Association for Women in Mathematics

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PRESIDENT'S REPORT

The Cincinnati Meeting. It will soon be time for another AMS Winter Meeting, this time at Cincinnati. As I said in my last report, AWM will have a panel on "Emmy Noether: Historical Context" to celebrate the Emmy Noether Birth Centenary. The participants are Jeanne LaDuke (DePaul University) and Uta Merzbach (Smithsonian), and the moderator is I.N. Herstein (University of Chicago). I hope this panel will, apart from being a treat in itself, whet your appetite so that you will attend the Emmy Noether Symposium at Bryn Mawr, about which I will say more below. The panel will be held on Thursday, January 14, 1982 at 11:15 a.m. and will be followed by the Business Meeting. Our third annual Emmy Noether Lecture, to be given by Julia Robinson, will be on Friday, January 15 at 10 a.m. There will be a party on Thursday evening; details will be posted at the AWM table. There will, of course, be an AWM table, and I hope to see many of you there.

Emmy Noether Symposium. We have now heard informally that we will get funding from the NSF for the Emmy Noether Symposium at Bryn Mawr on March 18 and 19, 1982. However, our budget will be very limited and it is not clear whether we will have any funds to spare for travel money for AWM members. We have written to some other sources too, for funding for this purpose. Those of you who have written to me expressing your interest will, of course, be considered, should any funds become available. Details about the Symposium will appear in the January issue of the Notices of the AMS. Rhonda Hughes has written to me to say that some dormitory rooms will be available at Bryn Mawr and enquiries about this should be addressed to Dedi Feldman, c/o Math. Dept., Bryn Mawr College.

New officers. Congratulations to Linda Rothschild, our new President-Elect, and to Joan Hutchinson, Jeanne LaDuke and Vera Pless, who will be our new Members-at-Large on the Executive Committee. Linda and I met nine years ago in Boston as members of a women's consciousness-raising group. AWM had been founded just a year earlier; Linda and Alice Schafer and I met one evening and decided to start having AWM meetings and activities in the Boston area. Since then Boston has been a stronghold for AWM activities. It will be a pleasure for me to work with Linda and our new Executive Committee in 1982. I also thank the members of the Committee who will be leaving us for their help and support to me during 1981. They are Judy Roitman, Rhonda Hughes, and Louise Hay.

Conclusion. I was invited to participate in one of many panel discussions at a conference titled "Women's Heritage: Celebration and Challenge" at Roosevelt University, Chicago on November 13, 1981. My talk was on "Women in the Mathematics Professions", and it would have been familiar to many of you. But perhaps the glory and the agony in the stories of women like Sonya Kowaleskya and Emmy Noether have to be retold again

and again, so that we do not forget them. After the panel we went to see the Dinner Party, which for me was a moving experience.

A happy New Year to you all.

Bhama Srinivasan
Dept. of Mathematics
University of Illinois at
Chicago Circle

JULIA ROBINSON: PRESIDENT OF THE AMS

by Marian B. Pour-El, University of Minnesota

It is a great pleasure to report that Professor Julia Robinson of the University of California at Berkeley has won an uncontested election for President-Elect of the American Mathematical Society.

Julia Robinson is known for the role she played in the solution of Hilbert's Tenth Problem. This problem is to give an algorithm which will determine of a given Diophantine equation with coefficients in the integers whether or not it has integer solutions. A key contribution was the formulation of a certain hypothesis, often referred to as the Julia Robinson hypothesis, which was shown to imply that no such algorithm exists. The Julia Robinson hypothesis was proved in 1970 by Matiyasevič.

Professor Robinson has had a distinguished career. In August 1980 she delivered the Colloquium Lectures entitled "Between Logic and Arithmetic". She has also given addresses at the AMS Summer Institute on Number Theory (1969) and at the Symposium on Mathematical Developments Arising from Hilbert Problems (1974). She was vice-president of the AMS in 1978-9 and is currently a member of the National Academy of Sciences. Her research interests include recursive functions and number-theoretic decision problems.

We all wish Julia Robinson great success as president of the American Mathematical Society.

MINORITY GIRLS: SCIENTIFIC AND TECHNICAL CAREERS

With support from the Women's Educational Equity Act Program (U.S. Department of Education), the Office of Opportunities in Science of the American Association for the Advancement of Science will produce three career information booklets. These booklets will focus on careers in mathematics and computer science, engineering and the physical sciences as viable options for Black, Mexican American, Native American and Puerto Rican women. The materials will be designed to be specifically useful to eighth grade minority females and will include facts about prerequisite high school courses, higher education, graduate training, financial aid, types of employment, specialties and other aspects of worklife, along with references to existing career materials and services.

Both English and Spanish language versions will be produced and field-tested with a variety of dissemination methods. Minority women scientists will be asked to provide anecdotal material, photographs of themselves in the workplace, and insight into the rewards and challenges of their careers. Individuals conducting science career awareness or enrichment programs, science and mathematics teachers, and guidance counselors will be involved in the field testing and evaluation of the booklets. Colleges and universities, scientific societies and publishers of career materials will be asked to provide specific kinds of information about their programs, services and products.

For more information, write Paula Quick Hall, Project Director, S/E Careers Project, OOS, AAAS, 1776 Massachusetts, N.W., Washington, DC 20036. Phone: (202) 467-5431.

WOMEN MATHEMATICIANS IN THE EIGHTIES

AWM panel at Pittsburgh meeting, August 19, 1981

Rhonda Hughes, Bryn Mawr

The '80's promise to be a trying time for women. Many of the gains of the 60's and 70's are under serious threat. Affirmative action programs, after a flurry of activity, seem to be running out of steam. Many institutions that can boast a token woman have left it at that, whereas some hire a stream of talented young women in prestigious, yet terminal, positions, leaving it to the state universities to grant them tenure.

In order to guess how many women we might hope to see in the upper levels of academe in the '80's, I did a telephone survey of the numbers of women in tenure-track and tenured positions at the research-oriented (by my own judgment) institutions in the Boston and Chicago areas, some famous, some infamous for their treatment of women. The results are as follows (Tenure-track/Tenure):

UICC	2/4	Harvard	0/0	U. Mass.	0/3
U. of C.	0/0	MIT	0/1	Northeastern	5/5
Northwestern	0/2	Brandeis	1/0	Tufts	0/1
DePaul	2/4	Boston U.	2/0	Wellesley	4/2

There are certainly gains over, say, ten years ago, but not as many as one would expect given that affirmative action and equal opportunity programs have been around since 1972. The numbers are so small, in fact, that one wonders whether the efforts of the women's movement have had much impact at all. Fortunately, there are other indications that women are finally making the advances which they should have made years ago, and are in fact becoming more visible in our profession. At an AWM panel ten years ago, it was noted that there had been no women recipients of the prestigious Sloan fellowships. Since that time, there have been at least eight women who have received this award. The President-elect of the AMS is a woman, as are many of the candidates for office. The work of the AWM has improved the status of women in our profession, and has certainly made women more visible with such activities as the Emmy Noether lecture given annually by a woman at the joint meetings, and the project to increase the number of women who are journal editors.

Nevertheless, we must ask why the situation has not improved more. Perhaps it is unreasonable to expect the inequities of several decades to be rectified in just one, but I think we could have hoped for more. The fundamental reasons I feel change has come about so slowly are, first, that many aspects of academe (and the entire working world, for that matter) are still basically designed to meet the needs of men or women who have a full-time spouse at home. As we all know, this is a grossly inaccurate scenario of the American family of the '80's. The scholar whose needs are well cared for by a devoted wife is a vanishing breed. For one thing, that scholar's salary can no longer buy the comfort it once did, and his wife is very likely to be in the work force herself. Many institutions continue to move slowly in providing adequate child care and maternity policies for their employees, increasing numbers of whom have working spouses or are single parents. Historically, women who succeeded in academe tended to be unmarried, or married and without children. Unless the work place keeps pace with the changing nature of its employees, equal opportunity for the full complement of talented women will be only a catchword. On the other hand, if we try to effect change by becoming a generation of superwomen, and relieve our employers of any burden, we place ourselves on the sure road to extinction. Instead, we can work together to determine, and stand up for fair policies and programs.

Another possible reason that change has come so slowly is that women who are educated as mathematicians are now choosing positions other than academic ones. As the gap between academic salaries and those in industry continues to widen, as teaching loads increase along with demands for more research, many young people are finding the

pressures of academe no longer balanced by the rewards. Although we still have a relatively flexible work schedule, industry is beginning to compete with innovative part-time and full-time schedules for its employees.

Yet another problem has been that those women who are well-known as mathematicians tend not to be the same women who work hard for women's rights. Certainly it is not necessary that every successful woman mathematician be a feminist, but those women who have been recognized by the mathematical establishment for their achievements are in a particularly strong position to offer support and encouragement to young women. When these women tell us they suffered no discrimination, they may be accurately describing their experiences, but do little to help others survive.

There are several things we can do, as individuals and members of the AWM, to support and encourage women in the '80's. As mentioned before, we can determine and advocate working conditions which put us on as equal a footing as possible with our colleagues: convenient, affordable child care of high quality, maternity policies which do not breed ill will on the part of our colleagues, considerate scheduling of meetings and colloquia. As a group, we can explore programs for more flexible tenure tracks and part-time academic work, and insure the availability of child care at our own meetings.

I also feel there is a great deal the AWM can do to facilitate the communication between women that is so important to improving our status. We can encourage women to share their triumphs, frustrations, and problems. I would like to see the AWM conduct a major survey of its members. How are women and men managing their lives in the '80's? What are their problems, their complaints? If they have succeeded, how have they managed to do so? Supposedly we women have had an edge over everyone else for the past several years. I would like to know if anyone thinks it has helped. All the sharing and communication of the past fifteen years which gave women so much strength and brought so many out of their shells seems to have abated. I sincerely hope we can resurrect it in the '80's.

Ruth Silverman, W. Va. COGS

I would like to pay tribute to Dr. Julius H. Hlavaty, who died last year. When I was a member of the Math Team at the Bronx H.S. of Science, he was an important influence on my adolescent interest in mathematics.

I am glad I became a mathematician. My career has been a stabilizing factor in my life; the self-confidence resulting from my acquisition of skills has affected every aspect of my life.

Careers in mathematics in the eighties have problems affecting men and women alike --such as withdrawal of funding from academia, withdrawal of funding of pure science. However, I would like to address myself today to the issues which affect women in particular, and my personal solution to some of these problems.

