

Association for Women in Mathematics

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NEWSLETTER

May-June 1986

PRESIDENT'S REPORT

International Congress of Mathematicians ICM-86. AWM activities at the ICM in Berkeley this summer should be exciting. We will sponsor a panel titled "Women in Mathematics: An International Perspective 8 Years Later." The panel will meet from 7:30 p.m. to 9:30 p.m. in PSL 1 on Wednesday, August 6, 1986. It will be preceded by a carillon concert played by Lucy Duchene, also sponsored by AWM. After the panel, there will be a reception in the Mathematics Lounge of Evans Hall. I look forward to seeing you all there.

It is disappointing to note that the Program Committee of the ICM-86 showed that it is completely insensitive when it comes to women in mathematics. The initial list of invited speakers, posted at New Orleans, had only one woman on it, and she is in the section on history and education. Pressure was applied from various segments of the community, and two other women have been invited to give 45-minute addresses. There are still no women invited to give hour addresses. The problem lies with the Program Committee. There are no women on the Committee; the male members are consciously or unconsciously patronizing in their attitudes towards women. The Committee appoints panels in the various fields to recommend speakers and in general accepts these recommendations. It is the Committee's responsibility, and particularly the responsibility of the Program Director, to make sure the list is representative of the best mathematics. This means not overlooking the contributions of a large number of excellent women mathematicians. I suggest you write to Prof. Jurgen Moser, President of the International Mathematical Union, at the E.T.H. in Zurich, Switzerland, to make your feelings on the matter known.

Directory of Women in the Mathematical Sciences. Ruth Rebekka Struik, University of Colorado, Boulder, has taken over the updating of the *Directory*. I urge everyone to fill in the form on page three (or a photocopy of it) and send it in soon. Updating the computer files will be a time-consuming process, and we would like to get the updated version of this valuable resource into print as quickly as possible.

Funding for Mathematics. The questions and issues related to funding of mathematics become more and more complicated. The Gramm-Rudman-Hollings Act is having a serious effect on non-military support of mathematics. The number of individuals supported in the traditional manner is decreasing. The universities have yet to react seriously to the cut in overhead. In the meantime, support from the Department of Defense is increasing. The current *Notices* of the AMS says that the NSF budget in the Mathematical Sciences Division is likely to be \$49.5 million while the budget of the new program of support from DARPA (Defense Advanced Research Projects Agency) is \$6 million and increases are expected. The object of the program is to support mathematical research that has well-defined goals and will enhance the purpose of DARPA and the nation's defense posture. "Core Mathematics" which does not necessarily meet these criteria is losing support. What does this mean for the future of mathematics? It is extremely important that the long-term consequences to the profession of these funding policies be discussed, and where necessary, that action be taken. Let the members of the AMS Council who represent you know your views. Write to me, and I will arrange to publish your ideas in this newsletter.

Awards to Women Mathematicians. We congratulate Joan Feigenbaum and Svetlana Katok on their NSF Postdoctoral Fellowship Awards. These were two out of twenty-nine recipients. None of the five recipients of Presidential Young Investigator Awards were women this year. If you think you deserve to be considered for this award, or for a Sloan Fellowship award, ask your department chair to nominate you. Don't be shy!

Linda Keen
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LETTER FROM THE EDITOR

Recently I have received a couple of communications regarding the attitude of many feminists toward science. I concur with the opinion of my correspondents that we have something to worry about. Most discussions of "feminist science" I have read discuss mostly issues from anthropology and extrapolate (wrongly, I feel) toward the hard sciences. The recent *Ms.* issue on religion was given a surreal edge by articles seeming to suggest witchcraft and mysticism as alternatives to science, a somewhat extreme manifestation of asserting the value of intuition over technology.

The letter from Beth Ruskai in this issue addresses these problems. Please read it and send in your reactions. I would be especially interested in hearing about other examples of feminist anti-science bias.

The first installment of the Laramie panel on ethics appears in this issue. Let me reiterate Linda Keen's hope that this *Newsletter* will become a forum for the discussion of ethical and moral issues related to mathematics. I welcome letters and articles on ethical problems, reactions to the panel talks, etc. Let us hear from you!

