

Association for Women in Mathematics

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NEWSLETTER

March-April 1983

PRESIDENT'S REPORT

The Denver meeting. The AWM program at the annual meeting included a panel on computers, the Emmy Noether Lecture, a cocktail party, and a dinner, all in one very busy day. Despite the hectic schedule, all the events were very well attended.

The panel on computers began with a talk by Nancy Johnson on "My microcomputer and I" in which she described uses for her Apple, which included the scheduling of summer school teaching. Louise Hay, speaking on "Administrative uses of computers," discussed the use of a mainframe computer in her department for activities ranging from writing memos to keeping personnel records. Next, Lucy Garnett talked about "My evolution from mathematician to the field of computers." Marci Perlstadt spoke on "Symbol manipulators in mathematical research," i.e., software for symbolic calculations. The last speaker was Lenore Blum whose talk, "Some influences of computer science on mathematical research", dealt with theoretical questions of the difficulty of a computation.

The fourth annual Emmy Noether Lecture was delivered by Cathleen Morawetz. She was introduced by Jill Mesirov. Her talk, entitled "How do perturbations of the wave equation behave?", came with an unexpected ending: a movie showing the phenomena she had discussed. At the dinner held that evening to honor the speaker we were very pleased that Olga Taussky Todd, a previous Emmy Noether Lecturer, was able to join us.

The AWM cocktail party drew a record crowd. Besides the many AWM members and friends, we also had a surprise guest: Edward A. Knapp, the new director of the NSF.

At the meeting of the Executive Committee a change in the by-laws was proposed. This change would require resolutions for the Business meeting to be discussed first by the Executive Committee. A committee consisting of Bhama Srinivasan, Jeanne LaDuke and Bettye Anne Case was appointed to study this possible change and make a recommendation. Another issue discussed was the proposal that AWM provide a roommate matching service for women who want to attend the summer or annual meetings. This plan has a lot of support from AWM members, and it will be tried experimentally first at the Albany meeting in August. Rebekka Struik will be responsible for working out the details. ..Ed. note: see article below.

The Business Meeting passed a resolution introduced by Christine Ayoub, in which AWM expresses its support for the National Academy of Sciences' call for steps toward a nuclear freeze. The resolution appeared in the Oct.-Nov. Newsletter.

Another honor for Julia Robinson. She has just been awarded a MacArthur Fellowship, in a program designed to support "geniuses." Congratulations from AWM.

Linda Rothschild
Department of Mathematics
University of Wisconsin
Madison, WI 53706

LETTER FROM THE EDITOR

Professor Lee Lorch, York University, Ontario, Canada, is in the news again. The student newspaper the Excalibur of November 18, 1982 contains an article entitled "Mathematics Professor Lorch's work status to be decided by arbitration" by John P. Schmied. The dispute centers around whether Lorch should continue teaching on a full-time reduced-load basis or on a retired part-time basis. Schmied reports "An ad hoc committee in support of Professor Lorch has expressed its concern that he is possibly being offered a part-time position in order to keep him out of the union and fully backs the grievance committee report which recommended that a full-time, reduced load position be offered to the professor." The issue is going to arbitration after a grievance committee recommendation in the professor's favour was rejected by the Administration as unsatisfactory.

Professor Lorch has a long history of social activism and has been very active in the York faculty union. He is also a long-time AWM member and supporter.

The publication Illinois Issues has published five original essays by distinguished humanists, sponsored in part by a grant from the Illinois Humanities Council, in cooperation with the National Endowment for the Humanities. Reprints of the essays are available at no cost from the Illinois Humanities Council, 210 W. Springfield, Champaign, IL 61820.

The first of these, "The Women's Movement: Place and Power", appeared in the May 1982 issue of Illinois Issues, pp. 19-26. The author is Bari Watkins, Director of the Program on Women at Northwestern University. The article did not provide me with any earth-shaking new insights, but it is extremely well-written and could prove useful in the education of recalcitrants. The passages below are my favorites.

"This is a true story. During the Christmas holidays Betty Friedan and a local woman journalist appeared on a Boston TV talk show, Friedan, as is now usual, argued frantically that feminists have denigrated the family by encouraging women to desert the joys of home and motherhood for selfish careers. The local journalist managed to observe that feminists have in fact worked hard for a decade to foster better child care and family health and to help women shoulder the double burden of paid work and household labor. When the male moderator finally called on the all-female studio audience for comments, a young woman rose to her feet and angrily attacked Friedan. Her eyes filled with tears and her voice shook with fury as she said that the women's movement 'couldn't make' her go to work even if the ERA passed, 'that she loved her children and that Friedan was trying to destroy the family. The audience cheered and the moderator patted her shoulder approvingly. Friedan looked baffled; the local journalist was bemused.

"Feminist social scientists have recently pointed out some of the more fascinating aspects of this struggle in everyday life. Women, they find, end spoken sentences on a rising (and questioning) tone far more frequently than men, and also complete statements with what are called tag questions, as in "It's a beautiful day, isn't it?" Women sit and stand in ways (hands in lap, knees together) that take up less space than conventional male postures and avert their eyes from strangers much more often than men. Women smile far more than men, are touched by men more often than they touch, and are interrupted in conversations twice as much as men. Even the great door-opening controversy has been examined: It turns out that high-status persons (physicians, professors) control door-opening for the low-status (patients, students) as a way of maintaining power over space and access. Men open doors for women.

"Taken one by one, these issues may appear individually irrelevant; they are only the stage business of life. But taken together, they add up to a texture of interactions in which women's subordinate status and need to please the dominant group are endlessly repeated and reinforced. The level of discomfort, irritation and anger that erupts when the rules are violated testifies to their significance in a social order that depends on unspoken but powerful rules to maintain male dominance and female dependence. A woman faculty member reports she deliberately did not smile excessively at a department meeting; her male colleagues reacted to her proposals and suggestions with uncharacteristic hostility."

WOMEN MATHEMATICIANS IN CANADA

AWM panel at Toronto meeting, August 25, 1982
third installment

Reine Fournier

"Women Mathematicians in the Province of Québec"

Women mathematicians in Québec have the same kinds of problems as those encountered by women mathematicians elsewhere in Canada. However, they have at least one more, that is, if they want to work in French they do not have as many universities or colleges to apply to; and as far as colleges are concerned, in the province of Québec, it is very hard for a Ph.D. holder (woman or man) to get a position in one of them except possibly in Montréal and the immediate vicinity.

One problem that I may point out is the hard time a woman mathematician has finding and holding a job, especially if she is married to a mathematician and has children.

My feelings are that nowadays a woman has no real choice: either she goes for a career or else she decides to have children. Since child-bearing and -caring takes a lot of energy and time, it is impossible for a woman during child-bearing years to devote as much time to her work as a man, resulting in fewer papers being published and less chance of getting or keeping a job at the university level.

ROOMMATE MATCHING SERVICE

by Ruth Rebekka Struik

I have volunteered to organize a roommate matching service for females planning to attend the big math meetings. The following plan is meant to provide a list of women looking for roommates and nothing more. The next big meeting is in Albany in August. My idea is the following: each female looking for a female roommate should send me the following information about herself; name, address, phone numbers (work and home), dates planning to arrive and leave, smoker or nonsmoker. Use the following format to send me the information:

Susan B. Mathematician	Tel (303)444-3005 (h)	Ar: Feb. 29
3.1416 Cosine Road	492-7683 (0)	Lv: March 32
Banach, N.D. 22222	Nonsmoker	

I will paste the rectangular slips I receive on a piece of paper. A xerox of the sheet will be sent to everyone who has sent me the above information about herself, provided she has included a self-addressed stamped envelope.

The Toronto meeting last year was from August 23 to August 26. Preregistration had to be in July 9. The Albany meeting is from August 8-12, so preregistration will probably have to be in by the end of June. The slips should be sent to me two weeks before the preregistration date. Those that I have received by that date, I will paste on a sheet and send that sheet to all on that sheet. If a slip comes after that date, I will add it to the sheet and send the new woman a xerox of that sheet.

