the enthusiasm and the commitment of all — students and teachers and researchers and industrial mathematicians — of every woman, and every man, who stands *for women's right to mathematics.*

Cora Sadosky
Washington, DC
February 1, 1993

AT THE MEETINGS ...

Mary Ellen Rudin, Naomi Fisher, and Phil Wagreich

Two presidents at our party:
Deborah Haimo (MAA) and Michael Artin (AMS)

Lenore Blum (third from right) and Mills reunion

AWM IN SAN ANTONIO

Mills reunion

Sue Geller and another AWM member

Alice Schafer and Naomi Fisher

NSF-AWM TRAVEL GRANTS FOR WOMEN

The objective of the NSF-AWM Travel Grants is to enable women to attend research conferences in their fields, thereby providing a valuable opportunity to advance their research activities and their visibility in the research community. By having more women attend such meetings, we also increase the size of the pool from which speakers at subsequent meetings may be drawn and thus address the persistent problem of the absence of women speakers at some research conferences.

Travel Grants. These grants provide full or partial support for travel and subsistence for a meeting or conference in the applicant's field of specialization. A maximum of $1000 for domestic travel and of $2000 for foreign travel will be applied. International travel must be on U.S. flag carriers.

Eligibility. These travel funds are provided by the Division of Mathematical Sciences of NSF, and the research conference must be in an area supported by DMS. For example, this includes certain areas of statistics, but excludes many areas of mathematics education and history of mathematics. Applicants must be women holding a doctorate (or equivalent experience) and having a work address in the U.S. (or home address, in the case of unemployed mathematicians). Anyone who has been awarded an AWM-NSF travel grant in the past two years or who has other sources of external funding, such as a regular NSF grant, is ineligible. Partial institutional support does not however make the applicant ineligible.

Target Dates. There will be three award periods per year, with applications due February 1, May 1 and October 1. An applicant should send *five copies* of 1) a description of her current research and of how the proposed travel would benefit her research program, 2) her curriculum vitae, 3) a budget for the proposed travel, and 4) information about all other sources of travel funding available to the applicant, to: Ginny Reinhart, Executive Director, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; (301) 405-7892.

WE'VE MOVED! WE'VE MOVED! WE'VE MOVED!

Cora has already included this information in her president's report, but we want to be sure no one misses it. We have new staff along with a new address and phone number. We'll report later on FAX number and email address.

Executive Director: Ginny Reinhart

Administrator: Dawn Wheeler

Address:

4114 Computer & Space Sciences Building
University of Maryland
College Park, MD 20742-2461

Phone number: (301) 405-7892

THANKS TO JODI BELDOTTI!

The statement below was read by Lee Lorch and endorsed at the AWM Business Meeting on January 13, 1993 in San Antonio:

The AWM expresses its deep appreciation to Jodi Beldotti for her efficient, cooperative, imaginative and cheerful services. It regrets enormously that AWM's move from Massachusetts to Maryland has impelled her to resign. It wishes her well in her new employment and congratulates her new employers on their great good fortune on acquiring her services.

Jodi Beldotti

CALL FOR NOMINATIONS: ALICE T. SCHAFER MATHEMATICS PRIZE

The Association for Women in Mathematics calls for nominations for the Alice T. Schafer Mathematics Prize in the amount of $1000 to be awarded to an undergraduate woman for excellence in mathematics. All members of the mathematical community are invited to submit nominations for the Prize. An institution may have more than one nominee.

The nominee may be at any level in her undergraduate career. The letter of nomination should include, but not be limited to, an evaluation of the nominee on the following criteria: quality of performance in mathematics, exhibition of real interest in mathematics, ability for independent work, and performance in mathematical competitions at the local or national level, if any.

Supporting materials should be enclosed with the nominations. Please send *five copies* of the letter and other materials. Nominations are due by **March 22, 1993** and should be sent to Ginny Reinhart, Executive Director, Association for Women in Mathematics, 4114 Computer & Space Sciences Building, Univ. of Maryland, College Park, MD 20742-2461; (301) 405-7892.

A VOTE OF THANKS TO WELLESLEY COLLEGE

And appreciation for housing the AWM Office and supporting AWM in many additional ways for almost 20 years! It all started in late spring of 1973 when at the end of her term AWM's first President, Mary W. Gray, sent me all of AWM's office supplies. They arrived in one cardboard box!

Rosamond White, Secretary of the Mathematics Department (now Administrative Director of the Science Center), took charge of the box immediately. For the next two years she was truly AWM's first volunteer, typing the *Newsletter*, answering the telephone, and doing whatever she could for AWM in addition to her regular duties. At that time the College printed the *Newsletter* at no charge to AWM; it continued to do so for some years until AWM's needs became too large for the print shop to handle. Soon Judy Roitman and Ann Stehney joined the mathematics faculty. Judy became the Editor of the *Newsletter* (and later President of AWM). Ann became the first Treasurer of AWM and the first fund-raiser. She had the honor of writing the first grant proposal of AWM, which was funded. (Last year she was a member of the Committee on the Schafer Prize.)

By 1975 AWM's membership had reached 1000, and we could afford a part-time secretary. Ruth Samia (now the Coordinator of the First Year Dean's Office) worked half-time for AWM and half-time for the Mathematics Department. In 1977 Ruth accepted a full-time position in the Mathematics Department; then Jane Kettendorf became the AWM Secretary. In 1978, when Margaret Munroe, Administrative Assistant to the Librarian, retired from Wellesley, she and Jane walked across the campus and changed positions. Margaret retired from AWM on July 1, 1987 (but stayed an additional month to train her successor!).

A corner of my office remained the AWM Office until shortly after Margaret Munroe began to work for AWM. Barbara Newell, then President of Wellesley, appointed a committee of women faculty members, active in their professions on behalf of women, with the charge of establishing the Center for Research on Women. During one of the committee's meetings she asked me if I would like an office for AWM. Her offer was gratefully accepted.

by Alice T. Schafer, Marymount University
AWM's second president

As AWM leaves Wellesley for the University of Maryland, we want to express our thanks and appreciation for the help and support which the College and the individuals mentioned above have given to AWM. We want to thank also President Nannerl O. Keohane for the support the College has given to AWM throughout her Presidency, which covers more than half the time the AWM Office has been at Wellesley! Also, we want to thank Martin Magid, Chair of the Mathematics Department, for his support of AWM and for his help in obtaining the last space which the AWM Office occupied on the campus.

I cannot end this piece without expressing my personal heartfelt thanks to Maud Chaplin. She has always, whether as Dean of Students, Dean of the College, Acting President, or Professor of Philosophy at Wellesley, supported AWM in its purpose of increasing the participation of women in the mathematical community.

NAOMI FISHER WINS HAY AWARD

In August of 1990, the AWM Executive Committee passed a resolution establishing the Louise Hay Award for Contributions to Mathematics Education and stating that:

> while Louise Hay was widely known for her contributions to mathematical logic and her strong leadership as Head of the Department of Mathematics, Statistics and Computer Science, her devotion to students and her lifelong commitment to nurturing the talent of young women and men secure her reputation as the consummate educator. The annual presentation of this award is intended to highlight the importance of mathematics education and evoke the memory of all that Hay exemplified as a teacher, scholar, administrator and human being.

This text was read by Mary Ellen Rudin, University of Wisconsin, Madison at the AWM Business Meeting, January 13, 1993, San Antonio when she presented the Hay Award to Dr. Fisher.

The 1993 award is presented to Dr. Naomi D. Fisher of the University of Illinois at Chicago, Co-director of the Mathematicians and Education Reform Network (MER) of the Universities of Illinois at Chicago and Minnesota and Director of the High School Teaching Program for the Regional Geometry Institute (RGI) for the Universities of Chicago at Illinois, Rice, Texas, Utah, and Washington.

The Mathematicians and Education Reform Network was created to facilitate the involvement of mathematicians in education improvement efforts. These efforts include mathematics education reform in elementary and secondary schools as well as improvement of undergraduate mathematics education. Over the past four years, MER has involved over 300 mathematicians and mathematics educators in regional workshops, has published, through the Conference Board of the Mathematical Sciences (with AMS and MAA), two monographs entitled *Mathematicians and Education Reform*, and has become a respected vehicle for legitimizing the role of mathematicians in education reform.

Naomi Fisher

Much of the success of MER can be directly attributed to the vision and efforts of Dr. Fisher. From the beginning, she had a clear sense of what was needed to develop a feeling of respectability for education-related projects among research mathematicians. She recognized that for many mathematicians involvement in education reform is a difficult step that requires nurturing and evolves slowly. She first designed workshops that highlighted successful and substantial efforts by respected mathematicians. The workshops often included sessions that addressed various concerns related to the participation of women and minorities in mathematics. With interest growing among mathematicians in mathematics education improvement, she later developed workshops that were broader in scope and carved out a leadership role for mathematicians in school reform efforts. Her conception of the *Mathematicians and Education Reform* monographs provided a scholarly forum for mathematicians to share research, experiences, and ideas about mathematics education. Her careful editing of the articles ensured that the content of the journal would be of high quality and respected. She has also attempted to use MER as a means to forge links between mathematics educators and mathematicians.

As coordinator of the program for high school teachers of the Regional Geometry Institute (RGI), Dr. Fisher developed a rigorous and exciting agenda for teachers that has been widely praised by participants. She also structured the program so that there would be significant time for exchange of ideas between the researchers and the high school teachers. In being a strong advocate on behalf of meaningful, two-way dialog among teachers and mathematicians, Dr. Fisher has made an important impact on the structure of the RGI and has broadened the views of many mathematicians.

It is also worth noting that Dr. Fisher has also developed many innovative ideas for the teaching of geometry at the elementary level. Her ideas have helped inspire many of the geometry lessons being developed in two major school curriculum projects: the University of Chicago School Mathematics Project (UCSMP) and the Teaching Integrated Mathematics and Science Project (TIMS).

Prior to coming to the University of Illinois at Chicago, Dr. Fisher served four years as Associate Director of the University of Chicago School Mathematics Project. There she had the difficult task of articulating the work and ideas of many different contributors into a coherent program. The wide commercial success of the University of Chicago materials can at least in part be attributed to Dr. Fisher's success in accomplishing that task and in laying a strong foundation for further development and growth.

