

# Association for Women in Mathematics

Volume 17, Number 3

NEWSLETTER

May-June 1987

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## PRESIDENT'S REPORT

I have just been asked to serve on the newly-formed MAA Committee on the Participation of Women. For several years, I have felt that some effort must be made by AWM to assess our progress as women in mathematics; our representation on this committee will offer an opportunity to do so, in collaboration with the MAA. Certainly we have made some inroads. The list of current officers of the AMS shows women represented in a substantial way; this indicates considerable progress since the pioneering efforts of Mary Gray and others. On the other hand, has affirmative action made a real difference? Are we more tenured, promoted and well-paid in relation to our male colleagues than we were ten years ago? Many of the statistics are available, but we must interpret them and bring them to the attention of our members. Not having attended an annual joint meeting for a few years, I was stunned in San Antonio to see how much of a minority women are, still. Perhaps life at a women's college has blunted my awareness of this fact, which I used to know so well. At any rate, working with the MAA is an important first step towards assessing our professional role. I also look forward to the activities of our newly-formed committees to bring us information on several aspects of our involvement, but more on that later.

Changing of the guard at Wellesley. After nine years of faithful service as AWM's Administrative Assistant, Margaret Munroe has submitted her resignation, effective July 1, 1987. Margaret tells me she wants to pursue her growing interest in computers. AWM certainly cannot stand in the way of *that* goal. I've known Margaret, mostly over the phone, for many years, and value her deft handling of AWM business. She and Alice Schafer have held down the fort at Wellesley, and many an AWM President has relied on their expert management. Margaret has promised to stay and share her wisdom with her successor. I wish Margaret, personally and on behalf of AWM, an intellectually stimulating, yet relaxing and contented future. We shall miss her.

Margaret's departure creates a natural opportunity to expand the role of Administrative Assistant to that of a much-needed, full-time Executive Director. In San Antonio, the Executive Committee agreed that this new position had become a necessity. I am pleased to announce that Lori Kenschaft, a senior at Swarthmore College majoring in biology and religion, with a concentration in women's studies, has accepted this position. Those of us who have met Lori are delighted that she will be joining us. She has a great deal of energy and enthusiasm, and is eager to be involved in AWM projects. I hope that she will attend the joint meetings, so that many of you will have the pleasure of meeting her.

Dues. In order to support the additional cost of a full-time administrator, the Executive Committee has approved an increase in the dues effective October 1, 1987. The details are yet to be worked out, but we anticipate no more than a \$5 increase for most members, with the Retired/Student/Unemployed rate remaining fixed. If you are able to do so, we would welcome your becoming a Contributing Member. Your contribution will be used to send our Executive Director to the joint meetings. Lori's presence should help to revitalize the AWM table, which was somewhat deserted in San Antonio, except for Rebekka Struik's vigil, and to increase our membership.

Salt Lake City. In response to the considerable interest generated by Beth Ruskai's letter in the *Newsletter*, a panel on Gender and Science is being organized for the summer meeting. It will be held at 8:30 a.m. on August 6th. Details will appear in the next issue of the *Newsletter*.

Committees. I wish to thank the following members, who have agreed to chair various AWM Committees:

Evelyn Silvia, University of California, Davis — Committee on Relationships with Other Societies

Sun-Yung Alice Chang, U.C.L.A. — Speaker and Journal Subcommittee

Anita Solow, Harvey Mudd College and Grinnell College — Task Force on Maternity Leave Policies.

If you volunteered to serve on a committee, I have forwarded your name to the respective Chair.

Anita Solow has agreed to write an article for the *Newsletter* on maternity policies. She would appreciate hearing from members about their institutions' policies, as well as personal experiences, positive or negative. Maternity policies tell a great deal about an institution's attitudes towards its women employees. I always approach pregnant women and ask them about their maternity leave. The answers are surprising—often they are offered very little, or they take less than they are entitled to. AWM would like to increase awareness on this subject, and needs your input to do so.

Emmy Noether Lectureship. On behalf of the Mathematics Department of Bryn Mawr College, I am pleased to announce that the Emmy Noether Lectureship has been awarded to Dr. Jennifer Key of the University of Birmingham, England. Dr. Key's specialties are finite group theory, finite geometry, and combinatorics. She will spend the Spring semester at Bryn Mawr doing research and teaching a graduate course. The Noether Lectureship was made possible by generous contributions to an existing fund at the time of the Emmy Noether Symposium at Bryn Mawr in 1982. This is the first time the Lectureship is being awarded in this form.

Finally, you are cordially invited to communicate with me via electronic mail. My address is BITNET:RHONDAJ@BRYNMAWR. I look forward to your messages.

Rhonda Hughes  
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## AWM ELECTIONS

The Nominating Committee was listed incorrectly in the last issue. Its members are Linda Rothschild, Chair (UC San Diego); Cora Sadosky (Howard University) and Bhama Srinivasan (UI Chicago). The members of the AWM Executive Committee we will be electing this year are President-Elect, Treasurer, and two At-Large Members. The slate of candidates will appear in the July-August issue.

## LETTER FROM THE EDITOR

*The Mathematical Intelligencer* Vol. 9, No. 1, contains an article written by AWM members Judy Green and Jeanne LaDuke entitled "Women in the American Mathematical Community: The Pre-1940 Ph.D.'s". The article contains both information about specific women and about the situation in general. One interesting fact is that of the 229 women Ph.D.'s in this category the authors have identified, 46 obtained their Ph.D.'s at the University of Chicago!

I quote from the conclusion:

There have been enormous changes in the years since the first undergraduate degree was granted to one of our group in 1869. Many of the formal barriers to education and professional achievement were at least in part removed fairly rapidly. There were many opportunities for women to obtain an undergraduate education by the beginning of the last quarter of the nineteenth century; by 1910 almost all of the major research universities that gave degrees to men also admitted women for graduate study. In their graduate work we see

a certain amount of clustering of the women around certain advisors and, therefore, in certain fields. After receiving their degrees, most served mainly as undergraduate teachers. They generally were not hired by research departments, and when they were they often became the "beloved teacher" who was retired at the rank of associate professor.

Our group constituted a substantial community of imaginative and vigorous women who functioned in diverse ways; most taught and were often the backbones of their departments; some used their intelligence and the results of their training outside of mathematics; some made important contributions to the body of mathematical ideas. Most importantly, perhaps, the knowledge that 229 American women received Ph.D.'s by 1939 makes it possible to discard the myth that there have been few women mathematicians, a myth so strong in the 1950s and 1960s that the presence of women in mathematics could be detected only by the most observant.

Linda Keen sent me an interesting article, "Mothers' Attitudes May Affect Math Scores" by Barbara Vobejda from *The Washington Post*, Sunday, January 11, 1987. The provocative subtitle is "Asian Women Demand More From Their Children and Give Them More Help, Study Finds." I quote from the article:

While American mothers are likely to believe that their children's achievement is determined more by ability than effort, Japanese and Chinese mothers stress effort as an explanation for achievement. The Asian mothers demand more of their children and spend more time helping them with homework, according to a study released today by a National Research Council panel. Fathers' attitudes were not measured in the survey.

...

American children are more likely than their Asian counterparts to believe they are doing well, and American mothers express more satisfaction with their children's performance.

The article also includes other information from studies of fifth-graders in the U.S., Taiwan, and Japan released by the Mathematical Sciences Education Board. Asians were found to spend more time in math classes and a greater percentage of class time working on math. Also, individual topics were covered at greater length.

The Project on the Status and Education of Women has come out with another paper in its campus climate for women series. This one is entitled "The Campus Climate Revisited: Chilly for Women Faculty, Administrators, and Graduate Students." It addresses many issues and includes a useful list of recommendations for individuals and academic units at all levels.

From the introduction:

...Yet, despite many improvements, some things have not changed at all:

- Women are still concentrated in a limited number of fields and at lower levels. Indeed the pattern for women faculty and administrators has not changed for many years:
  - The higher the rank, the fewer the women.
  - The more prestigious the school or department, the fewer the women.
  - At every rank, in every field, at every type of institution, women still earn less than their male counterparts.
  - Women have been less likely to receive tenure than men: 47 percent of women faculty are tenured, compared to 69 percent of the men.
  - The rate of increase for tenured male faculty has been greater than that of women. Between 1972 and 1981, the percentage of tenured male faculty increased by 17.7 percent; the percentage of tenured female faculty increased by 13.4 percent.
- It is uncommon for women to be department chairs, and rarer still for them to be academic deans.
- For the most part, women administrators remain concentrated in a small number of low-status areas that are traditionally viewed as women's fields (such as nursing and home economics) or in care-taking roles (such as in student affairs and affirmative action) or in other academic support roles (such as admissions officer, registrar or bookstore manager). Women who are in more central administrative areas frequently find themselves locked into "associate" or "assistant-to" positions with little chance of advancing upward.
- The hiring and promotion of women faculty and administrators has lagged far behind the enrollment of women students, who now constitute the majority of undergraduates and an increasing proportion of graduate and professional students.
- Although women earn approximately half of the degrees at the undergraduate and master's level, they earn only 32 percent of the doctorate degrees.

Copies of the paper may be ordered from the Project on the Status and Education of Women, Association of American Colleges, 1818 R Street, Washington, DC 20009. Individual copies are \$5.00 (prepaid). Bulk rates are available. Please make checks payable to AAC/PSEW.

