

Association for Women in Mathematics

Volume 9, Number 2

NEWSLETTER

March-April 1979

PRESIDENT'S REPORT

Biloxi. The AWM presence in Biloxi was a huge success. Many green armbands were worn. Apples especially imported from Washington state were eaten as a symbolic gesture. Especially remarkable is that we did not have to solicit participation - people came to us for the armbands, cheerfully donated for the apples. The local publicity was excellent - a spot on the tv news and page one stories in each of the local papers (headlines were: "ERA protest takes toll at Biloxi meeting" and "ERA backers urge economic boycott at Coast gathering"). Again, we didn't solicit these stories. The demonstration clearly went far beyond the mathematical community, making its impact felt in the local community as well. The joint mathematics meetings were the first large meetings held in the new convention center in Biloxi and the educational impact of our protest was clear. It was also interesting that the local hotel and restaurant people were quite friendly to those of us who wore green armbands - after all, we were local media celebrities - and were curious about why we wore them. Many thanks are due to Bettye Anne Case and Evelyn Sylvia who organized the demonstration, and who also took charge of the AWM table and a myriad of small details at the meeting. Grateful thanks also to the many women who staffed our table.

An encouraging trend noticed at the Biloxi meetings was the increase in women holding responsible positions with publishing houses, many of whom joined our protest and encouraged their colleagues to join us as well.

The only official AWM event was the panel on "The ERA and the mathematical community" with Chandler Davis, Mary Gray, Jack Quine, and Judy Green. Questions afterward focused largely on the practical matter of how to get the Equal Rights Amendment into the U.S. Constitution.

Elections and by-laws. Although the panel was the only official AWM activity at Biloxi, it turned out that 7 out of 10 of our executive committee members were there and so we met unofficially to discuss by-laws, blind refereeing (see next section) and other matters.

In the last newsletter I announced that we would have March elections. Unfortunately that newsletter arrived - at least in Kansas - after the March newsletter deadline. Even extending things long enough to include Biloxi news does not give enough time to solicit nominations. There is also the problem that many of our members don't know where they'll be next year and are hence reluctant to run for office, and the further problem that late spring or summer elections will catch many of our members out of town. So the elections will be held in the fall.

On the brighter side, there was strong concensus on the proposed by-laws (outlined in this newsletter) and such enthusiasm that we decided to conduct the next election by their guidelines. (Current election procedures have evolved in an ad hoc fashion, as has the makeup of the executive committee, and nobody is particularly pleased with them.)

So the positions open this fall according to our proposed by-laws are president-elect and three at-large members.

The general thrust of the proposed by-laws is to increase participation and democracy. A major part of this is to have nominations by a nominating committee, currently being appointed by the executive committee, specifically charged to ensure contested elections. In addition, nominations may be made by any AWM member (simply send me the names of your candidates early enough so I can verify their willingness to run and obtain a brief statement from them for the newsletter).

For more details on the proposed by-laws see the article on them in this newsletter. Your comments are solicited by May 1. We will then present a final version of the by-laws at the Duluth business meeting. Whatever by-laws come out of this meeting will go into effect immediately.

Blind refereeing. At the AMS Council meeting in Biloxi a resolution was passed rescinding automatic blind refereeing of the Proceedings of the AMS, but allowing authors to request that their articles be refereed blind. The vote was close, and the matter will be brought up again at the April 19 Council meeting in New York City. I urge you to express your concern via letters to the Notices of the AMS, with copies to Peter Lax (Courant Institute) and Chandler Davis (University of Toronto). Deadlines (again!) being what they are, it is likely that letters will appear in the Notices after the fact, but their effect on the Council will be immediate.

Since AMS Council meetings are open, if you are at the April 1979 joint regional meeting, you are urged to attend the AMS Council meeting.

Judy Roitman
Department of Mathematics
University of Kansas
Lawrence, KS 66045

OUTLINE OF PROPOSED BY-LAWS

by Judy Roitman

Preface. This outline represents the concensus of the executive committee members who met in Biloxi. Its broad goals are to increase participation, ensure democracy, and provide functional continuity. The major change is a total reorganization of the executive committee and of election procedures.

Your comments are hereby solicited. Send them to me at the University of Kansas by May 1, so that we can consider incorporating them into the final by-laws.

Copies of the proposed by-laws will be available at the AWM table at the summer meeting in Duluth prior to the AWM business meeting. Anyone suggesting substantial changes in a letter received before May 1 whose suggestions are not incorporated in the final version to be presented in Duluth will be informed by letter and sent the relevant section, so that she has time to prepare the general wording of any amendment she might wish to propose at the Duluth meeting.

If you are interested in seeing the current by-laws, complete copies are available from the Wellesley office. There are 8 pages of legalese (Massachusetts law is quite archaic) so if you only want to see one section, let Margaret Munroe at our office know and that's all she'll send you.

It is understood that in the above and following paragraphs "she" is the general first person singular, etc.

Officers and executive committee. Officers are: president, president-elect or past president (in alternate years), treasurer, newsletter editor, and clerk. Executive committee = officers + five at-large members - clerk. Clerk is a quirk of Massachusetts corporation law and must be a resident of Massachusetts. She will act as executive secretary, i.e. liaison with office staff, responsible for corporation records, etc.

Clerk is appointed by executive committee, newsletter editor is appointed by president. All other executive committee members are elected by the general membership.

All terms are for two years except president-elect and past president, which are for one year. No elected executive committee member may hold the same office for more than three consecutive terms.

Getting in and out of office. President-elect and three at-large members are elected in odd years; treasurer and two at-large members in even years, which is also when clerk and editor are appointed. Elections are held in the fall by mail ballot, and offices assumed on January 1.

A 3-person nominating committee appointed in the spring by the executive committee will be charged with preparing a ballot in which all position are contested. Further

nominations will also be solicited through the newsletter.

Recall of an executive committee member may be initiated by petition of either $\frac{2}{3}$ of the executive committee or 25% of the general membership. Upon receipt of the petition, verification of signatures and vote by mailballot will occur as soon as possible, with an outside deadline of 6 months.

Vacant offices shall be filled by appointment of the executive committee to complete the current term of that office.

Meetings. There will be two business meetings per year, one at each of the national joint mathematics meetings. Executive committee meetings will be open and also scheduled during the joint mathematics meetings. Upon majority vote, the executive committee may go into closed executive session. The corporation's annual meeting, required by law, is the business meeting at the winter joint mathematics meeting.

Special meetings may be called as per current by-laws with notice as in current by-laws.

Membership. Membership categories, requirements, and privileges are as at present, with dues set by a majority vote of the executive committee.

There is an AWM Council, whose members may be self-nominated or nominated by another AWM member. In either case, an AWM member becomes a Council member by consenting to be one and designating her special interest area. Council members shall initiate projects, organize local meetings, communicate information, or be otherwise especially active in a particular area of concern to the organization.

Changing things. By-laws may be amended as per current by-laws. (A workable procedure, by the way, since that is exactly how we are proceeding.)

Minutes. At each executive committee meeting or business meeting the presiding officer shall designate a member to take minutes. All minutes will be kept on file and will be available to members upon request, as will records of action by writing. (Action by writing = official votes by mail on business appropriate to a meeting which can't wait for one.)

THE LARGEST KNOWN PRIME

from an article in the San Francisco Chronicle, Wed., Nov. 15, 1978.

2²¹⁷⁰¹-1 On October 30, 1978, Laura Nickel and Curt Noll of Cal State Hayward proved that is prime, using an implementation of the Lucas-Lehmer test on a CDC 174. The proof of primality took 7 hours, 8 minutes, and 20.023 seconds. The number has 6533 digits. The two 18-year-olds began working on the problem 3 years ago. They learned the basics of computer programming on the small computers at Hayward High School. Professor Arthur Simon, chairman of the mathematics department at Cal State Hayward, and math lecturer Dan Jurca provided them with information and research material about primes. They spent 1900 hours on various versions of the computer program; the fifth version proved to be successful. Nickel and Noll plan to continue their education and to write a sixth version of their program, seeking an even larger prime number.