Naomi Fisher's work over the past ten years has changed the way many people view mathematics and mathematics education. Whether she is working directly with pre-college teachers, developing innovative curriculum materials, or providing a legitimate entry point and encouragement for mathematicians to become substantially involved in mathematics education reform, Dr. Fisher has helped people stretch their thinking about mathematics. In doing so, she has embodied a spirit and passion for mathematics and a broad view of education that was shared by Louise Hay.

AWM TABLE VOLUNTEERS

Thanks to the following volunteers who staffed the AWM information table in San Antonio: Patty Anthony, Lisa Brooks, Randall Campbell-Wright, Toni Carroll, Laura Chihara, Cynthia Curtis, Pam Deering, Ruth Gornet, Cheryll Grood, Rebecca Hai, Deirdre Haskell, Ying Sue Huang, Ozlem Imamoglu, Maria Kubasiewicz, Nancy Lim, Elsa Newman, Barbara Nostrand, Tami Olson, Suzy Ottone, Donna Passman, Louise Que, Margaret Readdy, Sandy Rhoades, Catherine Roberts (the organizer), Dana Ruther, Hanna Sandler, Monica Vazirani, Anuradha Vishwanathan, Cynthia Woodburn, Olga Yirapaki, and Jennifer Zhao.

NSF-ONR WORKSHOP

The NSF-ONR Workshop was a full-day event on January 12 in San Antonio, full of mathematical excitement and ending with a well-attended dinner.

The postdocs and their talks were:

Cynthia Curtis, Princeton University
"Generalized Casson invariants"

Deirdre Haskell, College of the Holy Cross
"Cell decompositions for various algebraic structures"

Elizabeth Houseworth, Purdue University
"Escape rate for a conditioned 2-dimensional Brownian motion with applications to Zygmund functions"

Ying Sue Huang, University of Minnesota
"Ponies on a merry-go-round: Solutions for large arrays of Josephson junctions"

Ozlem Imamoglu, Dartmouth University
"Theta functions and Kubota homomorphisms for Sp(2n, Q(i))"

Tamara Olson, Brigham Young University
"Macroscopic mechanics of mixtures of materials"

Hanna Sandler, American University
"Self-intersections of closed geodesics on hyperbolic surfaces"

Jennifer Zhao, University of Michigan – Dearborn
"Numerical solutions for the Napier-Stokes equations"

The graduate students and their poster presentations were:

Patty Anthony, Howard University
"The left continuous and right continuous operations on BetaS can be significantly different"

Sheri Boyd, Vanderbilt University
"Mutually interassociative semigroups"

Ruth Gornet, Washington University at St. Louis
"Spectral geometry on Riemannian nilmanifolds"

Karin Johnsgard, University of Illinois at Champaign-Urbana
"Cayley complex structure for group presentations with all alternating-sign relators"

Nancy Lim, Brown University
"The Dirichlet problem for L^p for elliptic operators with bounded measurable coefficients"

Elsa Newman, Emory University
"Some problems in geometric optics"

Barbara Nostrand, Northeastern University
"Cosmic dice of a strange kind"

Margaret Readdy, Michigan State University
"Extremal problems for the Möbius function"

Sandra Rhoades, University of Massachusetts at Amherst
"A generalization of the Aramata-Brauer theorem"

Anuradha Vishwanathan, Mississippi State University
"A class of superlinear multi-parameter semi-positone problems"

Cynthia Woodburn, New Mexico State University
"Algorithms for the Quillen-Suslin theorem for monoid rings"

Olga Yiparacki, University of Michigan
"Some cardinal characteristics of the continuum"

Thanks to all for a great day!

LINDA KEEN: 1993 NOETHER LECTURER

Linda Keen

Professor Linda Keen of Lehman College, CUNY, delivered the 1993 Noether Lecture on January 14 in San Antonio. Her title was "Hyperbolic Geometry and Spaces of Riemann Surfaces."

Linda Goldway Keen was born in New York City. She attended the Bronx High School of Science, where she was first taken with the elegance of mathematics in her geometry class. After receiving her B.S. degree from City College, she studied at the Courant Institute and received her Ph.D. in 1964. She wrote her thesis on Riemann surfaces under the direction of Lipman Bers.

After a year at the Institute for Advanced Study, Keen took a position at Hunter College and at the Graduate Center of the City University of New York. When, in 1968, the Bronx campus of Hunter became the independent Lehman College, Keen moved to Lehman and has been there ever since. She was made full professor in 1974. She has held visiting professorships at U.C. Berkeley, Columbia, Boston University, Princeton University and MIT as well as at various mathematical institutes in Europe and South America.

Keen served as President of AWM during 1985-86 and as Vice President of the AMS during 1992-95. In addition to the Noether Lecture, in 1975 she presented an AMS Invited Address at the Joint Mathematics Meetings in Washington, DC, and in 1989 she presented an MAA Invited Address at the summer meetings in Boulder, CO. She is an associate editor for the *Journal of Geometric Analysis*.

In her Noether Lecture, Keen focused on the interplay between the analytic and geometric aspects of classifying Riemann surfaces. She originally tackled this problem in her thesis and subsequent early work. In the early 1960's Bers and Ahlfors showed that the space of conformal structures on a given Riemann surface can be modeled on a Banach space with a real analytic structure. Keen defined a set of parameters for this space in terms of the hyperbolic structure of a given surface determined by the conformal structure. In the mid 80's, she returned to this problem, this time in collaboration with Caroline Series. By this time, Bers had proved the space of conformal structures on Riemann surfaces admits a complex analytic structure, and Maskit had defined an embedding of that space into C^n for appropriate n. Using powerful techniques developed by Thurston that involve hyperbolic three manifolds, Keen and Series gave a geometric interpretation to Maskit's parameters.

Keen has also been interested in dynamical systems, where she has collaborated with Paul Blanchard, Robert Devaney, and Lisa Goldberg. She finds working with other mathematicians more exciting and less frustrating than working on her own. She says, "I am basically a social person and enjoy people."

Keen's father was an English teacher, and she says, "not only was mathematics fascinating, but it seemed as far away from English as I could get." Her father, though, was always encouraging. "I feel very lucky. First my father, then my thesis advisor, and finally my husband and children have been extremely supportive."

MOVING EXPENSES

Due to the move from Wellesley to Maryland, we have incurred more than $5000 of unanticipated expenses. If you have some dollars available in your charitable donations budget, we could put them to very good use.

AWM FAMILY LEAVE PRINCIPLES

Several years ago, Rhonda Hughes created an AWM Task Force on Maternity Leave to examine what was happening to women in academe when they decided to have children. The first thing that we did was to collect both official policies and personal stories. What we discovered was that most schools had no policy and that women were largely relying on luck, good timing, and the generosity of their colleagues. One large problem was that, for many women, the only recourse they had was to beg their co-workers to cover their classes. This led to a great deal of pressure for women to return to the classroom shortly after the birth.

AWM recognizes the need for parental leave. We need to make the workplace more responsive to the needs of the employees. And, as we all know, the pre-tenure years strongly overlap with child-bearing years. What follows is a list of principles that AWM supports. Feel free to use this list at your institution as a basis for developing parental leave guidelines.

- Leave with pay

  Duration: a minimum of six weeks, up to one term or semester

  Cause: birth or adoption of child

  Eligibility: parent with child responsibility. Must be a full-time faculty member with at least one year of service.

  Process: It is the responsibility of the administration to fund leave replacements for the faculty on parental leave.

  Tenure clock: can be stopped for up to one year at the request of the faculty member on parental leave.

- Leave without pay

  Duration: up to one year

  Cause: care of sick child or parent

  Eligibility: faculty member with responsibility for care. Must be a full-time faculty member with at least one year of service.

  Process: It is the responsibility of the administration to fund leave replacements for the faculty on parental leave.

  Tenure clock: should be handled the same way as for any faculty member on a leave without pay.

prepared by Anita Solow, Grinnell College

HONORS AND AWARDS

CONGRATULATIONS to the women listed below for their meritorious achievements.

Professor Anne Lester Hudson of Armstrong State College and Professor Doris Schattschneider of Moravian College received two of the first seven Distinguished College or University Teaching of Mathematics Awards given by the Mathematical Association of America. These Awards were established to honor college or university teachers who have been widely recognized as extraordinarily successful and whose teaching effectiveness has been shown to have had influence beyond their own institutions. The awardees were presented with certificates and cash awards of $1000 at the Joint Meetings in San Antonio.

Professor Hudson has a standard instruction to her department head when schedules are being prepared: "Give me as much variety as possible, and please don't give me two sections of the same course." As a result, her teaching assignments range from college algebra to abstract algebra, from mathematical modeling to number theory. A colleague wrote:

> Armed with a puckish sense of humor and a genuine concern for students, Anne Hudson quickly involves students at all levels in her enjoyment of mathematics.... [N]ot content just to be an excellent lecturer, Dr. Hudson has also been an innovator in classroom styles. In 1988 she became principal investigator of a successful NSF grant to create "An Environment of Computational Tools for Undergraduate Students in Mathematics."

Professor Hudson is widely known for her coaching of the Putnam team at Armstrong State and currently serves on the USA Mathematical Olympiad Committee.

Professor Schattschneider has been a highly respected mathematician and teacher of mathematics,

but her influence extends beyond her own classroom as an author, lecturer, and invited workshop leader. Her accomplishments related to the teaching of mathematics include work as a senior associate in the NSF Visual Geometry Project and as Editor of *Mathematics Magazine*. She is well-known as an author of expository articles and books in mathematics and was awarded the Carl B. Allendoerfer Award (for expository excellence).

Responding to receipt of the Award, Professor Schattschneider stated:

> I am deeply honored by this recognition by my colleagues in the MAA. I especially want to thank the teachers (including my mother) who inspired me — those who awakened my sense of curiosity, showed me that there was "wow!" in mathematics and appealed to the ham in me....

The 1993 Ruth Lyttle Satter Prize in Mathematics was presented to Lai-Sang Young of the University of California, Los Angeles, for her leading role in the investigation of the statistical (or ergodic) properties of dynamical systems. She has developed important and difficult techniques which have done much to clarify the subject. The Satter Prize is awarded every two years by the American Mathematical Society to a woman mathematician for an outstanding contribution to research in mathematics during the past five years; the prize was established by Professor Joan Birman in memory of her sister.