*The Campus Troublemakers: Academic Women in Protest* by Athena Theodore is an interesting account of the trials and tribulations suffered by many academic women. The main strength of the book is the anecdotal evidence collected from a survey of 470 academic women. The horror stories recorded here took place between 1970 and 1983, not exactly the remote past. Those of us who have been through the mill may still be shocked by some of the stories recounted (I ended up with the feeling that social science departments were the worst place to be during the worst of things). And perhaps some of our younger colleagues who feel that AWM is now anachronistic would understand the depths of our feelings if they read this book. We've come a long way since the early 1970's—a recent look at some early AWM newsletters reminded me of that—but I fear that already backsliding has begun, and of course there's still a whole lot further to go. Books of this type should help us in our efforts to assure that new generations of academic women will not have similar sad, angry stories to tell.

The book may be ordered for \$23.95 clothbound, \$15.95 softcover plus \$1.50 shipping from Cap and Gown Press, Box 58825, Houston, TX 77258.

The second report of the 30th annual AMS survey on employment trends of various types contains the following interesting paragraph:

As reported earlier, new women doctorates comprise 18% of the new doctorates employed by Groups I-III (compared to only 13% last year and 10% each of the three previous years). Among all U.S. doctorate-granting institutions (departments or programs) 19% of new mathematical science doctorates were women. Although the percentage of women among all new doctorates is 17%, we caution that the apparent gain is relative only—only 140 of 801 new doctorates were awarded to women. In Groups I-IV, M, and B, the percentage of new women doctorates to all new doctorates hired is: Group I (13%), Group II (26%), Group III (21%), Group IV (25%), Group M (19%), and Group B (21%).

This year, I am a member of my department's hiring committee. I didn't do any counting, but many of the applicants we considered most seriously were women. We have interviewed nine candidates, four of whom are women. Have any of you noticed similar phenomena this year, or is Loyola's experience unusual?

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## HONORS AND AWARDS

The Council for International Exchange of Scholars, an affiliate of the American Council on Education, has announced the Fulbright awards for 1986-1987. Congratulations are due to Sue E. Goodman, Associate Professor, University of North Carolina at Chapel Hill, who will visit Brazil and to Shirley Kolmer, Associate Professor, Saint Louis University, who will visit Liberia.

The National Science Foundation has announced the Mathematical Sciences Postdoctoral Research Fellowships. These Fellowships provide a stipend of \$66,000 for support for two nine-month academic years and three two-month summers under either the Research Fellowship or Research Instructorship options. Congratulations to the following recipients (institution in parentheses is current; outside, those at which fellowship is to be held):

Carolyn A. Dean (University of Chicago), University of Chicago; Leslie Greengard (Yale University), Yale University; Christine Haught (Loyola University of Chicago), University of Chicago; Jill C. Pipher (University of Chicago), University of Chicago; and Tamar Schlick (Courant Institute of Mathematical Sciences), Courant Institute of Mathematical Sciences, New York University.

Karen Uhlenbeck, University of Chicago, will be the guest lecturer for the NSF-CBMS Regional Conference in Gauge Theory to be held June 15-19, 1987, University of Michigan at Ann Arbor. The conferences are designed to stimulate interest in mathematical research.

## EMMY NOETHER LECTURER, 1987: JOAN S. BIRMAN

Professor Joan S. Birman, Professor of Mathematics at Columbia University and Chairperson of the Department of Mathematics at Barnard College, delivered the 1987 Emmy Noether Lecture at the joint math meetings in San Antonio on Thursday, January 22nd. Her title was "Studying Links via Braids." Her lively talk presented an interesting picture of a mathematical theorem as it developed and conveyed a vivid sense of the joy of participating in the discovery process.

Professor Birman received her B.A. from Barnard College. She received an M.A. in physics from Columbia University and, after the birth of her three children, a Ph.D. in mathematics from New York University. She taught at Stevens Institute of Technology and Princeton University before coming to Barnard in 1973.

She has been active in mathematical societies. She has been funded by the NSF since 1973. She has received the following honors: Sloan Foundation Fellow, 1974-76; Fellow, Japan Society for the Promotion of Science, 1980; Lady Davis Fellowship, Israel, 1981; Senior Science Faculty Fellowship, British NRS, 1981; and Member, Institute for Scientific Exchange, Torino, Italy, 1986. Her publications are too numerous to list here; they include 2 books and 45 articles. Her list of colloquia and talks delivered at conferences is 2 1/2 pages, single-spaced.

It was indeed an honor for AWM that Professor Birman served as the Emmy Noether Lecturer in 1987.

## NEWS FROM AWM MEMBERS

At the October meeting of the French Mathematical Society, there was a discussion about the question of women in mathematics and, in particular, the ENS. [Ed. note: see the article about ICM-86 in the September-October issue for more information on this.] A small commission has been formed to consider these issues.

The European section of AWM met December 13th and 14th at the Institut Henri Poincaré.

Dr. K. Savithri has written the book *Number Theory Seven* which was displayed at ICM-86. Books may be ordered for \$15 (includes postage) from Dr. Savithri at 18148 Normandy Terrace, SW, Seattle, WA 98166.

## RESPONSES TO THE DAVID REPORT: INITIATIVES FOR WOMEN AND MINORITIES

An AWM panel on this topic was held at the joint mathematics meetings in San Antonio on Wednesday, January 21, 1987. The panelists were John Polking, Louise Raphael, Fern Hunt, and Barry Simon. Lida Barrett served as moderator.

### Fern Hunt

I have been asked to make a few remarks about my reaction to the David report. By and large, I agree with the recommendations, but I would like to emphasize two points.

First there is a need to attract more gifted young people into mathematics research. Everyone agrees with that, but I want to add that they should be recruited from all economic classes and ethnic groups. This is not happening at a significant level, although the MAA has taken steps in this direction. Growing economic distress in this country is making it harder for a student from a non-professional family with modest income to get the kind of experiences she or he needs to become a mathematician no matter what the level of talent. Top-ranked mathematicians as well as other scientists presently and will increasingly occupy positions of prestige and political influence coinciding with the increasing influence of technology and science. This group, like the members of any other privileged group in a democratic country like ours, must be as broadly representative as possible.

To this end, we must create and fund programs that will reach the colleges and universities that students from backgrounds that aren't well represented in mathematics attend. This includes the funding of ongoing research and education programs, for problems described in the report that are particularly acute at these institutions.

The effects of a diverse group of people doing mathematical research aren't desirable solely from a political or social point of view. I think that diversity of people promotes the diversity of ideas—one of the prerequisites for progress in mathematics.

So to the French captain in the movie "Casablanca" who on witnessing a shooting shouts to a subordinate "Round up the usual suspects!" I would add...And round up a lot of unusual ones too!

The second point I want to make is that we as a profession must begin to make major efforts to explain to the general public what it is we do and why it is interesting or useful or important.

We are all aware of the growing gap between the general public's knowledge of science and the actual state of scientific knowledge, and this is *a fortiori* true of mathematics. We need to encourage people who are gifted in mathematical exposition aimed not just at the generally upscale consumers of *NOVA*, Public Television, or *Scientific American*. There is a precedent for this kind of appeal. Lancelot Hogben, a British scientist of the 1940s, was able to reach a wide audience, and it should certainly be possible now.

I think this problem has particular urgency now because I sense this gap has accelerated in recent years, and it is dangerous for science and intellectual activity in general. The bewildering pace of changes Americans see in their daily lives—largely brought about because of science and technology—have left many frustrated and hostile. Some have become susceptible to the anti-intellectual crusades of religious fundamentalists, as witnessed by the recent evolution trial and book bannings in several parts of the country.

Louise A. Raphael, NSF, Science and Engineering Education Directorate  
An elaboration of her panel presentation

Before I list some National Science Foundation programs for women, minorities and mathematics/science education, I would like to share a key factor which helped me reenter mathematical research. Namely, it is essential to find collaborators who share the same mathematical interest. Finding collaborators with whom you can form a mathematical synergistic bond is not easy. But I have found that once mathematicians are truly interested in a problem, they can't stop working on it. One word of caution: before talking with mathematicians about their work, read their latest articles/preprints, and tell them the essential aspects of their work which pique your mathematical curiosity. (I have been asked to write my personal algorithm for reentering mathematical research, and will do so soon.)

I will now quote and excerpt freely from various NSF program guides which I feel will be of interest to the AWM membership. Most importantly, as women are underrepresented in all scientific disciplines, the NSF has a number of programs "directed at increasing the numbers of women as full participants in the mainstream of the nation's research enterprise." These activities include:

**STANDARD RESEARCH AWARDS.** Women mathematicians (scientists/engineers) are eligible to apply for grants in all of the Foundation's programs, and are encouraged to do so.

**RESEARCH INITIATION AWARDS.** Women who have not previously received Federal research support or who are returning to research activities after a career interruption are eligible to apply.

**RESEARCH PLANNING GRANTS.** This program, limited in amount and duration, helps women develop competitive research programs.

**CAREER ADVANCEMENT AWARDS.** This program enables women to increase their research productivity.

**VISITING PROFESSORSHIPS FOR WOMEN PROGRAM.** These grants enable experienced women scientists and engineers to undertake advanced research and teaching at host institutions, where they can also provide guidance and encouragement to other women seeking to pursue research careers.