I have a couple of articles from *Feministische Studien* which look interesting. However, my German is too rudimentary for me to do much with them. "Der mathematische Formalismus--eine Maschine, die Wahres aussondert" was written by Christiane Frougny and Jeanne Peiffer, both mathematicians (a sentence I could actually translate completely comes out "We are two mathematicians and write as such"). The other, by Anna Maria Stuby, is "Sofja Kovalevskaja--'Prinzessin der Naturwissenschaften': Ein Beitrag zur Enteroisierung". If you would be willing to read one or both, please let me know. I would like to print either reviews, summaries, or translations of the articles.

I have a pleasant announcement to make. My reference to myself as "untenured" in my panel talk is now inappropriate: my husband and I both got tenure recently. Many thanks to all of you who have provided moral support over the years. And we *weren't* crazy after all to give up two tenured positions!

Anne Leggett
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BYU WOMEN IN SCIENCE CENTER

At Brigham Young University a Women in Science Center has been organized to encourage women to enter fields in science and engineering. Published information about women in various scientific and engineering endeavors is being collected. Biographies are being collected of women who can be role models for students. These biographies are being organized according to discipline and are available to those who use the Center. If you have suggestions for possible role models for the project, write Kay B. Franz, Ph.D., Chair, Women in Science Center, 2222 HBLL, BYU, Provo, UT 84602.

Directory of Women in the Mathematical Sciences

QUESTIONNAIRE FOR WOMEN WHO HOLD THE PH.D OR HAVE EQUIVALENT TRAINING, AND PH.D CANDIDATES

(PLEASE TYPE; handwritten forms may not be used.)

1. A. Name (last name first) _____

B. Cross listing of name (if desired) _____

2. Mailing Address (Preferred) _____

*Current Status ___(Employed) ___(Retired) ___(Graduate Student) ___(Unemployed)
(*This information is for record keeping and will not be printed in the Directory.)

3. Name of employer or institution _____
(If retired, give last institution where employed.)

Address of employer or institution _____

Title of position _____

4. Highest academic degree received _____
Year degree conferred _____ Institution _____

5. Fields of mathematical interest: (write 1 for primary field; 2 for other.
Only two will be printed.)

- | | |
|----------------------------|-----------------------------------|
| A. ___ Algebra | H. ___ Logic and foundations |
| B. ___ Analysis | I. ___ Number theory |
| C. ___ Applied mathematics | J. ___ Operations research |
| D. ___ Combinatorics | K. ___ Statistics and probability |
| E. ___ Computer science | L. ___ Topology |
| F. ___ Functional analysis | M. ___ Other |
| G. ___ Geometry | |

6. Publications: Bibliographic information for two most important publications. In addition to the title, give MR number and date only, if available; otherwise for an article, use MR abbreviation for journal, give volume number and date.

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LETTER ON FEMINISM AND WOMEN IN SCIENCE

Dear colleagues:

In the last few years I have become increasingly concerned about certain negative attitudes toward science and mathematics [I will often include mathematics and computer science in the term "science"] developing in so-called feminist circles. My two years at the Bunting Institute, where I had a great deal of contact with non-scientist professional women, convinced me that the situation is more serious than many of you may realize. I am particularly concerned that a few very vocal and visible sociologists are succeeding in promulgating opinions that are detrimental to the advancement of women in science. Let me give some specific examples.

The attitudes expressed by Dr. Mary Poplin in a July, 1985 interview with the *Boston Globe* typify my concerns. Dr. Poplin, a faculty member in the school of education at Claremont College, discussed a recent research project on computer aptitude. The Claremont researchers concluded that women and men had the same aptitude for computer science, but that women had significantly lower interest in computers and related topics. So far, so good. But instead of being concerned that women with an aptitude for computing, science, and mathematics were going into other fields, she seemed delighted. To explain her position she invoked a number of stereotypical misconceptions about science. She stated that women were not interested in working with quantification and that they did not want to go "...into science and academic fields that use numbers as their whole means of discovery." She continued "...and that's the other explanation about why women are not interested in science--because it doesn't deal with subtleties." She concluded with "...Gilligan is women scientists' hope for coming up with a model on which we can conduct research without reducing things to numbers. That's what everyone in the workshop feels." (Poplin was participating in a workshop organized by Dr. Carol Gilligan, a Harvard psychologist noted for her work on gender differences.) After reading the entire article, I could only wonder if Poplin had ever actually met a real woman scientist.