Deborah Haimo is the new chair-elect of the mathematics section of AAAS.

Joyce McLaughlin was named Ford Foundation Professor of Mathematics at Rensselaer Polytechnic Institute.

Margaret Cozzens is the new Division Director of the Elementary, Secondary and Informal Education Division at NSF.

Fifty percent of the speakers at the Swedish Mathematical Society winter meeting held January 15 in Linkoping were women. They were Gerd Grubb (Copenhagen), Rossitza Dodunekova (Gothenberg), and Ingrid Lindström (Uppsala).

Berit Blomberg, Kristin Dahl (a journalist), Celia Hoyles (London), Anna Kristjansdottir (Reykjavik; editor of the IOWME *Newsletter*), Ragni Piene (Oslo), Else-Marie Staberg (Umea), Heleen Verhage (Utrecht), and Inga Wernersson (Gothenberg) will be plenary speakers at a conference on "Women and Mathematics" to be held at the Lulea Higher School, June 14–16, 1993.

WOMEN IN MATH

"Women in Math" is a new video by Daniel Pennington produced by AWM and New Natives. This unique video introduces young girls to real women who are having fun and making a difference in the world using their math skills.

Girls will learn about exciting and rewarding opportunities in math fields through interviews with women who are biostatisticians, computer programmers, engineers, professors, and environmentalists.

Will I make good money if I get my degree in math? Can I make a difference in the world? Are there exciting jobs that require a math background? These are the kinds of questions that girls ask, and this video provides answers.

A few quotes from the video include:

> I really understood that in order to be good in math you simply had to work at it, and if you worked at it you could get it. [Dr. Arlene Ashe, biostatistician, Boston University]

> A background in mathematics prepares you for many different types of well-paid careers. [Dr. Margaret Menzin, mathematician, Simmons College]

> The more math you know, the better paid and more respected you will be. [Dr. Jill Mesirov, research scientist, Thinking Machines]

> If you are interested in your future, you could not do better than to study math. [Leslie Prescott, engineer, Mitre Corporation]

The "Women in Math" video is a result of one father's commitment to his daughter. Upon hearing that his daughter was in the top 5% of all math students, filmmaker Daniel Pennington set out to find and interview real women who've made math their career focus. His sincere interviews, along with MTV-style graphics, set the tone for this remarkable video. Copies of the video are available to individuals, organizations, libraries, and schools. For more information, contact AWM.

BOOK REVIEWS

Searching for Subjectivity in the World of the Sciences: Feminist Viewpoints. Roberta Mura. Canadian Research Institute for the Advancement of Women, 151 Slater Road, Ottawa, Canada K1P 5H3.

Over twenty years ago the second wave of feminism initiated feminist critiques in much of academe. Many disciplines now have well-developed feminist viewpoints and fields of research, but mathematics and the physical sciences remain almost untouched. A 1981 collection *Men's Studies Modified: The Impact of Feminism on the Academic Disciplines* had one chapter to cover the physical and natural sciences (with the exception of biology). *The Knowledge Explosion: Generations of Feminist Scholarship*, published in 1992, eleven years later, has an article on mathematics and physics and again mentions the paucity of feminist analyses of mathematics. One needs to keep this in mind when reading *Searching for Subjectivity in the World of the Sciences*. Its aim is not to provide a feminist analysis of mathematics, or any of the other physical sciences, but to draw on critiques of the "human sciences" and examples from all sciences to suggest lines of inquiry that a feminist critique of mathematics might take. The "subjectivity" of the title has a range of related meanings, many defined as the absence of some form of objectivity such as logical positivism, a split between the self and the world, subject-object duality, etc.

Subjectivity is the most nebulous of the themes Mura has abstracted from feminist critiques of the human sciences. The others, "the omission of women, their productions and concerns" and "inadequate or disparaging representations of women, evaluation of women according to a masculine 'norm,' " are, I think, easy to understand from everyday experience and historical accounts. Histories of science such as Rossiter's *Women Scientists in America*, Schiebinger's *The Mind Has No Sex?*, and Noble's *A World Without Women* show some of the ways in which women have been omitted, erased, unfairly evaluated, and misrepresented by scientists. Subjectivity, I think, is more difficult to demonstrate because it requires a knowledge of the relationship (varying, of course, with time, society, and the scientist) between scientist and object of study which is little examined in the case of the physical sciences, and because subjectivity itself isn't yet well-defined.

Mura's overview and discussion of subjectivity in science shows the many ways in which this topic has been approached. Studies vary from that of the influence of society on scientific theories (for instance, the influence of sexism in Victorian society on the development of Darwinism) to psychological descriptions of objectivity as separation of self from the world and accounts of its origins. Mura also discusses the issue of the relationship of subjectivity to gender and power, which is suggested by similarities in some feminist, Africanist, and Marxist critiques of science.

In her short discussion of subjectivity and mathematics Mura states that most mathematicians are formalists and if not may be Platonists or constructivists (she cites a French source for this statement; perhaps this is true of French mathematicians). She characterizes Platonism as "situat[ing] mathematical objects in the Platonic realm of ideas" and constructivism as "hold[ing] that these ideas exist only in the mind of the mathematician." She concludes: "Whatever the perspective, there is scarcely any sense in trying to separate, or trying not to separate, oneself from objects which do not exist, or which have only an ideal or an imaginary existence." This avoids the issue of how mathematicians themselves view mathematical objects, which might seem to be how the question of separation of knower from known in mathematics should be framed.

As Mura is a mathematician, it is disappointing that her discussions of mathematical examples are less detailed and convincing than her discussions of examples from other sciences and that she gives short shrift to philosophy. Work in the philosophy of mathematics, such as that of Kitcher or Lakatos, gives more detailed accounts of mathematicians and mathematics and could provide different formulations and evidence of subjectivity in mathematics.

One aspect of great interest to me in this monograph was the examples of ways in which science was affected by gender categories of our and other societies. Many were new to me. Most were from the history of science or from present-day critiques of biology. These examples and the order in which

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Cathy Kessel, 2520 Etna
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Mura presents them give a sense of the range of ways in which the doing of science may be affected by the importance of gender as a category in society.

In the section on projections of human sexual stereotypes, Mura cites some examples from zoology which may seem obvious to us now (though they weren't obvious to many biologists until recently), and less obvious examples from cell biology.

> The Biology and Gender Study Group of the University of Swarthmore College, Pennsylvania devoted an article to analyzing narratives of two phenomena of cell biology: fertilization and the determination of the sex of the embryo.... The authors demonstrate how undue association of the reproductive cells with the feminine and masculine genders has profoundly influenced observations and descriptions of the behavior of gametes during fertilization. Both in contemporary teaching manuals and in scientific works (as recent as the beginning of the twentieth century), the egg is presented as passive, possibly endowed with the capacity to "choose" the kind of sperm which it will allow to penetrate it. The sperm, on the other hand, becomes the hero of a saga in which it alone survives the trials of the passage through the vagina, the uterus, and the Fallopian tube, trials which are fatal to millions of its rivals: the egg, a sleeping princess, will be the prize of the conquering sperm.... It was only in the 1980s that the scenario was reexamined and that the mutually active roles of the two gametes were recognized.
>
> According to the same authors, the story is repeated with respect to zygotes.

Mura continues this discussion into the physical sciences, drawing on the work of Gaston Bachelard. Electricity was thought during the eighteenth century to have some connection with sexuality, at more than a metaphorical level, which led to testing the hypothesis that eunuchs were poor conductors of electricity and to the use of electricity for sexual disorders. The power of this connection hasn't entirely failed: electrical plugs are referred to as male and outlets as female.

Alchemical literature described chemical reactions as sexual acts. "Even today ... chemical reactions are often sexualized, at least in the minds of students. Acids, for example, have masculine connotations, and bases, feminine; hence an active role is attributed to acids and a passive role to bases in chemical reactions...."

An example from mathematics: Peiffer "identified a coherent system that links, among other things, sex and [ancient Greek] mathematics." This system associates male, rest, and straight in opposition to female, motion, and curved. Mura says only that this categorization has influenced mathematics beyond the classical period and cites Froughy and Peiffer's statement that "official mathematics has constantly separated the flowing, the indefinite, the moving, the multiple which are all put to the same side which is also the female side, to the benefit of the defined, the stable, the unique which accompanies the male" [my (fairly literal) translation]. Mura doesn't discuss this further so one doesn't get a sense of how this has affected mathematics.

Failure to accurately describe mathematics and mathematicians is, I suspect, one major reason why feminist critiques of mathematics are so few in number (if, indeed, any exist). Such a critique seems a formidable task, for which the knowledge of feminist mathematicians seems insufficient; one needs, perhaps, in addition a detailed "outside" description of mathematics from a philosophical or ethnographic viewpoint and a knowledge of feminist theory. As Mura says:

> Feminist writings on the sciences (always excepting human biology) are often the work of authors engaged in philosophy, history, and the teaching of science rather than in the sciences themselves. This situation has sometimes been denounced, but has not yet been redressed by scientists. Perhaps because of the lack of this specialized expertise, many of the critiques that have so far been put forward are global in nature and link up with political or philosophical currents stemming from other concerns: pacifism, the ecology movement, the constructivist critique of positivism.

Many of the critiques of science I read seem to be written by those who dislike, fear, or are ignorant of science. (One question this raises is: What about the objectification of science in critiques of science?) In her review of Sandra Harding's *Whose Science? Whose Knowledge?*, Judy Roitman quoted Harding as saying, "The issue for the feminist epistemological critiques is a different one: 'woman the knower' (like 'woman scientist') appears to be a contradiction in terms." In contrast, as a mathematician Mura doesn't need to wonder if "woman scientist" is a contradiction in terms. In fact, she concludes the monograph:

> I should like ... to stress something that should already be clear: the undertaking of a feminist critique of the sciences does not contradict that of increasing participation by women in scientific studies and professions. On the contrary, it is altogether likely that the two undertakings would mutually support each other.

A World without Women: The Christian Clerical Culture of Western Science. David F. Noble. Knopf, New York, 1992. xviii, 331 pp. $25.