I will now elaborate on the above programs.

For STANDARD RESEARCH AWARDS as well as other grants (if your development office does not have the booklets), write the Mathematical Sciences Division, Room 339, NSF, Washington, DC 20550 or call (202) 357-9764 requesting the *Grants for Scientific and Engineering Research*

booklet. In addition, the October issue of the NSF *Bulletin* publishes deadline dates for all programs. The latter can be obtained from the Editor, NSF *Bulletin*, NSF, Washington, DC 20550.

The RESEARCH INITIATION AWARDS are one-time awards intended to provide opportunities for women to become actively engaged in research as independent investigators. Eligibility is limited to women who have not previously served as principal investigators on an individual Federal award for scientific or engineering research or whose research careers have been interrupted for at least two of the past five years. Applicants are advised to contact their appropriate program officer to discuss the project and eligibility. Research awards range from \$25,000 to \$90,000 per year and are supported up to a maximum period of 36 months. Deadline dates are set by the disciplinary research programs.

The RESEARCH PLANNING GRANTS are designed for investigators who have not previously served as a principal investigator on a Federal award or who have had an interruption in their independent research career. Potential investigators apply initially for limited support to facilitate preliminary studies and other activities related to proposed research projects. Research Planning Grants may be used for salary; travel to conferences or major research centers to consult with other investigators; preliminary work to determine the feasibility of proposed line of inquiry; and secretarial, technical or computer support. These grants are limited to a maximum of \$12,000 for a period of up to 12 months and are not renewable (no-cost extensions may be permitted).

The CAREER ADVANCEMENT AWARDS "are particularly appropriate for promising upper-level junior faculty women, but are available for all women who are eligible to receive standard NSF research grants. For example, support may be provided to develop innovative research methods in collaboration with investigators at the applicant's home institution or at another appropriate institution; to gain experience in an area that will expand the applicant's research program; to conduct exploratory or pilot work to determine the feasibility of a contemplated new line of inquiry...". Awards are limited to a maximum of \$50,000 for a period of up to 24 months, and are not renewable.

The primary focus of the VISITING PROFESSORSHIPS FOR WOMEN is to support women who will serve as visiting faculty members at a host institution. It enables women mathematicians/scientists/engineers experienced in independent research to undertake advanced research at a university or research institution which has the necessary facilities. In addition to her research, the visiting professor undertakes lecturing, counselling and other interactive activities to increase the visibility of women scientists in the academic environment of the host institution, and to provide encouragement for other women to pursue careers in mathematics/science/engineering. The usual award is for 12 months for a full or part-time professorship. Past awards have ranged from \$30,000 to \$150,000. For more information about VPW of RESEARCH OPPORTUNITIES FOR WOMEN, call Dr. Gretchen Klein, VPW Program Director at (202) 357-7734.

## NSF MINORITY PROGRAMS

MINORITY RESEARCH INITIATION awards provide support for full-time faculty members who are U.S. nationals and who (1) are members of ethnic minority groups that are significantly underrepresented in the science and engineering career pool, (2) have not previously received Federal support as a faculty member, and (3) wish to initiate research efforts on their campuses, thereby increasing their ability to compete successfully for other research support. Further information about programs for minority scientists and engineers may be obtained from Dr. Roosevelt Calbert, MRI Program Director or Dr. Robert Harvey, Associate Program Director, Room 1225, NSF, Washington, DC 20550, telephone (202) 357-7350.

The MINORITY GRADUATE FELLOWSHIP program is open only to U.S. citizens who are members of an ethnic minority group underrepresented in the advanced levels of the U.S. science and engineering personnel pool, i.e., American Indian, Black, Hispanic, Native Alaskan, or Native Pacific Islander. These fellowships are intended for students at or near the beginning of their graduate study in science or engineering. Applicants must not have completed by the beginning of the Fall term more than 20 semester hours (30 quarter hours) of study in the science/engineering field following completion of the first bachelor's degree. For information about this program as well as the NSF GRADUATE FELLOWSHIPS, contact National Research Council, 2102 Constitution Avenue, Washington, DC 20418. For NATO POSTDOCTORAL FELLOWSHIPS and PRESIDENTIAL YOUNG INVESTIGATORS AWARDS write Dr. Terrence Porter, Director, Division of Research Career Development, Room 414, NSF, Washington, DC 20550 or call (202) 357-7536.

For information about FACILITATION AWARDS FOR HANDICAPPED SCIENTISTS AND ENGINEERS, which provide opportunities for physically disabled individuals to participate in research, general inquiries may be made to FAH Coordinator, NSF, Washington, DC 20550, telephone (202) 357-7552.

RESEARCH OPPORTUNITY AWARDS provide a means for science/engineering faculty members in predominantly undergraduate institutions to participate in research in association with NSF grantees at research institutions. Candidates may initiate contact with prospective host institutions, or such institutions may invite eligible candidates to apply. For information contact your program officer or Dr. Bruce Reiss, Program Director, or Dr. Lola Rogers, Assistant Program Director, Room 1225, NSF, Washington, DC 20550, telephone (202) 357-7456.

Applications for SUPPORT FOR PREDOMINANTLY UNDERGRADUATE INSTITUTIONS must be from investigators located in departments which do not offer the doctorate. Investigators must propose specific research projects and describe how the projects strengthen the preparation of undergraduate students for careers in science and engineering. Support may be requested for computers as well as research. For further information contact your NSF program officer or RUI Coordinator, Room 1223, NSF, Washington, DC 20550, telephone (202) 357-7456.

For the new \$9 million RESEARCH EXPERIENCES FOR UNDERGRADUATES which will give approximately 2,000 undergraduate students opportunities to participate in science research, contact Dr. William Adams, Mathematical Sciences Program Officer, Room 339, NSF, Washington, DC 20550, telephone (202) 357-9764. John Polking, Director of NSF Mathematical Sciences, spoke about this program at the AWM panel in San Antonio.

The COLLEGE SCIENCE INSTRUMENTATION PROGRAM for predominantly undergraduate institutions provides matching support up to \$50,000 for the introduction of modern instruments (e.g., computers) to improve the experiences of undergraduate students in mathematics/science/engineering courses, laboratories/field work. The program has supported projects which develop new ways of using instrumentation to extend instructional capabilities, as well as those which establish equipment sharing capability via consortia or centers. For further information contact Dr. Robert Watson, Program Director, Room 6, NSF, Washington, DC 20550, telephone (202) 357-9644.

I close with the list of programs directed to improving precollege science and mathematics education. In most cases, college and university faculty write/direct the projects. For information on SCIENCE AND MATHEMATICS EDUCATION NETWORK, TEACHER PREPARATION, TEACHER ENHANCEMENT, and PRESIDENTIAL AWARDS FOR EXCELLENCE IN SCIENCE AND MATHEMATICS TEACHING contact Dr. Alan Hoffer, Program Director; Dr. Florence Fasanelli, Associate Program Director; or Dr. Louise Raphael, Associate Program Director; Division of Teacher Preparation and Enhancement, Room 419, NSF, Washington, DC 20550, telephone (202) 357-7074. For APPLICATIONS OF ADVANCED TECHNOLOGIES, INFORMAL SCIENCE EDUCATION, INSTRUCTIONAL MATERIALS DEVELOPMENT, and RESEARCH IN TEACHING AND LEARNING contact Dr. John Thorpe, Deputy Director, Division of Materials Development, Research and Informal Science Education, Room 420, NSF, Washington, DC 20550, telephone (202) 357-7452.

I wish you good speed and good luck in your quest for NSF awards.

#### AAAS SYMPOSIUM ON GENDER AND SCIENCE

At the recent AAAS meeting in Chicago there were two highly successful symposia, "Participation of Women in Science since Antiquity" and "Bias in Sex Difference Research," sponsored by AWIS. The New England chapter of AWIS has been asked to help organize some symposia on topics of interest to women scientists at next year's AAAS meeting, which will be held in Boston in February, 1988. One possible topic for such a symposium is Gender and Science. Although the formal deadlines have passed, the program will not be final for several months. If you have suggestions or are willing to help, please get in touch with Mary Beth Ruskai, President AWIS-NE, Department of Mathematics, University of Lowell, Lowell, MA 01854.



## A LETTER FROM CAMBRIDGE, ENGLAND

by Mrs. Joyce Linfoot, Lucy Cavendish College, Cambridge  
She is an Emeritus Fellow of the College and was a Wrangler in 1932.

When I began this letter I was not setting out to explore the history of mathematics at Cambridge, but to give a brief account of the mathematical courses which exist here today, and to explain the circumstances under which they may be followed. But I had not gone far before I found myself led back to histories of medieval Europe for accounts of the thirteenth century, when the University was first recognized, and its long development began. For that development still continues, and from those early days there are words which are still used, and patterns which remain; it is not only in our buildings that traces are to be found of the medieval University.