If you want to receive the sheet, please type or write the information about yourself so that it will xerox clearly. I do not want to do any typing or proofreading. Please send your rectangular slip to:

Prof. Ruth Rebekka Struik, RMS
Math. Dept., Campus Box 426
University of Colorado
Boulder, CO 80309

The reason for putting RMS after my name (guess what that stands for) is that at present I do not know my summer plans. If I am out of town for part of the time when sheets should be mailed to people, then I will ask a friend to look through my mail, and those envelopes with RMS on them can be processed as indicated. If there is no RMS after my name, my friend will assume it is correspondence about something else.

I will do this for the Albany meeting in August and the Louisville meeting next January. Then it will be decided whether the project should be continued, and if so, who should be in charge.

It should be clear that I am in no position to judge whether those who send me their names are who they claim to be or if they would make suitable roommates for you. If you decide to use this service, it is your responsibility to use your judgment in deciding who to ask to be your roommate.

BOSTON AREA AWM MEETING

A small but enthusiastic group attended the AWM November 9 evening meeting held at MIT. The first part of the program was a talk by Susan Landau, Ph.D. candidate at MIT, on the topic "The Complexity of Factorization." A good question period followed. Michele Vergne reported on the Symposium on Mathematics in Honor of the Centennial of Emmy Noether held last March at Bryn Mawr College. Donna L. Beers gave a report of the AWM panel discussion on Women Mathematicians in Canada held at the August meeting in Toronto.

The formal part of the program was followed by a lengthy discussion period. Several suggestions for future meetings and the work of the AWM were made: have proposal-writing workshops at each meeting to which members could bring their own proposals, or partially-written proposals, for comments and suggestions; ask members who have received grants to bring copies of their proposals for those who have not yet received grants to see; if possible have someone from the NSF talk about proposal writing; from time to time have articles appear in the Newsletter containing suggestions for proposal writing; have an article in the Newsletter written by a member who now has a grant and who did not receive one the first time she/he applied in order to encourage, in particular, recent Ph.D. recipients to continue to apply for grants.

WE NEED YOUR HELP

A new project, funded by the Carnegie Corporation of New York, and conducted under the auspices of Hood College in collaboration with the Project on the Status and Education of Women, Association of American Colleges, will disseminate information about exemplary programs and policies that promote sex equity at colleges and universities to other institutions that may be interested in adapting them.

Please write and tell us about any effective programs and policies at your institution that address specific equity needs of women on campus, including minority women--such as those which increase recruitment, hiring and promotion of women faculty and administrators; encourage women students to choose nontraditional careers in mathematics and science; or combat subtle discrimination in the classroom and in other learning situations. The solutions that work on your campus may be adaptable to others. We are especially interested in old and new programs and policies that we cannot learn about unless you tell us.

Send descriptive materials such as brochures, newspaper articles, reports, letters of commendation, etc. and any other information to: Dr. Karen Bogart, Adjunct Associate Professor of Psychology and Project Director, Hood College, Frederick, MD 21701.

ARE COLLEGE WOMEN MATHEMATICS STUDENTS BEING EDUCATED FOR SUCCESS?

by Jacqueline M. Dewar, Associate Professor, Loyola Marymount University

This article describes a 1980-1981 study of science and engineering students at Loyola Marymount University in Los Angeles, California. The study attempted to determine sex-related differences in career aspirations and in anticipated family responsibilities. Students were told to imagine that it was the year 1990 and then asked to describe in writing what they envisioned as a typical Wednesday in their lives. The students' responses were analyzed by sex according to occupational choices and anticipated family responsibilities. This approach was used rather than a direct survey method to avoid alerting the students to the topics being researched and thereby influencing their responses.

Similar studies have been performed on large numbers of elementary and secondary students as part of the EQUALS Program originated at the Lawrence Hall of Science in Berkeley, California.¹ To provide a frame of reference for the results of the college-level study, here is a synopsis of the findings of the studies on younger students. Striking differences were found between the sexes both in the children's choice of occupations and in the level of their aspirations. While most of the youngsters expected to be working, the boys as a group mentioned a much wider range of careers than the girls and frequently projected a high level of success in these careers. The girls, for the most part, indicated that they would be working within the traditionally female fields. As for family responsibilities, the girls described their activities in this area more frequently and in much greater depth than the boys.

RESULTS OF THE STUDY

From the college students I obtained 105 usable responses, 74 from males and 31 from females. These students were enrolled in calculus, differential equations, or biochemistry. Nearly 85% of the students were majoring in engineering. Other majors represented in the study were biology, chemistry, computer science, mathematics and physics. Based on the contents of his or her paragraph, each student was assigned to one of nine occupational categories (Engineer-Scientist, Executive, Doctor, Teacher, Nurse, Professional Athlete, Military Person, Unpaid Worker, or Work Mentioned But Not Specified) and to one of five levels of family responsibility (Spouse or other person has major responsibility, Self has major responsibility, Shared responsibility, Incidental responsibility, or Family responsibility not mentioned). The percentages of students falling in each occupational category and responsibility level were then computed by sex. (See Tables 1 and 2.)

Almost everyone who participated, regardless of sex, intended to be working in 1990. There was only one young woman who expected to be a full-time homemaker and one young man who planned on being a full-time student. The range of career choices by the college women was about the same as that of the college men, unlike the very different ranges found for boys and girls in the study on younger students. Also, in contrast to the other study, the women were anticipating careers in traditionally male fields. The fact that in the college study both men and women were concentrated in the Engineer-Scientist, Executive, or Doctor categories is not surprising, since these students were already involved in degree programs designed to prepare them for careers in these fields.

However the responses indicated that some of the dramatic differences found in the study involving younger students still exist at the college level in science and engineering students. Nearly 50% of the college women as opposed to 7% of the men expected to assume the major role in the area of family responsibilities. Furthermore, when a male indicated he would play the major role, either it was in reference to caring for his own parents or he was single. Indeed the differences in anticipated family responsibilities are highly significant ($\alpha < .001$) statistically.

On the other hand college men seemed to project a higher level of success in their careers. In particular, 28.4% of the males versus 12.9% of the females were placed in

OCCUPATIONAL CATEGORIES	SEX	NUMBER	PERCENT (By Sex)
ENGINEER-SCIENTIST (Computer Scientist)	M	31	41.9%
	F	18	58.1%
PROFESSIONAL ATHLETE	M	1	1.4%
	F	0	0.0%
POLICE OFFICER (Military, Pilot).	M	4	5.4%
	F	0	0.0%
EXECUTIVE (Businessperson)	M	21	28.4%
	F	4	12.9%
DOCTOR (Lawyer, Dentist)	M	6	8.1%
	F	2	6.5%
TEACHER (Coach, Counselor)	M	2	2.7%
	F	1	3.2%
NURSE (Lab Technician)	M	0	0.0%
	F	1	3.2%
UNPAID WORKER (Homemaker, Student, Parent)	M	1	1.4%
	F	1	3.2%
WORK MENTIONED BUT NOT SPECIFIED	M	8	10.8%
	F	4	12.9%
TOTALS	M	74	----
	F	31	----

OCCUPATIONAL CHOICES

Table 1

FAMILY RESPONSIBILITIES	SEX	NUMBER	PERCENT (By Sex)
Not Mentioned	M	16	21.6%
	F	1	3.2%
Incidental	M	29	39.2%
	F	4	12.9%
Shared	M	9	12.2%
	F	11	35.5%
Self has major responsibility	M	5	6.8%
	F	15	48.4%
Spouse or other person has major responsibility	M	15	20.3%
	F	0	0.0%
TOTALS	M	74	----
	F	31	----

ANTICIPATED SHARE OF FAMILY RESPONSIBILITIES

Table 2

the Executive category. Students were assigned to this category if their paragraphs mentioned project management, business partnership, or business ownership. This large difference, while not statistically "significant", ($\alpha = .15$) may be a critical observation. Statistics reported by the Scientific Manpower Commission in Washington, D.C. indicate that females graduating from college with degrees in math, science, or engineering readily find jobs, often at salaries higher than males with the same degrees.² Yet after a few years on the job, males have usually moved up the management ladder and are outearning their female classmates.²

The differences found in these two areas are well-illustrated by examining typical responses. Many young women wrote paragraphs similar to this one by a nineteen-year-old electrical-engineering major detailing the daily chores in a two-career family.