The public prominence of some sociologists is exemplified by an article in the December 2, 1985 issue of *Newsweek* entitled "Liberation in the Lab." Although the article purports to discuss the opinions of women scientists, it does not quote a single, practicing woman scientist. All of the women quoted work in the social sciences although a few do have scientific backgrounds. A picture of Nobel laureate Barbara McClintock and related discussion gives a particularly misleading impression. The discussion is based entirely on Dr. Evelyn Fox Keller's biography; McClintock herself does not appear even to have been interviewed by *Newsweek*. Indeed, most of the article appears to be an exposition of Keller's views on gender and science. However, several non-scientists who discussed the article with me assumed that it was an accurate representation of the predominant thinking of women scientists. Regardless of what one thinks of Keller's work, it should not be represented to the public as the opinion of women scientists.

The *Newsweek* article also contains some rather disturbing remarks by the sociologist, Dr. Sherry Turkle, noted for her book *The Second Self: Computers and the Human Spirit*. She claims that by age ten girls and boys have different programming styles; that girls prefer the interactive approach which she refers to as female, artistic, and "soft mastery;" while boys prefer to plan ahead, an approach she refers to as male and "hard mastery." This theme of gender differences in computer science pervades her book very heavily. Other remarks suggest that she does not consider extensive planning of programs to be either necessary or desirable. Although she acknowledges that the interactive approach may produce more bugs, she does not regard this as significant--she even describes one bug in rather favorable terms.

Although it is not necessarily gender-related, I cannot resist commenting on a side issue raised by Turkle's dichotomous distinction between the "artistic" and "planning" approaches. This terminology shows a complete failure to recognize that computer science, like other scientific fields, is ultimately a creative endeavor. She does not seem to understand that the creativity, i.e. the art, does not lie in the programming, which is really a routine process, or in the pictures on the terminal screen. Rather, the really creative part is the study and development of the underlying algorithms, something she seems to consider as technical and unartistic. Thus, Turkle shows great appreciation for the visual artistry of a student programmer, Anne, but does not acknowledge that Anne's invention of a new data structure, a "screened bird," is also a significant *creative* achievement. Turkle, by looking for art in the superficial programming aspect of computers, seems to me like a painter who, when confronted with the score of Beethoven's fifth symphony, claims that it is not artistic because it is not visually attractive. Many of my non-scientific colleagues at Bunting were surprised to learn that scientists consider themselves

creative and artistic; they were amazed that I used words like beautiful and elegant to describe theorems and proofs. I fear that such misunderstandings promote negative attitudes toward science which discourage young women from scientific careers.

Returning to my main topic, I would like to discuss the feature article in the March, 1985 issue of the Radcliffe alumnae magazine. It is entitled "Women who could rule America," and contains statements by possible candidates for cabinet-level positions. Curiously, although there were no candidates for several significant positions--such as Secretary of State--the article contains not one, but three(!) candidates for the Director of NSF. Now I would have little difficulty in coming up with the names of several women scientists who would make excellent directors of NSF. However, none of the three Radcliffe candidates is a practicing woman scientist. All three are women with scientific backgrounds who now work in public policy or social science areas. One of the three, former biologist Dr. Dorothy Zinberg, did present an excellent statement which showed considerable understanding of both the problems facing NSF and the funding of basic research. However, the other two, Dr. Evelyn Fox Keller and Dr. Shirley M. Malcom, presented a joint statement so devoid of insight into the relevant issues that I consider it totally unacceptable for a potential director of NSF. The article also contains two candidates for Secretary of Health and Human Services, only one of whom even mentioned NIH and related issues involving biomedical research in her statement. Even if one found some of these candidates more acceptable than I do, the failure to propose even a single active scientist from so many candidates sustains the public misconception that qualified women scientists do not exist.

My final example concerns an article by Dr. Sheila Tobias in the June, 1985 issue of *Physics Today* in which she attempts to extend her theories on math anxiety to "physics anxiety" and possibly even "science anxiety." Although I missed this article when it first appeared, my attention was drawn to it through a subsequent series of offensive letters by men vehemently opposed to Tobias' views. After reading the article, I realized that, although I still found the tone of the men's letters offensive, I shared many of their underlying concerns. Although the article has some useful insights, Tobias makes no distinction between women who really have fundamental difficulties with basic mathematics, capable women who do not have the proper mathematics background for studying physics, and capable, well-prepared women who choose to go to law, medical, or business school rather than pursue scientific careers. Thus, the article left the male letter-writers with the impression that most women cannot succeed in physics courses with the traditional high standards, and that more women will pursue careers in the physical sciences only if we promote special introductory programs, remedial courses, and spoon-feeding. Her rebuttal does nothing to dispel this view. She objects to the view that physics and mathematics require special talent and ability as an elitist one that keeps women out of the physical sciences; she does not seem to consider the possibility that mathematics and physics do require special ability but that many women, as well as men, do possess the necessary talent to pursue careers in the physical sciences.