CHARLESTON--NOV. 4, 1978

by Bettye Anne Case, Tallahassee Community College

Attendance was 21 at the AWM Luncheon/Discussion Session. 10 of these were AWM members; most of the others requested further information. In addition to the planned discussions (M. Christine B. Stokes, women in mathematics in the south; Evelyn Silvia, Biloxi and the ERA), we were happy to have Lucille Whyburn join us and to discuss her attempts at preserving (and uncovering) the history of the mathematics done in this country. Conversation later uncovered that she has the previous Newsletter articles about women mathematicians, but has apparently not corresponded with any of the authors about further information/primary sources of which they are aware. She lists her address as

133 Bollingwood Road., Charlottesville, VA.

The time for the luncheon did not conflict with any meeting sessions and was listed in the AMS program. I was not totally happy with the attendance at the session, but those of us doing a post-mortem later certainly felt it was worth doing. We are not sure just how to involve a larger percentage of the AMS meeting attendees, especially in an area so conservative that an organization encouraging women in mathematics is viewed as somewhere between suspect and unnecessary. (8 of the 21 attending were men, incidentally.)

ACTIVITIES OF THE BAY AREA MATH/SCIENCE NETWORK

In 1974, women educators, researchers, and scientists--concerned that young women were screening themselves out of many educational and career options through inadequate mathematics training--began to institute programs in the San Francisco Bay Area designed to reverse the pattern of math avoidance among girls and women.

The "Women in Science" program at Mills College concentrated on preparing a student for calculus within one semester, while the "Math for Girls" program at Lawrence Hall of Science was providing a nonthreatening environment where 6-to 14-year-olds could explore mathematical concepts and applications. Soon, a "Math Without Fear" program was developed for San Francisco State students. The many people involved in developing these and similar programs were regularly exchanging ideas and resources with each other. And, out of these exchanges grew the Math/Science Network.

It was not until 1976, however, that the fruits of these meetings coalesced into a Network project: the first "Expanding Your Horizons" conference to increase young women's interest in math and science. Aimed at 7th-through 12th-grade women, this conference fostered awareness of career opportunities for women in math-and science-related fields and provided students with an opportunity to meet and form personal contacts with women working in traditionally male occupations. The format of the conference, mixing panel discussions, "hands-on" activities in math and science, and small-group discussions with women role models, proved so effective in drawing students and adults that additional conferences were soon organized and conducted. To date, ten such conferences have been held on local college and university campuses, with approximately 3500 young women and 500 parents and teachers participating. Last February 4th, four of these conferences were held simultaneously in different locations in the Bay Area. A half dozen more are being planned for March 17, 1979. It is hoped that other communities will participate in a nationwide effort to increase girls' awareness of careers in math and science on that day.

Meanwhile, Network members continued to develop and implement new programs to promote the participation of girls and women in mathematics: teacher training, career information, films, and books have been produced through federal and private funding received by Network members. [Ed. note: see following article.] In January 1978, the Carnegie Corporation of New York provided funding to the Network to consolidate and disseminate its considerable resources. While Network members continue to volunteer their time to organize and conduct conferences, the funding has enabled the Network to establish a resource center on the Mills College campus and to provide technical assistance to schools and colleges interested in promoting the participation of girls and women in mathematics.

A recent Network-generated activity was a conference for "People Who Count"--educators, parents, and citizens concerned with young women's future options. The November 4th event, on the Mills College campus, assisted these people in acquiring information, ideas, and specific knowledge of programs and material they can use to encourage their daughters and students to prepare for the widest range of career opportunities.

The Network's precollegiate and vocational programs are directed by Nancy Kreinberg, Lawrence Hall of Science, and its collegiate activities by Lenore Blum, Mills College. The Math/Science Resource Center is the main clearinghouse and switchboard for the Network. Inquiries should be directed to: Joanne Koltnow, Coordinator, Math/Science Resource Center, Mills College, Oakland, CA 94613, (415)635-5074.

MATH/SCIENCE FILMS

Two new films were designed to increase the participation of girls and women in math- and science-based fields. The films were produced by Mills College, Oakland, California under a grant from the Women's Educational Equity Act Program, U.S. Office of Education, H.E.W. The project director is Dr. Lenore Blum, head of the Department of Mathematics and Computer Science at Mills. The filmmaker is Mr. Peter Abramowitsch. Each film is 17 minutes long (color and 16mm) and is meant to serve as a springboard for a workshop or classroom discussion. Shown together, they provide an overview of strategies and methods that have proved highly successful.

The first film, "The Math-Science Connection: Educating Young Women Today", is intended for educators, parents and other concerned adults. It opens by articulating some of the causes and consequences of the unequal participation of girls and women in school math programs. It then presents a look into several successful model programs offered in the San Francisco Bay Area that stimulate and support the efforts of girls and women at different age levels: the "Math for Girls" program, "Expanding Your Horizons" conference, and the "Women in Math and Science" program mentioned in the preceding article, and an internship program at the San Jose IBM Research Center. Although these programs span all age levels and a variety of institutions, their underlying effective strategies are similar. Namely, (1) they provide role models and career information (emphasizing the importance of mathematics for many fields). And (2), they provide positive experiences "doing" math and science that stress developing the necessary conceptual and problem solving skills. The film illustrates how these common elements are applicable in a wide range of educational contexts.

The second film, "Sandra, Zella, Dee and Claire: Four Women in Science" is a role model film geared primarily for high school women when they may be just beginning to consider careers in the sciences. The women scientists - an astronomer, mechanical engineer, veterinarian, and laser physicist - were selected on the basis of the positive responses to them at the high school conferences, and on the basis of the photogenic nature of their work environments. The inspirational nature of the film comes from the four scientists' commitment to their work and their thoughtful observations. A synthesis of their ideas on the nature of scientific work, career opportunities and preparation for these and other fields, and ideas on choices in their personal lives is presented. "Take all the math and science you can in high school in order to keep your options open" is a message that comes through clearly.

WAM: WOMEN AND MATHEMATICS

The 1978-79 academic year marks the fourth consecutive year that WAM: Women and Mathematics, a program designed to encourage young women to seek adequate preparation in mathematics, has been sponsored by the Mathematical Association of America under a grant from IBM. By conservative estimates made in the summer of 1978, WAM visits had reached more than 260 schools, 25,000 students, 2,500 parents, teachers, and guidance counselors.

The idea for WAM was sparked when IBM representatives hosted a reception for top scorers in the USA Mathematics Olympiad and noticed that there were no women among the winners. The USA Olympiad is an annual mathematics contest for invited high school students who have excelled in previous mathematics competitions. From among the top scorers in the USA Olympiad, a special team is chosen for participation in the International Olympiad held each summer. For the first time in 1978, two young women scored highly on the USA Olympiad and participated in the training session for the international competition.

The absence of women from the Olympiad symbolized their absence from a host of fields which today require sound mathematical preparation - traditional fields like engineering and the physical sciences, and areas like business, the social and biological sciences, psychology, and medicine which increasingly involve mathematical applications. To encourage 9th and 10th graders to keep career doors open by being aware of the importance of mathematics, IBM agreed to support the WAM secondary school lectureship program. Visits of half to one full day are planned to try to meet the special needs of the school. Lecturers are drawn from a variety of career fields.

Since many factors influence attitudes toward mathematics, WAM also arranges presentations to professional societies, guidance counselors, elementary school teachers, math

teachers, civic organizations, parents associations, and legislative leaders. There is no cost to eligible participants within a WAM region. A special one-day conference called MODE: Math Opens Doors Everywhere, was sponsored by WAM and The Prudential Foundation for 100 New Jersey guidance counselors on December 5, 1978. Similar programs are to be planned in other WAM locations.

National Director of WAM: Dr. Eileen L. Poiani, Dept. of Math., Saint Peter's College,
Jersey City, NJ 07306

Special Materials Coordinator: Susan J. Devlin, Bell Labs, Room 2C-475, Murray Hill,
NJ 07974

Regional Coordinators:

New York/New Jersey: Lorraine Denby and Jean McRae, Bell Labs, Room 2C-472, Murray Hill, NJ 07074

Greater Chicago: Sisten Kathleen Sullivan, Dept. of Math., Barat College, Lake Forest, IL 60045

San Francisco Bay (including pilot extension in Portland, Oregon):
Professor Jean J. Pedersen, Dept. of Math., Univ. of Santa Clara,
Santa Clara, CA 90405

Southern California: Professor Dena Patterson, 826 Crater Camp Drive, Calabasas, CA 91302

Connecticut/Westchester, NY: Professor Florence D. Jacobson, Dept. of Math.
Albertus Magnus College, New Haven, CT 06511

Boston: Mrs. Abby Tanenbaum, 10 Crosby Road, Lexington, MA 02173

ERA

by Anne Leggett

ERAmerica has asked AWM to make a contribution in the amount of \$1000--of course the budget can't handle that. The extension victory has been won, but there are many rescission and ratification battles that need to be fought in 1979. I'm not rich like Phyllis Schlafly--but I send what I can. Individual contributions may be sent to ERAmerica, 1525 M Street, N.W. Suite 602, Washington, D.C. 20005.