I will probably get up in the morning around 7:30, if I have a 9-5 job, feed my children, and then go to work. I plan on having live-in help (no day-care centers). (I would like to have children around the age of 27-33). I would go to work at some large aerospace company and return home around 5:30. I plan to live close to my work, no commuting. I also will live in a house, no condominiums. I will have dinner ready for my family at 6:30, spend the evening with my family and then go to sleep.

The young men frequently gave some indication that they would be earning a good salary as in the following paragraph by a nineteen-year-old engineering major.

I shall get up from bed. My wife shall cook breakfast. Then I drive to work in my Mercedes. I work at an Engineering firm. Hopefully I am climbing up the corporate ladder. I shall do the daily work of design of various circuits. I go home, eat dinner, and go out and play racketball with a friend.

IMPLICATIONS

There are two implications of this study: one is sociological and the other is related to the preparation of young women for truly successful careers in math, science, or engineering.

This study found highly significant differences between the sexes with regard to anticipated family responsibilities. These differences were not unexpected, but they do have a significance for society. According to U.S. Department of Labor data for March 1978, in nearly 6 out of 10 intact American families (that is, families with both husband and wife present) both partners held jobs. These figures, in combination with the young women's expectations for shouldering most of the family responsibilities and the lack of intention of the young men to share the burden, lead to the following conclusion. The present situation of career women being primarily in charge of household duties will remain essentially unchanged for the foreseeable future.

In the area of career aspirations the findings of this study suggest that young women are unaware that project management is an essential component of a successful scientific career. Possibly this is due to a lack of career information or role models. As a result of sex-role socialization young women may be reluctant to aspire to managerial roles. Even those females who have passed through the "critical filter" of studying a sufficient amount of math and science in high school to enter a technical major in college may require assistance to realize their full potential for success in a scientific career. Thus, the second implication of the study is that many young women math, science, and engineering students would benefit from an intervention program designed to provide contact with role models, accurate career information, and encouragement.

RECOMMENDATIONS

Math clubs, student sections of the Society of Women Engineers, or other student groups could be encouraged to repeat this study at their schools. With the aid of a faculty advisor, the students should closely examine the results and consider what they imply for the future. Involvement in such a study can enlighten students and motivate

them to learn more about the day-to-day realities of their anticipated work both on the job and at home. Then a career awareness program can be organized to provide information about supervising positions and at the same time address the challenge of combining marriage, family, and a career. It could be a simple undertaking such as arranging a few visits by successful women scientists or engineers with time allotted for informal discussions. Resources to tap include: the AWM Speakers Bureau, local chapters of the Society for Women Engineers, the Association for Women in Science, or other similar professional societies; women's committees at local engineering firms; and past graduates.

Undertaking such a program with help from industry, professional groups, and past graduates is likely to forge new bonds that will benefit both the students and the college or university. Since successful graduates are a great asset, faculty and administrators will find long-term rewards for their efforts to increase career awareness and to encourage all their students to reach their full potential.

REFERENCES

1. Kaseberg, A., Kreinberg, N., & Downie, D., Use EQUALS to Promote the Participation of Women in Mathematics. Berkeley, California: Lawrence Hall of Science, 1980.
2. Vetter, B. Opportunities in Science and Engineering. Washington, D.C.: Scientific Manpower Commission, September, 1980.

ON CAMPUS WITH WOMEN

From the publication of the same name published by the Project on the Status and Education of Women, Association of American Colleges.
A one-year subscription is \$15 (check payable to AAC/PSEW). Write:
Project on the Status and Education of Women, Association of American Colleges, 1818 R St., NW, Washington, DC 20009.

winter 1982

Making Money: Harder for Women

- * The College Placement Council's July 1981 Salary Survey report covering the period Sept. 1980-mid-June 1981 notes that average salary offers for women were lower in the business, humanities, social sciences and sciences groups in all cases but accounting, which showed the same salary offers for women and men. In engineering, men's and women's salaries were also roughly the same.
- * The 1980-81 annual survey by the American Association of University Professors shows women still predominantly in lower ranks, and receiving lower salaries and pay increases than their male counterparts. Women professors earned 93 percent of the salary earned by men of the same rank, averaging \$28,250 as compared to \$31,420, while women instructors earned 94.8 percent of the salaries of their male colleagues--\$14,780 as vs. \$15,990.
- * Chemical and Engineering News (June 22, 1981) reports that at every degree level, and with all types of employers, women chemists earn less than men, although the pay differential has shrunk among recent graduates.
- * Women research librarians fare no better, according to the Association of Research Libraries salary survey (July 1980). In all position categories except head of circulation and head of document/maps, women received lower average salaries than men; as a group, women were paid 13.5 percent less than men. Women's salaries averaged \$5,159 less than those of men--\$21,979 as compared to \$27,138. The proportion of women in the 98 research libraries, according to the survey, remains virtually the same as it has been for the past two years. Of the top managerial positions (director, associate and

assistant director, and head of medical and law libraries), 34 percent are filled by women, while women occupy 79 percent of the non-supervisory positions. Not one of the special collections department posts in any of the libraries is filled by a woman or by a male minority group member.

* Recent (1977-78) graduates holding masters degrees in business administration (MBA) degrees from top U.S. business schools showed similar disparities between the sexes in regard to pay, job responsibility and perceptions. In their second or third year out of business school, men averaged \$29,676, but wished they were earning \$42,000. Women, on the other hand, reported they would like to be making \$31,000 rather than their current \$25,688. While 45 percent of the male graduates occupied executive or middle-management positions, only 25 percent of the women held such posts. Junior management, or management trainee positions were filled by 65 percent of the women, and only 41 percent of the men. The researchers, Laraine T. Zappert and Harvey M. Weinstein of Stanford University (CA) reported surprise that the women entering highly competitive occupations did not express greater dissatisfaction with their lower pay and status. They surmised that women might be unaware of the discrepancies or less concerned than men with wealth or position. Another possibility is that they may be comparing their pay and status with other workers or other women, rather than with their classmates.

Women in the Workforce

The Bureau of Labor Statistics' databook, Perspectives on Working Women, highlights trends in women's employment relative to family status, education, earnings and race. Among the statistics it presents:

- * While the percentage of women in the labor force rose from 33.9 to 51.2 between 1950 and 1980, that of men dropped from 86.4 to 77.2.
- * The majority (55 percent) of employed women work in traditional clerical and service jobs.
- * Close to half of all wives were employed or seeking employment in March 1979, in comparison with 41 percent in 1970 and 22 percent in 1950.
- * In 1950, only 11.9 percent of women with children under six worked outside the home, as compared to 43.2 percent in 1979.
- * Women received a median weekly salary of \$263 in 1979, in comparison with \$327 for men.

The databook is available at \$4.50 postpaid from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock number is 029-001-025-27-1.