Cambridge shared with Oxford, with Paris, and with many another centre of learning in Western Europe, the common curriculum of trivium and quadrivium, inherited with difficulty and in an attenuated form from the later Romans. The trivium, defined as grammar, rhetoric, and dialectic, had survived to some extent in schools maintained by the Church to educate boys for the priesthood; the boys learned at any rate enough Latin to enable them to conduct the services. In the same way, the classical quadrivium, defined as arithmetic, geometry, astronomy, and music was reduced to those elements which were considered directly useful. Church music was taught, along with the rudimentary astronomy needed for the regulation of the calendar and the determination of festivals.

In the disorder and violence of the times, particularly in the seventh and eighth centuries, standards fell; in Western Europe the great achievements of the Greeks in science and mathematics were forgotten. Arithmetic was reduced to the simplest properties of numbers, to ratio, proportion and fractions; geometry did not go much beyond the enunciations of the first book of Euclid. When by the end of the eighth century Charlemagne had at last succeeded in imposing a superficial unity on the Frankish Empire, he had to comb Europe from Northumbria in England to Pisa in Italy to find suitable teachers for the palace school which he founded.

In Constantinople, however, and the Eastern Mediterranean, Greek mathematical and scientific manuscripts still survived, and there were still Greek and Jewish doctors and scholars who were able to read them. At the end of the eighth century when Harun-al-Rashid was Caliph of Baghdad, he invited such men to his court, and there all they could teach was eagerly absorbed, in spite of the racial and religious differences. (Harun and Charlemagne were contemporaries, and a few letters and gifts did pass between them.) After Harun's death, the next Caliph sent a commission to Constantinople to buy up as many scientific works as possible, and employed a staff of translators to put them into Syriac and Arabic. By the end of the ninth century, the Arabs possessed copies of the main works of Euclid, Archimedes, Apollonius, Ptolemy, and others. This was not all, for they also learnt mathematics from the Hindus of Northern India, and adopted their system of numeration. All this had been made possible by the enormous expansion of the Semitic peoples. Baghdad was at one time the centre of an empire extending from the Eastern Mediterranean across North Africa into Spain. The knowledge of Greek mathematics was disseminated throughout these regions; in Cordova, the capital of Moorish Spain, there grew up a university where it was taught. Once there it was not out of the reach of Christian scholars, though it was dangerous for them to live in regions under Arab control.

In the twelfth century the Englishman Adelard of Bath studied in Cordova, and the Italian Gerhard of Cremona in Toledo. Adelard translated, among other works, the whole of Euclid from Arabic into Latin; Gerhard's translations included works on optics, mechanics, and physics. Gradually the knowledge of such works spread throughout Europe, and it became possible to transform the first three sciences of the quadrivium from their rudimentary state into basic mathematical disciplines. In Cambridge in particular a long-lasting pattern of university studies was built up on the foundation of Latin and the mathematical sciences.

### Examinations

In the medieval universities examinations as they are now known did not exist. Degrees were awarded after the performance of certain specified "acts" which took the form of Latin disputations in which a proposition was put forward by one man and opposed by others. Once established, this system persisted well into the eighteenth century. The most successful disputants became known as "wranglers". The custom arose of dividing all the men in a year into four groups classed in order of merit: wranglers, senior optimes, junior optimes, and poll men. The first three titles are still used for the three classes of the honours degree in mathematics, but since students are no longer admitted to read for a pass degree (it exists now only as a "fail-safe" device) "poll men" have vanished. For the

Cambridge honours degree the student must now take University examinations known as Triposes. Until 1824, when the Classical Tripos was instituted, mathematics was the only subject in which a Tripos was available; and it was 1850 before the extension to other subjects began. Now every group of subjects has its own Tripos, and the list is still growing. But it is only in mathematics that the archaism "Wrangler" persists. Until 1909 the list of Wranglers used to be published in order of merit; the top man was called the Senior Wrangler, and the title carried such high prestige that the competition for it was intense. In the nineteenth century, Senior Wranglers included such men as Sir John Herschel, Sir George Airy, G.G. Stokes, Arthur Cayley, John Couch Adams...all names still well-known to astronomers and mathematicians. James Clerk Maxwell (Maxwell's equations) was second wrangler in 1854.

As a rule (though there is some variation between different subjects) a Tripos is divided into two separate parts, the first to be taken after one or two years, and the second at the end of the three-year undergraduate course. In each part the results are divided into first, second and third classes. There is nothing which exactly corresponds to "majoring" as it is known in American universities. A student who comes to Cambridge to read mathematics need take no other subject. It is however possible, after taking the first part of one tripos, to take the first or second part of another, and still obtain a B.A. Honours degree.

The Mathematical Tripos is, however, divided into four parts: Part IA, Part IB, Part II, and Part III, Part III being a postgraduate course. This provides for the wide spread of experience and ability which is to be found among mathematics students, and for the different aims which they may have in view. The most usual course of study is to take Part IA at the end of the first year, IB at the end of the second, and Part II at the end of the third. It should be emphasised that this course is difficult and fast-moving; it is an "elite" course, like the one provided by the Polytechnique in France or MIT in the USA.

The Tripos as now arranged can in fact be used with great flexibility, and enables suitable courses to be planned for many different purposes. In addition to serving as a preparation for further parts of the Tripos, Part IA provides a suitable course for students who wish to have a brief introduction to mathematics before taking up what is to be their main subject, which might be physics, chemistry, engineering, economics, computer science, etc. Part IB of the Tripos provides a firm foundation for a more specialised study of Pure Mathematics or Mathematical Physics in Part II. It can also lead to a course in Natural Sciences, Engineering, Computer Science or Management Studies.

### Affiliated Students

It is possible for students who have graduated in other universities, both in the United Kingdom and elsewhere, to obtain a Cambridge B.A. in two instead of three years. A student who has obtained a first-class degree in mathematics, physics, or engineering from an "affiliated" university may be able to come to Cambridge to take Part III of the Tripos, and so obtain the Certificate of Advanced Study. There are about 60 courses available from which to choose; they range over the whole extent of pure mathematics, statistics and the mathematics of operational research, applied mathematics and theoretical physics. They are designed to cover those advanced parts of the subjects which are not normally given in first degree courses, but which are an indispensable preliminary to independent study and research. They are also useful to those who want further training before taking posts in industry or in research establishments.

### The Diploma in Mathematical Statistics

This is a postgraduate course for the professional statistician. It includes work in probability and in operational research. It is a nine-month course, beginning yearly on 1 October. Classes and practicals take place in the Statistical Laboratory, and each candidate is required to undertake a practical project. A wide variety of fields of application is usually available. All students are taught to use the University's mainframe computer.

### The Computer Science Tripos

There are two alternative courses for the Computer Science Tripos. There is the one-year course which is intended for students in their third year. These students will have spent their first two years reading for a part of another Tripos, which would normally be Mathematics, Natural Sciences, or Engineering. The other is a two-year course; students on this will have spent their first year on some other subject. The course does require some degree of mathematical preparation, but the mathematics in Part IA of the Natural Sciences Tripos is quite sufficient. Both courses provide a sound basis in

programming languages, computer hardware, compilers, and operating systems, and include many other computing topics. (These regulations are about to be changed. From 1988 it will be possible to do a three-year computer science degree.)

### Diploma in Computing Science

A candidate for the Diploma must be approved by the Computer Syndicate. He must satisfy the Syndicate that he has attained a standard in mathematics sufficiently high for him to profit by the course, and must ordinarily be a university graduate.

These notes can do no more than indicate the many possibilities. The Handbook of the University of Cambridge gives more details, and the Admissions Tutor of Lucy Cavendish College, Cambridge, will be glad to answer the enquiries of any woman graduate who gives details of her qualifications and of the type of course in which she is interested.

### Postscript

While I was in Berkeley this last August, I talked to some of the women mathematicians I met about Lucy Cavendish College Cambridge, and of the efforts of women here, over the last twenty years or so, which have led to its establishment.

It began with a group of friends who were concerned with the difficulties which graduate women, many of them with excellent first degrees, had when they tried to re-establish themselves in academic life after a break caused, in one way or another, by the responsibilities of family life. Sometimes the cause was simply that they had followed a husband to a new appointment in Cambridge, leaving behind the university where they had first studied, and where they could have expected an opportunity for further study and research. Sometimes there was a longer break, caused by the birth of children, and the care of them during their early years. In this case, a woman might find that she needed to update her qualifications for the career for which she now hoped. She might need a higher degree, or a diploma, or a course, say, in computing, which would extend her field of work.

It was apparent to us that social conditions had changed, and were still changing rapidly. Small families, better health, longer lives...all these were factors which made for a long stretch of time in which a professional woman would be able to develop her career. Was there anything we could do in Cambridge to make the most of the opportunities? A woman with a good first degree should have the chance of entrance to the University to make good the gaps if her education had stopped too soon to measure up to her inherent capabilities. Given the structure of the University, which we very well understood (for after all many of us were married to university and college administrators, professors, and other "dons"), and in which students had to be admitted not only by the University but also by a college, we knew that a mere suggestion that the University should set about the admission of a number of mature married women would be completely ineffective. Where were they to go? What college would think of taking them? All the existing colleges were already under heavy pressure to admit students of the usual kind, young men (or, as was then the case for three colleges, women) whom they knew how to deal with, for whose benefit they had been planned. The idea of admitting mature women would seem absurd.

The only way in was to found a college for this special purpose. Many colleges do, after all, for historical reasons, admit by preference special categories of students. Trinity Hall has a bias towards law students, St. Edmund's College towards Catholics: there are many other examples. We needed a college planned to deal with mature women.