I suspect many readers will have the same reaction that I did to the intriguing dust jacket of this equally intriguing book. The front shows a naked male figure (with the requisite fig leaf) in a pristine forest setting. Next to him is a dark area, empty save for a small branch and a leaf suspended in mid-air. The latter struck me as odd, but I gave it no further thought. It was only after I read the credit to Kathy Grove for her retouched photograph and looked at the back cover, where Dürer's original "Adam and Eve" is reproduced, that I realized the *trompe l'oeil*. My first impression of the "womanless world" of the front cover was that it was normal.

That such a simple visual trick could have misled someone who has herself spent more than a decade researching women's place in the history of science and medicine underscores how much we have needed someone to articulate the simple observation with which David Noble begins his book: that the absence of women from the world of science has been so pervasive historically that it "has been taken as a given, something to be overcome, perhaps, but never really explained." Unlike other recent books that have explored the history of women in science by examining the forgotten achievements and struggles of the female scientists who *have* existed, Noble places emphasis not on the exception but on the rule, arguing that the scientific culture of Western science "has not simply excluded women, it has been defined in defiance of women and in their absence." The profoundly masculine character of modern science is thus not an accident, a mere manifestation of the sexism of the rest of society. Rather, it is historically contingent, a manifestation of peculiar historical developments. It is not "natural," nor, Noble stresses, was it inevitable.

Science is not merely masculine, in Noble's opinion; it is monastic. And it is in the male monasteries of medieval Europe that Noble seeks to find the origin of science's "world without women." More than half of Noble's book is devoted to the development of Western Christian monasticism in the early Middle Ages and, in the later Middle Ages, of the equally celibate masculine world of the universities. At a very early stage in its development, Western Christianity focused on sexuality in a way unparalleled by most other religions. Religious heterodoxy became associated with the public commingling of men and public, and sexual licentiousness was a common accusation with which to dismiss religious movements labeled by their opponents as heretical. Orthodoxy, then, came to be defined around the rejection of sexuality while heresy was correlated to the proximity of women; for the male ecclesiastics who established control, women came to be sources of distrust, resentment, and outright fear. Hence the flight from women, first into the desert and later into the new autonomous and exclusive masculine world of the monastery. In the 11th century, universal male clerical celibacy, which had up to that point been only moderately enforced, became one of the two chief objectives of a new reform movement. In the 12th century, a new institution, the university, came into existence; unlike the male monasteries, it had no female counterparts. Rather, it was an absolute "world without women," an enclave of masculinity as exclusive as any military organization.

The rest of Noble's book chronicles the survival of clerical elements in the post-medieval world, where, Noble asserts, science remains an expression of Christian devotion. Although clerical celibacy was one of the first casualties of the Protestant Reformation, Noble argues that the masculine seclusion of the cloister remained a defining characteristic of both informal and formal scientific associations throughout the Scientific Revolution and beyond. Noble sees the trend toward greater sexual equality in 19th-century America as motivated by a return to the positive values of the early church.

Noble, who is to be congratulated for his exceptionally fine command of a huge body of historical literature, offers many persuasive arguments for this radically new look at the development of Western science. It is only in light of his arguments that one

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Reprinted by permission from Science, *Vol. 258, 30 October 1992, pp. 829-830, "Remanent Monasticism"*

sees the significance of the long ban, which extended up through the 19th century, that forbade dons at Oxford and Cambridge from marrying. And Noble's litany of great English scientist who never married (whether or not they belonged to the universities) is indeed amazing.

But Noble's arguments often seem overdetermined. Once he has identified male clerical celibacy as the culprit for the masculine nature of Western science, it becomes a Procrustean bed onto which he must force all the history of Western science. Italian university professors, who unlike their Parisian and English colleagues were often married laymen, have to be awkwardly explained away. So do other scientists who are not celibate; William Harvey, for example, is introduced by the terse assertion that "though married, [he] held women in low regard." Noble takes the 16th-century iconoclast Paracelsus as a model of anticlericalism and antiuniversity sentiment. Yet even as Paracelsus claims to seek out peasant women (among others) for information on herbs and natural remedies, he is as profound in his misogyny as any of his contemporaries ensconced in the masculine isolation of the universities.

Woven into Noble's analysis are unarticulated assumptions about sexuality. Noble never clearly explains that celibacy has only recently become synonymous with sexual continence. He seems eager enough to identify instances of homosexuality when he finds them, implying that the only sexual options were other men or nothing. Yet studies of medieval female prostitution show that the most regular clientele was university students. Noble's general thesis implies that if male scientists had been married and heterosexual, the position of women in science would have been very different. The "company of women" is of course a necessary precondition to intellectual exchange between the sexes, but it is hardly any guarantee of it.

When we look at the other two great civilizations adjacent to the Middle Ages in time and space — Greco-Roman Antiquity and the medieval Muslim world — we find exactly the same exclusion of women that characterizes Western science. Neither ancient Greco-Roman society nor medieval Islam had monks or celibate priesthoods. Yet their exclusion of women from science was just as absolute. The odd exception like the late antique mathematician Hypatia no more modifies the conclusion that ancient science was fundamentally masculine than do such later female scientists as Emilie du Châtelet or Maria Winckelmann. Hypatia, like her later sisters, could actualize her scientific interests and aspirations only because a male (in her case, her father) gave her a private door of entry. Noble is certainly correct in stressing that the masculine character of Western science cannot be attributed to simple continuity with Antiquity (or, he might also have noted, medieval Muslim society). But in fact, the more we acknowledge that the three cultures were distinct, the more we are faced with the realization that women's exclusion from science must have some deeper cause.

This does not mean that we should revert to thinking that the "world without women" is natural. It does mean that we need a more comprehensive analysis of how the construction of gender functions in the realm of intellectual life. Why is it that the greater the percentage of women's participation in a given intellectual sphere, the more the general prestige of the sphere declines? Why is it that women's intellectual capabilities have, until recently, been so ignored and underdeveloped? To the question "what is women's education for?" most societies have answered "nothing." The most famous medieval female intellectuals — such as the playwright Hroswitha or the cosmologist, visionary, and medical writer Hildegard — were products not of the early and exceptional double (that is, "coed") monasteries that Noble praises but of that "world without men," the single-sex female nunneries. Even when women were educated, their curricula were often structured on a belief in women's lesser intellectual capabilities. When science worked its way into the curricula of the 19th-century American women's colleges, it did so largely because it was seen as a suitable substitute for the classical languages, Greek and Latin, which were the foundation of male education but which women were thought too intellectually limited to handle.

In a way, it is Dürer's original and its suggestion that there ever was a time of genuine equality between men and women that seems so odd.

On second thought, maybe Noble's visual trick on the cover is not a *trompe l'oeil* after all. In a way, it is Dürer's original and its suggestion that there ever was a time of genuine equality between men and women that seems so odd.

JCW RECOMMENDATIONS

1. Study Groups:

We recommend that any congressional commissions and/or federal task forces which study issues affecting women mathematicians and related groups in science and engineering include representation from women active in the work force in these groups, and provide ample opportunity for input from groups which represent women mathematicians and scientists. In the case of mathematics, this would include both the AWM and the JCW.

Federal study groups should also recognize that while some issues affect women in most occupations, others may disproportionately affect mathematicians and scientists; in addition, there are variations within subspecialties, variations with type of work force, i.e. academia vs. industry, and with such characteristics as theoretical vs. experimental work. Therefore, it is important that data be gathered and presented in a manner which accurately represents the situation within appropriate subgroups. In particular, the workplace circumstances of women in mathematics, physical science, and engineering (in which women are a small percentage) are quite different from those of social scientists (in which women are a large percentage). Therefore, study groups should avoid merging these groups and should insure that any summary reports from studies which include both groups accurately reflect their different circumstances.

2. Fellowships and Awards:

We recommend that all federal groups which award scholarships, fellowships, and grants to mathematicians and scientists maintain and make available statistics on the application and success rate of women. When significant imbalances occur, federal agencies should carefully investigate the causes and consider mechanisms for increasing the number of successful female applicants. Special programs for women have often proved effective in enabling women to fully develop their talents and should be encouraged.

3. Grant Policy:

In view of the fact that women research mathematicians are not concentrated at a few top institutions, but dispersed across a wide range of institutions, any mechanism for federal funding of research should ensure that funding opportunities exist for mathematical scientists in every category of institution, either through direct grants or through provisions for allowing researchers at small institutions to join large consortia as full partners.

4. Education Policy:

Because of the importance of early education to the eventual success of women mathematicians and scientists, the JCW supports increased federal funding to improve the quality of education at every level. In addition, we recommend that all new programs include methods of assessment which effectively determine whether or not they are as effective for young girls as for boys.

5. Family Leave:

The JCW supports federal action to encourage and facilitate family leave so that all mathematicians, both female and male, can fulfill family responsibilities.

The Joint Committee on Women, chaired by Beth Ruskai, has produced these recommendations as input for the Joint Policy Board for Mathematics, which will be creating a federal policy agenda. The JCW looks forward to collaborating further with JPBM and the various societal policy committees on ways that the mathematics community can address differential gender effects in response to further developments in federal grant policy.

DUE ANNOUNCEMENT

NSF's Division of Undergraduate Education (DUE) has just released a new integrated "Program Announcement." This document describes grant opportunities in undergraduate science, engineering, mathematics, and technology for all types of institutions including universities and two- and four-year colleges. DUE serves as the NSF focal point for undergraduate education, conducting leadership activities and managing leveraged support programs. The DUE program announcement may be obtained from NSF's electronic mechanism, STIS, via Bitnet (pubs@nsf) or Internet (pubs@nsf.gov), by FAX (703-644-4278), or by phone (202-357-7861). Request NSF 92-135.

EDUCATION COMMITTEE

The Department of Mathematical Sciences of the University of Alaska Fairbanks includes computer science, mathematics, and statistics. The harmonious relationship that exists among the members of these areas may be one of the reasons for the great success of the department in mathematical modeling education.