New Association Gives Full-Time Attention to Part-Time Professionals

One of every six Americans works part-time, and over two million of these part-timers are professionals. So reports the Association of Part-Time Professionals (AFTP), which has announced plans to become a national professional association with local chapters across the nation. Organized in the Washington, DC area two years ago, the association's aim is to increase the acceptance of part-time work as an option for employees. For additional information, contact AFTP, P.O. Box 2419, Alexandria, VA 22302.

spring 1982

Misconceptions About Women Ph.D.'s Challenged

Continuing disparities between male and female scientists are discussed in "Career Outcomes in a Matched Sample of Men and Women Ph.D.'s." Issued by the Committee on the Education and Employment of Women in Science and Engineering, Commission on Human Resources, National Research Council (NRC), National Academy of Sciences, the study matched over 5000 triads of two male and one female scientists by year and doctoral field, reputation of degree-granting department, and race. The results are especially telling in ruling out a number of objective factors previously used to explain career differences for men and women. Reasons offered in the past for women's lack of advance-

ment--that many women have only recently earned doctorates, and therefore are clustered in the lower academic ranks; that family ties limit women's freedom to change jobs; and that women in academe are likely to slow their professional advancement by interrupting their careers for childrearing--were found to be invalid.

The NRC study found that even when men and women were matched by prestige of institutions at which they 1) were employed and 2) had earned degrees, "differences in salary and rank [remained] after matching." Women were more likely, at each level of academic employment, to be in a nonfaculty or junior faculty position than their matched male counterparts. Males were 50 percent more likely than females to have reached the status of full professor among men and women who received their doctorates between 10 and 19 years ago. No evidence was found that affirmative action goals had led to "reverse discrimination" in hiring Ph.D.'s. Among those earning doctoral degrees between 1975-78, two and a half times as many female than male academics were shown to be "involuntarily unemployed."

Even after controlling for type and quality of doctoral training, salary differentials remained between young male and female Ph.D.'s. Post 1975 doctorate holders showed the largest pay differentials in chemistry (\$3300) and the biological sciences (\$2100).

As for family responsibilities presenting possible obstacles to women's advancement, the study found that of women academics with young children, only 10 percent had dropped out of the labor force. "Moreover," states the report, "relatively few women doctorates --less than half--have children." Unmarried women, or women without children fared no better with faculty promotions than married women with children, according to the report, and, among junior faculty members, "the women were somewhat more likely than the men to have moved to a new institution."

Copies of the NRC report are available at \$10 prepaid from the National Academy Press, National Academy of Sciences, 2101 Constitution Ave., NW, Washington, DC 20418.

summer 1982

Professional Women More Prone to Suicide and Depression

Depression as an illness may affect women physicians and Ph.D.'s far more than women in the general population. Many of the professional women afflicted with depression come from families with a history of depression. Such were the findings of a study conducted by Paula Clayton, head of the department of psychiatry at the University of Minnesota. Though women in the general population become depressed twice as often as men, they are less likely to commit suicide. Only among professional women, especially physicians, does the suicide rate equal the rate among men. Clayton notes that the stress of pursuing a career under frustrating conditions contributes to the development of depression. She emphasizes the need for educators and counselors to encourage graduate students to be aware of these possible problems.

Math Programs for Women Described

"One Thousand Teachers Later: Women, Mathematics, and the Components of Change" describes programs designed to help educators increase the participation of women and girls in school mathematics courses. Written by Nancy Kreinberg, Director of Math and Science Education for Women at the University of California, Berkeley, the article appeared in the August 1981 issue of Public Affairs Report, Vol. 22, No. 4, a bulletin of the Institute of Governmental Studies of the University of California, Berkeley.

How To's for Science Career Workshops

Popular one-day conferences on "Expanding Your Horizons in Science and Mathematics" have been presented for secondary school young women on college campuses every year since the first such conference was held at Mills College in March 1976. Since then, nearly 30,000 young women have attended the conferences, which offer such hands-on science activities as "Taking a Look at a Car's Insides," "Crime and Science: Blood Typing," and "Programming in Basic and Other Fun Things on a Pet Computer." The conferences

also provide career exploration workshops led by women in many nontraditional fields. Expanding Your Horizons: A Handbook for Conference Planners was developed as a guide to preparing and presenting the conferences. Copies are available for \$2 postpaid from the Math/Science Resource Center, Mills College, Oakland, CA 94613.

Another guide for those providing career advice to prospective women scientists and engineers is a 53-page booklet, Ideas for Developing and Conducting a Women in Science Career Workshop. Published by the National Science Foundation, the booklet is available at no cost from the Women in Science Program, Directorate for Science Engineering Education, NSF, 1800 G St., NW, Washington, DC 20550. Each request should be accompanied by a mailing label.

Still another source of help for those planning programs for prospective students in science and engineering are day-long conferences such as the Science Career Workshop held for campus program planners and community leaders at Western Michigan University last summer. For more information on the workshop, sponsored by the Center for Women's Services at the University, write to CWS, Western Michigan University, Kalamazoo, MI 49008.

The University of Michigan's Center for Continuing Education of Women has established a Women in Science Program to encourage women students as well as prospective students to consider majors and careers in the sciences. Offering a conference, "Image and Professionalism: Issues for Women in Science;" workshops which focus on specific science careers; lists of resource persons and organizations useful to students; and assistance with summer and regular job placement, the program also exposes students to women role models in the sciences who have varied kinds of careers and lifestyles. The program is described in the CCEW Newsletter for Spring 1982 (Vol. XV, No. 1). Copies are available at no charge from CCEW, 350 South Thayer, Ann Arbor, MI 48109, Attn. Cindy Palmer.

Indiana Program on Engineering Education for Women

The Indianapolis education center run by Purdue University and Indiana University now offers engineering degrees in two years or less to women holding baccalaureate degrees in mathematics or science. The women accepted into the program pay no tuition, but are given paid internships in Indianapolis' industries. A standard undergraduate engineering sequence and intensive tutoring are included in the coursework to refresh and update studies which students have mastered in the past. Degrees are conferred by Purdue University. For further information, contact Susan Herrmann, Director, Target: Alternative Science Careers, Office of the Dean, School of Engineering and Technology, Purdue University, 799 W. Michigan St., Indianapolis, IN 46202.

WOMEN IN MEDICINE

The Joint Committee on the Status of Women, Harvard Medical School, is pleased to announce the availability of a series of videotapes entitled "Women in Medicine." The series consists of on-location footage of the work environment--hospital, medical school and laboratory--of eight prominent women physicians who are recognized leaders in their fields. Each fifteen minute videotape incorporates excerpts from extensive interviews which explore the difficulties and gratifications of their climb through the ranks of academic medicine.

The series addresses such questions as:

- * what courses in school contribute to the making of a physician?
- * are early role models important?
- * can a woman have a high-powered career in medicine and marriage and children, too?
- * how does the physician/researcher set priorities?

For more information, write: JCSW, Harvard Medical School, 25 Shattuck St., Room 514, Boston, MA 02215.

A FEW WORDS ON SOFIA KOVALEVSKAYA (1850-1891)

by Ann Hibner Koblitz, Ph.D. 1983, Boston University

Most women in mathematics these days know about Sofia Kovalevskaya. They know that she was Russian, that her name is associated with a theorem basic to the theory of partial differential equations, and that she is usually considered the finest woman mathematician before the twentieth century. Some might recall Eric Temple Bell's account of "Weierstrass and Kovalevsky", or the somewhat disparaging remarks made by Hermann Weyl in his commemoration of Emmy Noether, or the brief sketches in Lynn Osen's Women in Mathematics or Teri Perl's Math Equals. Perhaps those who are particularly well-read know of Kovalevskaya's Memories of Childhood (translated by Beatrice Stillman for Springer Verlag as A Russian Childhood) or P. Ia. Polubarinova-Kochina's biographies of Kovalevskaya.