One thing which helped us was that in the 1950s, the University was already employing some women in posts such as departmental lecturers, assistant keepers in museums, research assistants in scientific institutes and so on, who were not Fellows of the existing women's colleges, but were doing enough teaching in the University to qualify as members of the Regent House. These women formed the nucleus of our first organisation, known simply as the Dining Group, which gradually developed a sufficient cohesion to be able to formulate a policy and proposals for the education of mature women in the University.

We became an "Approved Society" of the University in 1965, and after twenty years hard work we are now recognised as an Approved Foundation. We have fifty women (mature and affiliated, married and single) reading a variety of undergraduate courses, and can admit as postgraduates any women whose qualifications are approved by the Board of Postgraduate Studies, and who can afford University and College fees. Twenty-five are here at present. There are eighteen Governing Body Fellows; many other senior members of the University are associated with us as members of the

Combination Room. The Honorary Fellows include Lady Trumpington, formerly Mayor of Cambridge and now a Minister and Member of the House of Lords, and Professor Eleanor Burbidge, F.R.S. of the Centre for Astrophysics and Space Sciences, University of California. The President is Dame Anne Warburton, DCVO, CMG, MA, a former Ambassador to Denmark.

Further information may be obtained from the College.

## NEW JERSEY CHAPTER OF AWM THRIVING

by Pat Kenschaft, Montclair State College

The New Jersey Chapter of AWM has grown in six years from a fleeting idea to a visible force in the state with about seventy members. In the past few years it has had four meetings a year, usually preceded by a brief newsletter. Letters in New Jersey daily newspapers steadily recruit new members, and since its inception there has been at least one woman speaker at each of the New Jersey Section's semi-annual MAA meetings.

The New Jersey Chapter of AWM began in the spring of 1981 when I called an informal discussion during the luncheon break of the spring MAA meeting entitled "Sexism Here and Now." About thirty people attended, and at first there was an insistent denial that sexism was a problem in the MAA. The different participation of the sexes in mathematics was blamed on the public schools, the media, families, and perhaps colleges.

I asked why, with eight speakers most years, there had been only one woman mathematical speaker in the past six years of New Jersey Section Meetings. There was a silence, and then someone said there were no qualified women speakers. A general hubbub ensued during which many names of nearby highly qualified women speakers were offered.

In the past six years we have had no less than fifteen women speakers at MAA Section meetings, in striking contrast to the one in the previous six. There was no perceptible resistance to this change. It required just one person to point out the pattern and supply suitable names. This was partly because the three NJ-MAA presidents (we have two-year terms) during these six years are also AWM members—Susan Marchand, Ashby Foote, and Sister Stephanie Sloyan.

The female speakers have ranged in quality from somewhat above average to superb. At first, I recommended a specific woman to the people in charge of planning each meeting, and then I was elected Vice Chair for Speakers of the New Jersey Section of the MAA. Recently I was reelected.

New Jersey's MAA meetings are one-day Saturday affairs, since everyone lives within a four-hour drive of everyone else, and most of us can drive to the majority of the state's colleges in less than two hours. At the fall Meeting in 1981, New Jersey AWM sponsored a talk by Judy Green on American women in mathematics during the MAA lunch break. It was well attended and well received, but we decided that AWM lunch meetings were too disruptive to the MAA program, and tried late afternoon meetings. Afternoon meetings tended to reflect a tired mood, so we tried breakfast meetings. These reflect a hurried mood, but are always animated, and are often useful for planning strategies and sharing ideas. They occur twice a year before the state spring and fall MAA meetings.

Before Judy Green's speech I obtained mailing labels from Wellesley of national AWM members in New Jersey, and I informed them of her talk and invited them to join the local affiliate. Several joined, but many did not respond to the single mailing of a fledgling organization. As this is written, we are anticipating our second public presentation, and I have again received such labels with similar plans in mind.

After the new chapter had about a dozen members, Mary Hesselgrave invited all of them to dinner at her home. Six accepted. This was a delightful evening that generated numerous ideas and gave a sense of cohesion and permanency to the group. We decided that regular leisurely dinner meetings in a restaurant would be easy and valuable. Since then we have been having such dinners each winter and summer, alternating with the hasty breakfasts. At the dinners we do nothing but get acquainted with each other, exchange advice, plan newspaper releases, and have a good time. They draw about a dozen people each time, but the group changes. It usually include some students (high school, college, or mature), some high school math teachers, some two-year college math teachers, some college and university math teachers, a full-time mother or two, someone from administration, and mathematicians from industry. Typically there is one man among the group, not always the same man.

We all introduce ourselves to the entire group early in the dinner and present problems (personal, social, or mathematical) that we would like the group to consider. The conversation has been uniformly lively. Toward the end of each dinner I ask for suggestions for an upcoming letter to the newspapers, and together we outline a new approach for presenting the AWM message to the public.

I write the letter on my word processor, and then use my carefully "saved" addresses to send copies of it to ten other members around the state, each of whom lives in the area of a different daily newspaper. Each letter uses the return address of the resident in that district and is co-signed by her (or him), as "regional representative" of the AWM and me, as president. Usually about three or four of these letters are published, but the newspapers that print them vary. Thus we have had repeated exposure in most parts of the state.

Mary Hesselgrave of AT&T offered to reply to people who want information about AWM or women and minorities in mathematics. Her name and address appears in each letter "for further information." She and I made up a packet of information, bibliographies, and application forms, which she has sent in response to hundreds of inquiries from students, parents, guidance counselors, school administrators, board of education members, and dozens of people who don't bother to identify themselves.

Last spring we sent a letter to each of the top twenty young women in the New Jersey MAA competition at their high school. It included personal congratulations from me, information about AWM and women in mathematics, and an offer to pay for one year's student membership in national AWM if they would send us their home address. This is a real bargain; for only \$5 a student can receive six inspiring newsletters! About a third of them accepted our offer. It is heartwarming to have such students at our local dinner meetings.

Public talks require more concentrated time than these activities, but the unusual meeting of the AMS in Newark provided an obvious opportunity. On April 25 Ann Hibner Koblitz, who is a Visiting Professor at Wellesley this year, spoke about Sofia Kovalevskaja and her impact. Her talk followed an AMS Spanish-Portuguese buffet dinner to which AWM members and their friends were invited. This enticed some AMS members to stay for an evening activity provided by AWM between their two days of mathematics.

We send out four announcements a year to all our members preceding our meetings, and these have grown into little newsletters. Aggie Azzolini makes these mailings, helps with numerous "housekeeping" items, and provides abundant good advice. Our newsletters announce that Cathy Folio has offered to match job applicants with openings, but I am not aware that we have formally made a "match" yet. (We do facilitate informal ones.) Helene Walker began some attempts to get a grant for student scholarships, but then we decided that just getting the grant would take more time than we have available. Every other year, we have distributed a list of the members with addresses to all the members. The informal contacts among our members matter.

It is hard to measure the impact of such an organization, but those of us who have put the most time into it feel that the time is not only well spent, but pleasant. It surely has given AWM visibility in the reading region of my own daily newspaper. When I first met and introduced myself to one high school math teacher, he responded, "Oh yes! Dr. 'Women-in-Mathematics.' I have three very gifted girls in my Algebra II class. Do you have something I can give to them? What should I be doing for them?"

## CAREER OPTIONS FOR GIRLS: A TECHNICAL MENTOR PROGRAM

by Ann E. Moskol, Mathematics/Computer Science Department, Rhode Island College

Despite the gains of the women's movement, technical fields that require mathematics training like engineering, architecture and computer programming are still dominated by males. As a result, most adolescent girls do not have the opportunity to meet any of the relatively few females in these technical careers, and do not think of such occupations as possibilities for themselves.

Career Options for Girls (COG), funded by the Rhode Island Department of Elementary and Secondary Education, Division of Vocational Education, was a pilot program whose goal was to provide middle school girls with the opportunity to meet women in technical fields. The meetings were to take place both on an informal, social level, and on a more structured level through an on-site visit to the role model's place of employment.

During the fall semester of 1986, 47 middle school girls (from three Rhode Island school districts) were matched with 21 female role models in a number of diverse technical fields such as engineering, architecture, actuarial work, computer programming, scientific research and business. In November, the students participated in a 90-minute visit to their role model's place of employment. Two evening meetings at Rhode Island College, which were held both before and after the on-site visit, provided the girls and their parents with additional time to meet with the role models. At the October meeting, Dr. Anne Fausto-Sterling, Professor of Biology and Medicine at Brown University, author of *Myth of Gender: Biological Theories about Women and Men*, spoke about the need for girls to keep their options open by taking mathematics and science courses. At the final meeting in December, students, parents, role models and teachers had the opportunity to play "Odds on You", a simulation game designed to show how decisions and circumstances effect career opportunities, and to hear Dr. Carol Guardo, President of Rhode Island College, address the students.

Although the on-site visit was very labor intensive, it was well worth the many hours of planning which was required to coordinate the logistics of bussing 47 girls to the employment sites of the 21 different role models. The students evaluated the visit as the best part and most influential part of the program. Many mentors went out of their way to make the worksite visit a memorable experience for their students. Several girls wrote that they were now considering pursuing their role model's career. For example, one student wrote, "When I first entered this program, I felt strongly about becoming a lawyer. Now, I'm not so sure anymore. I'm going to consider being a civil engineer."