IS THERE SEX DISCRIMINATION AT YOUR SCHOOL?

by Rita Bornstein, Ph.D., Title IX Consultant, University of Miami reprinted from AWIS Newsletter, Vol. VII, No. 5, by permission of the author

Despite a lot of talk about affirmative action, universities have made only minuscule progress in hiring, promoting, remunerating, and responding to women since the early 1970's. Sex discrimination is prohibited by a number of Federal statutes, but university women are often unaware of their rights and the avenues of recourse. Such statutes include Title IX of the 1972 Education Amendments, Title VII of the 1964 Civil Rights Act, The Equal Pay Act of 1963 (as amended in 1972) and Executive Order 11246 (as amended by Executive Order 11375). This article focuses on Title IX, but a working knowledge of other Federal protections is important since redress for discrimination may be sought from more than one government agency at the same time. Women must become their own affirmative action specialists, learning the laws, requirements for implementation and specific grievance procedures. Meetings should be held on campus to share such information, probe and monitor areas of sexual bias and discrimination, and discuss alternative action strategies.

Title IX is part of the Education Amendments passed by Congress in 1972. It states that "No person shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." The law was passed after much Congressional testimony documenting sex bias and discrimination in education policies, practices and programs. Since virtually all public school systems and post-secondary institutions (and even private schools) receive some Federal money, the coverage of this law is extensive.

Compliance with Title IX is enforced by the Office for Civil Rights of the Department of Health, Education and Welfare. At stake is the loss of all Federal dollars received

by an institution. The Office for Civil Rights (OCR) has had a poor record of enforcement at the post-secondary level; however, the settlement agreement reached by women's groups and OCR in a recent court case established strict time tables for the investigation and resolution of complaints against universities and resulted in a substantial increase in the number of investigators employed by that agency to carry out its enforcement responsibilities. [Note: AWIS, together with several other women's groups, was the plaintiff in this suit. A settlement in favor of the plaintiff was reached a year ago.] This agreement is being monitored by women's groups.

The guidelines for implementation of Title IX were disseminated to educational institutions in 1975. The Implementing Regulation contains four major sections: procedures, admission of students, treatment of students, and employment. The five procedural steps to have been completed by July 1976 are important as ongoing monitoring devices. Women should familiarize themselves with these procedures and use them as tools to monitor compliance with Title IX.

(1) Notification of policy. All employees, students, sources of referral or applicants for admission and employment, unions and organizations holding contract for services should have been notified that the institution does not discriminate on the basis of sex and adheres to the requirements of Title IX. Such a statement should appear in all official forms, documents and handbooks.

(2) A Title IX Coordinator should have been designated to coordinate compliance efforts and help investigate complaints of discrimination. It is advisable (though not required) to have a Title IX Coordinator in each college or division of a university.

(3) A grievance procedure must exist which works promptly and fairly to resolve complaints of sex discrimination. This may be a negotiated procedure, but a procedure must be available to students and staff. While such a procedure must exist within a university and should be well publicized, individuals have the right under the law to bypass this process and file a charge of discrimination directly with the Office for Civil Rights. OCR protects the names of those who file such complaints, but should the complainant's name become known some other way, reprisals are specifically prohibited and subject to redress.

(4) Self Evaluation. Institutions were required to undergo a self-evaluation of all practices and policies to see where they were out of compliance with the Title IX Regulation. Those areas out of compliance were to have been modified and remedial steps taken to eliminate the effects of previous discriminatory policies and practices. Although not required, such self-studies ought to be conducted annually to monitor compliance efforts. Women faculty should determine whether such self-evaluations have been conducted in their own departments, what the findings were, whether changes are being made to come into compliance, and who is monitoring the process.

(5) Compliance assurance forms were required of institutions as a condition of eligibility for Federal funds.

The Title IX Regulation is comprehensive and detailed regarding the non-sexist treatment of students and employees of educational institutions. In brief, students may not be discriminated against on the basis of sex in any academic, extracurricular, research, occupational training or in any other educational program or activity. Thus, there may not be any different rules, requirements or restrictions based on sex, nor activities which limit membership to one sex, unless specifically exempted. Specific areas covered by the Regulation include clubs, housing, financial assistance, scholarships, employment assistance, health and insurance benefits, course offerings, counseling and athletics. Unfortunately, there is an abysmal lack of information on the part of female students about the kinds of overt and covert sexism which exist at the university and about their legal rights and remedies.

The employment section of the Title IX Regulation covers all employees of an educational institution--full and part-time, professional and non-professional. It prohibits discrimination based on sex in all areas of employment. It is vital that women ask the right questions relating to various aspects of employment.

Access to employment: How aggressively is the institution seeking to recruit women? Where and how are they advertising? Are they using discriminatory testing or interviewing procedures? For example, are women asked about their family arrangements in job

interviews? Application forms may not ask for marital or parental status, although it is permissible to request information about an individual's gender, provided the information is not used to discriminate. Applicant pools should contain women in rough proportion to the number of qualified women available in the relevant labor pool. Those responsible for interviewing and hiring should be familiar with the data on availability of women in their fields and use both formal and informal means to invite applications from them.

Hiring, promotion and compensation: Title IX prohibits discrimination in selection practices, application of nepotism policies, job assignment and placement, demotion, lay-off, termination, tenure, salaries, extra compensation and supplements. Institutions may not make employment decisions based on sex, and while Title IX does not itself require an affirmative action plan, as do some of the other Federal statutes, where a pattern of discrimination has been found, efforts must be made to provide remedies. The status of women in a university should be ascertainable from the self-evaluation conducted by the institution. However, if the self-study was inadequate and superficial, it will reveal very little. In such a situation, pressure should be brought to bear to re-examine the situation. Women are conspicuously absent from positions of administrative importance in most universities. Where women do exist in administration, they are in the lower ranks. More men receive tenure than women and, on the average, at an earlier age. Women, as a rule, make lower salaries, however comparable their backgrounds, work activities and achievements. Such patterns and practices are discriminatory and should be remedied through the development of equitable and, where necessary, affirmative policies and procedures.

Fringe benefits: The Regulation prohibits sex discrimination in insurance plans, retirement plans, vacation, travel opportunities, selection and support for training. An institution may not offer a health insurance plan requiring employees to pay a deductible for pregnancy related costs unless the policy includes a deductible for other temporary disabilities. Health insurance policies should not discriminate against single women by requiring them to take a family plan in order to get maternity coverage. Pregnancy must be treated no differently than any other temporary disability in terms of leave policies, the use of sick leave, accrual of seniority and reinstatement, special requirements or limitations.

All universities should now be in full compliance with the Title IX Regulation. Failure to conform with the law can be expensive for institutions already in a budget crunch. Complaints and law suits cost a great deal of time, energy and money and result in bad publicity and polarization between groups. They may also result in costly remedial action, such as back pay awards, and ultimately, of course, the loss of all Federal funds coming into the university. The community of women at an educational institution can gain power and protect itself by (1) learning the laws, (2) monitoring compliance, (3) sharing problems and concerns, (4) seeking professional advice and assistance, (5) acting in concert when possible, because women are generally vulnerable as individuals, (6) working cooperatively with the institution to gain equal access and compensation, if possible, but, if necessary, securing those rights through outside agencies.

WOMEN AND MATHEMATICS IN FINLAND

by Marjatta Näätänen, University of Helsinki, Finland

I would like to try to give you a rough outline of the status of women in mathematical studies in Finnish universities. In 1901, while Finland was an autonomous part of Russia, tsar Nikolai 2nd gave women the same rights to study as men had. 75 years later we find these statistics:

Exams at the University of Helsinki, 1976-77
students majoring in math

	Women		Men	
Enrolled 1976	109	47%	124	53%
LuK (B.Sc.)	46	41%	65	59%
FK (M.Sc.)	18	29%	44	71%
FL			9	100%
FT (Ph.D.)			2	100%

These figures reflect the fact that the expectations for women, and especially their own expectations, are limited to the 2 lowest university degrees. These expectations are produced by the present situation in our society: we are used to seeing women teaching math in school and working with computers - though not in leading positions.