One problem I notice is that when I am in a group of mathematicians, I perceive myself as a mathematician in a group of mathematicians. However, my (male) colleagues see me as a woman in a group of men. Women have a problem with a lack of prima facie credibility. Men assume another man is capable until proven otherwise, but they assume a woman is not capable until proven otherwise.

Unfortunately, this forces a woman to prove herself again and again. Not only is this exhausting, but when a woman attempts to prove herself, she must tread a very thin line, or she will be perceived as pushy or aggressive. Very few of us have the social skills necessary to tread this line.

A related problem for women is that men are judged by potential, and through rose-colored glasses, while women are judged on past performance, and most critically. The effect of this is that women are rarely given a challenging new job which forces the learning of new skills. I am fortunate to have just obtained a challenging new position.

I'd like to point out that mathematics may be an objective science, but judgment of people's skills at mathematics, beyond the most elementary levels, is not objective. Men have trouble enough judging each other's abilities, without sex differences clouding the issue.

I have been fortunate in being able to develop research relationships with several married male colleagues. These relationships involve spending long hours together, and I feel that a key factor in the success of my joint projects has been securing the approval of their wives and gaining their support for the ongoing projects.

I feel it's very important for a woman mathematician to set up a supportive environment for herself. A woman attending a meeting must develop the perceptive skills to determine whether a man talks to her because she is an attractive woman, or as to an equal whom he respects professionally. AWM has been very important to me, furnishing me with the opportunity to meet other women mathematicians; seeing them as successful has helped me to see opportunity for my own success. AWM has also been important in giving me the supportive atmosphere and feedback helpful in enhancing my self-image and confidence as a professional.

To a certain extent you're seen at your own evaluation; the support from AWM has helped me to keep my self-evaluation high, even in periods of adversity.

I want to thank AWM for furnishing me with the opportunity to speak, and I hope that my description of my own experiences is helpful to other women.

Pat Kenschaft, Montclair State College

Psychologists claim that people become mathematicians because they want to be sometimes right. I plead guilty. I know I can't be right in a talk like this, but when I take the derivative I can be right--unless I make a mistake.

It has not been women's traditional role to be right. We have been "helpmates", people who help others. The foraging after truth has been expected to be led by men. But I like both helping people and searching for truth. I think a combination is important for a person of either sex.

Once when I accompanied my husband to an electrical engineering meeting, I was the only woman at a number of the talks. Seeing me there, an engineer asked me, "Are you just a wife or a person too?"

He was smiling, but it reminds me of an incident at a party. A man was openly eavesdropping on a conversation where I told about my career as a mathematics teacher and writer. In great earnestness, he entered the conversation with the question, "How do you feel about defying God's will?"

I like being a person who both helps others and seeks truth. In particular, I like coming to conferences like this. I like talking with other mathematicians about important things, such as what we, individually, want from life. I like to discuss the direction our society is taking and what we, as leaders, can do about that direction. Each of us registered for this conference and each spouse who is here is a significant leader in this sense. And I like considering with others here what life is ultimately for. As I look out over this well-lit hall, I see many of you with whom I have shared extremely precious moments. There is no one in this audience with whom I have spent a great deal of time, but there are many with whom I have shared a few wonderful hours that I will never forget. In some cases it was less than an hour, but very precious.

To become a member of this mathematical community we must have had a mentor, someone who picked us up by the back of the neck and helped us along. To remain a contributing member, we must have friends. Some of these friends can be women, but some must be men. Maintaining friendships with me is a little tricky for a woman, but, especially for a woman in mathematics, it is well worth the effort.

My advice to young women is to remain as blind to sexism as you can be. It's all right to be aware of it intellectually; I don't think listening to this panel will hurt you. But in your own life, accept the generosity of mentors and friends in as innocent a spirit as you can. Try to ignore any signs of sexism in your own life.

And then when you have tenure, as I do, (much audience laughter, forcing a long pause) it's time to take off the blinders.

I have been looking into the life of Charlotte Angus Scott, who was on the first council of the American Mathematical Society when it was founded in 1894 and was its vice president in 1905. During that decade she worked hard, and the progress of women

in mathematics was comparable to that of the 1970's. Lenore Blum laboriously computed the statistics of women's participation in the AMS meetings of 1971 and 1981 for the San Francisco panel this last January. The total number of mathematicians was much smaller in 1905 than it is now. But the percentage of women among those who attended conferences was about the same as now. And the percentage of women presenting research papers was about the same as in 1981.

Nevertheless, I think things will generally continue to improve and that in three or four generations women may attain equality. I think there is a good chance that my great-granddaughter will have equal opportunities with her brothers, and that hope makes me feel good.

I don't feel so optimistic about progress towards racial equality. The problems are deeper there. I feel strongly that each of us must look carefully to see human talent wherever it lies, not just without regard to sex but also without regard to race or economic background.

This is important not just to be fair, but also for the survival of the human species. There are two reasons for this. We need all the talent we have to meet the complex problems, some of them mathematical, that have to be solved to enable us to survive on this shrinking globe. Secondly, it is essential that we curb the population growth, and to do this we must find things for women to do other than having a long string of babies. Mathematics is an innocent pastime, requiring few natural resources, even if it is regarded only as a set of puzzles. And we here know there are other possibilities far beyond the puzzles.

What about the near future? I teach at a state college. This fall, for the first time in the eight years I have been there, I will be teaching primarily courses below calculus. This is not a personal statement. It indicates the trend. Now we are back to the "helpmate" idea. I expect women to be recruited to teach the growing number of remedial and required courses, because it is acknowledged that we help people well. I plan to enjoy the fall and to do a good job.

And then, I look to the future with enthusiasm. There may be much left in mine. Although my children will soon be starting college, my own present life expectancy is longer than the entire lives of Galois or Abel. I am very glad I have had an education in serious mathematics, and I am glad I live in the twentieth century, when a woman can be a mathematician.

Jeanne Ferrante, Thomas J. Watson Research Center, IBM

I would like to invite women mathematicians of the eighties to consider very seriously the field of computer science.

Firstly, I would like to tell you a bit about my background. I entered MIT in 1969 as a mathematics graduate student with a strong interest in logic. I hoped that logic was in fact the study of the foundations for mathematics, but in fact it has become a branch of mathematics like any other, largely motivated by its own questions and problems. I then started taking some theoretical computer science courses, and by the time I was ready to start a thesis, had decided to work in that field. I chose to stay in the math department, but worked with Albert Meyer in computer science. After finishing my degree, I taught mathematics and basic computer science courses at Tufts University. I then decided to move more heavily into computer science, into the area of software development, and now work at IBM's Thomas J. Watson Research Center. That switch required a real change of orientation on my part; I have learned a lot, particularly in the area of compilers, in the last three years. For the most part, the switch has been a happy one.

I want to invite mathematicians to consider computer science, while at the same time urge them to find what they most want to do. If you love the branch of mathematics you're working in, and could not consider doing anything else, fine. But if you would like to consider other possibilities, I urge you to take my suggestions seriously.

There are several possibilities for mathematicians considering the switch to computer science. If you are already in a field of mathematics closely allied to

computer science, such as logic, combinatorics, or numerical analysis, reading some papers and attending some conferences is enough to get started with some computer science research problems. If you are interested in staying in academia, but would like to make yourself desirable professionally, taking five or six courses in basic computer science should be enough of a background to convince a university that you can teach the basic computer science curriculum. If you are interested in making a switch to industry, the jobs and the possibilities for retraining are there. The reasons for considering such a switch are numerous, but one of the most convincing ones is job opportunities. According to National Research Council statistics, the discrepancy between male and female unemployment rates for mathematics Ph.D.'s has grown from .5% in 1973 to 1.9% in 1979. In computer science, we find a situation of equal opportunity (at least on the surface)--the unemployment rates for computer science Ph.D.'s has continued to be zero for both sexes over that time period.

Even given this situation, there is still a much higher percentage of women going into mathematics (34.7% in 1978-79 for the M.A.) than computer science (18.8%) or engineering (9.1%), according to the U.S. Office of Education. I would like to invite women to consider getting graduate degrees in the field of computer science. Although it is still possible to make the switch into computer science from mathematics without a graduate degree in the field, in my opinion, it will be increasingly important to have such a degree. There are many more excellent graduate programs in computer science now than a decade ago, and the most desirable applicants seem to be from this pool.

Another possibility in the computer science field is the possibility of consulting, working at home, and flexible work hours, leaving time for other activities such as child-rearing. I know of one company which arranges consulting jobs for women, gives them terminals at home, and provides a means of quality control for clients. I suspect that more such opportunities will become available.

Another possibility is moving from a technical area of computer science in industry to management positions. I would like to be able to say great opportunities exist here, but unfortunately that may not be the case in a male-dominated, hierarchical structure. An exciting possibility is female-run companies--and I hope in the future we will be seeing more of these.

In conclusion, I would like to urge all women mathematicians of the 80's to consider the opportunities in computer science. The field is open, and there is the opportunity to make great strides.

SIAM 30th ANNIVERSARY MEETING

The 30th anniversary of the founding of the Society for Industrial and Applied Mathematics (SIAM) will be marked by a gala international meeting on the campus of Stanford University during the week of July 19-23, 1982. This Meeting will feature an unusually full program of events. The program includes six symposia--twice the normal number--and a number of "mini-symposia" organized by SIAM members on various topics in applied mathematics. The schedule will also feature the first award of the SIAM Prize in Numerical Analysis and Scientific Computing, presentation of the 21st John von Neumann Lecture, and a special lecture sponsored by the SIAM Institute for Mathematics and Society.

A call for papers has been issued for the anniversary meeting. Contributors may obtain the standard abstract form from SIAM, Contributed Abstracts, 117 South 17th St., Philadelphia, PA 19103. SIAM must receive abstracts--200 words or less--by March 1, 1982. Contributions in all areas of applied mathematics are welcome, but contributions consistent with the themes of the six symposia are especially desired. These themes are the numerical solution of partial differential equations and applications, the numerical analysis of ordinary differential equations, control and optimization, biomathematics, computer science, and methods in nonlinear analysis.

NOTES

Pat Kenschaft writes: On October 24, 1981, the New Jersey Chapter of AWM held its second meeting during the lunch break of the state MAA meeting. Judy Green spoke about her research on "Women Ph.D. Mathematicians before World War II". Over 40 people were clearly absorbed in her fascinating report. Several asked questions afterward, and others eager to respond were cut off because of time limitations.

Two articles of interest appear in the October Math Monthly: "S. Kovalevsky: A Mathematical Lesson" by Karen Rappaport, Essex County College, and "Black Women in Mathematics in the United States" by Pat Kenschaft, Montclair State College.