Mathematical Contests in Modeling (MCM) began in 1985, and UAF began participating in 1986. Since then, we have had a disproportionately large share of teams rated "meritorious," and in both 1990 and 1991 we fielded teams which were judged "outstanding meritorious," which ranked them among the top six teams in the nation participating in the MCM those years. In 1990 mathematics professor Patrick Lambert entered a winning team consisting of Chris Hartman, Kirk Hogenson and John Miller — all men. The 1991 winning team from Alaska was entered by statistics professor Robert Hollister and was composed of Anna Baumgartner, Eiluned Hogenson and Anu Rao — all women. In Alaska, both men and women chop firewood, win the Iditarod and excel in the mathematical sciences.

Like many universities, UAF has occasionally provided courses to fulfill the continuing education requirements of secondary teachers. But we have been concerned with the lack of coherence that often exists among the various classes. In response UAF has developed a summer master's degree program. The degree program we have set up is for four consecutive summers and is composed of three academic components.

The first component consists of a synthesis of applied mathematical sciences used in mathematical modeling. Our successful undergraduate program in mathematical modeling will now be extended to a program accessible to high school teachers (and through them to their students).

The second component is a mix of traditional core topics providing background information required for the modeling component. Just as importantly, however, it introduces aspects of modern mathematical thought and logic, and the historical perspective behind the development of these ideas.

Finally, each student will complete three projects. These may be traditional master's projects, or they may be aimed at popularizing and/or interpreting new or profound areas of the mathematical sciences through the incorporation of modern technology. Participants will be guided in the use of computer programs such as Maple and Mathematica for exploring mathematics, statistical packages for quantifying nature, and mathematically oriented word processors.

UAF is very excited about the prospects of the Summer Masters Program, and, pending NSF funding, approximately 30 participants will be provided travel expenses, funding toward room and board, and a small stipend for each of the seven-week summer sessions. Interested parties are invited to write: Larry Santoni, Director, Summer Masters Program, Department of Mathematical Sciences, UAF, Fairbanks, AK 99775; email: ffls@aurora.alaska.edu.

UAF is also instituting a new M.S. option in applied mathematics. This augments the current Ph.D. program in mathematics, an accredited M.S. in computer science, and various inter-disciplinary programs (in particular, biostatistics and engineering related projects).

Finally, the University of Alaska system's new Cray supercomputer may possibly be the most powerful supercomputer in the world when it is fully installed by August on the Fairbanks campus. Computing science students now also have access to IBM, Sun, and DEC workstations and parallel-based machines. Moreover, all mathematical science students are benefiting from the NeXT lab installed this past year.

Any comments? Write to:

AWM Education Committee, c/o Sally I. Lipsey, Chair
70 E. 10th Street, #3A, New York, NY 10003-5102

by Basil Coutant and Larry Santoni (Director, Summer Masters Program), University of Alaska Fairbanks

NAFIPS CONFERENCE

The North American Fuzzy Information Processing Society will hold its annual conference on "The Impact of Fuzzy Logic in Modern Technology" August 23–25, 1993, with tutorials on August 22, at the Allentown Hilton, Allentown, PA. Conference and tutorial fees are much reduced for registration by April 30, 1993. For more information, write Program Chair, Marialuisa N. McAllister, 3604 Gloucester Drive, Bethlehem, PA 18017.

ICMI CONFERENCE

The conference "ICMI Study on Gender and Mathematics Education" will be held 7–12 October 1993, in Malmoe, Sweden. A discussion document for this conference was published in the November-December 1992 AWM *Newsletter*.

For matters concerning the scientific program, please contact: Gila Hanna, Ontario Institute for Studies in Education, 252 Bloor St., West Toronto, Ontario, Canada M5S 1V6. Tel: (416) 923-6641, ext. 2474. Email: ghanna@oise1.oise.on.ca. Fax: (416) 926-4725. For organizational matters, please contact: Barbro Grevholm, Malmö College of Teacher Education, Box 23501, S-200 45, Malmö Sweden. Tel: (+46) 46 143826. Fax: (+46) 46 184948.

CBMS CAREER GRANT

Acting on behalf of the Conference Board of the Mathematical Sciences, the Mathematical Association of America has received a three-year grant from the Department of Energy to develop a comprehensive program to prepare and disseminate career information in the mathematical sciences. This initiative will serve as the basis for a sustained effort by the fifteen CBMS member societies to provide up-to-date career information in the mathematical sciences to students, teachers, advisors, and guidance counselors in schools and colleges.

There are four related components to the project: gather information about existing career information; link math community efforts with other organizations that provide career information; develop needed new materials in print and video formats; and establish a subscription program for continuing dissemination of career information.

This program will be directed by Dr. Andrew Sterrett at the MAA headquarters in Washington. Responsibility for general policy and project direction will be vested in a steering committee representing the CBMS member societies. The current members of the steering committee and the societies they represent are: Carol Westfall (AMATYC), Samuel Rankin (AMS), Nancy Flournoy (ASA), Jenny Baglivo (AWM), John Alexander (NAM), Linda Hall (NCTM), Frank Trippi (ORSA), and Leon Seitelman (SIAM).

The career information that reaches students should be lively and appealing and should reflect the great opportunities and real diversity of careers in the mathematical sciences. As the first step in implementing this project, we are urgently seeking information about existing career information materials and programs. Posters, brochures, videos, books, programmatic ideas: please send us samples or references for any career material that you or your students have found helpful or useful, as well as your suggestions for where new material is most badly needed.

All correspondence or inquiries about this program should be directed to: Andrew Sterrett, Career Information in the Mathematical Sciences Project, Mathematical Association of America, 1529 18th Street NW, Washington, DC 20036. Telephone: (202) 387-5200. Email: maa@hilda.umd.edu

MATHEMATICS RESEARCH OPPORTUNITIES FOR UNDERGRADUATES

We are inviting applications from undergraduate students to fill six student research positions at the National Science Foundation Research Experiences for Undergraduates Site at Texas Christian University, which will be held during the dates June 7 – July 30, 1993. The participants will conduct research in the area of computational group theory and graph theory under the guidance of experienced faculty. All participants will receive a stipend of $2400 along with a $400 housing allowance.

Participants must be students enrolled in a degree program leading to a bachelor's degree. To apply, please send a completed application form, college transcript(s), and two letters of recommendation from mathematics professors to Dr. Rhonda L. Hatcher, Mathematics Department, Texas Christian University, Fort Worth, Texas 76129.

Application deadline: March 15, 1993. For further information or an application form, please contact Dr. Hatcher at the above address, by e-mail at hatcher@gamma.is.tcu.edu, or by phone at (817) 921-7335.

FELLOWSHIPS

Fulbright Scholar Awards

The Fulbright Scholar Program includes some 1000 grants for research, combined research and lecturing, or university lecturing in nearly 135 countries. Opportunities range from two months to a full academic year; many assignments are flexible to the needs of the grantee. Nearly one-third of Fulbright grants are targeted for research, and many lecturing awards offer research opportunities; multi-country research is also possible in many regions.

Virtually all disciplines and subfields participate. The basic eligibility requirements for a Fulbright award are U.S. citizenship and Ph.D. or comparable professional qualifications. For lecturing awards, university or college teaching experience is expected. Language skills are needed for some countries, but most lecturing assignments are in English.

Applications are encouraged from professionals outside academe and from independent scholars. Fulbright seeks good teachers as well as active researchers.

The deadline is August 1, 1993 for 1994-95 awards to all world areas. Other deadlines are in place for special programs.

For further information and applications, call or write the Council for International Exchange of Scholars, 3007 Tilden St., NW, Suite 5M, Box NEWS, Washington, DC 20008; (202) 686-7877.

Research Fellowships in India

The Indo-U.S. Subcommission on Education and Culture is offering long term (6-10 months) and short-term (2-3 months) awards for 1994-95 research in India. These grants will be available in all academic disciplines except clinical medicine. Applicants must be U.S. citizens and hold the Ph.D. or comparable professional qualifications.

The fellowship program seeks to open new channels of communication between academic and professional groups in the United States and India and to encourage a wider range of research activity between the two countries than now exists. Scholars and professionals with limited or no prior experience in India are especially encouraged to apply. The program is sponsored by the Subcommission and is funded by the USIA, the NSF, the Smithsonian Institution, and the Government of India.

The application deadline is August 1, 1993. Application forms and further information are available from CIES, 3007 Tilden St., NW, Suite 5M, Box INDO-NEWS, Washington, DC 20008-3009; (202) 686-4017.

NRC Postdocs

The National Research Council announces the 1993 Resident, Cooperative and Postdoctoral Research Associateship Programs to be conducted on behalf of 30 federal agencies or research institutions whose 115 participating research laboratories are located throughout the United States. The programs provide opportunities for Ph.D. scientists and engineers of unusual promise and ability to perform research on problems largely of their own choosing yet compatible with the research interests of the sponsoring laboratory. Initiated in 1954, the Associateship Programs have contributed to the career development of over 7000 scientists ranging from recent Ph.D. recipients to distinguished senior scientists. Most of the programs are open to both U.S. and non-U.S. nationals and to both recent Ph.D. degree recipients and senior investigators.

Awards are made for one or two years, renewable to a maximum of three years; senior applicants who have held the doctorate at least five years may request a shorter period. Annual stipends for recent Ph.D.'s for the 1992 program year range from $27,750 to $44,000, depending upon the sponsoring laboratory, and are appropriately higher for senior Associates.

Financial support is provided for allowable relocation expenses and for limited professional travel during duration of the award. The host lab provides the Associate with programmatic assistance including facilities, support services, necessary equipment, and travel necessary for the conduct of the approved research program.

Applications must be postmarked no later than April 15 and August 15 for reviews in June and October, respectively. Initial awards will be announced in July and November, followed by awards to alternate candidates later.

Information on specific research opportunities and participating federal laboratories, as well as application materials, may be obtained from: Associateship Programs (GR430/D2), National Research Council, 2010 Constitution Ave., NW, Washington, DC 20418; fax: (202) 334-2759.

GIRL SCOUTS AND SCIENCE MUSEUMS

The Franklin Institute and Girl Scouts of the U.S.A. have announced a three-year, $1.5 million joint project to promote achievement in science among girls aged 8 to 13 through hands-on activities. Special efforts will be made to reach girls from underserved populations.

Funded by grants from the National Science Foundation, The Annenberg Foundation, the American Honda Foundation, and The Equitable Foundation, the National Science Partnership for Girl Scouts and Science Museums establishes links between Girl Scout councils and science-technology museums at six sites across the nation. They include: Philadelphia, Hartford, Columbus (Ohio), St. Louis, Dallas, and Los Angeles.