There are four Finnish female Ph.D.'s in math, compared with 97 male. The ratio seems to have been an approximately constant 5%, even in the 1970's. The fact that except for the first (in 1951) we all have university careers reflects the attitudes of faculties - no repression towards the few women. The way of thinking of the majority of the male faculty members is something like this: Finland was among the very first countries to give her women the vote in 1906; hence women have all rights; it is their own fault if they don't use them. No extra encouragement is justified; neither is repression. But if a reason had to be given to explain the 5% and not 50% of women among math Ph.D.'s, they would, I'm afraid, mention something biological...perhaps the female brain... It seems to me though that this attitude is very gradually changing: there are faculty members who recognize that women are handicapped, for example by the psychological barrier of weak self-confidence in math, due to social attitudes and roles. In our culture, math, especially beyond school math, is traditionally a man's field symbolizing male intelligence and logic. So knowing math doesn't fit the female role.

Outside the mathematical community a female mathematician inspires fear - and admiration - both in men and women. I would like to end with a characteristic comment: "A female mathematician - that's the worst thing one can meet."

DATA ON WOMEN IN SCIENTIFIC RESEARCH: Part 5

By Betty M. Vetter, Executive Director, Scientific Manpower Commission

LABOR FORCE PARTICIPATION OF WOMEN SCIENTISTS AND ENGINEERS

In 1976 and 1977, the National Science Foundation published two studies on the scientists and engineers in the Manpower Characteristics System, a combination of data from the National Sample (derived from the 1970 Census), surveys of a sample of graduates from 1972 and 1973 (largely at the baccalaureate level), and input of new doctorates from the Doctorate Records File maintained by the National Academy of Sciences.

These reports¹ pointed out an astonishing statistical finding - that 47% of all women scientists and engineers compared to only 12% of men were out of the labor force in 1974, that is, not employed and not seeking employment. A considerable effort has been made by the staff of the Scientific Manpower Commission to determine whether this figure is credible, and if so, why so many women were out of the labor force. A definitive answer is not available, but it appears that this large percentage results from a combination of factors. A large segment of recent baccalaureate graduates probably are full-time graduate students. The MCS sample for women was distorted by the inclusion of relatively many more women from the New Entrants surveys of recent baccalaureate graduates than men, particularly in the social sciences, because the number of women in the National Sample was small. Another contributing factor may be the stated requirements for inclusion or exclusion from the survey sample as they relate to field of degree, field of present work, and self-identification. There are complex variables which need not be fully identified for purposes of this paper. The most important finding of the effort to delineate the meaning of that 47% figure was that the survey instruments used did not include the right questions to determine why women were out of the workforce in such substantial numbers; and even for those questions which were asked that might have illuminated the finding, the results were never by sex. Thus, we do not know for sure

why this high proportion of women educated in science and engineering were neither working nor seeking work, nor how the proportion would have differed if all the samples used had been over-selected for women in order to provide an adequate base to examine their characteristics. We do know from other data from the Labor Department that among women with four or more years of higher education, 64% are in the labor force², and that among those with five or more years of college, 70% are at work or seeking work in 1974.³ It seems impossible that women trained in science and engineering would be less likely than women trained in other fields to utilize their training in the labor force.

Among women doctoral scientists and engineers, only 10.6% were out of the labor force in 1975, and half of this group were retired. Only 5.1% of the total were out of the labor force for all reasons other than retirement.⁴

Thus, despite the NSF finding that almost half of all women scientists and engineers were out of the labor force in 1974, the data appear to indicate that a large segment of this group probably were full-time graduate students improving their credentials and training in order to participate later in the labor force.

Among those women who are in the labor force, the unemployment rate is higher than for men. For example, among women doctorates in 1975, 3% of women but only 0.8% of men were unemployed and seeking work. In some fields, the difference in unemployment rates is even higher. Among physicists, 7.3% of women doctorates were unemployed and seeking work in 1975 compared to 1.5% of men. In chemistry, the rates were 3.7% for women and 0.9% for men. In every field, the unemployment rate for women was at least three times as high for women as for men.⁵

By age, the same unemployment rate difference holds true. Among women aged 30 to 34, 4.6% were unemployed and seeking jobs, as were 0.9% of men in that age group. Among those aged 45 to 49, 3.1% of women doctorates and 0.8% of men were in this position.⁶

Among all scientists and engineers in 1974, including persons at all degree levels, 1.8% of women and 0.9% of men were unemployed and seeking work.⁷

Thus, at least some of the women found by the National Science Foundation to be out of the labor force in 1974 are likely to have been discouraged job seekers - and since the unemployment rates for women scientists and engineers are so much higher than for men, women may be more likely than men to be in this category.

A current project now underway by the Scientific Manpower Commission with NSF funding will perform a more detailed analysis of the labor force participation rates of women scientists and engineers in 1976 and 1978, and the factors affecting their participation.

Salaries

While the representational gap between men and women scientists and engineers is decreasing slowly, the salary gap generally is increasing. Women scientists and engineers have lower annual salaries than men at every degree level, every level of experience, in every work setting and in every field, and the salary gap widens with age. Further, this gap is not decreasing. For example, women doctorate scientists in all age groups in 1975 had salaries about 19% below those men, compared to a 17% difference in 1973, although women doctorates under 30 years of age had 1975 salaries 8% below those for men of the same age with the gap having narrowed from 10% two years earlier.⁸

In 1975, doctoral women scientists and engineers working in basic research had median annual salaries of \$18,400 to \$22,200 for all doctoral scientists and engineers working in basic research. In applied research, the women's figure is \$20,400 compared to \$23,300 for men and women combined. The data are not available for men only, so that salaries of men and women could be compared directly. However, it is obvious that the salaries of men in each instance would be higher than the combined salaries of men and women, since the data for women show their salaries well below the combined figure.

Women doctoral scientists and engineers with five to nine years of professional experience earned \$17,800 compared to \$19,800 for men and women combined at the same number of years of experience. Even at entry level, the salary gap has not closed. Doctorate women with one or less year of professional experience averaged \$15,100 in 1975 compared to all doctoral scientists and engineers at the same experience level who earned \$16,200. At 30 to 34 years of experience, the combined group earned a median salary of \$29,200 while women doctorates earned only \$23,500. In 1973, women doctoral scientists and engineers aged 35 to 39 earned 11% less than men of the same age. In 1975, men in that age

group earned 16% more than women.⁹

The salary gap is not limited to women with the doctorate nor is the pattern of change consistent. Women biological and biomedical scientists and the baccalaureate level who were engaged in R&D seven years after receipt of the degree received 28% less than comparable men in 1974. In 1976, only a 20% gap separated men and women at the bachelor's level seven years after the degree. However, among chemists the gap four years after the baccalaureate was 12% in 1974 and had widened to 21% by 1976.¹⁰

Notes

1. NSF, U.S. Scientists and Engineers, 1974, NSF 76-329, p.4, and NSF, Women and Minorities in Science and Engineering, NSF 77-304, p. 2.
2. Bureau of Labor Statistics, U.S. Working Women: A Chartbook, January 1977.
3. Bureau of Labor Statistics, Monthly Labor Review, January 1977.
4. NSF, Characteristics of Doctoral Scientists and Engineers in the United States, 1975, NSF 77-309, pp.35-37.
5. National Research Council, Employment Status of Ph.D. Scientists and Engineers, 1973 and 1975, 1976, p.8.
6. Ibid., p.10.
7. Same as 1, p.19.
8. Commission on Human Resources, National Academy of Sciences, Doctoral Scientists and Engineers in the United States, 1973 Profile, 1974, p.25 and same, 1975 Profile, 1976, p.23.
9. Same as 4, pp.63, 118.
10. Battelle Columbus Laboratories, National Survey of Compensation Paid Scientists and Engineers Engaged in Research and Development Activities, 1974 and 1976 editions, reported in Scientific Manpower Commission, Salaries of Scientists, Engineers and Technicians, A Summary of Salary Surveys, 1977, p.46.