But the scraps and snippets of information most people have picked up along the way about Kovalevskaya are not satisfying. There is a tendency for women to feel embarrassed or uncomfortable about Kovalevskaya, because they know her only through distorted, inaccurate accounts. In the past, these accounts have been used to support the contention that women and mathematics are not a happy combination.¹ Even now, it is not unheard of to come across slighting references to Kovalevskaya. "A pretty messy life, to say the least," was J. Fang's offhand comment in Philosophia Mathematica a few years ago.²

Yet in the past ten years, Kovalevskaya's scientific researches have been exciting renewed attention among mathematical physicists. Moreover, specialists in her native country and in the United States are looking again at her work on the revolution of a solid body about a fixed point (the Kovalevskaya top, for which she won the prestigious Prix Bordin of the French Academy of Sciences of 1888). They are also sifting through her letters to Mittag-Leffler, Picard, and others; on one occasion a notion of Kovalevskaya, scoffed at by Picard at the time, has been proved correct ninety years later.³

Such renewed interest in the work of a mathematician so long dead is unusual. It is more common for the names of mathematicians prominent in their own time to be forgotten as their work is superseded by newer results. That Kovalevskaya is to have a second period of recognition is indicative of the depth of her mathematical thought. Indeed, several prominent mathematicians have told me that until recently, they had placed Kovalevskaya in the ranks of the minor luminaries of the nineteenth century. But now, with mathematical physicists and specialists in theoretical mechanics reevaluating her work, the respect in which Kovalevskaya is held by experts has been considerably enhanced.

This renewed interest in Kovalevskaya's scientific results comes at a particularly appropriate time. On 30 January 1884, Sofia Kovalevskaya gave her first lecture as a privat docent at Stockholm University. It is therefore almost one hundred years since the first woman gave regular lectures to a college audience. And mathematics was to have the distinction of being the first field to give a full professorship to a woman: in 1889 Kovalevskaya became the first woman ordinary professor in any discipline at a European university.⁴

Kovalevskaya had a long, hard struggle to attain her professorship and her position of equality in the mathematical community. In fact, she had to face enormous difficulties even in pursuit of her doctoral degree. In the early 1870's when Kovalevskaya was a young woman in search of education, almost all European universities were closed to women. Only the university and polytechnical institute in Zürich allowed women to graduate, but the mathematical training there at that time was not satisfactory to Kovalevskaya.

In late 1869, Kovalevskaya persuaded the university administrators at Heidelberg to allow her to study mathematics, physics and chemistry as a special exception. In 1870, when she moved to Berlin, university officials would not even go that far; Karl Weierstrass had to tutor her privately. And then, when it came time to present her work for the doctorate, neither Berlin nor Heidelberg would admit a woman to the examinations. Only after prolonged negotiations, and the energetic, vocal support of Weierstrass,

Lazarus Fuchs, and other prominent mathematicians, was Kovalevskaya awarded her degree, in absentia, from Göttingen University in 1874.

In this battle, as in many others, Kovalevskaya fought for professional recognition in her lifetime; it is interesting to take a look at the line-up of forces arrayed against her. Objections were raised mostly by university administrators, government officials, professors in the social sciences and humanities, and conservative journalists. Almost never were mathematicians themselves among her enemies, and rarely did her opponents include scientists in any field. At first this might seem strange, almost unbelievable, but it was indeed true. Kovalevskaya encountered opposition and hostility aplenty, from the time of her first demand for calculus lessons at the age of thirteen, until her premature death soon after her forty-first birthday. But rarely if ever did this opposition come from mathematicians.

Kovalevskaya was the first woman to become a professional mathematician. By this I mean that mathematics was her career rather than her avocation, and she entered fully into both the professional and social sides of the nineteenth-century mathematical scene. She was the first woman on the editorial board of any major scientific journal. But she was more than just an editor of Acta Mathematica. She was a fundraiser for the journal, and worked to persuade the Russian Academy of Sciences to give institutional support to Acta. Moreover, Kovalevskaya was a crucial liaison between the mathematicians of her own country and those of Western Europe. Her voluminous correspondence from her colleagues all over Europe attests to her importance in this respect.

The names of those who aided Kovalevskaya during her career read like a compendium of the greats and near-greats of late nineteenth-century mathematics. Paul DuBois-Reymond, Lazarus Fuchs, Karl Weierstrass, Leo Königsberger and Hermann Schwarz all helped her during her student years, and fought against university bureaucracies on her behalf. Weierstrass, P.L. Chebyshev, Charles Hermite, Emile Picard, Henri Poincaré, Leopold Kronecker and Gösta Mittag-Leffler assisted Kovalevskaya, to varying degrees, during the years before her appointment to Stockholm University. Mittag-Leffler was almost singlehandedly responsible for her initial position in Sweden. Chebyshev and two other mathematicians pushed through her nomination to the Russian Imperial Academy of Sciences, after first causing the by-laws regarding sex to be changed, specifically so that her case could be considered. Hermite and Joseph Bertrand had the prize money of the Prix Bordin raised by 2000 francs to honor Kovalevskaya's work.⁵

Given the unique nature of Kovalevskaya's position as the first professional woman mathematician, the amount of support she received from established mathematicians might at first seem surprising. But it must be remembered that Kovalevskaya's talent was extraordinary. Weierstrass frequently called her his "most gifted disciple," and Hermite ranked her as one of the finest analysts in all of Europe.⁶ When one realizes that Weierstrass's disciples included such specialists as Königsberger, Schwarz and Frobenius, and that Hermite was ranking Kovalevskaya with himself, Picard, Poincaré and Weierstrass, the full value of Weierstrass's and Hermite's praise becomes clear.

In addition to being such a talented mathematician, Kovalevskaya was a political woman. From her early adolescence, she had been interested in the progressive and revolutionary movements of the Russia of her day. She was an ardent champion of the cause of women's rights. She helped other women to independence and careers, and always encouraged young women to educate themselves. Moreover, she was friends with many of the Russian and Polish revolutionaries of the 1870s and 1880s, and helped them whenever she could.

Mathematicians knew about Kovalevskaya's political activities and sympathies. Not all of them shared her enthusiasm for radical causes. In particular, her politics sometimes made more difficult the task of defending her against anti-women attacks by administrators and government officials.⁷ But most of Kovalevskaya's colleagues were at the liberal to mildly radical end of the political spectrum. Consequently, they felt that neither her progressive beliefs nor her sex should be allowed to interfere with her well-deserved professional advancement.

The treatment of Kovalevskaya by her mathematical colleagues was a credit to mathematicians everywhere. Indeed, since the first woman to hold a chair in any subject

in a modern European university was a mathematician, this means that women mathematicians as professionals have a longer history than women in any other academic discipline. This is a tradition of which to be proud.

NOTES

1. See, for example, Anna Carlotta Leffler's biographical sketch in Sonya Kovalevsky. Her Recollections of Childhood (New York: The Century Co., 1895); Isabel F. Hapgood, "Notable Women: Sonya Kovalevsky," Century Magazine, 50 (1895), pp. 536-9.
2. J. Fang, "Mathematicians, Man or Woman: Exercises in a 'Verstehen Approach,'" Philosophia Mathematica, 13-14 (1976-1977), p. 55.
3. See B. A. Dubrovin, V. B. Matveev, S. P. Novikov, "Nelineinye uravneniia tipa Kortevega-deFriza," Uspekhi matematicheskikh nauk, 31, No. 1(187) (1976), p. 61.
4. Here, as elsewhere in this article, I am leaving out of the reckoning the women of the late Italian Renaissance--Maria Gaetana Agnesi, Laura Bassi, etc. Their achievements are in the process of being more carefully documented, and while it is certain that Bassi, and possibly Agnesi, taught at Italian universities, it is not clear in what capacity.
5. The full story of these and other incidents in Kovalevskaya's mathematical career are in my Sofia Vasilevna Kovalevskaja (1851-1891)--A Biography (Ph.D. dissertation, Boston University, 1983), which should be published later this year.
6. See G. Mittag-Leffler, "Weierstrass et Sonja Kowalevsky," Acta Mathematica, 39 (1923), p. 172; Charles Hermite, 22 March 1886 and 21 May 1889 letters of recommendation for Kovalevskaya, Institut Mittag-Leffler archives in Djursholm, Sweden.
7. The correspondence between Weierstrass and Mittag-Leffler, in the Institut Mittag-Leffler, is full of references to Kovalevskaya's politics.