Although Tobias devotes a great deal of attention to "cures" for physics anxiety, she does not mention the prophylactic effect of proper math preparation. Neither the importance of encouraging women to take the necessary math courses in high school, nor the value of stimulating programs to encourage the talented, are discussed in her article. On the contrary, she seems to feel that students with only 3 years of high school math are well-prepared for calculus, physics, and engineering. Women students who disagree merely "think" that they are inadequately prepared! In some ways, Tobias' ideas resemble those of Turkle, who also seems to feel that the subject must change in fundamental ways in order to accommodate women. In particular, Turkle seems to feel that we should not insist upon teaching women students to *plan* their computer programs. Instead Turkle feels that the field should change to accept the less-structured interactive and "artistic" approach that she considers feminine.

One recurrent idea in many articles of this type is that women are more intuitive than men, where intuition and logic are perceived of as opposites. In this context the notion that women are more intuitive seems suspiciously like a rewording of the old bigoted male accusation that women can't think logically. Another distressing theme, which did not surface in the examples above, is that women are naturally more inclined to the biological sciences because of their "nurturing" instincts. I am particularly sensitive to this misconception because, as a young graduate student in chemistry, I was told that women should study biochemistry rather than physical chemistry. (Undeterred, I wrote my thesis on a mathematical problem in quantum chemistry, beginning a continuous transformation to mathematical physics.)

Although I would like to dismiss such opinions as belonging to a misinformed minority, I fear that they are actually the tip of a very serious iceberg. As the examples from *Newsweek* and the *Boston Globe* illustrate, these women have succeeded in attracting a great deal of attention and publicity to

themselves and their views. They are frequently perceived of as women scientists and as *spokespersons* for women scientists. Non-scientists, particularly feminist academics, assume that their views represent the majority opinion of women scientists.

That non-scientists do regard the views of this vocal minority as orthodox was impressed upon me during my stay at the Bunting Institute. Most of the women I met at Bunting ordinarily had little or no contact with women scientists, whom they assume to be far rarer and more isolated than we actually are. (One seemed surprised to learn that I actually knew other women mathematicians.) Their attitudes toward science ranged from enthusiastic amateur to severe anxiety and avoidance. But most of them, regardless of attitude, received their information about women scientists from sociologists, some of whom they regarded as scientists. (One considered Sheila Tobias to be the quintessential woman mathematician.) As a result, their views about science and women scientists were often quite distorted. Furthermore, because the social scientists in question are widely regarded as staunch feminists, dissenting views are sometimes regarded as non-feminist.

Having, I hope, convinced you that there is cause for concern, I now come to the problem of what to do about it. Frankly, I don't know. Obviously, we should speak out whenever possible. Because of the disturbing tendency to dismiss individuals who hold opposing views on these issues as "non-feminist," I feel that it is particularly important for organizations, such as the AWM, to take a stand. In order to do this effectively we need to find ways of increasing our visibility. Ideally, news agencies seeking commentary on such issues should seek out representatives of AWM and similar organizations, rather than social scientists. Although AWM is very visible and effective in the mathematics community, it does not have the same notoriety in either the popular press or in feminist circles. We will have to find ways to change this if we want to effectively confront these issues.

Nor do I mean to condemn all social scientists. Many of them do excellent and important work. But we do need to be aware of, and deal effectively with, those whose work affects the progress of women in science. I think that we also need to find more ways to communicate informally with non-scientists. We should take advantage of hidden opportunities, as might occur when one serves on a university-wide committee, to interact with non-scientists.

I hope that those of you who have persevered in reading this rather long article found it stimulating. I would appreciate your comments and suggestions.

Sincerely,

Mary Beth Ruskai

JULIA ROBINSON'S THESIS

Lisl Gaal, University of Minnesota, Minneapolis, MN 55455
from a talk delivered at the New Orleans meeting in January 1986

In Memory of Julia B. Robinson

I am here to speak on behalf of Julia's many friends; in particular, I want to mention Emma and Dick Lehmer. As many of you know, Julia was a great champion of everyone's right to privacy. She once told me: "When I am dead, I hope I shall not be remembered by anecdotes, but for my work". I first met Julia in 1950 shortly after her thesis was published. [Julia B. Robinson. "Definability and Decision Problems in Arithmetic." *J. of Symb. Logic*, v. 14 (1949), 98-114.] Her unusual methods were the talk of Berkeley, so today I shall speak briefly on her Ph.D. thesis.