COG was successful in demonstrating the feasibility of a student-mentor program which involved an on-site visit to a variety of worksites. Both mentors and students were very enthusiastic about their roles in the program. Several role models and students exchanged phone numbers and were planning to continue their relationship after the formal program ended.

COG developed a 26 page booklet, *Keep Your Options Open: RI Women in Technical Fields Tell Their Own Stories*, based on the 21 role models. A total of 2600 copies of these booklets were distributed to educators, libraries and resource centers throughout the state. The number of copies requested far exceeded what the project staff had originally anticipated; many people commented on the great need for such a booklet. (To obtain a booklet, write: Linda Nightingale Greenwood, RI Department of Elementary and Secondary Education, Vocational and Adult Education, 22 Hayes St., Providence, RI 02908.)

NOTE: The staff of COG included Ann Moskol as director, David Capaldi and Joan Webb as project coordinators, and Marcelline Zambuco and Claire Pollard as school liaisons.

## OPERATIONS RESEARCH MEETING

by Linn Sennott

A national meeting of The Institute of Management Science and Operations Research Society of America (TIMS/ORSA) will be held in Washington, D.C. on April 25-27, 1988. I'm organizing several sessions to appear in a "Mathematics Cluster."

Traditionally, TIMS/ORSA has dealt with optimization in all its guises, including such subjects as linear and nonlinear programming, combinatorial optimization, applied probability, queueing theory, econometrics, reliability, etc. While some of the sessions are more applied, many tend to be theoretical and very mathematical.

I would like to organize several sessions in the area, loosely interpreted, of applications of mathematics to operations research. Such sessions could deal with any topic that has application, or may have application in the future, to operations research, including educational issues. The sessions are each 1 1/2 hours long, and should include three to five speakers. Four is considered the optimum number. A session could also consist of a panel discussion or tutorial.

I would like to solicit members of AWM as session chairpersons. As a chairperson, your responsibility would be to obtain commitments from four speakers, attend the meeting and chair your session. All attendees are required to register for the meeting; the fee is usually about \$100. It would be a good opportunity to learn something about operations research and management science.

If you would like to discuss the possibility of chairing a session, please let me know right away. I will be on sabbatical at (703) 860-2351 until August 1, and then can be reached at: Dr. Linn Sennott, Department of Mathematics, Illinois State University, Normal, IL 61761, (309) 438-8781.

## CITATIONS AND NETWORKING

by Marianne A. Ferber

The full-length paper on which this synopsis is based is to appear in a forthcoming issue of *Gender and Society*. It contains further information about the way the data were collected and references to other related research. Before publication, copies may be obtained from the author, Department of Economics, Box 64 DKH, 1407 West Gregory Drive, University of Illinois, Urbana, IL 61801.

Thanks to Beth Ruskai for bringing this article to our attention.

The extent to which the merits of a scholar are recognized and rewarded depends on participation in meetings and conferences, serving as an officer and on committees of professional associations, giving speeches and seminars and, of course, on publishing. The opportunity to participate in these activities depends, to a considerable degree, on the willingness of peers to extend invitations, nominate, recommend, and cite.

To determine whether and to what extent women may be at a disadvantage in these respects, we examined how much recognition is given to the works of same-gender and different-gender colleagues in several disciplines. If there is greater affinity between researchers of the same gender, members in a minority will find it more difficult to establish their reputation. Citations were used as a test case, for ease of data collection, quantifiability, and because they are a frequent indicator of academic merit.

Five fields were chosen, with a view toward a distribution of varying proportions of women, as well as differences in the extent to which "women's issues" might be relevant. Using randomly chosen samples of articles written by men only and by women only, published in U.S. and Canadian journals, we found that in developmental psychology 18.1 percent of the references in the former and 29.1 percent in the latter were to publications written by women only. The comparable figures were 7.5 percent and 15.8 percent in sociology, 6.8 percent and 17.4 percent in labor economics, 1.5 percent and 5.1 percent in financial economics, and 1.2 percent and 4.8 percent in mathematics.

These results not only show that women are cited less often when they constitute a minority among authors, but suggest that the divergence in citation patterns increases as the proportion of women decreases. Hence where women are in a smaller minority they lose both because there are fewer articles written by women, and because of the lower ratio of citations of women's works by male as compared to female authors.

We can only speculate about the reasons for these differences. Most plausible, perhaps, is that gender segregated networks play a part, but that these become less exclusive as the representation of women in the profession increases, and it becomes progressively more difficult to ignore them. In any case, the results suggest that as more women enter academic fields dominated by men they need not anticipate growing resistance but may rather look forward to an increasingly welcoming atmosphere. Meanwhile, however, women scholars in predominantly male fields continue to face substantial hurdles in achieving status in their profession.

## INSTITUTE FOR RETRAINING IN COMPUTER SCIENCE (IFRICS)

The IFRICS program was established in an effort to help meet the critical shortage of qualified college teachers of computer science by providing retraining for faculty from other fields such as mathematics. Each IFRICS class participates in two summers of intensive course work. During the intervening academic year each participant is expected to teach a computer science course at their home university and to complete a major programming project. The curriculum consists of eight four-week courses designed to prepare participants to teach a major portion of the ACM '87 core curriculum in computer science. In addition to the regular two-summer program, IFRICS will offer two independent four-week courses entitled "Data Bases and File Management" and "Computer Based Discrete Mathematics" during the summer of 1987.

The two campuses of IFRICS have enrolled 246 participants representing over 200 schools from 44 states and 6 foreign countries during the first four summers of operation. IFRICS has been guided since its creation by the joint ACM/MAA Committee on Retraining for Computer Science. Faculty for the Institute are selected from among the top computer science departments in North America based upon outstanding records in both research and teaching.

The dates for the classes scheduled to begin in the summer of 1987 are as follows: Clarkson University, June 1, 1987-July 31, 1987, and Kent State University, June 15, 1987-August 14, 1987. Interested candidates should write for more information and application forms to either: Ed Dubinsky, IFRICS Director, Department of Mathematics and Computer Science, Clarkson University, Potsdam, NY 13676 or Darrell Turnidge, IFRICS Director, Department of Mathematical Sciences, Kent State University, Kent, OH 44242.

## GRANTS AND FELLOWSHIPS

from the *AMS Notices*, February 1987

The Council for International Exchange of Scholars has announced the opening of the competition for the 1988-1989 Fulbright grants in research and university lecturing abroad.

The awards for 1988-1989 include more than 300 grants in research and 700 grants in university lecturing for periods ranging from three months to a full academic year. There are openings in over 100 countries and, in some instances, the opportunity for multi-country research is available. Fulbright Awards are granted in virtually all disciplines, and scholars in all academic ranks are eligible to apply. Applications are also encouraged from retired faculty and independent scholars.

Benefits include round-trip travel for the grantee and, for most full academic year awards, one dependent; maintenance allowance to cover living costs of grantee and family; tuition allowance, in many countries, for school-age children; and book and baggage allowances.

The basic eligibility requirements for a Fulbright Award are U.S. citizenship; Ph.D. or comparable professional qualifications; university or college teaching experience; and, for selected assignments, proficiency in a foreign language. It should be noted that a new policy removes the limit of two Fulbright grants to a single scholar.

Application deadlines for the awards are June 15, 1987 (for Australasia, India, and Latin America, except lecturing awards to Mexico, Venezuela, and the Caribbean); September 15, 1987 (for Africa, Asia, Europe, the Middle East, and lecturing awards to Mexico, Venezuela, and the Caribbean); November 1, 1987 (for institutional proposals for the Scholar-in-Residence Program); January 1, 1988 (for Administrators' Awards in Germany, Japan, and the United Kingdom; the Seminar in German Civilization; the NATO Research Fellowships; and the Spain Research Fellowships), and February 1, 1988 (for the France, Italy, and Germany Travel-Only Awards).

For more information and applications, call or write Council for International Exchange of Scholars, Eleven Dupont Circle N.W., Washington, D.C. 20036 (202-939-5401).

The Indo-U.S. Subcommittee on Education and Culture is offering twelve long-term (6-10 months) and nine short-term (2-3 months) awards for 1988-1989 research in India. These grants will be available in all academic disciplines, including mathematics. Applicants must be U.S. citizens at the postdoctoral or equivalent professional level. 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. Therefore, scholars and professionals with limited or no prior experience in India are especially encouraged to apply.

Fellowship terms include: \$1,500 per month, of which \$350 per month is payable in dollars and the balance in rupees; an allowance for books and study/travel in India; and international travel for the grantee. In addition, long-term fellows receive international travel for dependents; a dependent allowance of \$100-\$250 month in rupees; and a supplementary research allowance of up to 34,000 rupees. This program is sponsored by the Indo-U.S. Subcommittee on Education and Culture and is funded by the United States Information Agency, the National Science Foundation, the Smithsonian Institution, and the Government of India.

The application deadline is June 15, 1987. Application forms and further information are available from the Council for International Exchange of Scholars, Attention: Indo-American Fellowship Program, Eleven Dupont Circle, Suite 300, Washington, D.C. 20036 (202-939-5469).