SEX-ROLE STEREOTYPING IN THE BROADCAST MEDIA

press release

In its final report published September 1, 1982, the Canadian Radio-television and Telecommunications Commission Task Force on Sex-Role Stereotyping in the broadcast media announced the implementation of a wide-ranging program combining broadcast and advertising industry self-regulation with public accountability, designed to improve the portrayal of women in Canadian broadcasting.

Entitled Images of Women, the 189 page report not only outlines recommendations for solving the problem it was asked to address, but also describes how it has worked actively with both the advertising and broadcasting industries to develop action plans for self-regulation. Many of these undertakings are already in place and are listed in the report as "Achievements."

The Task Force's responses to the problem of sex-role stereotyping began in November 1980 when it released an action plan developed by the advertising industry in consultation with the Task Force. Since then, this plan has produced the following results:

- * Canadian advertisers have adopted nine positive action statements as guidelines for the elimination of sex-role stereotyping in broadcast advertising;
- * Advertising committees on sex-role stereotyping have been established by both the Advertising Advisory Board and le Conseil général de la publicité, to process public complaints about stereotyping in advertising; and
- * an information campaign has been launched to promote these committees. It includes an information brochure and a film to help advertisers and others understand the nature of the problem.

An action plan to deal with sex-role stereotyping in broadcast programming on privately-owned radio and television stations, developed by the Canadian Association of Broadcasters, in consultation with the Task Force, is also in place. This program includes the following major commitments by the CAB:

- * to establish a committee to act on public complaints about sex-role stereotyping in programming;
- * to amend its code of ethics to address the issue of sex-role stereotyping, to support the initiatives of the advertising industry, and to call upon members to adhere to the Task Force guidelines on sex-role stereotyping in advertising; and
- * to develop an educational program that includes sensitizing its members to the problem, holding a workshop on sex-role stereotyping at the next CAB convention, and informing the public about CAB efforts in the area of sex-role stereotyping.

Images of Women also outlines initiatives developed by the Canadian Broadcasting Corporation in consultation with the Task Force. The CBC has recently published major content analysis studies on the portrayal of women on both its English and French TV networks. It has also amended its commercial acceptance code to address the issue of stereotyping, and has accepted the nine positive action statements regarding sex-role stereotyping in advertising.

The Task Force realizes, however, that programs of self-regulation need to be independently monitored and assessed in order to ensure that they achieve their goals. It has therefore recommended that the CRTC monitor and assess the industry programs over the next two years, publish the results of its evaluation, and discuss them in a public forum. The report notes that further action may have to be taken at the end of the two-year review period if the goals of self-regulation are not being achieved.

Other recommendations are made which have been designed to render the programs for self-regulation as effective as possible. As well, the public members of the Task Force have added several additional and specific recommendations that reflect their particular concerns.

Said Marianne Barrie, President of the Task Force, "I am confident that the implementation of these programs and recommendations will pave the way for a more balanced and equitable portrayal of women in Canadian broadcasting."

The Task Force, established in September 1979 at the request of the Minister of Communications, was made up of 19 representatives drawn from the general public, the broadcasting and advertising industries, and the CRTC.

Images of Women is available from Supply and Services Canada, catalogue number BC 92-26/1982E for \$3.95 (\$4.75 outside of Canada).

The nine positive action statements are listed below.

1. Advertising should recognize the changing roles of men and women in today's society and reflect the broad range of occupations for all.
2. Advertising should reflect a contemporary family structure showing men, women, and children as equally supportive participants in home management and household tasks and as equal beneficiaries of positive attributes of family life.
3. Advertising, in keeping with the nature of the market and the product, should reflect the wide spectrum of Canadian life, portraying men and women of various ages, backgrounds, and appearances, actively pursuing a wide range of interests--sports, hobbies, business--as well as home-centered activities.
4. Advertising should reflect the realities of life in terms of the intellectual and emotional equality of the sexes by showing men and women as comparably capable, resourceful, self-confident, intelligent, imaginative, and independent.
5. Advertising should emphasize the positive, personal benefits derived from products or services and should avoid portraying any excessive dependence on or excessive need for them.
6. Advertising should not exploit women or men purely for attention-getting purposes. Their presence should be relevant to the advertised product.
7. Advertising should reflect contemporary usage of non-sexist language, e.g., "hours" or "working hours" rather than "man-hours," "synthetic" rather than "man-made," "business executives" rather than "businessmen" or "businesswomen."
8. Advertising should portray men and women as users, buyers, and decision-makers, both for big-ticket items and major services as well as smaller items.
9. Advertising should reflect a realistic balance in the use of women both as voice-overs and as experts and authorities.

FIRST NATIONAL SCWIST CONFERENCE

The Society for Canadian Women in Science and Technology (SCWIST) is hosting a national conference for women scientists, potential women scientists, and those who wish to be informed on contemporary issues in science. It will be held at the University of British Columbia, Vancouver, BC from May 20-22, 1983. The three-day conference will address the specific issues of science and math education for girls, women scientists re-entering the work force, problems and issues related to practicing women scientists, and the development of a national network of women in science and technology. Such eminent women scientists as Evelyn Fox Keller, Donna Brown and Rose Sheinin will open the plenary sessions with talks on gender and science and on the future of Canadian women in science.

Conference registration before February 28, 1983 is \$75; later registration is \$100. Graduate student registration is \$25. Make checks payable to SCWIST. Registration and further inquiries should be directed to: Dr. Hilda Lei Ching, SCWIST, P.O. Box 2184, Vancouver, B.C. V6B 3V7.

OF POSSIBLE INTEREST

Africa Counts by Claudia Zaslavsky, mentioned in the last Newsletter, is available in paper at the stabilized retail price of \$6.95 from Lawrence Hill & Co. Publishers Inc., 520 Riverside Ave., Westport, CT 06880. This price has not been raised in 3½ years, even after a new printing!

The program for NSF Visiting Professorships for Women in Science and Engineering were funded again for 1983. In fiscal year 1982, 17 of the 118 eligible proposals submitted were funded at a total cost of \$948,257. In 1983 the Foundation intends to maintain the program at approximately the same level.

Write National Women's Mailing List, 1195 Valencia St., San Francisco, CA 94110 for a registration form if you would like to be on the list (\$3.50 donation requested). Areas in which you may request mailings are political candidates, women's culture, sports, legal/political issues, health, education, violence against women, work, lesbian, and women of color.

The National Summer Institute in Women's Studies will be held July 3 through July 23, 1983 on the University of Michigan campus. It offers an opportunity for intensive study in feminist theory and its transforming potential at every level of the academy. Write: Barbara Caruso, Ph.D., Director, The National Summer Institute in Women's Studies, Box 94, Earlham College, Richmond, IN 47374.

The eighth annual Summer Institute for Women in Higher Education Administration will be held July 5-29, 1983, on the Bryn Mawr campus. Write: Summer Institute, Bryn Mawr College, Bryn Mawr, PA 19010.

Sigma Delta Epsilon/Graduate Women in Science is a national organization which aims, among other things, to improve science and mathematics education for women and to encourage girls and women to enter scientific fields. Grants-in-aid and fellowships are awarded each year to women in science who have demonstrated outstanding ability and promise in research in the mathematical, physical or biological sciences. Annual membership is \$25. Write: Sigma Delta Epsilon, FASEB, 9650 Rockville Pike, Bethesda, MD 30814.

DEADLINES: Mar. 24 for May-June, May 24 for July-Aug., July 22 for Sept.-Oct.
AD DEADLINES: Apr. 5 for May-June, June 3 for July-Aug., Aug. 5 for Sept.-Oct.
ADDRESSES: Send all material except ads to Anne Leggett, Math. Dept., Western Illinois University, Macomb, IL 61455. 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 \$10.00 apiece and must be prepaid. The vacancies listed below appear in alphabetical order by state. All institutional advertisers below are Affirmative Action/Equal Opportunity employers.