WOMEN IN ACADEMIC CHEMISTRY FIND RISE TO FULL STATUS DIFFICULT: Part 1 of 2

by Rebecca L. Rawls and Jeffrey L. Fox, C&EN Washington
reprinted, with permission of the copyright owner, the American Chemical Society, from the Sept. 11, 1978, issue of Chemical and Engineering News

Chairman of a major chemistry department at a prestigious U.S. university:

It is a rare person who can get on a faculty like this.

Young woman chemist being informed that she will not make tenure on that same faculty:

I'm not going to let something like this keep me from doing what I want to do--research. I've tried to be like a man; tried not to make waves. I'm very happy to do my work. Just, please, let me do it. I'm not going to see my research and my life go down the drain.

Chairman: It takes more than intellect; it takes strong ambition. It's like the problem afflicting people born to great wealth, in a way. They just don't feel great pressure to pursue a career.

Woman: It seems I just don't have any credibility in your eyes. There's no precedent for women getting tenure in this department. Nobody ever said how I was doing. I couldn't even get any graduate students to come and talk with me about my work; they were always mistaking me for one of their classmates.

Chairman: Women in chemistry make it by keeping their noses clean. We're looking for a woman who meets our high standards--but we won't find one. Affirmative action programs just don't work for chemistry departments.

Woman: I don't want to spend my whole life playing academic games. I know all sorts of women chemists who've given up. But I'm a lab worker; I love working in the lab. I can't do my experiments in the living room.

Chairman: You just never joined the club...

Fictitious? Not entirely. The dialogue is made up from comments either by women trying to establish careers in academic chemistry or by department heads--mostly men

--who help decide whether someone deserves tenure. Both parties face many perplexing questions concerning women trying to pursue academic chemistry careers.

And the questions will come up more and more frequently. More women than ever are enrolling in chemistry Ph.D. programs; more of them are completing those programs. The number of women chemists hired to fill academic positions also is edging upward. More notably, several of the most prestigious chemistry departments in the U.S. recently have hired their first women for tenure-track positions. Two such departments--one at the University of California, Berkeley, the other at Harvard--just this summer have added women to previously all-male faculties.

But those facts, and the ripple of celebration following in their wake, simply do not characterize what's happening. Instead of optimism, several prominent women chemists privately voice fears that academic opportunities for women might soon take a downward plunge, especially in hiring. And, as to the gains on chemistry faculties so far, Dr. Lilli S. Hornig, who chairs the National Research Council's committee on education and employment of women in science and engineering, says, "We get the impression that women are going through revolving doors." Thus, some apparent increases might be transient, as promising young women fail to find permanent berths.

The statistics tell only part of the story. Much of the rest of it is personal and thus highly subjective; no two scientists view the issue in quite the same light. And the matter is delicate. Not being hired or not achieving tenure has enormous impact on anyone's life.

"Everybody's standards for tenure have 'ratcheted' up," says Dr. James L. Kinsey, chairman of chemistry at Massachusetts Institute of Technology. Hence, chemistry departments are caught in a squeeze affecting academic institutions across the country. Fewer students, tighter budgets, and more directed research programs make for decreased hiring followed by greater competition for fewer tenured positions. The small number of women going after tenured faculty positions "may reflect the increasingly brutal competition in recent years at the assistant professor level," suggests Dr. Christopher S. Foote, chairman of chemistry at the University of California, Los Angeles. "That is about the most savage job situation around, for men or women."

Such attitudes help explain why many people who follow the careers of women chemists admonish them to seek jobs in industry. It also partly explains why many of them heed such advice.

That seems a simple solution to career problems. But it ignores subtle factors underlying the training and employment of women chemists. There is a sense of uneasiness among many women chemists at universities. Many of them are reluctant to speak openly about their views. This is true both for older, established scientists and for younger ones planning to follow university careers.

"I don't want to get into the 'pot'," one established women scientist tells C&EN. "Practically any woman over 30 has a story, but I will have to remain anonymous." Adds another woman, "Our livelihoods depend on our profession; we have to keep quiet." Says Hornig, "I doubt that you will find a woman in chemistry anywhere, tenured or not, who will talk for the record about the sort of discrimination she faces. Nobody is that secure."

For some of these women scientists, insecurity is too mild a word. Outright fear is more correct, and that impression pops up when they refer to "blacklisting" and "the old boys" network." These feelings extend even to women scientists who've sought legal remedies to discrimination.

"Some women have won court cases, others have settled out of court," says Dr. Anne M. Briscoe, who oversees the affirmative action program of American Women in Science (AWIS). "Those women who've won are better off if they play it low key." Court action

is not the way to go, argues another scientist. "Every woman who has won a court case has lost her job," she says. "The smart thing to do is not go to court."

Indeed the record of cases brought to the courts by academic women has been equivocal, at best. Although each case is different, the much-publicized case of Dr. Sharon Johnson, a biochemist who was denied tenure at the University of Pittsburgh, may be representative, and it is familiar to many women in academic chemistry (C&EN, Aug. 15, 1977, page 22).

The court found that though there was a statistical case for discrimination against women in the hiring and promotion practices of the university, the university had legitimate and nondiscriminatory reasons for refusing tenure to Johnson. It also expressed its reluctance to "take over the matter of promotion and tenure for college professors," saying that, except in clear cases of discrimination, "we must leave such decisions to the Ph.D.'s in academia."

Nevertheless, the fact that some women are suing universities, and some are winning, is cited by many women scientists as the most important factor in changing university attitudes toward hiring and promoting women. "It's the threat of litigation that is changing things, not present enforcement of affirmative action regulations," says one woman chemist. "There isn't any enforcement."

What some call discrimination, others see as a blind to cover incompetence. "Be careful," warns one woman scientist. "There are paranoid people who aren't willing to work hard and who use this claim of discrimination as an excuse." Adds another, "It is sad when a mediocre person thinks her failure is due to the system."

Distinguishing real cases of discrimination from malingering and paranoia is in no way clear and simple. Dr. Estelle Ramey, past president of AWIS and a professor at Georgetown University medical school in Washington, D.C., notes that many women "stay scared" after an incident when they must fight to keep a job. Such women aren't likely to speak out, much less help others.

"I get very impatient with them," Ramey says. "But I've learned that people who have been disadvantaged are not very pleasant." Thus, Ramey notes, it's possible to start out backing someone in an alleged instance of discrimination, and then "begin to be suspicious. You begin to feel that maybe they deserved it." Ramey emphasizes that such thinking is a trap, for it substitutes a simple but unsatisfactory reaction for an understanding of a complex issue.

Against this backdrop, women have been carving out a larger place in chemistry for the past 20 years. In 1976, there were 197 Ph.D.'s in chemistry granted to women--or more than 12% of all chemistry Ph.D.'s that year. That's nearly four times the 52 granted to women in 1956 and more than double the percentage of Ph.D.'s that went to women at that time. And enrollments of women in graduate chemistry departments are up sharply. Several top departments report that 20 to 35% of their graduate students are women. Moreover, fewer women are dropping out of graduate programs, and some schools say they are more vigorously recruiting women students.

Women drop out of chemistry graduate programs
more than men do

12.1% of total Ph.D. recipients, 1976
17.6% of total, total grad students, 1974
18.9% of total, entering grad students, 1972

Are these women finding jobs at academic institutions? The answer is, yes--but not in proportion to the Ph.D.'s they receive. Moreover, the promotion to tenure seems elusive for many. For example, Dr. Agnes Ann Green, a chemistry professor at Immaculate Heart College in Los Angeles, has surveyed women on the faculties of chemistry departments offering doctoral studies. She finds a net increase of 38 women over seven years, starting in 1970. More than 1000 Ph.D.'s were granted to women in chemistry during that period. The increase in women holding tenured positions during that period was up by eight to a total of 46. But most of the gain was an increase of 30 assistant professors distributed among the 188 doctoral-granting chemistry departments. As of 1977, 114 of these departments had no women in tenure-track faculty positions. Green says, "The increase of 10 (from 1975 to 1977) in a total faculty count of more than 4000 can hardly be called much more than modest."

C&EN surveyed the distribution of women among 35 of the more prestigious chemistry departments and found that women account for less than 3% of the total chemistry faculty at these schools. Of a total faculty numbering 1182, only eight are women with tenure. These numbers are important precisely because there is concern that many recently appointed women will not receive tenure, and that many apparent gains might erode. "My concern is not so much initial hiring as who is getting tenure," says Dr. Anna J. Harrison of Mount Holyoke College, president of the American Chemical Society. "Are those hirings a feeble first step by departments that are willing to make a temporary but not a permanent commitment to women?"