The goal of the National Science Partnership is to change the way young women view science. We know that within ten years, nearly half of the American workforce will be women. We also know that to compete in a global, technology-driven economy all American workers will have to be science literate. Unfortunately, many American students, both boys and girls, are ignorant of even the rudimentary principles of science. But the problem is particularly acute for girls, who often demonstrate socially influenced avoidance of science and math by the time they reach adolescence. Science museums and Girl Scout councils, with their emphasis on informal, non-competitive education, present an ideal environment where girls can learn science by acting like scientists: questioning, experimenting, observing, predicting, keeping records, and learning from both their successes and their failures that science is a vital part of their everyday world.

Seven "lab-in-a-bag" activity kits on topics like chemistry, physics, and astronomy have been developed. They correspond to the science activities found in the official Girl Scout handbooks. Training the volunteer Girl Scout leaders to conduct a 6-8 week program of science activities is the first and perhaps the most important step in the partnership program. Science museum staff members will introduce leaders to these hands-on science activities, lead them step-by-step through each experiment and provide much needed support to those who may be intimidated by science. With new-found confidence in their own ability to do science, each leader will serve as a role model and touch the lives of hundreds of girls in the next several years.

Although national in scope, the National Science Partnership recognizes that each community faces different challenges and that every community has unique strengths. Each council/museum partnership will develop specific programs that serve the needs of their local Girl Scouts.

Based on a successful pilot program conducted by The Franklin Institute Science Museum in Philadelphia, PA, and the Greater Philadelphia and Washington Rock (NJ) Girl Scout councils, the National Science Partnership's three-year project will directly serve 11,500 Girl Scout leaders and 138,000 Brownie and Junior Girl Scouts.

For more information on the national project please contact: Elaine Wilner, The Franklin Institute Science Museum, (215) 448-1176 or Barbara Smith, Girl Scouts of the U.S.A., (212) 852-6548.

STRIVE PROGRAM

Worcester Polytechnic Institute (WPI) is sponsoring an exciting educational enrichment summer opportunity for Black, Hispanic and Native American students who are presently in their high school junior year. The goal of this program, "Strive for College and Careers in Mathematics, Engineering and Science," is to increase the number of underrepresented minority students who successfully pursue careers in the areas of science, mathematics, and engineering. To be admitted, a student must demonstrate interest and achievement in the sciences and mathematics. Cost of participation in Strive can be offset by partial and full scholarships.

WPI has been ranked highly for the past several years in the *U.S. News & World Report* "America's Best Colleges" issue. This year, it was rated first of Northeastern regional universities.

The deadline for submitting Strive applications is April 30, 1993. Please encourage eligible students to apply. To obtain brochures about the program and its benefits (such as guaranteed admission and a four-year full-need financial aid package to participants who meet WPI's entrance requirements upon graduation from high school) or application forms, contact Nicolás Ledú at (508) 831-5819.

AWM WORKSHOP

AWM will sponsor a Workshop in conjunction with the annual SIAM meeting for women graduate students and postdocs in applied mathematics. It will be similar to the workshops held at major mathematics meetings over the past three years and will be funded by NSF and ONR. The workshop will take place on July 11, 1993, before the SIAM Meeting (July 12 to 16) at the Wyndham Franklin Plaza Hotel in Philadelphia, PA.

Funding for travel and subsistence will be offered for up to ten women graduate students and ten women postdocs to attend the AWM Workshop. Those attending are encouraged to stay for the rest of the SIAM meeting. Departments are urged to provide some institutional support.

To be eligible for funding, graduate students must have begun work on a thesis problem. Postdocs must have received their Ph.D. within approximately the last five years. All applications should include a curriculum vita and a concise description of research; graduate students should include a letter of recommendation from their advisor.

Nominations by other mathematicians (accompanied by the information described above) are welcome.

The deadline for applications is April 1, 1993. They should be sent to: Ginny Reinhart, Executive Director, AWM, 4114 Computer & Space Sciences Building, University of Maryland, College Park, MD 20742-2461; (301) 405-7892.

BARRIERS TO WOMEN IN SCIENCE AND ENGINEERING

The barriers prohibiting women from achieving equity in science and engineering, which often comprise a "triple penalty" of cultural, attitudinal and structural bias, are examined in a new report by the Commission on Professionals in Science and Technology. The report finds that although generally better educated than in earlier years, American women continue to endure higher rates of unemployment and, when employed, lower salary levels than their male counterparts.

This is clearly demonstrated in the science and engineering professions. Budget and recession-based cutbacks for research and development have provided fewer job opportunities, allowing the gap between unemployed men and women to widen. Women are more likely than men to be laid off first, especially when seniority is a factor. In academe, women's standing in the academic pecking order is likely to place them in positions outside the tenure track, or not yet tenured, again making them prime candidates for workforce reductions.

In all fields, women earn significantly less than their male counterparts. However, the rate at which women move toward achieving near pay equity in science and engineering appears to correlate directly to the amount of college-level mathematics completed. The message for young women seems clear, whether provided by better advice and assistance in selecting high school and college courses or simply by insuring that Barbie has her facts straight and delivers the right message, but the job of spreading that good news is not an easy task.

The report also notes:

- An increasing number of foreign doctoral recipients, largely male, reduces the percentage of women among the graduates, particularly in the math-based fields where foreign participation is greatest.

- Even in female dominated fields such as nursing, elementary teaching, and office and financial services, men are paid more than women, from the very first job.

For example, 1992 starting salary offers to new baccalaureate graduates in elementary education average $22,676 for men, $20,176 for women. In nursing, the figures are $33,039 for men, $32,557 for women, and in psychology, $22,034 for men, $19,647 for women.

- Less than 3% of top jobs at Fortune 500 companies were held by women in 1990; only 2.6% of the 6,502 corporate officers employed at the nation's largest companies last year were women; only 4.5% of the corporate board seats of the Fortune 500 companies were held by women.

- As in other occupations, women employed in science and engineering are subject to sexual harassment, with 30 percent and more of women in various science fields reporting such experiences.

- The barriers of social prejudice, custom, and societal mythologies about sex-based characteristics

of girls and women continue to impede progress for women in science.

What is Holding up the Glass Ceiling? Barriers to Women in the Science and Engineering Workforce by Betty M. Vetter is the third in the 1992 series of occasional papers published by the Commission on Professionals in Science and Technology. Copies are available for $25 from CPST, 1500 Massachusetts Ave., NW, Suite 831, Washington, DC 20005.

BRIEF NOTES

The Scientists' Institute for Public Information (SIPI) is a national, nonprofit organization working to improve the public's understanding of science and technology. They would like to increase the number of women scientists listed with their Media Resource Service.

The Media Resource Service, a core program of SIPI established in 1980, refers journalists to scientists, engineers and physicians who have agreed to speak on subjects within their areas of expertise. It maintains a database of almost 30,000 participants. The Videotape Referral Service has broadcast quality videotape available for science-related stories.

To obtain a questionnaire and join MRS, write SIPI-Media Resource Service, 355 Lexington Ave., 16th Floor, New York, NY 10017.

Many items are available from the National Women's History Project. "Women in Science and Mathematics" is a colorful poster made possible by a grant from AT&T. The 22" x 27" poster is $8 plus $3 s/h. "Women in Science" is a 16-page tabloid designed to promote gender equity in the classroom and workplace. Packed with information on historic and contemporary women in science, the tabloid is sure to capture the attention of secondary students and adults alike. It is $2.50 plus $1 s/h; bulk rates are available. The "Outstanding Women in Mathematics and Science" display kit features 23 full-page black-and-white photos and short biographies of women who have made important contributions to a wide variety of mathematical and scientific fields; it is $12 plus $4.50 s/h. The 13-minute video "You Can Be a Scientist, Too!" is about careers in science fields and was filmed on location with elementary schoolchildren. It is $69.95 plus $7 s/h. The multicultural booklet series, American Women in Science Biographies, shows how the childhood interests of a number of women scientists led to their interesting careers. Set I of the series features 10 women (10 booklets and a teacher's guide is $72 plus $7.20 s/h), and Set II includes five women with major disabilities (5 booklets; $29.95 plus $4.50 s/h). To order or to request the full catalog of multicultural women's history materials, contact the National Women's History Project, 7738 Bell Rd., Windsor, CA 95492; (707) 838-6000.

"Teaching Mathematics Effectively and Equitably to Females" outlines ways that female students can be encouraged to continue their mathematics education beyond basic courses. It is $5 from ERIC Clearinghouse on Education, Box 40, Teachers College, Columbia University, New York, NY 10027; (212) 678-3433.

"Science and Engineering Programs: On Target for Women" is drawn from papers presented at a conference about intervention programs designed to increase the participation of women in science and engineering. It shows how those programs work effectively to attract women to and keep them on a career track in science and engineering fields. It is available for $19 (prepaid) plus shipping from the National Academy Press, 2101 Constitution Avenue NW, Washington, DC 20418; (800) 624-6242 or (202) 334-3313.

"Leadership for Today & Tomorrow," the national conference for college women student leaders, will be held June 3-5, 1993, in Washington, DC. Conference registration materials are available from the National Association for Women in Education, 1325 18th St. NW, Suite 210, Washington, DC 20036; (202) 659-9330.

AAUW has recently released the report *How Schools Shortchange Women: The AAUW Report.* A compilation of studies documenting gender bias in the classroom, the report makes recommendations on how to eliminate stereotyping in textbooks and curricula, to train teachers to be more sensitive to bias and to meet the needs of girls, and to get educational reformers to be more concerned about girls' needs. The report can be ordered by calling AAUW headquarters at (800) 225-9998 and charging it to a credit card (price: $16.95).

Hopscotch is a magazine aimed at six- to twelve-year-old girls. Each bi-monthly issue has a theme of interest to this age group. Recently Larry White, Director of the Needham Science Center (Needham, MA), has joined the staff as Science Editor. Each issue, he will contribute a science experiment. He will also consult on science-related articles and features.