California State Polytechnic University. Mathematics Department, 3801 West Temple Ave., Pomona, CA 91768. Asst. or Assoc. Professorships (\$20,868-\$26,316, academic year,) dependent on qualifications. (1) Operations Research; required: Ph.D. or equivalent, evidence of interest in industrial applications of math; demonstrated potential for doing research. Courses include mathematics of operations research, mathematical modeling, graphs & network flow. Teaching experience desirable. (2) Computational mathematics or Numerical Analysis. Required: Ph.D. in Math with dissertation in computational math or numerical analysis; interest in industrial applications of computational math & demonstrated potential for doing research. Courses include numerical analysis, numerical methods in linear algebra & differential equations. Teaching experience desirable. (3) Applied Probability. Required: Ph.D. with dissertation in probability with emphasis on applications; interest in real-world applications of probability & potential for doing research. Courses include discrete probability models, applied probability theory, stochastic processes, queueing theory & applications. Teaching experience desirable. (4) Math Education. Required: Ph.D. in math or math education, college teaching & ability to coordinate dept programs in elementary and/or secondary math education. By 4/15/83 send application, resume, 3 letters of reference & confirmation of highest degree to Search Committee.

Claremont Graduate School. Dept of Math, Claremont, CA 91711. Position as of Fall, 1983 with rank to be determined by qualifications. Required: demonstrated achievement in teaching & research in area of applied math, stat., or comp sci. Visitors also sought. Teaching and/or attachment to a Math Clinic project may be arranged. Send resume & 3 letters of reference to Search Committee.

San Francisco State University. Dept of Math, 1600 Holloway Ave, San Francisco, CA 94132. Newman Fisher, Acting Chair. Four tenure track Asst Professorships. Salary \$19,044-\$22,896. Required: Ph.D. in math or equivalent & demonstrated competence in teaching & research. One position in math education at secondary level, one position in pure mathematics, other 2 in applied math in areas of numerical analysis & mathematical physics. Teaching load 12 hrs/week. By 4/1/83 send vita, granduate transcripts & 3 letters of recommendation to Acting Chair.

Trinity College. Dept of Math, Hartford, CT 06106. D. A. Robbins, Chmn. One year position for 1983/84. Required: demonstrated excellence as a teacher, especially at 1st & 2nd year levels & a knowledge of combinatorics or mathematical modeling. Prefer Ph.D. candidates. Teaching load 3 courses per semester. By 3/18/83 send vita, academic record & at least 3 letters of reference to Chmn.

University of Delaware. Dept of Computer & Information Sciences, Newark, DE 19711. Prof. B. F. Caviness, Chairperson. Tenure track & visiting positions open. Special interest exists for candidates with research expertise in networks, distributed systems software, symbolic computation, languages, graphics, parallel architectures, software engineering data base systems etc. Required: Ph.D. or equivalent. Apply to Chairperson.

Grinnell College. Dept of Comp Sci, Grinnell, IA 50112. Emily Moore, Coordinator of Computer Curriculum. Lecturer & Coordinator of Summer Computing Programs. Prefer candidates with Ph.D. in Comp Sci or a Ph.D. in a related field, and a Master's or its equivalent in Comp. Sci. Position emphasizes teaching with academic year responsibilities involving a full complement of undergrad courses through the Math Dept & the Computer Studies Concentration. Salary is commensurate with experience. Resumes & names of reference should be sent to Emily Moore, address above, by 3/1/83.

University of Iowa. Dept of Comp Sci, Iowa City, IA 52242. Douglas W. Jones, Chmn., Faculty Search Committee. Asst & Assoc professorships. Required: Ph.D. & strong research commitment. Limited number of visiting positions may also be open. Dept research facilities include a PDP - 11/23 and VAS-11/780. Available software includes Unix, Interlisp & Ada. Other facilities include an IBM 70 & a network of Prime 750 & 850 computers. Please send resume, names of 3 references & copies of any recent publications or technical reports.

Kansas State University. Dept of Math, Hanhattan, KS 66506. R. Richard Summerhill, Head. Several anticipated temporary (9 mo) Asst Professorships or above beginning 8/1983. Salary commensurate with qualifications. Will consider candidates in all fields of math. Expect strong interest in both teaching & research. Required: Ph.D. in math or equivalent. By 5/1/83 contact Head.

University of Kansas. Dept of Math, Lawrence, KS 66045. C. J. Himmelberg, Chmn. Tenure track Asst Professorship 8/16/83. Field unrestricted. Required: Ph.D. & strong interest in teaching & research. Postdoctoral experience preferred. Knowledge of comp sci and/or interest in applications desirable. Send resume with description of past & current research & have 3 letters of recommendation sent to Chmn. Applications will be considered until 4/4/83.

Bates College. Dept of Math, Lewiston, ME 04240. Prof David C Haines, Chair. Opening for replacement of faculty member on leave 83/84. Position will probably be available following year & may become tenure track. Ph.D. required. Send resume, transcripts & at least 3 letters of recommendation to Chair.

U S Naval Academy. Dept of Math, Annapolis, MD 21402. F. I. Davis, Chmn. Three-year tenure track Asst Professorships Fall, 1983. Initial 10 mo salary \$20,000-\$27,000 commensurate with experience & qualifications. Research opportunities exist for augmenting salary during summer intersessional period. Specialization in applied math desired but not essential. Required: Ph.D., commitment to excellence in teaching & ability to pursue independent research. Send resume, transcripts & 3 letters of recommendation to Chmn.

U Mass/Boston. Mathematical Sciences. Growing undergraduate & master's program in Comp Sci. Rank & salary open for regular faculty positions and directorship of the master's program. Long term, part-time positions available as complement to part-time work in industry. Positions subject to availability of funds.

U Mass/Boston (con'd)

Dept operates 2 PDP-11/34 and 2 VAX-11/750 computers. University operates Harris & Cyber computers. Software engineering emphasized with mathematics & computer science integrated in the curriculum. Current faculty research interests include networking, text processing, formal languages & compilers. Lively local computer industry and academic milieu. Applicants should have Ph.D. (completed or expected) in Computer Science or equivalent experience, research experience or potential in Computer Science, interest in teaching. Please send resume to Prof. Ethan Bolker, Dept of Math Sciences, U Mass/Boston, Harbor Campus, Boston, MA 02125.

Worcester Polytechnic Inst. Dept of Math Sciences, Worcester, MA 01609. One or two tenure track asst professorships. Required: Ph.D. & research interests paralleling current activity in Dept (applied analysis, differential equations, applied probability, combinatorics, discrete organization); strong commitment to scholarship & teaching, both in classroom & in advising student research projects. Research & teaching interaction with other disciplines is encouraged. Send resume to P.W.Davis at above address.

Alma College. Dept of Math & Comp Sci., Alma, MI 48801. Dr. Melvin Nyman, Chmn. Tenure track position in Comp Sci 8/1983. Required: Master's Degree in Comp Sci plus experience or Master's Degree in Comp Sci plus Ph.D. in math sciences preferred; Commitment to teaching at undergraduate level. Background and interests must be compatible with curricular needs of Dept. Salary & rank commensurate with education & experience. Please forward vitae, transcripts & 3 reference names immediately to Chmn. Applications will be considered until position is filled.

Oakland University. Dept of Math Sciences, Rochester, MI 48063. One or more Asst. Professorships Fall, 1983. All specialties invited. Prefer those with applied math, operations research, combinatorics, and statistics. Duties include research & teaching (2 courses/semester). Salary negotiable. Generous fringe benefits. Ph.D. required. Position(s) subject to funding. Send vita & 3 letters of reference to department's Personnel Committee.

Western Michigan University. Dept of Math, Kalamazoo, MI 49008. Dr. James H. Powell, Chairperson. Tenure track Asst Professorship expected Fall, 1983. Duties: teach 2 grad/undergrad courses, research, possible consulting. Competitive salary. Excellent fringe benefits. Contact Chairperson.

Carleton College. Dept of Math, Northfield, MN 55057. Instructor/Asst Professorship available 9/1983. Candidates should have strong interest in teaching & working with undergraduates. By 4/1/83 send resume & 3 letters of reference to Steve Galovich.