A letter to the editor about the Bryn Mawr symposium on Emmy Noether appeared in the latest Ms. It was written by our president, Bhama Srinivasan.

AWIS WORKSHOP

The Chicago Area Chapter of the Association for Women in Science, in cooperation with the DuPage Career Education Consortium, is sponsoring a one-day Workshop for approximately one-hundred junior high and high school counselors, teachers, and administrators to be held March 25, 1982, at the Hilton Inn, Lisle/Naperville, Illinois. The Workshop will address the dual questions of "Why do so few girls choose careers in science and engineering?" and "How can we encourage more to consider such careers?".

The program will consist of an introductory keynote speech, followed by panel discussion and seminar sessions on such topics as "The Role of Family and Peers in a Girl's Career Decision", "Ways to Encourage Girls to Prepare for Careers in Science and Engineering", "Responsibilities of Educators as Mentors", and "The Many Rewards of a Scientific Education". The day will end with a wrapup session summarizing the Workshop and optional tours of the nearby Amoco and Bell Laboratories research facilities arranged by Chapter members from these organizations.

For more information, contact Margaret Butler, AWIS, P.O. Box 13, Lemont, IL 60439 (312) 972-7249.

NSF NEWS

The Mathematical Sciences Section of the National Science Foundation is interested in enlarging its pool of reviewers for proposals in the mathematical sciences. NSF reviewers are requested, from time to time, to evaluate a research proposal and prepare written comments on it for use by program directors in the Section. Normally, each proposal is reviewed by several people and their comments form an extremely important source of information for NSF in making decisions concerning recommendations. Although the Foundation does not compensate reviewers, it considers reviewing to be one of the more important contributions individuals can make to the future of science. A large pool of active mathematical sciences researchers, industrial, academic, men, women, and minorities, is needed. Persons with research experience who are interested in participating in this activity are invited to send a copy of their curriculum vita, including a list of publications, to: Mathematical Sciences Section, Division of Mathematical and Computer Sciences, National Science Foundation, 1800 G St., N.W., Washington, DC 20550.

Plans for the first year of the Institute for Mathematics and its Applications at the University of Minnesota are beginning to take shape. The general topic for the year is Statistical and Thermodynamic Approaches to Phase Transition. Write Prof. Hans Weinberger, Director, Institute for Mathematics and its Applications, University of Minnesota, 514 Vincent Hall, 206 Church St. S.E., Minneapolis, MN 55455.

PELAGEYA YAKOVLEVNA KOCHINA: ON HER 80TH BIRTHDAY

by P. S. Aleksandrov, G. I. Barenblamm, A.I. Ishlinskii, O.A. Oleinik, S.A. Khristianovich
translated by S. Rhodes
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Thanks to Lee Lorch for bringing this article to our attention. He says: "She is a leading applied mathematician and hydrodynamicist. She is a (full) member of the Soviet Academy of Sciences, a point which, while clear to the Soviet reader, may not be clear to many western readers of the enclosed article. This is a very high honour carrying also many practical consequences such as a life-time stipend of 500 roubles monthly, beyond other income the Academician may receive."

The well-known Soviet mathematician, Hero of Socialist Labour, Academician Pelageya Yakovlevna Polubarino-Kochina celebrated her eightieth birthday on 13 May 1979.

Pelageya Yakovlevna Kochina (née Polubarinova) was born in Astrakhan. In 1916 she graduated from the Pokrovskii Women's Gymnasium in Petrograd and started attending the Bestudzevskii women's courses, which after the October revolution was integrated into the Leningrad University. In 1921 she graduated from the Physics and Mathematical Faculty of the University of Leningrad, having specialized in pure mathematics.

Even before she completed her university studies, she began work at the Main Physics (later Geophysics) Observatory, under the direction of the theoretical physicist A.A. Fridman, who at that time worked on a scientific basis for meteorology. Fridman's ideas influenced the topics of Pelageya Kochina's early papers.

In 1925 she married Academician Nikolai Evgrafovich Kochin, who was a member of Fridman's remarkable school and whose work later made an enormous contribution to hydrodynamics and dynamic meteorology. Thus, their work and their private lives were intertwined. They both worked in their own particular field, but they also took a deep interest in each other's research. After her husband's sudden death, she continued giving his course of lectures on the theory of interrupted currents and helped with their publication.

In 1935 she moved to Moscow and began work at the Steklov Mathematics Institute of the USSR Academy of Sciences. In 1939 the department of mechanics in which she worked was subsumed into the newly founded Institute of Mechanics of the USSR Academy of Sciences. Here she worked for over twenty years, initially as a senior research fellow and then as Head of the Hydrodynamics Department. Just as earlier in Leningrad, so in Moscow she did much lecturing along with her own research: initially she taught at the Hydrometeorological and Aircraft Building Institute, and then at the Aviation Industry Academy of the University of Moscow.

In 1958 M.A. Lavrent'ev asked Kochina to help with the founding of the Siberian branch of the USSR Academy of Sciences, and from 1959 until 1970 she worked in Novosibirsk. There she was in charge of the department of applied hydrodynamics at the Hydrodynamics Institute of the Siberian branch of the USSR Academy of Sciences, was a member of its Praesidium, and was head of the department of theoretical mechanics at the University of Novosibirsk. Since 1970 she has been head of the section for mathematical methods of mechanics at the Institute for Problems in Mechanics of the USSR Academy of Sciences in Moscow.

The theory of filtration, that is, the theory of seepage of natural fluids (liquids, oils, gases) through porous media--layers of rock, soils, subsoils--has a dominant place in Kochina's work. This area of hydrodynamics has, on the one hand, many applications and, on the other, poses very interesting mathematical problems.

Kochina's main results concern the flow of subsurface and underground water. In particular, she proposed a very general method for solving two-dimensional problems on the steady seepage of subsurface water in homogeneous subsoils. The essence of this method is as follows.

If we consider a parametric ζ and if z is a complex coordinate for the points of the field of seepage and w is the complex potential of filtration, then $dz/d\zeta$ and $dw/d\zeta$ are analytic in a half-plane of ζ.

By assuming that the water-tight parts of the boundary of the domain of filtration and the so-called interval of seepage are linear, and by using the condition for a complex potential on a free surface, the functions $dz/d\zeta$ and $dw/d\zeta$ have analytic continuations under which the functions become analytic in the whole plane ζ, except for the points on the real axis corresponding to the ends of parts of the boundary of the domain of filtration z and of the complex potential of filtration w. By analyzing the behaviour of $dz/d\zeta$ and $dw/d\zeta$ in a neighbourhood of singular points, it can be established that these points are regular singularities with certain characteristic exponents, and that the functions themselves are linearly independent solutions of the ordinary linear second-order Fuchsian differential equation:

$$(1)\quad w'' + pw' + qw = 0,\ p = \sum_{n=1}^{n} \frac{1-\lambda_m-q_m}{\zeta-\zeta_m},\ q = \sum_{m=1}^{n}\left[\frac{\lambda_m q_m}{(\zeta-\zeta_m)^2} + \frac{A_m}{\zeta-\zeta_m}\right],$$

where ζ_m $(m = 1,\ldots,n)$ are the coordinates of the regular singularities other than the point at infinity, λ_m and q_m $(m = 1,\ldots,n)$ are the characteristic exponents of $dz/d\zeta$ and $dw/d\zeta$ at these points, and λ_∞ and q_∞ are the characteristic exponents of $dz/d\zeta$ and $dw/d\zeta$ at infinity satisfying the condition

$$\sum_{m=1}^{n}(\lambda_m + q_m) + \lambda_\infty + q_\infty = n - 1,\ \sum_{m=1}^{n} A_m = 0,\ \sum_{m=1}^{n}(\zeta_m A_m + q_m\lambda_m) = \lambda_\infty q_\infty.$$

Thus, the problem of determining the unknowns $dz/d\zeta$ and $dw/d\zeta$ reduces to that of integrating (1): if $dz/d\zeta$ and $dw/d\zeta$ are determined, then $z(\zeta)$ and $w(\zeta)$, the parametric representations of the solution, can be found by integration. Kochina showed how to determine the characteristic exponents at regular singularities from the conditions on the boundaries of the domain.

Kochina applied her general method to the discussion of a number of important problems on filtration in earth dams and cofferdams. These problems are direct analogues of other free boundary problems in hydrodynamics, in particular problems on jet flow around solids. Kochina found an effective solution to a number of such problems, among them the famous problem on a triangular cofferdam, which many scientists had been working on.

She and her students also solved problems on the filtration in dams when evaporation from a free surface or infiltration into it are taken into account. She also succeeded in finding an effective solution to the problem of the flow of subsurface water in two-layered strata when there is an impermeable dam with a basis of simple form.

Problems of determining the form of a free surface and the division line between fresh and salt water from given values of the intensity of evaporation and infiltration, the parameters of the water-carrying seam and other such variables, were also an object of study by Kochina and her students, and in these problems the general method she had developed again found an application.

Kochina raised and was the first (together with her daughter I.N. Kochina) to solve problems on determining the form for the foundations of a concrete dam from given conditions: in some parts of the contour of the foundation the magnitude of the modulus of velocity is given (and constant), and in other parts it is the direction of the velocity of the flow of the water.

In this paper she raised for the first time the inverse problem of the theory of filtration: to determine the domain of flow from one property or another of a projected construction. By now there is an extensive literature on generalizations and solutions of such inverse problems, due mainly to mathematicians in Kazan'.

Kochina also treated the interesting problem on the flow towards pores in thin curved layers. This work also had many continuations.

On the topic of unsteady filtrated flow, one of the first problems she considered had been raised by the organizations of the Solikamskii hydroengineering complex

project: how would the process go of squeezing out salt water by fresh water, once it begins to be saturated on the water bed as the concrete dam was built. First she studied possible forms of the boundary of the division between fresh and salt water in flowing along the straight foundation of the concrete dam. Later she solved the problem of the deviation of an unsteady flow from a steady one, by means of the telegraph equation; here the correction to the condition on the boundary of the division between fresh and salt water takes a linearized form, similar to the theory of long waves.

In her studies on unsteady filtration of underground water Kochina paid much attention to filtration in an hydraulic arrangement, when the pressure (or potential speed) is averaged over the height. Here one obtains for the pressure h the Boussinesq equation

$$\frac{\partial h}{\partial t} = a^2 \Delta h^2 \tag{2}$$

a non-linear equation of parabolic type, which when linearized, goes over into a type of heat conduction equation. For one-dimensional non-linear Boussinesq equations she studied automodel solutions corresponding to the problem on the flow of water towards a canal from a vertical wall, when there is a sudden change in the level of the water in the canal. In the limiting cases of a flow to an empty canal and of effluence from the canal to a dry bed, Kochina found formulae for an effective calculation, and in other cases she transformed the problem into a numerical solution of a boundary-value problem for an ordinary differential equation. The exact solutions which she found were generalized by a number of authors and applied to estimate the accuracy of the results obtained by approximation methods: the method of successive changes of stationary states etc. In particular, Kochina calculated the shape of a tongue of underground water as it flows out into a dry bed and found the speed at which it changes shape.