A Guide for Building an Alliance for Science, Mathematics and Technology Education provides information on successful programs nationwide and a bibliography on educational projects. Single copies are free from Alliance Guide, Triangle Coalition for Science and Technology Education, 5112 Berwyn Rd., 3rd Floor, College Park, MD 20740; (301) 220-0885.

The Baltimore Science/Math Enrichment Program on how to establish a volunteer program and *A Manual for Teachers and Volunteers* are available for $10 each from NESC, Math/Science Education Group, 257 Park Avenue South, New York, NY 10010; (212) 529-6660.

Counting on You: Actions Supporting Mathematics Teaching Standards is an action plan supporting teacher professionalism which recommends activities for all the major constituencies in mathematics education reform. Copies are $2.95 (bulk rates are available) from Mathematical Sciences Education Board, 2101 Constitution Avenue NW, Harris 476, Washington, DC 20418; (202) 334-3294; FAX (202) 334-1453.

The following are available from the Center for Women Policy Studies, 2000 P St., NW, Suite 508, Washington, DC 20036: *Preparing for the Future: A Guide to Exemplary Programs for Women and Girls of Color in Mathematics, Science and Technology Education*; *Women Faculty at Work in the Classroom, or, Why It Still Hurts to be a Woman in Labor*; and *Is This College Good for Women? 34 Questions to Grade the College of Your Choice*.

Several directories are available from the National Council for Research on Women. They are *A Directory of National Women's Organizations, A Directory of Women's Media*, and *A Directory of Works-in-Progress and Recent Publications*. Contact NCRW, 47-49 East 65th St., New York, NY 10021; (212) 570-5001.

CALLS FOR INFORMATION

Dr. K. K. Anand, Department of Mathematics and Statistics, Sir George Williams Campus, Concordia University, 1455 de Maisonneuve Blvd. West, Montreal, Quebec H3G 1M8, Canada, is collecting biographical information about Canadian women mathematicians. She is especially interested in those women who received their Ph.D.'s in the period 1960 to the present.

She has had several articles on her work published in the *Notes* of the Canadian Mathematical Society. "Canadian Women Mathematicians from the Early Nineteenth Century to 1960" appeared in Vol. 20, No. 6; "Canadian Women Mathematicians from the Early Nineteenth Century to 1960 — A More Comprehensive Study," in Vol. 21, No. 5; and "Canadian Women Mathematicians from 1960 to 1990," Vol. 23, No. 5. The second paper gives details on the lives of 12 women. The third paper mentions that Anand has learned the names of 165 Canadian women mathematicians who obtained their Ph.D.'s in the period 1960-1990; however, at the time the article appeared, she had received C.V.'s or other information about only 24 of them.

Dr. Anand would like information on the professional lives and on the current whereabouts of these women. She is particularly interested in how they feel their gender has affected their careers.

Dr. Penelope Kegel-Flom, President-Elect of the Association for Women in Science (AWIS), is seeking course syllabi, recommended readings, student projects and other materials which are used in teaching courses on women in science. She plans to compile a bibliography and an anthology of course materials on women in science which, with each author's permission, would be available to college faculty through the National Office of AWIS. Materials may be sent to her at College of Optometry, University of Houston, Houston, TX 77204.

The National Council of Teachers of Mathe--matics (NCTM) Committee for a Comprehensive Mathematics Education of Every Child is compiling a resource directory of organizations that support underrepresented populations in mathematics. The committee is particularly interested in programs and initiatives that have local impact, no matter how small the group. Send information to NCTM, C-ME, 1906 Association Dr., Reston, VA 22091.

ADVERTISEMENTS:

ALLEGHENY COLLEGE - DEPARTMENT OF MATHEMATICS - We invite applications for a two-year position. The position starts Fall of 1993 and may be renewed or converted to a tenure track position. Faculty are expected to maintain professional and scholarly activity and be committed to excellence in teaching. Teaching load is six courses per year on a semester calendar. Allegheny has a network of NeXT computers, and the college provides excellent support for use of computing in courses. Applicants must have a Ph.D. in mathematics by August, 1993. Send curriculum vitae, graduate transcripts, and three letters of recommendation (one should address teaching) to: Ronald E. Harrell, Dept. of Mathematics, Allegheny College, Meadville, PA 16335.

EDUCATIONAL DEVELOPMENT CENTER, INC. - RESEARCH AND DEVELOPMENT/ CURRICULUM DEVELOPER. The Connected Geometry project based at Education Development Center is developing innovative curriculum materials for high school geometry. The responsibilities of this full-time staff position include the design and development of student materials and teacher guides; classroom testing of curriculum; and review and organization of materials, research, and software. Qualifications include curriculum writing, mathematics teaching, strong writing and organizational skills, and ability to work independently and with diverse groups. Contact: June Mark, EDC, 55 Chapel Street, Newton, MA 02160.

LAWRENCE BERKELEY LABORATORY - POSTDOCTORAL FELLOWSHIP - NIH/NRSA postdoctoral position available in the Center for Functional Imaging, Life Sciences Division, Lawrence Berkeley Laboratory, to develop image correlation and analysis software for PET and NMR imaging. A recent Ph.D. in Electrical Engineering, Computer Science, Mathematics, Physics, or Biophysics is required. The successful candidate must be familiar with medical imaging techniques and image processing algorithms. Programming experience with the UNIX operating system and the X window system is desirable. U.S. citizenship or permanent resident status required. Send resume and names of three references to: Dr. Ronald H. Huesman, Center for Functional Imaging, Life Sciences Division, Lawrence Berkeley Laboratory, Mailstop 55/121, Berkeley, CA 94720, Equal Opportunity Employer.

MONTCLAIR STATE COLLEGE - MATHEMATICS DEPARTMENT - Tenure Track Assistant Professor in Mathematics Education V-13. Candidates will be expected to teach undergraduate mathematics and graduate mathematics education courses, have expertise in junior and senior high school mathematics curriculum and the use of current technology. A commitment to teaching, participation in curriculum development, and grant activities as well as scholarly and professional activities are expected. Teaching load is 12 credits per semester. Doctorate in Mathematics or Mathematics Education. Expertise in junior and senior high school mathematics curriculum, including the use of current technology. Resume with names, addresses, phone numbers of three reference to Dr. Ken Wolff, Box C316, V-13, Montclair State College, Upper Montclair, NJ 07043. Screening begins Feb. 1, 1993, and continues until position is filled. Starts September 1, 1993. Position subject to available funding. Montclair State College is an Equal Opportunity/Affirmative Action Employer.

OAKLAND UNIVERSITY - The Department of Mathematical Sciences invites applications for a tenure-track position at the rank of Assistant Professor in the area of applied statistics. Duties include teaching, research, and/or consulting. Preference will be given to applicants with background in statistical computing, reliability, stochastic processes, robust methods, spatial statistics, or statistical process control. A Ph.D. in statistics is required. Ability to interact with local industry is highly desirable. Please send vitae and arrange for three letters of reference to be sent to: Chair, Statistics Search Committee, Department of Mathematical Sciences, Oakland University, Rochester, MI 48309-4401. For further information, contact B. Turett (E-mail address: turett@vela.acs.oakland.edu). Review of vitae will begin March 15, 1993 and continue until the position is filled. Oakland University is an Affirmative Action/Equal Opportunity Employer and encourages applications from women and minorities.

PITZER COLLEGE - Pitzer College invites applications for a one-year visiting position in Mathematics at the Assistant Professor level beginning September 1993. The teaching load is five courses over two semesters. Applicants should provide evidence of excellence in teaching and the ability to teach innovative, lower level courses appropriate for liberal arts students. Pitzer College, a member of the Claremont Colleges, is committed to educating students for interdisciplinary and intercultural understanding and for social responsibility. The Colleges jointly sponsor a regular mathematics colloquium and maintain an excellent research library. Send curriculum vitae, three letters of reference, and other relevant materials to: Thomas L. Ilgen, Dean of Faculty, Pitzer College, Claremont, CA 91711-6110. Please direct any E-mail correspondence to: jhoste@pitzer.claremont.edu. Review of applications will begin April 1, 1993, but applications will be accepted until the position is filled. Pitzer College is an Affirmative Action/Equal Opportunity Employer. We particularly encourage individuals from groups traditionally underrepresented in the academy to apply.

RENSSELAER POLYTECHNIC INSTITUTE - MATHEMATICAL SCIENCES DEPARTMENT - J.G. Ecker, Chair - Applications are invited for a tenured or tenure-track position starting in September 1993 in applied mathematics, with a preference for someone in mathematical programming/optimization. Ph.D. with strong research and teaching potential required for junior level appointments and demonstrated outstanding record required for senior level appointments. Send to: J.G. Ecker, Chair, Mathematical Sciences Department, Rensselaer Polytechnic Institute, Troy, NY 12180. Rensselaer is an Equal Opportunity and Affirmative Action Employer.

ST. CLOUD UNIVERSITY - Applications are invited for two tenure-track, assistant professor positions in mathematics, beginning Fall-1993, subject to funding. A Ph.D. in Mathematics (by 9/93) is required. Candidates should be dedicated to quality undergraduate teaching and provide evidence of teaching effectiveness and research potential. Experience in modeling, optimizations or dynamical systems is desirable. Experience using technology in the classroom and/or familiarity with current reform efforts in collegiate mathematics education is a plus. Send a letter of application, resume, three letters of recommendation, summaries of student evaluations, and copies of educational transcripts to: Dr. James W. Johnson, Department of Mathematics and Statistics, St. Cloud State University, 7200 4th Avenue South, St. Cloud, MN 56301-4498. Telephone: 612/255-2221. Deadline: March 26, 1993. Women and minorities are encouraged to apply.

SYRACUSE UNIVERSITY - DEPARTMENT OF MATHEMATICS - A position may be available in the area of mathematics education at open rank beginning Fall 1993. Candidates should have outstanding research ability and evidence of excellence in teaching. Responsibilities include: Teaching and advising undergraduate and graduate (M.S. and Ph.D.) students in mathematics education; directing and conducting research in problems of curriculum, learning, and teaching. We have particular interest in the application of technology to these areas. Send a letter of application and vita with a list of publications, and have three letters of reference sent to: Philip T. Church, Search Committee Chair, Syracuse University, Box 1, Syracuse, New York 13244-1150. Syracuse University is an Equal Opportunity/Affirmative Action Employer.