One of the principal goals of the National Science Foundation is to ensure an adequate supply of high quality mathematicians, scientists, and engineers for the future. Talented undergraduate students



must be attracted to research careers in these fields. To this end, the NSF is beginning in FY 1987 to significantly expand its programs directed toward undergraduate mathematics, science, and engineering education.

Research Experiences for Undergraduates (REU) is a new NSF program intended to provide approximately 2,000 undergraduate students with opportunities to participate in active research in mathematics, science, and engineering. In contrast to past procedures with this kind of program, REU will be conducted by the research divisions. The Division of Mathematical Sciences (DMS) is placing particular emphasis on increasing the level of participation of women, minorities, and the disabled in the mathematical sciences, and this factor may influence decisions about the REU awards.

There will be two categories of awards: REU sites and REU supplements. Awards of either kind are expected to average \$4,000 per student, with at least half going to the student as a stipend. In the first category, the grants will support undergraduate research participation sites, usually involving at least 8 students of whom half are expected to come from outside the host institution. The programs can be carried out during the summer and/or the academic year. The sites might serve a geographical region or focus on a particular set of topics.

The REU supplements provide additional funds to ongoing NSF research grants to provide for research training experiences for 1-2 undergraduates. Normally funds will be available for up to 2 students, but exceptions will be considered for training additional minority, physically disabled, or women students. These projects could also be carried out during the summer and/or the academic year.

## ON CAMPUS WITH WOMEN

reprinted from the Summer 1986 issue of the publication of the same name published by the Project on the Status and Education of Women, Assn. of American Colleges, 1818 R St., NW, Washington, DC 20009  
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### Why Do Students Major in Science or Mathematics?

A study of factors associated with the decision to major in science or mathematics found that women students continue to view involvement in science as incompatible with marriage and family life, while their male counterparts did not view the goals of pursuing science and raising a family to be in conflict.

The report, based on a 1980 and 1982 study of high school seniors and college sophomores, shows that only 14 percent of the women in the top academic group had chosen a college science major, compared with 40 percent of the men. Researchers Norma C. Ware of Radcliffe College and Valerie Lee of the Educational Testing Service also found that encouragement by teachers and school counselors had a larger impact on the women students than the men. Their conclusion indicates that teachers and counselors can help young women feel confident about pursuing scientific careers by showing them how demanding careers and families can be effectively combined, and actively encouraging them to participate in science and math.

"Factors Predicting College Science Major Choice for Men and Women Students" is available for \$2.00 from Norma Ware, Associate Dean, Fay House, Radcliffe College, 10 Garden St., Cambridge, MA 02138.

### Student Evaluations: Unfair to Women?

Once again another study has confirmed that women faculty are consistently rated more negatively than their male counterparts in student evaluations. Researchers at Lafayette College found that not only males but female students as well seemed to be biased against women professors. Susan A. Basow and Nancy T. Silberg examine a number of sex-role variables and discuss their importance in predicting teacher evaluations. The study also contains a short list of references which would be useful to those researching this subject. Copies of "Student Evaluations of College Professors: Are Males Prejudiced Against Women Professors?" are available free from Susan A. Basow, Psychology Department, Lafayette College, Easton, PA 18042.

#### EEOC: Goals and Timetables not Necessary

The Equal Employment Opportunity Commission (EEOC) no longer requires employers to establish numerical goals for hiring and promoting women and minorities when it settles complaints of race and sex bias. The five members of the EEOC never officially voted to discontinue using these remedies, but apparently since there was no support for these requirements among the commissioners, the EEOC Acting General Counsel instructed EEOC attorneys in fall 1985 to stop making settlements requiring goals and timetables.

At the same time, Attorney General Edwin Meese III has been battling for months with members of the Cabinet over his campaign to have the President drop or modify Executive Order 11246 which directs federal contractors, including colleges and universities, to set numerical goals to remedy past discrimination. According to the White House, no date has been set for a decision on that issue.

Speaking on administration attempts to jettison the use of goals and timetables under affirmative action programs, Harvard University president Derek Bok said:

As president of a large affirmative action employer, I feel sure that without goals and timetables we would never have been as aware of our deficiencies or had as much motivation to overcome them. As a veteran of repeated reviews under four administrations, I have never seen federal officials treat our goals as quotas even when my university failed to meet its targets. The most substantial pressure to hire more minorities and women has come not from the government but from private sources both inside and outside the university. If federal officials have erred, it has been through bureaucratic overkill that has forced my colleagues to spend too much time preparing reports and statistics and too little time trying to identify promising candidates whom we might hire.

In 1970 Harvard was the first private university investigated under Executive Order 11246 after being charged with sex discrimination.

#### OF POSSIBLE INTEREST

*Gender & Society*, official publication of Sociologists for Women in Society. Quarterly journal. Sage Publications, Inc., P.O. Box 5084, Newbury Park, CA 91359.

Women, gender, family. Allen & Unwin, Inc., International Publishers, 8 Winchester Place, Winchester, MA 01890.

SUNY series on Women and Work. State University of New York Press, P.O. Box 6525, Ithaca, NY 14850.

Women's studies. Indiana University Press, 10th & Morton Streets, Bloomington, IN 47405.

DEADLINES: May 24 for July-Aug., July 24 for Sept.-Oct., Sept. 24 for Nov.-Dec.  
AD DEADLINES: June 5 for July-Aug., Aug. 5 for Sept.-Oct., Oct. 5 for Nov.-Dec.  
ADDRESSES: Send all Newsletter material **except ads** to Anne Leggett, Dept. of Math. Sci., Loyola University, 6525 N. Sheridan Rd., Chicago, IL 60626.  
Send everything else, **including ads**, to AWM, Box 178, Wellesley College, Wellesley, MA 02181.

JOB ADS

Institutional members of AWM receive two free ads per year. All other ads are \$10.00 apiece and must be prepaid. The vacancies listed below appear in alphabetical order by state. All institutions advertising below are Affirmative Action/Equal Opportunity employers.

University of Florida. Dept of Statistics, Gainesville, FL 32611. Lecturer: One or two non-tenure accruing but continuing full-time positions, to teach undergraduate statistics courses starting 8/1987. Requires masters level training in statistics or related area & strong commitment to quality teaching. One year experience desirable. By 5/8/87 send curriculum vita, graduate transcripts, 3 letters of recommendation to Dennis Wackerly at above address.

Fitchburg State College. Mathematics Dept, 160 Pearl St., Fitchburg, MA 01420. (1) One year renewable tenure-track position (2) One year temporary position. Rank & salary open. Duties: teach 4 classes in math per semester, advise students regarding their academic programs, participate in curriculum & program development & in dept & college committees. Required: demonstrated teaching ability. Prefer PhD in math. Starting date: 9/87. By 5/18/87 send letter specifying which position, resume, transcripts & 3 letters of recommendation.

MIT Sloan School of Management. E53-383, Cambridge, MA 02139. Tenure track position (asst or untenured assoc prof) in Statistics Group of Sloan School of Management. Required: potential for excellence in research & ability to teach in our Master's & Doctoral programs. Seeking statistician with interests in theory applications & computing who could interact successfully with Sloan School faculty in areas such as finance, marketing & information systems. Required: PhD or prospects of its early completion. Send resume & 3 letters of reference & sample of research to Prof. Roy E. Welsch at above address.

Smith College. Dept of Math, Northampton, MA 01063. Non tenure track instructorship 1987-88. Teaching load is 3-2 with one course each semester at junior/senior level. Send vitae & at least 3 letters of reference to Kathy Bartus at above address.

Wheaton College. Mathematics Dept., Norton, MA 02766. Rochelle Leibowitz, Chair. Two-year tenure track asst professorship 9/1987. Required: PhD in math sciences, & commitment to quality teaching and active scholarly activity. Preferred areas: analysis, probability & statistics, computer science. Send application, vita, transcripts & 3 letters of recommendation to Chair.

Wayne State University. Dept of Math, Detroit, MI 48202. Clarence W. Wilkerson, Jr., Chmn. Several tenure track positions, Fall, 1987. PhD required. Higher rank or tenure possible for those extremely qualified with established res. records & national or international reputation. May be a few lectureships or visiting positions. Duties: undergraduate & graduate teaching & research. Current areas of interest: statistics, algebra, combinatorics, functional analysis, geometry, analysis & topology. Salary & rank to be negotiated. Send resume & have 3 letters of reference sent to Chmn.

Mankato State University. Dept of Math, Astronomy & Stat, Mankato, MN 56001. F. T. Hannick, Chairperson. Tenure track position in math. Rank/salary depend on qualifications. Required: PhD in math. Special interest: algebra, analysis, applied math, math educ & stat. Strong interest in teaching at freshman thru graduate levels & evidence of successful teaching at postsecondary level. Teaching load 36 quarter hours per 9 mo. academic year. Appointee will teach math, advise students, serve on dept committees & do research. Open until filled. Send application, vita, res. & teaching interests & 3 letters of reference to Chairperson.

SUNY College at Plattsburgh. Dept of Math, Plattsburgh, NY 12901. Tenure track positions 9/1987. Appts possible at all levels. Duties: undergraduate teaching, research & service to the College. Required: PhD in math, stat or math education. Screening starts 3/1/87 & will continue until positions are filled. Contact Dr. Robert Hofer, Chairman, Search Committee, at above address.