The fact that the speed of propagation of a perturbation for (2) is finite had previously been established by other authors and was later generalized to the case of more general non-linear equations. This sequence of papers aroused the interest of mathematicians who were studying Cauchy's problem and boundary-value problems for equations of the non-stationary filtration type.

To solve specific problems on unsteady flow of underground water a linearization of the Boussinesq equation and its generalizations is sometimes introduced. Various authors do this in various ways, so that linearization is not really a clearly defined idea. Kochina suggested her own method of linearization. Recent studies by mathematicians have put this approach on a rigorous mathematical basis and have corroborated the rationality of her linearization method.

Among the problems pertaining to the flow of oil in an oil-bearing stratum, we mention Kochina's elegant solution to the problem on the displacement of the so-called contour of oil-bearing, that is, the boundary of the division between the domain containing oil and the water surrounding it. It is required to determine the shape of this contour when the oil begins to flow away through one or several wells, the contour of oil-bearing shrinks, and certain non-linear conditions for the velocity hold.

In a number of cases Kochina found a simple exact solution; it turned out that the solution exists only for a finite time, since at some moment the contour becomes two-sheeted and the solution ceases to exist.

An account of the research by Kochina and her students on the very important economic problem of irrigation is in the monograph "Mathematical methods in the theory of irrigation", which she wrote jointly with her students V.G. Pryazhinskaya and V.N. Emikh.

Her work on the filtration theory of underground water was summed up in the remarkable monograph "The theory of flow of subsurface water" which has had several reprintings (the most recent in 1977) and been translated into many foreign languages.

Kochina has also done research on the hydrodynamics of free-flowing currents, the theory of tides, dynamic meteorology, the theory of elasticity, and analytic mechanics. Her creative work on the history of science has also been of importance. Her interest in the history of mathematics and mechanics was aroused by Chaplygin, who organized in

1938 the publication (in honour of Sonya Kowalewski's jubilee) of a collection of articles on the problems of the rotation of a heavy solid body around a fixed point and encouraged her to work on this. Later she made a number of studies on the life and work of Sonya Kowalewski, translated her papers, edited her complete works and wrote a book and some articles about her. She also studied and publicized the scientific legacy of other outstanding scientists: Weierstrass, Gromek, Fridman, Kochin, and others.

Kochina's research activity is characterized by a deep and well organized link with practice, a subtle attention to the physical essence of the phenomena being considered, an exact mathematical formulation of the relevant physical problems, and by a brilliant mastery of the mathematical apparatus.

Social work has always been an important part of her life. This includes being a deputy of the RSFSR Supreme Soviet, a deputy of Moscow Soviet and the Novosibirsk town council and an active participant in women's movements for peace.

The Soviet Government has highly valued Kochina's work. In 1969 she was given the title of Hero of Socialist Labour and she has received many other orders. On the occasion of her eightieth birthday she has been awarded the order of the Friendship of Nations.

Pelageya Yakovlevna Kochina is a person of much charm and rare spiritual qualities. On such a remarkable birthday we wish her good health, happiness, and more new activity for the good of our science. (A list of P. Ya. Kochina's work was published in Priklad. 8 (1969), 136-138, and also in the book "Pelageya Yakovlevna Kochina", Bibliography of Soviet Scientists, Nauka, Moscow 1977.)

AMERICAN MEN AND WOMEN OF SCIENCE

American Men and Women of Science is about to undergo a major revision. The 15th edition of this respected biographical reference will be published in August of 1982. The seven-volume directory contains approximately 130,000 brief biographical entries of men and women who have education and training equivalent to the doctorate and who have attained a position of responsibility in the physical, biological, mathematical or engineering sciences. Coverage includes researchers, educators and administrators who are citizens of the Americas and non-citizens working in the Americas on a permanent basis. Prospective entrants may request a questionnaire on which to submit information from the editors through April of 1982. Current entrants will be sent copies of their existing data for review and updating during the fall and winter of 1981-82. All address changes occurring since 1978 should be reported to the editors promptly. Information or requests should be addressed to the Editors, American Men and Women of Science, P.O. Box 25001, Tempe, AZ 85282.

AWIS SEMINAR

The Association for Women in Science will hold a seminar during its annual meeting entitled "Women in Science: Prospects for the Eighties", on January 4, 1982, in Washington, DC. The prospects for women in science during the Eighties are a matter of great importance to AWIS members. Changes in national science policies, and in many other areas, have serious implications for women in science. New initiatives are needed to deal with these changing conditions. So AWIS has invited representatives of committees and associations concerned with women in science to an exchange of view on the prospects for women in science, the goals we should be striving for, and the strategies needed to achieve these goals in the changing conditions of this decade. AWIS hopes further cooperative efforts to improve the status of women in science will result.

ON BEING A WOMAN STUDENT AT MIT or HOW TO MISS THE STUMBLING BLOCKS IN GRADUATE EDUCATION

by Candace L. Sidner
The author received her Ph.D. in the department of Electrical Engineering and Computer Science at MIT in 1979. While pursuing her degree, she was a research assistant in the Artificial Intelligence Laboratory. She was a member of the graduate women orientation committee, and in 1975 a member of the special sub-committee on education of women at MIT. She is currently a research scientist at Bolt Beranek and Newman Inc., Cambridge, MA.
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Thanks to Martha Smith for bringing this article to our attention.

Receiving an advanced degree, in fact, any degree, from MIT is rather like being admitted to a fraternity. One has a certain set of rituals to go through, and both the process and one's performance define one's position in the fraternity in the years that follow. The rituals in the case of graduate education are theses, exams, classes, and hence grades. These activities are rituals because there is meaning attached to each of the events, both by the initiate and by the members of the fraternity. What is the meaning of these events? It appears that the faculty, and to a lesser degree, the alumni, view these rituals as preparation for professional life, and also as trial by fire. As such, the first meaning imparted, preparation, is common to all education. The second meaning, however, is what makes graduate education at MIT fraternity like; for the trial distinguishes the initiate from the uninitiated forever.

For a student, the rituals become a kind of race. Since one can fail to pass any of the ritual events, they are in fact hurdles which one must jump over. If one is successful in passing one hurdle, there is another a little way down the track, while if one fails, there is gravel in the shins, pain, and more often than most students care to admit, the temptation not to go on. For most initiates, the fraternity hurdles are fair; the resources, both material and human, at MIT are excellent, and most initiates by virtue of their invitation to try out are capable of surmounting the hurdles. Simply said, though not so simply done, one must use the resources and one's native intellect to produce a running style that has both grace and creative movement.

The Stumbling Blocks

The purpose of the race is undeniably membership in the group of people who are graduates of MIT. However, the membership is distinctively a fraternity, that is, an organization of men bonded together for a common purpose. In recent years, fraternities have begun to admit women, thereby changing the nature of the fraternity in some manner which is not clear to all, but perhaps a few, members. As a result of the change, the fraternity may seek some new set of rituals or modify its old ones. While the educational/professional fraternity which is MIT invites women as initiates, women face several additional stumbling blocks in their paths during the five or more year hurdle event than do men. As I will try to show, these stumbling blocks are unfair and should ultimately be cleared from the track. As time passes, as the stumbling blocks are identified and seen as driving out qualified initiates, and as the members redefine the rituals, the blocks will disappear. In the meantime, those who are initiates are proceeding blindly without knowledge of rocks in the road and how they might be avoided. I would like to offer some insight into these blocks and how the women initiates can avoid them. I hope that my observations will serve as a resource for women in the contest, so that those who come after me will trip less often when overcoming the hurdles which lead to professional life. Finally, I believe that these stumbling blocks can often be avoided, and when unavoidable, made smaller by understanding what and where they are.

A woman student encounters five kinds of stumbling blocks: different socialization from her brother initiates, difficulty in mentor relationships, overt and covert sexism, confusion about support from colleagues and disillusionment about change. Each of these

has some similar roots, and what these are will be clearer as we consider each difficulty in more detail.

Building Confidence: Getting Something Out of Nothing

It surprises no woman to say that women are socialized differently than men in our culture. What is surprising is the effect of that socialization when women take roles traditionally held only by men. The most significant role change centers on developing confidence and competence. Part of the process of hurdle jumping is not just the getting over, it is the form which one presents in doing it. For the MIT fraternity ritual, the form is confidence; a woman student must use what I will call strutting behavior, that is, she must look and act like she knows what she is doing.

While developing confidence, from accompanying competence, is difficult for all initiates, for women there is a subtle, but remarkable difference; women in the everyday world are not supposed to appear very confident and competent. When spoken to and praised, women are taught to lower their eyes and deny how well they did; not only must women act outwardly in this fashion, but they must also feel inward denial. When seeking solutions to problems, women are expected to ask everyone else how they feel and introduce their solution by making it look like someone else's. At MIT, that behavior works against both the appearance and the feeling of confidence and competence. As a result, women must not only build and show confidence and competence, just as their male counterparts do, but unlike the men, they must decide first to unlearn their normal behavior patterns and then actually unlearn them.

Confidence must follow competence. Without competence, the strutting, as both men and women have discovered, is a shallow game. Women students often do not feel that they have any basis for acting confidently. They have a great deal of difficulty believing that they are competent; but in fact they generally are. Oddly enough then, for many women, acting confidently is like trying to get something from nothing. I do not understand why this belief occurs, but I have seen it so many times in myself and others. In part the lack of feeling competent may result from women being perceived as different, a theme which will be reconsidered later on, and from the fraternity members who demand proof that the women students are as good as the men. Feelings of being less competent also, however, result from within the women themselves. Women must learn to overcome these doubts. In addition, the requirement of competence becomes a double whammy for women because the fraternity members do not perceive her as competent until she is confident.