The first women to break into formerly all-male chemistry departments have had a tough time. Some of the difficulties are not unique to women. Competition in universities is fierce, and it extends even to smaller, liberal arts colleges, which have been known traditionally for their teaching instead of their intense research programs. Now, even here, research achievements receive new emphasis. Departments expect young faculty to "have no hobbies, no outside interests," reports one chemist. "There are plenty of people willing to live this way. But I think it less likely for women."

That notion is echoed by several chemistry department chairmen. "You can't work an eight-hour day and survive" in an academic chemistry department, they note, adding that junior faculty often work nearly twice that long as they build research programs and carry out teaching duties.

But a heavy commitment to chemistry isn't born at the assistant professor level, and it seems unlikely that women first confront the notion at that juncture. Dr. Nina M. Roscher of American University in Washington, D.C., and chairman of the Women Chemists Committee of ACS, notes that chemistry graduate students and postdoctoral fellows don't work eight-hour days. "They've already made some commitment," she says. "I don't know that I believe that women are any less committed than men."

The problem is much more than a matter of commitment, many observers say, pointing to subtle factors that effect women caught in the tenure crunch. "The little things are important," Roscher says. "It's not a matter of women chemists not being good." Others agree. "Anyone who has been to graduate school knows there are plenty of bright women around," the chairman of a major chemistry department says. "But there are feelings that informal avenues of advice aren't open to women starting up."

These informal avenues--and other slightly more formal ones, such as greater administrative support and more equitable committee responsibilities--are considered vital, judging from the number of women chemists who mention them. Many women on chemistry faculties note that they feel left out of the informal information networks operating in their departments and across the country within various research areas. Thus many women say they lack guidance from their colleagues and receive inadequate feedback as to how well they're doing.

"I came straight out of a Ph.D. program, skipping a postdoc," explains one chemist. "No one seemed willing to give me the scoop." The scoop for her was finding out how to set up a lab, penetrate the university's bureaucratic maze, and determine where and how to apply for grant support. "You don't feel like asking the tenured faculty such questions," she says.

"The young assistant professors (men) might play basketball with older colleagues," she continues. "That camaraderie just isn't open to me." Several chemists who are the only women in their departments admit to feeling lonely at times. "I wish there were more women," says one tenured chemist. "It would be nice to have meetings of 'the old girls.'"

Some department chairmen acknowledge the importance of these avenues and admit that they have overlooked them. "We plan to be more overtly supportive," one chairman says, "and see to it that people talk to young women on our faculty." Along with that, some departments are reconsidering the process whereby graduate students elect to do thesis research with a certain faculty member. "We don't present an appropriate role model for most graduate students," one young woman faculty member says. The hesitation that graduate students show for working with any young, untried assistant professor--one who might not remain long enough for that student to complete a thesis project--seems greater when the faculty member is a woman and perhaps the only woman in the department.

"Graduate students didn't choose to work for me," says a woman chemist who recently

left her academic position. "The result was disastrous for me, from a morale standpoint and from its effect on my research."

When it comes to getting research projects going, attracting students is critical for many young faculty members. To be sure, graduate students work with some young women chemists on their projects, but those who have not had students express concern that students shy away from them because they are women. "Students make such a difference in the progress of a research project," Roscher notes. Thus, when a young woman chemist isn't productive, "the big difference might be lack of opportunity instead of lack of ability."

Graduate students are not the whole picture. Equipment, analytical services, secretarial support, technicians, postdocs, and computer time are part of nearly every chemist's success story today. Acquisition of such support is itself something of a full-time occupation--one that many young women faculty members say they've been ill-prepared to conduct.

Not all women think they lack this support, and others note that young men on the faculty sometimes face the same problem. "I'm in a field of my own here, but I'm struggling no more than anybody else," one scientist says. "I don't have particular difficulties because I'm a woman."

However, other women feel that this informal support network extends beyond the universities and permeates the granting agencies, making peer review something of a subjective process. One's prior affiliation with certain well-known chemists counts a great deal toward the success of a grant request. Without that informal advocacy, grant applications sometimes are not taken seriously, many women scientists think. Thus, because they haven't been in on the workings of the informal, colleague network, their research application is less likely to receive favorable attention.

Defenders of the peer review system aren't comfortable admitting that such biases might operate. But grant review is not done in the dark, and the scientist applying for money is readily identifiable. Some men privately admit that it might not be possible for women to receive fair review of grant applications.

It isn't just young assistant professors who think they face special pressures in chemistry because they are women. Women who are tenured professors deny any "real discrimination," but still feel that because they are part of such a small minority in chemistry departments they face different conditions than do their male colleagues. One of the most commonly mentioned is what one woman calls "the problem of being taken really seriously. Your work is considered 'very nice.' It's hard to explain, but you know that if one of your male colleagues had done the work it would have been a big deal."

ARTICLES OF INTEREST

Dr. Mina Rees has served as Director of the Mathematical Sciences Division at ONR (the Office of Naval Research), as President of the American Association for the Advancement of Science and, until recently, as Dean of the Graduate Division of the City University of New York. The June, 1978 issue of the SIAM News contains her article "ONR Pioneered Government Move to Support Mathematics", an edited version of a longer piece appearing in "Naval Research Reviews", February, 1977. She was involved in setting up the mathematics program of ONR when the office was established in 1946. As she says: "I... went on many visits to leading mathematics departments where I consulted senior mathematicians who helped to evolve the first outline of the ONR mathematics program. ...Basically our decision was to support pure and applied mathematics, statistics, and computer development with its related numerical analysis to insure the sophisticated use of electronic digital computers when they became available." The article goes on to describe the major programs of the original mathematics branch of the ONR.

"Academic Recommendations: Males and Females as Judges and Judged" appears in the AAUP Bulletin, Vol. 64, No. 2, May 1978. The author is Jennie Farley, an assistant professor at the New York State School of Industrial and Labor Relations at Cornell University. About 1200 letters of recommendation written between 1972 and 1977 were analyzed in a variety of ways. A quote from the conclusion is: "It appears that letters written by women do not differ substantially from those written by men. Nor do letters written for women differ greatly from those written for men. What we do see is an extraordinary change in a comparatively short time in the choice of factors which judges

- both female and male - chose to mention. ...Both men and women are concentrating on work related criteria in 1978." In particular, references to the marital status and appearance of women candidates are much less likely to occur in letters of recommendation nowadays.

"In Memoriam, Irmgard Flügge-Lotz, 1903-1974" appears in IEEE Transactions on Automatic Control, Vol. AC-20, No. 2, April 1975. The authors are her colleagues John R. Spreiter, Milton D. Van Dyke, and Walter G. Vincenti of the Departments of Applied Mechanics and Aeronautics and Astronauts, Stanford University. She was internationally renowned for her contributions to aerodynamics and to automatic control theory. The article gives a short biography and lists some of her many accomplishments.

The London Times Higher Education Supplement, September 8, 1978, contained an interesting article "Success or Failure?". Written by Tessa Blackstone, recently-appointed professor of educational administration at the Institute of Education, University of London, it examines the access women have had to higher education and surveys the contribution they have made over the past 50 years. The proportion of women students in the undergraduate population only in 1975 reached the same proportion as 1925. This proportion is, however, continuing to rise and may reach 40% by 1980. The percentage of women in the postgraduate population has grown reasonably steadily since 1925 from 15% to 26%. However, this is probably due to obtaining postgraduate certification in education rather than obtaining higher degrees. Historical data are not available for the proportion of women among university teachers. However, in 1975, only 84 out of a total 4205 professors are women. Women fare better in other ranks and account for 11.5% of the total university staff. There are 27 women members of the Royal Society out of a total of 861; one of these is a mathematician, M. Cartwright. Blackstone concludes with: "To return to the statistics with which this article began, the growing number of girls going to university in the 1970's is cause for optimism about the inroads women may make in the future. Whereas we cannot expect to find women represented in equal numbers to men at all levels in British universities in any of our life-times, it would be unfair to accuse anyone of false optimism who claimed that the future will bring more women Nobel Prize winners, more women members of the British Academy, more women fellows of the Royal Society, more women professors, more women research students, and simply more women graduates."