University of Pennsylvania. Dept of Mathematics, Philadelphia, PA 19104-6395. One or more tenure positions 7/1/87 for candidates with significant recognized research achievements who are successful teachers of undergraduate and graduate students. Rank and salary dependent upon experience. Write to Chairman, Personnel Committee, at above address.

University of Vermont. Dept of Mathematics & Statistics Chair. Chairperson of Dept of Math & Stat. Seeking mathematician or statistician with strong research background, a record of leadership and commitment to excellence in teaching. New chairperson will be instrumental in shaping research mathematics, both within the univ and in the State of Vermont, by developing existing strengths of dept as well as fostering interaction with other scientific & engineering groups in the univ, the medical school and industry. This task is expected to include the implementation of a PhD program & building in the areas of analysis & applied mathematics. Required: PhD in math or stat. Will consider all fields but prefer those in fields mentioned above. Salary competitive & commensurate with candidate's experience. Nominations of, and applications from, qualified female & minority candidates are especially invited. Position starts 6/1/88. By 8/31/87 (or until position is filled) send nominations & applications (including resume listing names, addresses, and phone numbers of at least three references) to Prof. Kenneth I. Golden, Chair, Math & Stat Search Committee, Office of the Dean, College of Engineering & Mathematics, 123 Votey Bldg., Univ of VT, Burlington, VT 05405

SEARCH FOR AN EXECUTIVE DIRECTOR  
for the  
AMERICAN MATHEMATICAL SOCIETY

Position: The post of Executive Director of the American Mathematical Society will become vacant on a date to be established in 1988 upon the retirement of William J. LeVeque from that position. The Executive Director is employed by the Trustees of the Society, who now seek a replacement. Employment could begin at a date of mutual convenience in 1988 and might include overlap with the term of the incumbent, though this is not a requirement. The central office of the Society is in Providence, R.I.

Duties: The duties of the position are summarized in Article VI of the bylaws of the Society as follows:

Section 1. There shall be an Executive Director who shall be a paid employee of the Society. He shall have charge of the central office of the Society, and he shall be responsible for the general administration of the affairs of the Society in accordance with the policies that are set by the Board of Trustees and by the Council.

Section 2. The Executive Director shall be appointed by the Board of Trustees with the consent of the Council. The terms and conditions of his employment shall be fixed by the Board of Trustees.

Section 3. The Executive Director shall work under the immediate direction of a committee consisting of the President, the Secretary, and the Treasurer, of which the President shall be chairman ex officio. The Executive Director shall attend meetings of the Board of Trustees, the Council, and the Executive Committee, but he shall not be a member of any of these bodies. He shall be a voting member of the Committee to Monitor Problems in Communication but shall not be its chairman.

Note: In the above statement, "he" is the sexless third person singular pronoun, used to avoid the awkwardness of repeated "he or she" or the barbarism "he/she."

The purpose of the Society is described in this quotation from the charter:

The particular business and objects of the Society are the furtherance of the interests of mathematical scholarship and research.

The Society accomplishes its purpose through meetings and conferences and through publication. There is a diversity of other activity.

The annual budget of the Society exceeds thirteen million dollars, about one fifth being in the general fund and four fifths in the publication fund. There are about 150 employees in Providence and 75 in Ann Arbor. Mathematical

Reviews is a semi-autonomous operation in Ann Arbor under the direction of the Executive Editor.

There are about eight general meetings per year and as many as twelve to fifteen specialized conferences.

The Society publishes at least sixteen journals of various kinds. It publishes about a dozen series of books. All of the operations, except for the printing of a couple of journals with very large print runs, are done in house.

Both the office operations and the publication are highly computerized.

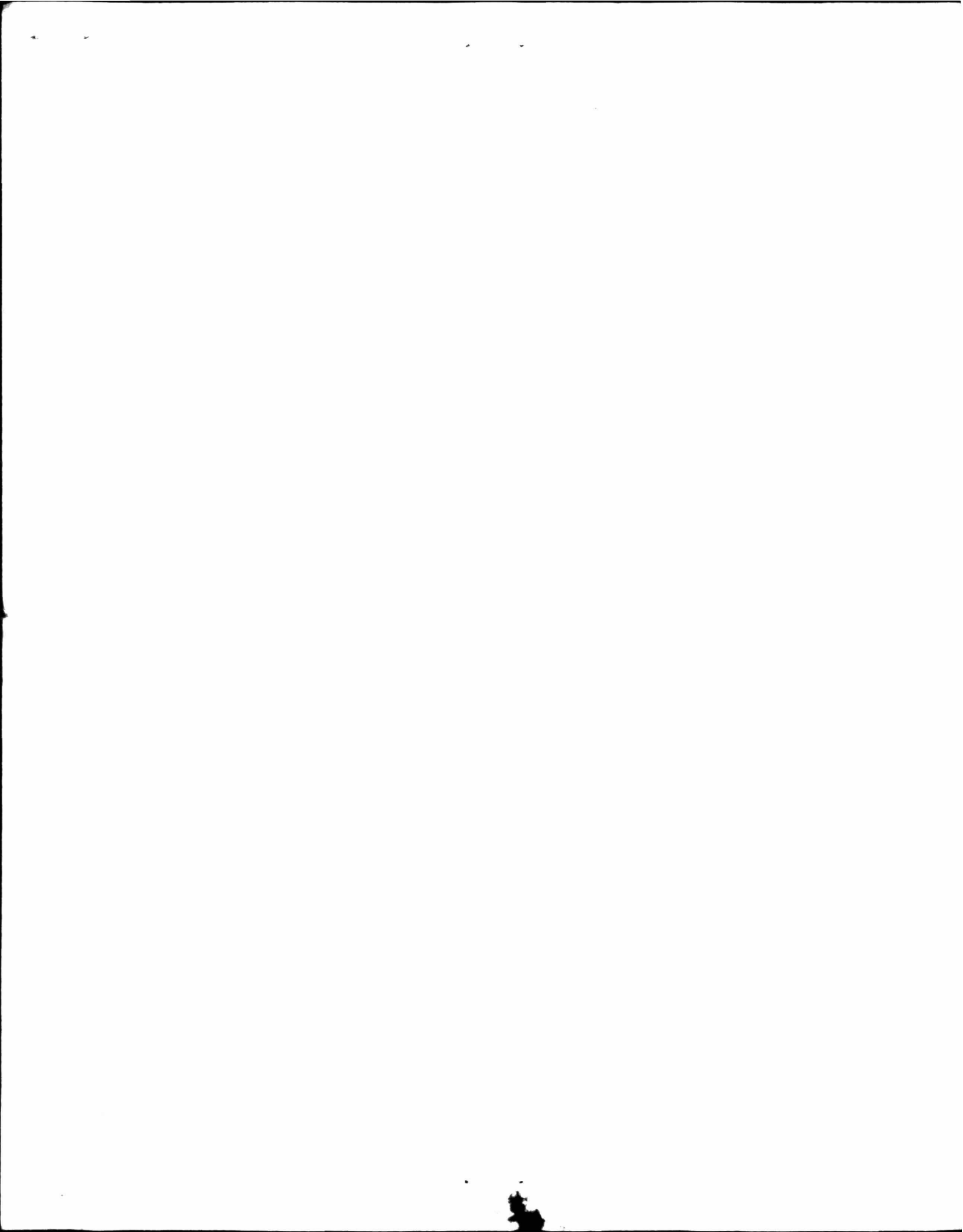
Qualifications: Candidates should have a Ph.D. in mathematics (or the equivalent), published research beyond the Ph.D., and significant administrative experience. Desirable qualifications include experience in

mathematical publication, fiscal management, and computer utilization.

Applications: A search committee, with Frederick W. Gehring as Chairman, has been formed to seek and review candidates. Persons who wish to be considered or to make a nomination should provide supporting documentation to

Professor F. W. Gehring  
Department of Mathematics  
University of Michigan  
Ann Arbor, MI 48109

before 1 September 1987 to receive full consideration.



Association for Women in Mathematics  
Box 178, Wellesley College, Wellesley, MA 02181  
617-235-0320 Ext 2643

Application Blank

The AWM membership year is Oct 1 to Oct 1

Individual \$15 \_\_\_\_\_

Family \$20 \_\_\_\_\_

Contributing Member \$20 or more in addition to regular dues \_\_\_\_\_

Retired, Student, Unemployed \$5 \_\_\_\_\_

New Member Rate:(Individual) (Applicable only to those who are joining  
AWM for the first time.) For each of 1st 2 years \$10 \_\_\_\_\_

Foreign members please remit \$8.00 additional for postage.

Institutional (2 free advertisements per year in Newsletter)

Sponsoring, Category I \$65 \_\_\_\_\_

(Includes nomination of 10 students for free membership for 1 year)

Sponsoring, Category II \$45 \_\_\_\_\_

(Includes nomination of 5 students for free membership for 1 year)

Regular \$25 \_\_\_\_\_

Name \_\_\_\_\_

Address \_\_\_\_\_

Institutional Affiliation, if any \_\_\_\_\_

Association for Women in Mathematics  
Box 178, Wellesley College  
Wellesley, MA 02181

May-June, 1987

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