The strutting behavior appears slowly; there are stops and starts, forward and backward progress. A woman student begins to act from a little bit of confidence in her competence, and tests out this confidence among her peers and superiors. Two more difficulties follow. First a woman feels less feminine, because in fact she is less feminine according to the prevailing behavior patterns. In her personal life, her feelings may be communicated to her partner(s) who may find her less attractive. This threatens her personal status. Eventually a woman can learn to find personal friends who value her confident image, but the time in between is frightening. Second, in her professional life, not all the members of the fraternity are comfortable with her projection of competence and confidence; for these people, such behavior is overly aggressive, simply because she is female. Of course this catch-22 can also be mastered, as long as that threatened fraternity member is not directly influential in the woman's education, and as long as the woman comes to recognize the source of the cognitive dissonance. But again the woman wonders why she is perceived as different and therefore less valuable than the other initiates. Her bewilderment retards the growth of confidence and may result in its loss altogether for a time.

In addition to understanding how strutting behavior catches her up, a woman student can do three things about this problem. One is to define realistic goals and then to act confidently; if the goals are met, there is every reason to be confident, and acting that way will help achieve one's goals. The second is to work and be visible as a hard worker, because some fraternity members and some initiates will offer praise of what they recognize as good hard work. The third, a theme which will recur in what I say

below, is to seek encouragement and support from other women; sometimes it's hard to continue without a pat on the back, and other women who have had similar experiences most easily offer this to women.

Finding a Mentor

A second serious stumbling block comes in relationships with mentors. Some graduate students pass through MIT without ever having a mentor, and they miss, next to research, the deepest learning experience in graduate education. Mentors are role models, not just in the sense that they show a student what she can attain, but in a more intimate way, they teach her to think critically about her research, to judge others (hopefully) fairly, and to evaluate good and poor directions in research and teaching.

Women students have two difficulties with mentors: finding them and throwing them over. Potential mentors, who are accustomed (usually) to think of women as sisters, mothers, lovers, wives and witches, initially see a woman student in one or more of these roles. A creative thinking person will surmount these traditional roles and eventually see a woman student as a potential colleague, just as he sees male students. Unfortunately, while learning to view her differently, he will treat her as some combination of all of these roles or ignore her. Women students sometimes feel that their mentors coddle them rather than speak frankly, and that mentors are somehow afraid that when the chips are down, the woman student will cry; while she may in fact respond so, the behavior may be interpreted wrongly because crying means something different to men than women.

For the woman student who is trying to see herself as a professional, her mentor's treatment is, at best, confusing. In addition, the woman will probably tend to revert to a more traditional role in which she appears less competent, thereby further endangering the establishment of mentor/potential colleague relationship. However, in some cases, the faculty member is not a creative thinker and will never see his woman student as a potential colleague. Then the woman must have the guts to find a new mentor, and to do so without making clear the real reason (which she may know only intuitively and be unable to verbalize herself). More often she drifts along thinking there is something wrong with her.

The woman student who finds a mentor who sees her as a potential colleague still faces another burden which her male counterparts do not share. Part of the growing process in professional life is to stand on one's own, to make one's own judgments, have one's own successes and one's own failures. The mentor shows the student the ropes, and when the lesson is done, the student must carve out a new territory. Most male students go off in the unknown; they worry about mistakes and success, but after all, they have been conditioned since birth to go off independently and deal with those problems. Women, on the other hand, have rarely been taught to be independent. While one of the goals of professional life is independence, many women are unprepared for what they have implicitly arranged. They still must learn to <u>think</u> of themselves as independent. Women have difficulty separating themselves from their mentors when the lesson is completed; they may no longer go to them for research advice, but they often may look for a substitute mentor even though they are capable of professional exploration. It is only by recognizing that one's mentor must be thrown over, and that private exploration is the <u>final</u> ritual, that women students will not be left behind as the years go by when professional prizes are given.

Dealing with Sexist Faculty

Among the faculty at MIT there are still covert chauvinists and outright sexists. This statement should be no surprise to anyone since such people exist in the population at large, and MIT reflects that population. Yet somehow it is a great surprise to women to discover this behavior in the MIT fraternity. Perhaps this myopia exists because sexism is so threatening to everyone and is generally denied; whatever the cause, sexism is the most unexpected stumbling block of all. Overt sexism takes two forms: body wanters and prejudice. The second is the easiest to deal with since everyone is able to

recognize as utter stupidity the belief that women just are not as good, cannot do science, and the like. The woman student who encounters this prejudice may believe she is not as good. Eventually she will decide she is as good and then feel angry. Women need to recognize this behavior and release their anger by changing themselves and by countering this prejudice explicitly. The body wanters are more problematic because they can be subtle, that is, it can be hard to figure out that some frat members want a woman's body, rather than a colleague to share ideas and interests with. However, by looking out for these two types, a woman can avoid them, or perhaps tell them off. If unavoidable, one can holler loudly to a higher authority.

The price of overt sexism is high for women students. It takes energy to be on one's guard or to holler about sexist behavior. Women students spend energy coping with these stumbling blocks when their energy could be used more productively. Wasted energy is one good reason why the fraternity should do away with the stumbling blocks.

Covert sexism is much more difficult to pin down. It has the form of the Saturn rings phenomenon, so elegantly described by Mary Rowe. (Saturn's Rings, Proceedings of the Conference on Women's Leadership and Authority in the Health Professions, University of California, San Francisco, June 1977, pp. 55-92.) That is, it is always present but in such small ways that a woman feels downright silly wasting time and energy complaining about it. Yet it happens frequently enough that like the rings of Saturn, it is visible from a distance. Covert sexism is the message that women are different from men in oh so many ways. While no sensible person would claim or even want to claim, that women and men are alike, in joining the fraternity, women and men are equal in value; the only differences that are relevant are the ones which cause women to stumble. Covert sexism confuses the real issues.

Covert sexism affects the confidence a woman student may feel; for it suggests that no matter how hard she tries, or how well she does, she is forever going to be seen as different and second class, and hence that she will have to prove herself long after her male counterparts have been recognized as wonders. To counteract this disease, the woman student must squawk about it every time it happens. Otherwise the nebulousness of the experience will eat away at her. One last problem remains: who does she squawk at? If she squawks at her male counterparts or the male fraternity members, she appears indirectly to be proving that she is in fact different. That leaves her female colleagues to hear the problem out. It is worth a try, but I find after several years of graduate study that most women find it so painful that they do not want to hear yet another case of this problem. Sometimes it seems the best recourse is a good sympathetic wall.

Support: Where It Comes From

Women students are confused about where the support they need should come from. Most expect that faculty will provide support; I suppose this belief results from early training women are given in the notion that men will make them happy. Yet most fraternity members do not have the time or energy to give support to anyone, male or female. A woman student must then seek support elsewhere. This lesson is not simple, as most women feel reluctant to leave their work and "socialize"; they find it hard to believe that they need this support and must seek it out. But they must because most women find themselves among few other women and are isolated from them.

Very often women students seek support from their fellow (male) graduate students. In some cases they get support from them, as many men in graduate school view women as colleagues and feel comfortable being supportive of other people, male or female. In these situations women often decide that they need go no further; they have found a friend and that's all that matters. I believe this conclusion is only half true. Most men do not experience what women students do just because they are men. Some are capable of hearing out a woman's complaints, but beyond being a sounding board, men students cannot get at the root of the problem. While I think the sounding board role helps build strong colleague relationships, a woman student must also get clear about what the sources of her problems are. In general, a woman makes the automatic assumption that she is the cause, which is only partly accurate. It is only by talking out her concern

with other women that a woman student can see what is rightfully her responsibility, and what is the result of the MIT bias. These distinctions are necessary so that a woman student can begin to change herself, and has the chance to release her anger about the unnecessary and unfair stumbling blocks in the road.

Disillusionment with Change

Graduate school at MIT forces immense change in women; they become competent professionals due to their abilities and the quality of the research environment. They become confident in their abilities in order to become professionals. With all that change happening to them, women students expect that the fraternity is changing the stumbling blocks they have encountered as well. There may be male faculty members who believe the fraternity rituals should change, but few understand this clearly enough to see its importance for their own lives. When women students discover how little concern for these matters the faculty really has, they become angry and disillusioned. Furthermore, they do not see any other means for removing the blocks.

Change is necessary for women students in a way that it is not for men. The added stumbling blocks are wasteful of energy, dehumanizing of men (yes, indeed) and women, and result in loss of qualified and needed good thinkers. Women sense the need for change, but after the stumbling have little energy left for causing it. They sense that change will be slow, and the lack of it meanwhile is painful. Hence, the support and encouragement of other women, and men, should be sought in large doses. It's the only remedy for the pain along the way.

If the lack of change is painful, the fight for change is even more so. Most difficult to recognize is that in the end the move for change cannot and will not come from anyone but the women; for they seem to have the only need for this change. Women must, bit by bit, lead the members of the fraternity to remove the stumbling blocks. This implies that the change will be slow; yet more significantly, women must believe that they can take the lead and cause change, even slowly; they must feel that they can successfully change the rituals.

What changes am I talking about? While I am not prepared to lay out the entire plan, several necessary steps are clear to me. First, women must understand what blocks are there and how they are wasteful. Second, women, particularly those who are members of the fraternity, must convince others that in fact everyone has reason to desire an end to the stumbling blocks. Third, they must encourage women to be more confident and competent, and encourage their male colleagues to do likewise. Fourth, they must move men (and women!) to change their sexist biases, overt and covert. Fifth, they must provide active support for women, and encourage men to do likewise. Parts of steps three and five are already in progress, but firmer commitment is needed. It is discouraging to see so much which must be done and to feel so little energy for doing it. At least the road is somewhat clear, however steep.

Two caveats

I would like to end this discussion with two caveats. The first is to point out that I have left out what I suspect are significant problems to a special group of women initiates, that is, black women. Since I am white, I can only observe the difficulties, but I do not understand them nor have I lived them first hand. Let it suffice to say that the fraternity is not only a fraternity, it is a racist one. The best interests of all will be served by clearing the stumbling blocks and hurdles of racism from the paths of students.

Second, a caveat to women who fall and to those who do not. Not every woman at MIT is caught up in the stumbling blocks. Some sail on wings the rest envy; others press on holding their breath and hoping the blocks are not really there. Some stumble and catch themselves and go on, while some lie fallen and pained upon the track. Each woman responds to her situation uniquely, and not all will be sympathetic to the needs of another. It cannot be otherwise. The caveat then is both to recognize these differences and to look for support from those who can be of help, without despairing in those who choose not to. Somehow in diversity there is great strength; for those who stand back may later take the place of those who have already served.

OF POSSIBLE INTEREST

The "marriage tax" has not been eliminated, but the Tax Incentive Act of 1981 has reduced it somewhat. Millicent Fenwick, Member of Congress, has worked hard to eliminate the marriage penalty, but feels "this is a major first step in eliminating discrimination against two-earner couples." Under Reagonomics, this is no doubt true.