"Getting Hers" is an article in the October, 1978 issue of Viva about Rosalyn Yalow, the Nobel prizewinner. Here are a few quotes: "My home and a full-time teaching position were hardly enough to occupy my time fully." "I'm a conformist, and I didn't want to be different from other women. I was a wife just like everybody else. If you said that as a woman I could not be a physicist, that I would buck, because I wanted to be a physicist. But if you said to me, as a woman, one should be a wife and should think about some of the things wives think about, I'm perfectly willing to be a wife and think about things that wives think about." "I'm not a feminist in the ordinary sense of the word. I'm not mad at the male establishment. I'm mad in the sense that I feel like being in a position to do something about it." "We still live in a world in which a significant fraction of people, including women, believe that a woman belongs and wants to belong exclusively in the home; that a woman should not aspire to achieve more than her male counterparts, and particularly not more than her husband...But if women are to start moving toward [their] goal, we must believe in ourselves or no one else will believe in us; we must match our aspirations with the competence, courage, and determination to succeed; and we must feel a personal responsibility to ease the path for those who come afterward."

OF POSSIBLE INTEREST

The National Women's Studies Association announces its First National Conference to be held at the University of Kansas at Lawrence May 30-June 3, 1979. NWSA was founded in 1977 "to further the social, political, and professional development of women's studies at every educational level and in every educational setting." The conference coordinators are Emily Abel and Peg Strobel, c/o Women's Studies Program, California State University, Long Beach, CA 90840. The national office is at University of Maryland, College Park, MD 20742.

There is a new organization for women in computer science. Contact Anita Cochran, 5A-137, Bell Labs, Murray Hill, NJ 07974.

Anyone interested in coaching high school students for the national high school math competitions or the USA math olympiad should contact Walter Mientka of the University of Nebraska or Samuel Greitzer of Rutgers University.

The University of California Press publishes a number of books in the area of Women's Studies. Two new titles are Women in Soviet Society: Equality, Development, and Social Change by Gail Warshofsky Lapidus and The Reproduction of Mothering: Psychoanalysis and the Sociology of Gender by Nancy Chodrow. For a brochure and order form, write UC Press, 2223 Fulton St., Berkeley, CA 94720.

The Public Works, Inc. has announced a New England edition of The Women's Yellow Pages. It contains more than 50 essays and how-to articles and 3500 annotated listings on employment and educational opportunities and benefits, health care, counseling, legal rights, consumer protection, financial planning, parenting and child care. It is available for \$7.95 from the Public Works, Inc., RFD#3, Box 186, Putney, VT 05346.

National Institute of Education plans for fiscal year 1979 include a program of support for fundamental research relevant to reducing barriers to women's educational equity. The focus of a planned competition, which has not yet received final approval, is expected to be on informal social processes that inhibit or enhance girls' and women's interests and achievements, especially in the areas of mathematics, sciences, and technology, areas in which educational inequity is particularly great. Attention to racial, ethnic, and socio-economic diversity will be encouraged. Ordinarily, deadline dates for proposals are only 2 to 3 months after the issuing date of the announcement. Therefore, interested researchers are urged to place themselves on the mailing list in order to receive the announcement as promptly as possible. To receive the announcement when it is issued, send a self-addressed mailing label to Social Processes/ Women's Research Team, National Institute of Education, Washington, D.C. 20208. An Announcement is expected early in 1979.

DEADLINES: March 23 for May-June; May 24 for July-Aug.

ADDRESSES: Send all copy to Anne Leggett, Dept. of Math., University of Texas, Austin TX 78712.

Send everything else, including ads, to AWM, Women's Research Center, Room 204, Wellesley College, 828 Washington St., Wellesley, MA 02181.

JOB ADS

Institutional members of AWM receive two free ads per year. All other ads are \$5.00 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 Alabama, Birmingham. Dept. of Mathematics. Two tenure track assistant professorships for 1979/80. PhD required. Candidate must be interested in teaching, undergraduate and MS level, and in pursuing a research program. Salary negotiable. Full fringe benefits. Send vita and three letters of reference to Peter V. O'Neil, Chairman, Dept. of Mathematics, University of Alabama, Birmingham, Birmingham, AL 35294.

University of Alabama, University. Dept. of Mathematics. Possible tenure track positions at assistant professor level. Demonstrated ability in research and teaching essential. PhD required. Current research interests in department include algebra, analysis and applications and topology. Write to C. Hobby, P. O. Box 1416, University, AL 35486.

California State University, Chico. Dept. of Mathematics. Tenure track Asst. Prof., Ph.D. with broad background in mathematics. 12-unit teaching load: undergrad. math and/or statistics. Start Aug. 1979. \$14,200-\$17,100. April 30 deadline. Send resume or phone Dr. Neil C. Schwertman, Chair., Math. Dept., Calif. State Univ., Chico, CA 95929. Phone (916) 895-6111.

California State University, Chico. Dept. of Mathematics. Visiting Assoc. or Full Prof. 1 semester or year; Fall semester September 1 - December 22, 1979. Spring Sem. Jan. 28 - May 23, 1980. Duties: teach 1 lower division course, 1 upper div. and seminar for faculty and advanced students. Phone or write: Dr. Neil C. Schwertman, Chair., Math Dept., Calif. State Univ., Chico, CA 95929 (916) 895-6111. March 31, 1979 deadline.

University of the Pacific. Dept. of Electrical Engineering. Tenure track faculty position in Computer Engineering open 9/1979. Required: earned doctorate with demonstrated potential in teaching; assist with development & teaching of undergraduate lecture and laboratory courses in Digital Logic, Computer Organization, Computer Architecture, microcomputers and Distributed Processing. Applicants must support a required CO-OP program in School of Engineering. Send resumes to Irvin D. Dunmire, Chmn., Dept. of Electrical Engineering, University of the Pacific, Stockton, CA 95211.

University of the Pacific. Dept. of Mathematics. Tenure track faculty position in Computer Science open 9/1979. Required: ability to teach courses involving systems and application software, including operating systems and data base management systems. Candidate specializing in data base management systems is preferred. PhD in Computer Science or an allied field is required. Resumes should be sent to William R. Topp, Chmn., Dept. of Mathematics, University of the Pacific, Stockton, CA 95211.

Eastern Kentucky University. Dept. of Mathematical Sciences. Applications are invited for a tenure track position. Candidate should have a PhD in mathematical sciences with expertise in the areas of computer science and/or statistics. This position is contingent on funding. Send vita and 3 letters of reference to Dr. Marijo LeVan, Acting Chmn., Dept. of Mathematical Sciences, Eastern Kentucky University, Richmond, KY 40475.

University of Maine. Dept. of Mathematics. Instructorship (1 year) open 9/1979. Renewal possible for 2nd year. 12 hour teaching load in service courses. Previous teaching experience desirable. Salary depending on credentials. Send vita, transcripts and 3 letters of recommendation by 5/1/79 to Gary Haggard, Chmn., Dept. of Mathematics, University of Maine, Orono, Maine 04469.

Hood College. Dept. of Mathematics. Faculty position beginning as half-time in spring, 1979, probably becoming full-time in Aug., 1979; half-time as Coordinator for Computational Skills in Learning Assessment and Resource Center (LARC). Responsibilities: (LARC) planning, administering & teaching developmental mathematical skills clinics; supervising math-anxiety & math-avoidance counseling; selecting & administering diagnostic mathematics test; assisting faculty in developing computer-assisted courses; teaching regular undergraduate math courses. Required: at least a master's in mathematics, mathematics education or computer science; teaching experience at college level, also experience in use of computer as a teaching and tutoring device. 9 mo. appointment. Salary: \$6000 - \$7000 annual half-time salary and \$12,000 - \$14,000 annual full-time salary. Send vitae and 3 letters of reference by 3/21/79 to S. G. Turner, Director of Learning Assessment and Resource Center, Hood College, Frederick, MD 21701.

University of Lowell. Dept. of Mathematics. Assistant Professorship (tenure track) in Mathematical Statistics open 9/1979. Qualifications: (1) PhD - Prob. Theory, Math. Stat. or Operations Research preferred. (2) Commitment to innovative high quality teaching and research activity. (3) Interest in curriculum development & use of modern computational techniques. Send curriculum vita, statement of current research interests and 3 letters of recommendation to Personnel Committee, Dept. of Mathematics, University of Lowell, Lowell, MA 01854 - Tel. 617-452-5000 Ext.520.