TRINITY COLLEGE - LECTURER - MATHEMATICS - The Trinity College Mathematics Center is searching for a lecturer to fill a full time, one year position for academic year 1993-94. The Mathematics Center is responsible for testing incoming students for mathematical proficiency, providing tutoring services, and instruction at the pre-calculus level. The lecturer will teach five courses per year (3/2) and work with students who need assistance in meeting the proficiency requirement. Requirements: Masters degree in mathematics or mathematics education, teaching experience at the high school or college level, and the ability to work effectively with and empathize with students of widely divergent mathematical backgrounds. We especially encourage women and members of minority groups to apply. Applicants should send a c.v., a statement of teaching interests, three letters of reference (at least two of which address teaching), and one self-addressed stamped envelope to Search Committee, Mathematics Center, Trinity College, Hartford, CT 06106. Applications will be reviewed as they are received until this position is filled. We encourage applicants who may be interested in part time teaching to so indicate since we also anticipate openings for part time positions in 1993-94 and future years.

UNIVERSITY OF KANSAS - ASSISTANT PROFESSOR POSITION - THEORETICAL AND COMPUTATIONAL SCIENCE - The Kansas Institute for Theoretical and Computational Science, through the departments of Chemistry, Mathematics, and Physics and Astronomy at the University of Kansas, is seeking candidates for tenure-track junior faculty position to begin Jan. 1, 1994. The person sought for this position will be active in the field of theoretical and/or computational science, preferably with a proven research record in some aspect of nonlinear sciences. Relevant research problems under study by Institute faculty members are classical and quantum chaos, non-linear partial differential equations and their geometrical visualization; atomic, molecular and particle astrophysics; modeling of systems atmospheric science; frontier problems in scientific computing; atomic, molecular and optical physics. Scientists with a Ph.D. in fields related to any of the above topics in theoretical and computation chemistry or physics, in mathematics, and computational science in general are encouraged to apply. Applicants should submit a statement of professional interest, a curriculum vitae (including a list of publications), and at least three letters of recommendation to be sent to: Professor D. McKay, Kansas Institute for Theoretical and Computational Science, c/o Department of Mathematics, 405 Snow Hall, The University of Kansas, Lawrence, KS 66045, 913/864-4626, FAX: 913/864-5262, E-mail: McKay@kuphsx.phsx.ukans.edu. The Search Committee will begin its evaluations on April 1, 1993. Later applications will be considered, however, until the position is filled. The successful candidate is expected to establish a vigorous interdisciplinary research program. The appointment will be jointly between two of the three participating departments -- chemistry, mathematics, and physics, and astronomy. Research, teaching and other academic responsibilities will be shared between the participating departments. The salary will be commensurate with qualifications and experience. The University of Kansas is committed to increasing the ethnic and gender diversity of its faculty, and we strongly encourage female and minority individuals to apply. The University of Kansas is an AA/EEO employer.

UNIVERSITY OF SOUTH CAROLINA - COLUMBIA - DEPARTMENT OF MATHEMATICS - The Department of Mathematics invites applications for anticipated tenure track positions for the Fall of 1993 at all ranks. Applications in all areas of mathematics will be considered. Faculty research is supported by excellent in-house library and computing facilities. The Ph.D. degree or its equivalent is required, and all appointments will be consistent with the Department's commitment to excellence in research and in teaching at the undergraduate and graduate levels. A detailed resume, including a summary of research accomplishments and goals, and four letters of recommendation should be sent to: Dr. George F. McNulty, Chairman, University of South Carolina, Department of Mathematics, Columbia, SC 29208. E-mail address: mcnulty@milo.math.scarolina.edu. The University of South Carolina is an Equal Opportunity/Affirmative Action Employer.

WESTERN MICHIGAN UNIVERSITY - DEPARTMENT OF MATHEMATICS AND STATISTICS -Western Michigan University seeks applications for a tenure-track assistant professor position in statistics beginning Fall 1993, pending budgetary approval. The position requires a Ph.D. in mathematical statistics. Specialization in robust statistics is preferred. Applicant must demonstrate potential for teaching, scholarship, and publication. Western Michigan University, a Carnegie Classification Doctoral I Institution, has embarked upon a vigorous affirmative action program and encourages applications from women and members of minority groups. Send letter of application, vita, academic transcripts, and three letters of recommendation to Ruth Ann Meyer, Interim Chair, Mathematics and Statistics Department, Western Michigan University, Kalamazoo, MI 49008. Review of applications will begin January 15, 1993, and continue until the position is filled.

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REMINDER

AWM's NEW ADDRESS IS:

4114 COMPUTER & SPACE SCIENCES BUILDING
UNIVERSITY OF MARYLAND
COLLEGE PARK, MARYLAND 20742-2461
PHONE: 301/405-7892

PLEASE MAKE NOTE OF THIS INFORMATION. THANK YOU.

ASSOCIATION FOR WOMEN IN MATHEMATICS

Institutional Membership

Date_____ 19____

Please fill out this application and return it as soon as possible. Your institution will be updated on our membership list upon receipt of the completed application and payment of member dues or receipt of postal order. See below to determine which membership category you wish to choose. Subscription to the AWM Newsletter is included as part of the membership. Institutional members receive two free advertisements in our newsletter per year. All institutions advertising in the AWM Newsletter are Affirmative Action/Equal Opportunity Employers.

Indicate below how your institution should appear in the AWM Membership List.

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_____

Are you a new member?_____ Is this an address change?_____

Department Telephone Number: _____

Chair: _____

Last name First Middle Initial

Telephone number: _____ Electronic mail address:_____

MEMBERSHIP CATEGORIES

Please indicate below the category for which you are applying. AWM membership year is **OCTOBER 1ST to SEPTEMBER 30TH.**

Dues Schedule
Indicate amount enclosed

_____ Sponsoring Category I (may nominate 10 students for membership): $120

_____ Sponsoring Category II (may nominate 3 students for membership): $ 80

NOTE: List names and addresses of student nominees on opposite side or attach separate page.

SEND TO: AWM Membership, 4114 Computer and Space Sciences Bldg., University of Maryland, College Park, MD 20742-2461. Any questions, call 301/405-7892.

AWM

ASSOCIATION FOR WOMEN IN MATHEMATICS

Individual Membership

Date _____ 19____

Please fill out this application and return it as soon as possible. Your individual membership will be updated immediately. Subscription to the AWM Newsletter is included as part of membership. AWM membership year is **October 1st to September 30th.** See next page to determine membership category you are eligible for.

Indicate below how your name and address should appear in the AWM Membership List.

_____

Last Name First Middle Initial

Address for all mail: _____

_____

_____

Family member name (if applicable):

_____

Last Name First Middle Initial

Are you a new member?_____ Is this an address change?_____

Telephone numbers -- Home: _____ Work: _____

E-mail address (if any): _____

Degrees (with institutions and dates) :

_____

_____

_____

Present position: _____ Institution or Firm: _____

_____

City State Zip/Country

Primary Fields of Interest. Select up to **5** from list on next page. _____ _____ _____ _____ _____

Please indicate below if you would allow your name, address and phone number to be included in the AWM Membership Directory. Yes _____ No_____ Please Initial: _____

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00 General
01 History and biography
03 Mathematical logic and Foundations
04 Set Theory
05 Combinatorics
06 Order, lattices, ordered algebraic structures
08 General algebraic systems
11 Number Theory
12 Field Theory and Polynomials
13 Commutative rings and algebras
14 Algebraic Geometry
15 Linear and multilinear algebra: matrix theory
16 Associative rings and algebras
17 Nonassociative rings and algebras
18 Category Theory, homological algebra
19 X-theory
20 Group theory
22 Topological groups, Lie groups
26 Real Functions
28 Measures and Integration
30 Functions of a complex variable
31 Potential theory
32 Several complex variables and analytical spaces
33 Special functions
34 Ordinary differential equations
35 Partial differential equations
39 Finite differences and functional equations
40 Sequences, series, summability
41 Approximations and expansions
42 Fourier analysis
43 Abstract harmonic analysis
44 Integral transforms, operational calculus
45 Integral equations
46 Functional analysis
47 Operator Theory
49 Calculus of variations and optimal control
51 Geometry
52 Convex and discrete geometry
53 Differential geometry
54 General topology
55 Algebraic topology
57 Manifolds and cell complexes
58 Global analysis, analysis on manifolds
60 Probability theory and stochastic processes
62 Statistics
65 Numerical analysis
68 Computer Science
70 Mechanics of particles and systems
73 Mechanics of solids
76 Fluid mechanics
78 Optics, electomagnetic theory
81 Quantum Theory
82 Statistical mechanics, structure of matter
83 Relativity and gravitational theory
85 Astronomy and Astrophysics
86 Geophysics
90 Economics, operations research, programming, games
92 Biology and behavioral science
93 Systems theory, control information and communication, circuits
94 Information and communication, circuits

001 Education: K-8
002 Education: 9-12
003 Education: Undergraduate
004 Education: Graduate
005 Gender Issues
006 Affirmative Action
007 History of Woman in Math Sciences
008 Other (please specify:_____
_____

MEMBERSHIP CATEGORIES

Please check the appropriate membership category below. Make checks or money order payable to: Association for Women in Mathematics. NOTE: All checks must be drawn on U.S. Banks and be in U.S. Funds. AWM Membership year is **October 1st to September 30th.**

DUES SCHEDULE 1992/1993
(Please note changes from last year).

REGULAR MEMBERSHIP..... (Base dues $25 plus $5 prize fund and $10 general)	$ 40	_____
FAMILY MEMBERSHIP..... (Base dues $40 plus $5 prize fund and $10 general)	$ 55	_____
CONTRIBUTING MEMBERSHIP.....	$100	_____
STUDENT, RETIRED, OR UNEMPLOYED MEMBERSHIP.....	$ 8	_____
ALL FOREIGN MEMBERSHIPS (INCLUDING CANADA & MEXICO) ..... NOTE: All payments must be in U.S. Funds using cash, U.S. Postal orders or checks drawn on U.S. Banks.	ADD $ 8	_____

TOTAL DUES $_____

AWM

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AWM
ASSOCIATION
FOR WOMEN IN
MATHEMATICS

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University of Maryland
College Park, Maryland 20742-2461