The Michigan Collection: Women and Culture. The University of Michigan Press, P.O. Box 1104, Ann Arbor, MI 48106.

G. K. Hall Women's Studies Publications. G. K. Hall Reference Books, 70 Lincoln St., Boston, MA 02111.

Webb Institute of Naval Architecture accepts about 25 freshmen each year to its full scholarship program in naval architecture and marine engineering. Admission is competitive and is limited to American citizens. Write Registrar, Box B, Webb Institute, Glen Cove, NY 11542 for information and application papers. Closing date is February 15th.

Microcomputer Week '82, the third annual conference cosponsored by CATALYST, will be held on 3-7 March at Jersey City State College in Jersey City, NJ. The focus of the international event is the use of microcomputers in education at the elementary, secondary, and college levels. Write: CATALYST Conference, H 112, Jersey City State College, 2039 Kennedy Boulevard, Jersey City, NJ 07305.

DEADLINES: Jan. 22 for Mar.-Apr., Mar. 24 for May-June, May 24 for July-Aug.

ADDRESSES: Send all newsletter 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 institutions advertising below are Affirmative Action/Equal Opportunity employers.

University of Alabama, Huntsville. Dept. of Mathematics, Huntsville, AL 35899. Two or more tenure track positions 9/1982. Rank & salary depend on experience and credentials. Required: Ph.D. in math, evidence of quality teaching. Prefer specialty areas of applied math, functional analysis & algebra. Will teach both graduate & undergraduate courses. Send applications, graduate transcripts, vita & 3 letters of reference by 2/1/82 to F.L.Cook, Chairman, Dept. of Mathematics.

California State University, Chico. Dept. of Math, First St., Chico, CA 95929. (1) Five positions: One tenure track applied math, one tenure track statistics, three one year temporary appts. All require Ph.D. & evidence of excellence in teaching. 12-unit teaching load. Salary $19,900-$36,000 depending on qualifications. (2) Distinguished Visiting Professor. One or two semester appt. Two semester salary $22,000 - $36,000 depending on qualifications. Applicants must have tenure at home institution, have published extensively in mathematics & be excellent teachers. Will teach 6-8 units of undergraduate mathematics & conduct seminar for department's faculty. By 3/1/82 (for all positions) send application, resume & 3 letters of reference to Dr. Jim Jones, Chair.

California State University, Fullerton, Fullerton, CA 92634. Dept. of Mathematics. Tenure track position for 1982/83. Prefer applicants with outstanding teaching qualifications, research experience & backgrounds in areas of applied math such as modeling, numerical analysis, applied statistics or optimization. Ph.D. required. Salary & rank depend on experience & qualifications. By 2/16/82 send vita & inquiries to Chair of Selection Committee, Dept. of Math.

California State University, Long Beach. Dept. of Math, 1250 Bellflower Blvd., Long Beach, CA 90840. Several lectureships (2-yr appt., non tenure track) Fall, 1982. Ph.D. in Math, excellence in teaching & potential for research required. Salary $19,044 to $22,896/academic year. Send resume, 3 letters of reference and transcripts to Dr. Gittleman, Chair, by 2/15/82. Numerous part-time positions requiring at least an M.A. in math are also available with first preference given to those applying before 5/15/82.

Loyola Marymount University, Los Angeles, CA 90045. Dept. of Mathematics. One tenure track & 1 visiting asst. professorship, Fall 1982. Required: Ph.D. & willingness to teach a variety of courses. Teaching load: 12 hours per semester. Send resume & 3 letters of recommendation to M. R. Cullen, Math Dept.

San Diego State University. Dept. of Mathematical Sciences, San Diego, CA 92182. (1) Two year postdoctoral lectureship 9/1982. Purpose is to encourage recipient's research activities. Prefer recent Ph.D. of any age in pure or applied math. Some teaching & classroom experience would be desirable. Salary $19,044-$22,868; some cost of living increase is expected. Send vitae & 3 references to Postdoctoral Search Committee by 2/14/82. (2) Comp. Science position (with tenure) Fall,1982. Rank open. Salary dependent on rank: from $20,868 to $36,540. Required: Ph.D. by time of appt., research background & good teaching references. Will teach undergraduate & graduate courses in computer software & theory, direct research at Master's degree level & conduct own research. By 1/15/82 send vita & names of 3 references to Comp. Sci. Search Committee. (3) Position in Statistics (with tenure). Rank open. Required: Ph.D., strong commitment to teaching & interest in biostatistics. Will direct Master's level projects & conduct own research. By 1/31/82 send vitae & 3 references to St. Search Committee.

Stanford University, Stanford, CA 94305. Dept. of Mathematics. Hans Samelson, Chmn. (1) Two senior appts. Fall 1982, one in analysis (PDE, geomentric measure theory etc.), the other in geometry (algebraic, differential, topological). Send curriculum vitae & bibliography to Chmn. (2) One Asst Professorship, Fall, 1982, for mathematician with outstanding research ability. Send resume & have 3 letters of reference sent to Chmn.

University of California, Berkeley. Dept. of Statistics. Pending final approval, one Asst. Professorship fall, 1982. Ph.D. required. Holder of this tenure track position to teach courses in Probability & Statistics & continue vigorous research. Address inquiries to David A. Freedman, Chmn., Dept. of Statistics, Univ. of CA, Berkeley, Berkeley, CA 94720 by 2/15/82.

University of California, Davis. Division of Statistics. Tenure track asst. or tenured assoc. professorship fall, 1982. Required: demonstrated creative research in theoretical & applied statistics, ability to teach statistics at all levels, willingness to consult with researchers across campus. By 2/15/82 send resume & 3 letters of reference to J. R. Blum, Division of Stat., Univ. of CA, Davis, CA 95616.

University of the Pacific, Stockton, CA 95211. Mathematics Dept. (1) Computer Science teaching position (tenure track). Required: Master's Degree in Comp. Sci. or a Ph.D. in a mathematical science with significant computer course work/experience. Salary & rank negotiable & competitive. Depts emphasize business data processing & systems programming. Research opportunities available. (2) Tenure track math education position. Rank & salary negotiable. Required: earned doctorate; experience with the K-12 school programs preferred, though interest in pre-service teacher training sufficient. Must be committed to undergraduate mathematics in a growing program of mathematical & computer sciences. For both positions send resume to William Topp, Math Dept.

Connecticut College. Dept. of Math, New London, CT 06320. Ernest Schlesinger, Chairperson. Two positions for fall, 1982. One position requires experience in teaching undergraduates as well as active involvement in scholarship & publications. Rank dependent on qualifications. Second position at Asst. Prof. level. Required: Ph.D. Interest in applicable math & comp. sci. studies desired for at least one appt. Send vita & 3 references by 2/1/82 to Chairperson. Chairperson will be at Cincinnati AMS/MAA meetings.

Trinity College. Dept. of Math, Hartford, CT 06106. D. A. Robbins, Chairman. One year position, pending approval, available academic year 1982-83. Required: demonstrated excellence in teaching & knowledge of statistics & computer applications. Ph.D. preferred. Teaching load: 3 courses per term. Salary competitive. By 2/15/82 send curriculum vitae, academic record & names of 3 references to chairman. Representatives of Dept. will be at AMS meeting in Jan., 1982.

University of Connecticut. Dept. of Mathematics, Storrs, CT 06268. Eugene Spiegel,Head. (1) Asst. Professorship. Duties: teaching elementary & intermediate math at greater Hartford regional campus; conducting research in areas of competence. Required: Ph.D. in math & some teaching experience; some knowledge of computer science desirable. Salary negotiable. By 2/15/82 send resume to Head of Dept. (2) Two tenure track positions Fall, 1982. Asst. Professorships, one at Southeastern Regional Campus in Groton & other at Hartford Regional Campus in West Hartford. To teach elementary & intermediate math & conduct research. Required: Ph.D. in math & some teaching experience. Some knowledge of comp. sci. desirable. By 2/15/82 send curriculum vitae & 3 letters of recommendation to Head of Dept.

Emory University. Dept. of Mathematics & Computer Science, Atlanta, GA 30322. (1) Opening for Chairperson. Required: outstanding research record & dedication to excellence in teaching. Rank of Prof. with tenure. By 1/20/82 send application to Trevor Evans, Search Committee. (2) Tenure track & temporary Asst. Professorships Sept., 1982. Required: strong research interests & promise of excellence in teaching. Interest in Comp. Sci. program desirable for some positions. By 2/15/82 send applications to Trevor Evans, Search Committee.

DePaul University. Dept. of Mathematical Sciences. Tenure track position Sept., 1982. Required: Ph.D. & a specialization in pure math, probability & statistics, or applied math. By 2/15/82 send resume & 3 letters of reference to Dr. Walter Pranger, Chairperson, Dept. of Math, DePaul Univ., 2323 N. Seminary, Chicago, IL 60614.

Southern Illinois University at Carbondale, Carbondale, IL 62901. Dept. of Math, Alphonse Baartmans, Chmn. (1) 2 Asst Professorships tenure track 8/16/82. Any area in pure or applied math will be considered. Required: Ph.D., demonstrated evidence of excellence in research. Preferred: evidence of teaching excellence. Salary competitive. By 2/1/82 send application plus 3 letters of recommendation (marked "continuing position") to Chairman. (2) Asst/Assoc Professorship in Analysis tenure track 8/16/82. Required: Ph.D., demonstrated evidence of excellence in research. Preferred: evidence of teaching excellence. Salary competitive. By 2/1/82 send application plus 3 letters of recommendation (marked "Analysis Position") to Chairman. (3) Asst/Assoc Professorship in Numerical Analysis or Optimization tenure track 8/16/82. Required: Ph.D., demonstrated evidence of excellence in research. Preferred: evidence of teaching excellence. Salary competitive. By 2/1/82 send application plus 3 letters of recommendation (marked "Numerical analysis/optimization position") to Chairman.

(4) Asst/Assoc Professorship tenure track in Discrete Math/Computer Related Math 8/16/82. Required: Ph.D., demonstrated evidence of excellence in Discrete Math or some area of computer related math. Prefer candidates with background & experience in computer science. Salary competitive. By 2/1/82 send application plus 3 letters of recommendation (marked "Discrete Math/Computer Related Math Position") to Chairman. (5) Professorship 8/16/82. In any area of pure and applied math. Salary negotiable. Required: outstanding research record & a commitment to further develop strong research program in mathematics. By 2/15/82 send applications or nominations (marked "Professor Position") to Chairman.