Wellesley College. Department of Mathematics. Possible opening for Sept., 1979. Assistant Professorship with salary at least \$15,000. Evidence that PhD will be completed by Sept., 1979 required. Teaching load approximately 8 hours per week. Position may be filled at rank of Full Professor, for candidate with appropriate experience and an excellent teaching and research record. Preference for the Full Professor rank will be given to applicants with backgrounds in applied mathematics, and salary will be commensurate with experience. Contact Chairman, Dept. of Mathematics, Wellesley College, Wellesley, MA 02181.

Ferris State College. Dept. of Mathematics. Teacher of Mathematics; salary and rank open as of 9/1979. Share teaching at all levels thru advanced calculus. Additional responsibilities: (1) advising students in science-oriented curricula, (2) develop existing B.S. degree program in applied mathematics, (3) computer-oriented instruction. Doctorate and successful teaching experience are required. Send resume to Dr. Robert J. Kosanovich, Head, Dept. of Mathematics, Ferris State College, Big Rapids, MI 49307.

Kalamazoo College. Dept. of Mathematics. Temporary opening for Asst. Professor of Mathematics, beginning Sept., 1979 with possibility of renewal for 1980/81. Completed PhD desired. Demonstrated excellence in teaching essential. Send vitae and letters of reference to Dr. T. Jefferson Smith, Chairman, Mathematics, Kalamazoo College, Kalamazoo, MI 49007.

Michigan Technological University. Academic Computing Services. Position of Academic Analyst. Computing on large scale UNIVAC 1110 and on a mixture of mini-computers (DEC, Data-100, INTERDATA). Position involves programming, maintenance and consulting in a variety of computer languages. Bachelor's degree and computer experience required. Knowledge of applied statistics desirable. Send resume to George Funkey, Director, Academic Computing Services, Michigan Technological University, Houghton, MI 49931.

University of Michigan, Dearborn. Dept. of Mathematics. Several positions open 9/1979 teaching undergraduate mathematics and/or computer science. At least 2 of these will be tenure track at Assistant or Associate rank. Strong computer science background preferred. In addition, several 1-year lectureships will be filled. Teaching and demonstrated research capability required. Contact Chairman of Mathematics, University of Michigan, Dearborn, 4901 Evergreen Rd., Dearborn, MI 48128.

Carleton College. Dept. of Mathematics. Assistant Professor starting in Sept., 1979. PhD required. Undergraduate teaching. Prefer experience in statistics or computer science. Two-year appointment with possible renewal. Apply by March 15 to Frank L. Wolf, Chairman, Dept. of Mathematics, Carleton College, Northfield, Minn. 55057

Saint Mary's College. Dept. of Mathematics and Statistics is developing a cooperative applied statistics major with two other colleges in the city. PhD in mathematics or statistics is preferred. Permanent full-time position with advancement to possible tenure. Contact Louis A. Guillou, Chairman, Dept. of Mathematics and Statistics, Saint Mary's College, Winona, Minn. 55987.

Stockton State College. Dept. of Mathematics.

(1) Instructor in Developmental Mathematics. Salary base \$11,933. Master's degree required. Prior teaching experience preferred. By March 15, 1979 contact Dr. Raelee Siporin, Dean of General Studies, Stockton State College, Pomona, N.J. 08240.

(2) Instructor or Assistant Professor of Mathematics. Master's degree required for Instructor and PhD required for Assistant Professor. Salary base for instructor \$11,933 and \$14,505 for Assistant Professor. By March 15, 1979 contact Dr. Philip Nanzetta, Dean, Faculty of Natural Sciences and Mathematics, Stockton State College, Pomona, N. J. 08240

Stockton State College. Faculty position in developmental math skills available Sept., 1979. Strong commitment to skills enhancement program required. Applicants should be knowledgeable in innovative math skills teaching. Teaching load of 6 courses per year. Ed.D. or Ph.D. and teaching experience preferred. Send resumes and three letters of recommendation by April 1, 1979, to Rae Lee Siporin, Dean of General Studies, Stockton State College, Pomona, N. J. 08240.

Stockton State College. Coordinator, Skills Acquisition and Development Center. Administrative position with responsibility for entire Basic Skills Placement Test Program; hiring, training and supervision of math and science tutors; coordination of other diagnostic testing; some teaching as appropriate. Master's degree in Math or related discipline required. 12 month appointment starting 7/1/79. Salary plus fringe benefits competitive. Send resume and three letters of reference by 4/1/79 to R. L. Siporin, Dean of General Studies, Stockton State College, Pomona, N.J. 08240.

State University College. Dept. of Mathematics. Assistant Professorship open 9/1979. Salary negotiable. One or two possible temporary one-year positions starting Sept., 1979. Knowledge of beginning computer courses desirable. Contact Dr. Frank Olson, Dept. Chairperson, Dept. of Mathematics, SUNY College, Fredonia, New York 14063.

Wright State University. Department of Mathematics. Asst. Professorship for 1979/80 tenure track opening. PhD and significant research potential required. Additional temporary positions are likely including one instructorship. Preferred areas are applied mathematics and statistics. Please send resume and ask 3 references to write to Faculty Search Committee, Dept. of Mathematics, Wright State University, Dayton, Ohio 45435.

Bryn Mawr College. Dept. of Mathematics. Associate Professorship and Assistant Professorship Sept., 1979. Candidates should have distinguished records & be committed to research in pure or applied mathematics and to excellence in teaching at all levels. Send vita and three letters of recommendation to F. Cunningham, Jr., Chmn., Dept. of Mathematics, Bryn Mawr College, Bryn Mawr, PA 19010.

University of Washington. Dept. of Computer Science. Faculty position open 9/1979. Applicants should be prepared for research and teaching at graduate and undergraduate levels and should have PhD in computer science or related discipline. Preference given to applicants in areas of programming languages, hardware, artificial intelligence, data bases or software engineering. Send curriculum vitae and names and addresses of 3 references to Robert W. Ritchie, Chmn., Dept. of Computer Science, FR-35, University of Washington, Seattle 98155.

Marquette University. Dept. of Mathematics & Statistics. One-year appointment for PhD in Mathematics or Computer Science with expertise in computer languages, computational mathematics and related areas. Research potential important; position may become tenure-track. Normal teaching load, 9 hours. Contact W. E. Lawrence, Dept. of Mathematics & Statistics, Marquette University, Milwaukee, WI 53233.

University of Wisconsin - Milwaukee. Dept. of Mathematical Sciences. Asst. Professorship (tenure track) in probability or statistics with initial 3 year appointment to begin Aug., 1979. PhD in probability or statistics required by fall, 1979. Duties include conducting research and teaching 2 undergraduate and/or graduate courses in probability, statistics or general mathematics each semester. Send vita and have 3 letters of reference sent to R. L. Hall, Dept. of Mathematical Sciences, University of Milwaukee, P. O. Box 413, Milwaukee, WI 53201 by 4/1/1979.

Somerville College, Oxford, England. Official Fellow and Tutor in Pure Mathematics.

(College Statutes, made under the Universities of Oxford and Cambridge Act 1923, provide that all Fellows of the College must be women.) Part-time University Lectureship is associated with Fellowship and successful candidate will be eligible for appointment to the post by the Board of the Faculty of Mathematics. Applications, giving qualifications and experience, and 3 referees should be sent to the Principal from whom further particulars may be obtained.

ASSOCIATION FOR WOMEN IN MATHEMATICS
MEMBERSHIP APPLICATION

The AWM membership year is October 1
to October 1.

Name and
Address _____

New _____ Renewal _____

Individual \$10.00 _____

Family \$12.50 _____

Retired, Student, Unemployed \$5.00 _____

Institutional affiliation, if any _____

Institutional \$25.00 (Two free advertise-
ments in the Newsletter)

Contributions are tax deductible, welcome
and needed.

Make checks
payable to: ASSOCIATION FOR WOMEN IN MATHEMATICS

and mail to: Association for Women in Mathematics
Women's Research Center, Wellesley College
828 Washington Street
Wellesley, Massachusetts 02181

Association for Women in Mathematics
Women's Research Center, Wellesley College
828 Washington Street
Wellesley, Massachusetts 02181

March, 1979

NON-PROFIT ORG.
U. S. POSTAGE
PAID
BOSTON, MASS.
PERMIT NO. 12548

H K NICKERSON
184 WASHINGTON RD

PRINCETON

NJ 08540