Northeast Missouri State University. Div. of Math, Kirksville, MO 63501. Lanny Morley, Head. Five positions (2, tenure track at rank of Asst Prof.) 8/1983. Specialties desired include comp sci, algebra & applicable areas of math. For tenure track positions prefer Ph.D. or near Ph.D. All positions demand excellence in teaching & potential for research. By 3/10/83 send vitae, transcripts & 3 letters of reference to Head.

SUNY - Albany. Dept of Math & Statistics, Albany, N.Y. 12222. Prof. L. Childs, Chair. (1) Asst Professorship in statistics 9/1983. Qualifications: promise of excellence in research, strong teaching ability, demonstrated interest in & aptitude for applications. (2) Asst Professorship in math 9/1983. Qualifications: promise or evidence of excellence in research, strong teaching ability, compatibility of research interests with those of existing faculty. Send vita, summary of research interests & have 3 letters of recommendation sent to Chair.

SUNY - Stony Brook. Dept of Applied Math & Stat, Stony Brook, N.Y. 11794. Prof. Alan Tucker, Chmn. (1) Senior & junior positions in operations research, applications experience very important; and (2) Senior & junior positions in statistics; theoretical or applied. Distinguished research record needed for senior positions; evidence of research potential needed for junior positions. Send resume to Chairman.

State Univ College at Buffalo. Math Dept, 1300 Elmwood Ave., Buffalo, N.Y. 14222. Dr. Ruth E. Heintz, Chair. Tenure track Asst Professorship, Fall, 1983 to teach undergraduate math courses. Earned doctorate with background in math sciences. Must have teaching ability & desire to contribute to new program in math/sciences. Need a working knowledge of programming languages, numerical analysis, linear programming networks etc. Salary about \$20,000 depending on qualifications. By 5/1/83 send application, resume, transcripts & 3 letters of recommendation to Chair.

Wells College. Dept of Math, Aurora, N.Y. 13026. Position beginning Fall, 1983. Nine hour teaching load. Excellence in undergraduate teaching required. Ph.D. & some experience with computers desirable. Rank & salary open. By 3/15/83 send vita, transcripts, & 3 letters of recommendation to Carol C. Shilepsky.

University of Cincinnati. Dept of Math Sciences, Mail Location #25, Cincinnati, OH 45221. (1) Six tenure track positions Fall, 1983. One position in each of following fields: statistics, numerical analysis, differential equations. Will consider candidates from all areas of math. Required: Ph.D. & commitment to research & teaching. Salary depends on experience. Send vita & 3 letters of recommendation to Faculty Search Committee. (2) Two tenurable positions in Comp Sci to join a separate Dept of Comp Sci being established Fall, 1983. Duties include developing new courses in Comp. software & theory. Ph.D. required. Send vita & 3 letters of recommendation to Prof. Dieter Schmidt.

Miami University. Dept of Math & Stat, Oxford, OH 45056. David J. Lutzer, Chmn. (1) Tenure track asst professorship in Stat 8/1983. Required: Ph.D. in Stat, ability in research & interest in teaching. (2) Tenure track asst professorship 8/1983. Required: Ph.D. in math, stat or math educ; teaching ability & interest in research. Knowledge of statistics or computing desirable. Duties: teaching 12 hours per semester on Hamilton Branch Campus (near Cincinnati). Send vita, graduate transcripts & 3 letters of recommendation to Chmn.

Villanova University. Dept of Math Sciences, Villanova, PA 19085. Dr. Frederick Hartmann, Chmn. Asst or Assoc Professorship Fall, 1983. Several appts will be made for up to 3 years with possibility of tenure track. Required: Ph.D. & strong interest in undergraduate & graduate teaching as well as mathematical research. Expertise in comp sci desirable. Apply to Chmn.

Rhode Island College. Dept of Math & Comp Sci. Tenure track Asst Professorship Fall, 1983. To teach all levels of math courses, to do research & curriculum development & related college & departmental responsibilities. Required: Master's Degree in math with equivalent of one year's graduate work in math beyond the Master's degree. Ph.D. preferred (required for tenure). Prefer relevant teaching experience, publications & research record. Salary \$16,000 - \$20,000. Attractive fringe benefits. By 4/20/83 send application with college placement office credentials or resume, transcripts, & 3 current references to Office of Personnel Services, Rhode Island College, 600 Mt Pleasant Ave, Providence, RI 02908, atten: Chair, Math & Comp Sci Dept.

College of Charleston. Math Dept., Charleston, SC 29424. W.L. Golightly, Chmn. Two Assoc or Asst Professorships available 8/22/83. Duties: teaching in a liberal arts, state supported institution, research, advising & committee work. Required: Ph.D. in math or related field, strong commitment to teaching & serious interest in continuing research. Salary competitive depending on experience. Send vita & 3 letters of recommendation to Chmn.

Queen's College. Dept of Math, 1900 Selwyn Ave, Charlotte, N.C. 28211. Dr. Jack Fehon, Head. Tenure track position available 8/15/83. Strong commitment to teaching necessary. Prefer Ph.D. in math. Ability to teach introductory computer science courses desirable. Salary negotiable. Send curriculum vitae to Head.

University of Tennessee. Dept of Math, Knoxville, TN 37996/1300. John S. Bradley, Head. Professorship or Assoc Professorship in numerical analysis 9/1983. Areas of interest include numerical partial differential equations, numerical linear algebra, optimization and nonlinear systems. Successful appointee should have outstanding research record & will be expected to complement and provide leadership in a strong, established numerical analysis program. Possible tenure track openings at junior level and/or visiting positions with level depending on qualifications. Research interests should be compatible with those of present faculty: algebra, analysis, integral equations, math ecology, numerical analysis, ordinary & partial differential equations, probability statistics, topology. Send resume to Head.

Texas A&M University. Dept of Math, College Station, TX 77843-3368. Dr. H.C.Lacey, Head. (1) Several positions at all ranks for 1983-84. These include both tenure track and visiting positions. The dept has 84 faculty positions & major research areas in approximation theory, functional analysis, partial differential equations, applied mathematics, geometrical analysis, probability, mathematical physics, algebra, geometric topology, number theory & combinatorics. Send current vita & have 3 reference letters sent to Head. (2) Several openings for 1983-84 at all levels. Research & teaching are both important. All areas considered. Send vita, 3 letters of recommendation, reprints and preprints to Head.

University of Texas, Austin. Math Dept, Austin TX 78712. E. W. Cheney, Recruitment Committee. Two tenure track asst professorships & four two-or-three year terminal instructorships Fall, 1983. Asst professorships should be at least 2 or 3 years past Ph.D. with strong research records. Instructor candidates should have recent Ph.D's in areas in which Dept has active research. Contact E. W. Cheney.

University of Texas, San Antonio. Div of Math, Computer Science & Systems Design, San Antonio, TX 78285. Prof Stanley G. Wayment, Director. Several tenure track Asst/Assoc Professorships 9/1983. Required: Ph.D. & an interest in teaching & research. Applicants in mathematics, statistics, computer science, systems design or mathematics education will be considered. Send vita to Director.

University of Washington. Dept of Math GN 50, Seattle, WA 98195. Opening for numerical analyst with expertise in area of numerical solutions of partial differential equations. Rank & salary open. Excellent computing facilities. Required: Ph.D. & strong teaching & research records. Send curriculum vitae, bibliography & have 4 letters of recommendation sent to Chmn., Appointments Committee.

University of Wisconsin - Milwaukee. Dept of Math Sciences, Box 413, Milwaukee, WI 53201. D. J. Patil, Chmn. Several non-tenure track lectureships for 83/84 academic year, Master's Degree required; Ph.D. preferred. Evidence of teaching ability expected. Teaching load 10-12 hours per week. Salary range \$15,000 - \$18,000. Send letter of application, vita & 3 letters of reference to Chmn.

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March - April, 1983