Western Illinois University. Dept. of Mathematics. Tenure track Asst. or Assoc. Professorship Aug., 1982. Prefer candidate with Ph.D. in modern areas of applied math, numerical analysis or comp. Sci. Expect documented evidence of excellence in teaching and research. Salary open. By 2/1/82 contact Dr. Larry Morley, Chairperson, Dept. of Math, Western IL Univ., Macomb, IL 61455.

Indiana University. Dept. of Mathematics, Bloomington, IN 47405. J. Stampfli, Chmn. Several openings at various levels in both pure & applied math, 8/1982. Particularly interested in candidates in fields of applied math, statistics, algebra, analysis & topology, but will consider those in other areas. Contact Chairman.

Purdue University. Dept. of Mathematics, West Lafayette, IN 47907.M. S. Baouendi,Head. (1) Several regular or research asst. professorships 8/1982. Exceptional research promise & excellence in teaching required. Send resume & 3 letters of recommendation. (2) One or two senior positions for year 82-83 in applied math (Prof/Assoc. Prof. with tenure). Salary competitive & negotiable. Excellent research credentials are required. Please apply early. (3) Possible Assoc. Professorship 8/1982. Excellent research credentials required. Send resume & 3 letters of recommendation.

Saint Mary's College. Mathematics Dept., Notre Dame, IN 46556. Sister Miriam P. Cooney, Chairman. Tenure track position for Fall, 1982. Saint Mary's offers a math major, an applied math option & comp. sci. minor. Required: Ph.D. & commitment to teaching & active involvement in mathematical scholarship. Will teach 12 hours per week. Apply to Chmn.

Kansas State University. Dept. of Mathematics, Manhattan, KS 66506. Asst. Professorship 8/15/82. Salary $22,000 - $24,000 for 9 mo. appt. Required: demonstrated research ability in applied math. Specially interested in candidates in fields of linear & non-linear wave propagation, theoretical hydrodynamics, or partial differential equations. Expect commitment to excellence in teaching. Ph.D. in math or equivalent required. Contact Head, Dept. of Math.

University of Louisville. Dept. of Mathematics. Entry level tenure track position Fall 1982. Required: Ph.D., research promise & evidence of good teaching ability. Special consideration given to analysts, but candidates in all fields will be considered. Send application, 3 letters of recommendation & graduate transcripts to Michael S. Jacobson, Chmn., Search Comm., Dept. of Math, Univ. of Louisville, Louisville, KY 40292.

Bates College. Dept. of Math, Lewiston, ME 04240. One tenure track position at Instructor or Asst. Prof. level starting Sept., 1982. All requirements for Ph.D. should be completed. Send resume, list of publications, transcript & 3 letters of recommendation to David C. Haines, Chair.

Hood College. Dept. of Math & Comp. Sci., Frederick, MD 21701. Dr. Elizabeth B. Chang, Chairperson. Asst. Professorship (tenure track) fall, 1982. Duties: teach introductory & advanced mathematics courses & introductory programming courses. Required: Ph.D. in math & commitment to excellence in teaching undergraduates. By 3/1/82 send application, resume & have transcript & 3 letters of reference sent to Chair.

Holy Cross College. Dept. of Mathematics, Worcester, MA 01610. Peter Perkins, Chmn. Regular appt. fall, 1982. Ph.D.'s invited to apply. Field of specialization open. Excellence in teaching is top priority, but research is encouraged & required for promotion & tenure. Teaching load: 3 courses per semester. Usual fringe benefits. Salary competitive. Applications should include resume, transcript & 3 letters of recommendation.

Mount Holyoke College. Dept. of Mathematics, South Hadley, MA 01075. George Cobb, Chmn. Three year asst. professorbhip with possibility of renewal. Field open. Required: Ph.D. or nearly completed Ph.D. By 2/15/82 send resume & 3 letters of recommendation.

Williams College. Mathematics Dept., Williamstown, MA 01267. Asst. Professorship 7/1982. Ph.D. required. Prefer candidates with training in comp. sci. & combinatorics. By 2/1/82 send vita & letters of reference to Neil R. Grabois, Chmn., Math Dept.

Albion College. Mathematics Dept., Albion, MI 49224.(1) Comp. Sci. tenure track position. Required: Ph.D. in Comp. Sci. or in Math with sufficient experience to teach upper-level computer science courses. (2) Mathematics tenure track position. Required: Ph.D. in math. Preferred:additional experience in comp. sci. or an applied field such as operations research or mathematical modeling. Ranks depend on qualifications. Salaries are competitive. Contact J. A. Wenzel, Chair by 2/15/82.

Michigan State University. Dept. of Mathematics, East Lansing, MI 48824. Dept. of Math is eager to attract qualified women to its program of graduate study in math & applied math. For further information have them contact the Director of Graduate Affairs, Dept. of Mathematics.

Michigan Technological University. Dept. of Mathematics & Computer Science, Houghton, MI 49931. About 5 tenure track positions in applicable mathematics (e.g. probability, fluid mechanics, ODE, PDE, functional analysis, calculus of variations, control theory etc.) statistics, differential geometry, numerical analysis & comp. sci. Asst. or Assoc. Profs preferred. Excellent teaching & research required. Some visiting positions available. To apply write Dr. Richard Millman, Head.

Carleton College. Dept. of Mathematics, Northfield, MN 55057. Asst. Prof. or Visiting Asst. Prof. 7 hours undergraduate teaching per week. Start 9/1982. Ph.D. required. Prefer experience in statistics or computer science. By 2/15/82 apply & have letters of reference sent to Steve Galovich, Chmn.

University of Minnesota. School of Mathematics, Minneapolis, MN 55455. Willard Miller,Jr., Head. Starting 9/16/82 or later. Several visiting positions from lecturer to full professor available for periods of one-quarter to 2 years. Strong research & teaching abilities required. Prefer applicants whose research interests are compatible with those of School. Salary competitive. Please apply immediately.

University of Minnesota. School of Mathematics, Minnespolis, MN 55455. Willard Miller,Jr. Head. Starting 9/16/82. Several Asst. Professorships tenure track in all fields. Outstanding research & teaching abilities required. School has particular needs in functional or numerical analysis, differential or low dimensional topology, PDE, differential geometry & several complex variables. Salary competitive. Teaching load: five 1-quarter courses per academic year. By 2/1/82 send curriculum vitae & 3 letters of recommendation to Head.

Northeast Missouri State University. Division of Math, Kirksville, MO 63501.Head of Division. Will lead faculty in curriculum development, instructional improvement & program evaluation; will recruit & evaluate Divisional faculty. Reports directly to chief academic head of Univ. Required: Ph.D. in math or comp. sci., well established research & scholarship. Salary: Minimum of $30,000 with excellent benefits. By 2/1/82 send undergraduate & graduate transcripts, placement papers, resume & application to Chmn., Search & Screen Comm.

University of Nebraska-Lincoln. Dept. of Math & Stat., 828 Oldfather Hall, Lincoln, NE 68588-0323. Asst/Assoc Professorship, tenure track, in statistics/probability 8/16/82. Two course teaching load at undergraduate & graduate levels. Applicants should show evidence of strong research & teaching ability. By 3/1/82 send resume, transcripts & 3 letters of recommendation to Dr. K. M. Lal Saxena, Chairperson, Search Committee.

Dartmouth College. Computer Science (1) Asst. Professorship. Initial 3 year appt. Possibility of reappointment & eventual tenure. Qualifications: demonstrated research in comp. sci. & ability & interest in teaching undergraduate comp. sci. & mathematics. Ph.D. required (2) Dept. of Math, John Wesley Young Instructorship. Two-year, non-renewable, postdoctoral appt. for Ph.D.'s with strong interest in research & teaching. Teaching duties 6 hrs/wk. Academic year stipend of $17,000 plus resident fellowship of $2500. Write to Martin Arkowitz, Chmn., Dept. of Math, Dartmouth College, Bradley Hall, Hanover, N.H. 03755 by 1/15/82.

Rutgers - The State University. Mathematics Dept. (1) Asst. Professorship tenure track 9/1982. Prefer individuals with specialization in algebraic geometry, algebraic number theory, representative theory, Riemann surfaces, low-dimensional topology. (2) Asst. Professorship tenure track available for Computer Scientist/Mathematician Sept., 1982. Required: Ph.D. in comp. sci. or math & ability to assist in developing major & minor computer programs. Contact Dr. E. Boylan, Chmn., Math Dept., Rutgers, the State Univ., 101 Warren St., Room 211, Smith Hall, Newark, N.J. 07102.

Trenton State College. Dept. of Mathematical Sciences, Pennington Rd., CN550, Trenton, N.J. 08625. Michael Iannone, Chmn., Faculty Search Committee. Two tenure track positions 9/1982. Required: ability to teach upper level comp. sci. courses; at least Master's degree in comp. sci. or Ph.D. in math or statistics. (Candidates with master's will be expected to pursue Doctorate.) Asst. Professorship or higher, depending on qualifications and experience. By 2/28/82 apply to Michael Iannone.

New Mexico State University. Dept. of Mathematical Sciences, Las Cruces, N.M. 88003. Carol L. Walker, Head. Visiting position & tenure track asst. professorship in math, numerical analysis or statistics starting 8/23/82. Salary $18,000 or higher depending on rank, qualifications & experience. Required: Ph.D. & strong commitment to teaching & research. Send vita & have 4 letters of reference sent to Head.

Hamilton College. Dept. of Mathematics, Clinton, N.Y. 13323. Anne L. Furno, Chairwoman. (1) Two year renewable position . Asst. Prof. level with Ph.D. in math; instructor level for A.B.D. Six courses per year. Expected: excellence in teaching & continuing professional activity. Required: general computing science training. (2) One-year position to replace faculty on leave; possibility of renewal for second year. Teaching 9 hrs/sem. of undergraduate mathematics. Rank & salary dependent on experience. For both positions send vitae & 3 letters of reference to Chairwoman.

St. Lawrence University. Dept. of Mathematics, Canton, N.Y. 13617. Robert G. Cromie, Chmn., Search Committee. Asst. or Assoc. Professorship (tenure track) 9/1/82. Required: Ph.D. in any of mathematical sciences. Ability to teach introductory level computer science courses desirable. Must be a permanent resident. 4-1-4 schedule, teaching load of 3 courses/semester plus one course during two out of every three winter terms. Emphasis on quality teaching. By 1/31/82 send resume & have 3 letters of recommendation sent to Robert G. Cromie.

Skidmore College. Dept. of Math, Saratoga Springs, N.Y. 12866. Richard Speers, Chmn. Tenure track. To teach computer organization & assembly language, data structures, formal language theory & compiler design. Invite applications from candidates interested in development of comp. sci. curriculum. Required: Ph.D. in comp. sci. or Master's in comp. sci. with work toward Ph.D., or Ph.D. in math with extensive computer experience. Rank & salary dependent on qualifications. By 3/1/82 send CV & 3 letters of recommendation to Chmn.

SUNY - Buffalo. Department of Mathematics. (1) George William Hill/Emmy Noether Research Instructorship for 1982-83. Prefer recent or prospective Ph.D.'s whose degrees will be completed by 9/1/82, appt. being for 2 years. Ten month stipend is $21,000 plus generous staff benefits. Will teach 2 one-semester courses during 10 months. When 2 year appt ends, consideration for 2 year appt as asst. prof. will be given. Each applicant should prepare sketch of his or her

SUNY - Buffalo (con'd)
post-high school educational background & research activity. Field: Pure or applied mathematics. (2) Asst. Professorship for term starting 9/1/82. Salary competitive. Will consider outstanding applicants in all fields; prefer those in discrete applied math. (3) Asst. or Assoc. Professorship for term starting 9/1/82. Salary competitive. Will consider outstanding applicants in all fields; prefer those in algebraic or differential topology & applied math (including combinatorics). By 1/15/82 send application, supporting information & have 4 letters of recommendation sent to Dr. Zbigniew Zielezny, Search Comm. Chmn., Dept. of Math, SUNY-Buffalo, 106 Diefendorf Hall, Buffalo, N.Y. 14214.

SUNY - Stony Brook. Dept. of Applied Math & Stat., Stony Brook, N.Y. 11794. Alan Tucker, Chairman. Several openings likely: (1) Asst. Prof. in numerical analysis, with computational efficiency specialization preferred; (2) Senior & junior positions in operations research, applications experience very important; (3) Senior & junior positions in statistics, theoretical or applied. Distinguished research record needed for senior positions; evidence of research potential needed for junior positions.

Syracuse University. Dept. of Mathematics, Syracuse, N. Y. 13210. Prof. Jack E. Graver, Chmn. (1) Senior theoretical statistician to coordinate various stat. programs. Essential: outstanding research record, excellence in teaching & proven leadership ability. By 1/15/82 send vita & names & addresses of 4 references. (2) Asst. Professorship in statistics (tenure track). Required: Ph.D., good research potential & compatibility with research activity in dept. Applications must include a detailed vita. New Ph.D.'s should include a transcript. Arrange for 3 letters of reference to be sent. Complete applications are due 3/15/82.

University of Rochester. Dept. of Mathematics, Rochester, N.Y. 14627. Two tenure track appts 9/1982. Teaching duties are two courses each term. Initial appt. will be for 3 or 4 years. Required: Ph.D., research promise & excellence in teaching. Send resume & names of at least 3 references to Chmn., Math Dept.

Vassar College. Dept. of Mathematics. One year position substituting for person on leave. Applicants must hold or be close to Ph.D. 9-hour undergraduate teaching load. Send vita to David M. Merriell, Chmn., Dept. of Math, Vassar College, Poughkeepsie, N.Y. 12601.

Vassar College. Computer Science Studies (1) Assoc./Full Prof. of Comp. Sci. to chair well established program. Demonstrated excellence in teaching & research required; administrative ability highly desirable. (2) Two Asst. Professorships. Required: expertise in comp. languages (FORTRAN, PL/I, APL, PASCAL); data structures, modeling & simulating, computer architecture, operating systems, structured design, compilers, numerical analysis. Salary & rank depend on qualifications. Send curriculum vitae, publication list & statement concerning interests & objectives in teaching & research & have 3 recommendation letters sent to Prof. Winifred Asprey, Director, Comp. Center, Vassar College, Box 87, Poughkeepsie, N.Y. 12601.

East Carolina University. Dept. of Math, Greenville, N.C. 27834. Prof. Eugene E. Ryan, Chair, Search Committee. Opening for chairperson. Dept. has 34 full-time faculty members in math, math education, comp. sci. & statistics. Required: Ph.D. in math/Math Sciences & evidence of effectiveness in teaching; ability to

East Carolina University (con'd)
administer a multifaceted dept., & achievement involving research, creative activity, publications etc. Salary & rank commensurate with qualifications. By 2/1/82 send application or nomination with complete dossier including 3 letters of reference to Professor Ryan (listed above).

North Carolina State University. Dept. of Statistics. Two tenure track junior faculty positions 7/1982. Asst. or Assoc. Professor level. By 2/15/82 send resume, transcripts, 3 letters of reference to Daniel L. Solomon, Head, Dept. of Stat., N. C. State University, Raleigh, N. C. 27650.

University of North Carolina , Chapel Hill. Dept. of Math, Chapel Hill, N.C. 27514. Two year appt. as lecturer starting 8/1982. Required: Ph.D. & research program in modern complex analysis. It is anticipated Dept. will conduct special year of research in modern complex analysis with distinguished visitors during 83-84. Send application, vita, abstract of current research & 3 letters of reference to Chmn., Math Dept.

University of Oregon. Dept. of Math, Eugene Oregon 97403. Theodore W. Palmer, Head. Two Asst. Professorships 9/1982. Leading to tenure. Required: Ph.D. in math & demonstrated research & teaching ability. Postdoctoral experience is preferred. Duties: 6 to 8 contact hours of teaching (graduate & undergrad.) and research. Salaries competitive. Prefer probability & analysis, but will consider all research areas which mesh with those in dept. Closing date 1/20/82.

Bryn Mawr College. Dept. of Math, Bryn Mawr, PA 19010. Opening for replacement of faculty member on leave in 1982-83. This appt. may be extended through 1983-84. Required: Ph.D. or nearly completed Ph.D., commitment to teaching & research. Send applications & 3 letters of recommendation to F. Cunningham, Jr., Chmn.

Bucknell University. Dept. of Mathematics, Lewisburg, PA 17837. David S. Ray, Head. (1) At least one position for Sept., 1982 in any area of mathematics or statistics. Required: Ph.D. (or nearly so), strong commitment to teaching & research. Potentially tenurable. Application cosists of curriculum vitae, graduate transcript, & 3 letters of recommendation, one of which must comment on teaching. (2) Tenurable position in statistics for Sept., 1982. Rank & salary negotiable. Required: Ph.D., excellence in teaching & research. Application consists of curriculum vitae & 3 letters of recommendation, one of which must comment on teaching. Original deadline 12/1/81, but late applications may be reviewed.

Haverford College. Dept. of Mathematics, Haverford, PA 19041. Kenneth Baclawski, Acting Chmn. Asst. Professorship 9/1982. Tenure Track. Required: Ph.D. in math. Prefer candidate in any area of pure math or analysis. Must show strong interest & evidence of ability in both research & teaching. Send curriculum vitae & 3 letters of recommendation & brief description of research & professional plans to Acting Chmn.

University of Pennsylvania. Dept. of Math, E1, Philadelphia, PA 19104. (1) Some tenure positions 82-83. Prefer applicant in area of algebra, but will consider those in all areas. (2) A limited number of teaching-research positions in math available 7/1/82.By 1/1/82 send resume & 3 letters of reference describing both research & teaching ability to Prof. Frank W. Warner, Chmn., Personnel Committee.

College of Charleston. Dept. of Mathematics, Charleston, S. C. 29401. W. L. Golightly, Chmn., Search Committee. Asst/Assoc. Professorships. Two tenure track positions available 8/22/82. Teaching undergraduate courses in applied & pure mathematics & computer science (up to 12 hrs/wk with possibility of 6-9 hrs/wk). Required: Ph.D. in math or related field, commitment to teaching & continuing research. Prefer those with training in pure & applied math. Salary depends on experience, with a minimum salary of at least $20,000. Send 3 letters of recommendation & resume to Chmn., Search Committee.

University of Tennessee. Dept. of Mathematics, Knoxville, TN 37916. Four tenure track Asst. Professorships (possibly associate) 9/1/82. Also seeking person for joint appt. with Comp. Sci. Dept. Primary areas of interest are listed below. Send resume & have 3 letters of reference sent to person indicated. (1) Algebraic number theory with applications to algebraic geometry or commutative algebra. Contact David E. Dobbs. (2) Probability & statistics - applied probability, probability measures on algebraic structures, statistical inference & estimation theory. Contact Balram Rajput. (3) Applied math; ordinary & partial differential equations, integral equations, numerical analysis, optimization. Contact Vassilios Dougalis. (4) Analysis; function theory, several complex variables and harmonic analysis. Contact W. R. Wade. (5)Joint appt. with Comp. Sci: Research area should be compatible with those present in 2 depts. Contact John S. Bradley.

University of Texas, San Antonio. Division of Math, Comp. Sci. & Systems Design, San Antonio, TX 78285. Prof. Stanley G. Wayment, Director. Several tenure track Asst. Professorships (possibly Assoc.) 9/1982. Required: Ph.D. & interest in teaching & research. Will consider applicants in all areas of math, stat., comp. sci., systems design & math education. Send vitas to Director.

University of Utah. Dept. of Mathematics, Salt Lake City, UT 84112. (1) 3 or 4 three year instructorships for 81 or 82 Ph.D.'s. Selection made on basis of ability & potential in teaching & research. Salary $20,000. Teach 2 courses thru academic year. (2) One visiting position dependent on teaching ability & potential contribution to our research environment. (3) Possible 1 or 2 permanent senior positions. Essential criterion will be level of research activity in areas which complement but do not overlap with, existing areas of research. By 2/1/82 send vita, bibliography & references to Ms. Sylvia Morris, Committee on Staffing.

University of Washington. Dept. of Mathematics. Following positions may start 9/1982. (1) Two asst. professorships (3 year appts. with possible renewal) for Ph.D.s with strong research & teaching records. (2) Two acting asst. professorships for recent Ph.D.s of any age with strong research & teaching potential (2 year appts. subject to annual review). Prefer applicants with background in differential equations (ordinary & partial) and/or numerical analysis. Positions carry a six hour teaching load, standard salary & fringe benefits. Send vitae, bibliography & 4 letters of recommendation to Ramesh Gangolli, Chmn., Dept. of Math GN-50, University of Washington, Seattle, WA 98195.

University of Wisconsin. Dept. of Mathematics. Tenure track position beginning Fall, 1982. Required: Ph.D. in math or stat., strong commitment to excellence in undergraduate teaching. Send resume, transcripts & 3 letters of reference by 2/15/82 to Dr. Thomas Breiter, Chairperson, Dept. of Math, Univ. of WI, La Crosse, La Crosse, WI 54601.

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828 Washington Street
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January - February, 1982

H K NICKERSON
184 WASHINGTON RD
PRINCETON NJ 08540