First a little bit of background. In 1931 Godel published his famous theorem stating that if A is the set of all statements using variables ranging over non-negative integers (but not sets of integers), the constant 0, operations S (successor), $+$ and \times and logical connectives \wedge, \vee, \neg and quantifiers $\forall x, \exists x$, then A contains some statements which can neither be proved nor disproved using the Peano axioms or any recursive extension of the Peano axioms.

In 1939 Alfred Tarski however showed that the equivalent result for the theory of real numbers, that is when the variables in the formulas of A range over the reals and the axioms are those for real closed fields [cf. as given by van der Waerden] is different: this result was not published until 1949 in a Rand report [A. Tarski. "A decision method for elementary algebra and geometry." Project RAND,

Publ. R-109. 1948] in which he describes a decision procedure using algebraic methods, in particular Sturm's theorem on the location of roots of polynomials. Tarski's result implies that there cannot be any formula $\text{Int}(r)$ in A such that $\text{Int}(r)$ holds for the real number r if and only if r is an integer. For if there were such a formula, then we could formulate the Peano axioms, and we already know that any deductively closed system which contains the Peano axioms must contain undecidable statements, while the theory of reals is decidable.

This leads immediately to the following question: What happens if we allow the variables to range over the rational numbers? The field \mathbb{Q} of rationals contains the integers, but it is densely ordered like the reals and there is a well-known test whether a given polynomial has a rational root. So it seems plausible to guess that Tarski's methods could be modified to yield a decision process to determine the truth or falsehood of any statement in A for the case when the variables are allowed to range over the rationals. It was characteristic of Julia Robinson that she could not be fooled by plausible arguments, so by some remarkable unexpected number-theoretic methods she produced a formula $\text{Int}^*(N)$ in which N and all other variables appearing in it range over the rationals \mathbb{Q} and which has the property that $\text{Int}^*(N)$ holds if and only if N is an integer. Again using Godel's theorem, this shows that there is no algorithm to decide whether a given statement in A about rational numbers is true.

Now for a brief glimpse at the methods mentioned above. I have no idea how Julia arrived at the following formula and the accompanying proof using, of all things, a theorem of Hasse on quadratic forms. [H. Hasse. "Über die Darstellbarkeit von Zahlen durch quadratische Formen im Körper der rationalen Zahlen." *J.f. Reine & Angew. Math.*, v. 152 (1923), 129-148.]

In the following, lower case variables a, b, c, \dots will stand for integers, upper case variables A, B, C, \dots for rationals. The theorem is: The rational number N is an integer, i.e., $\text{Int}(N)$ holds, if and only if

$$(1) \quad \forall A, B \{ [\phi(A, B, 0) \wedge \forall M (\phi(A, B, M) \rightarrow \phi(A, B, M+1))] \rightarrow \phi(A, B, N) \}$$

where $\phi(A, B, K)$ is an abbreviation for $\exists X, Y, Z (2 + ABK^2 + BZ^2 = X^2 + AY^2)$. That is: The rational number N is an integer if and only if for all rationals A, B , $\phi(A, B, N)$ holds, provided $\phi(A, B, 0)$ holds and $\phi(A, B, M) \rightarrow \phi(A, B, M+1)$.

Mathematical induction shows that every integer satisfies (1), but the converse is quite another matter.

I only have time to repeat Julia Robinson's argument showing that if $N = n/d$ in lowest terms satisfies (1) and p is a prime $\equiv 1 \pmod{4}$ then $p \nmid d$. A parallel argument shows that the same is true if $p = 2$ or $p \equiv 3 \pmod{4}$.

The starting point for the first case is this result of Hasse:

Lemma 1: If p and q are odd primes, $p \equiv 1 \pmod{4}$ and $(q/p) = -1$, then $\exists X, Y, Z (M = X^2 + qY^2 - pZ^2)$ if and only if M is not of the form

$$pkS \text{ with } (k/p) = -1$$

nor

$$qkS \text{ with } (k/q) = -1,$$

with S rational.

This is now used to prove

Lemma 2: If p and q are odd primes, $p \equiv 1 \pmod{4}$ and $(q/p) = -1$, and $M = n/d$ in lowest terms, then $\exists X, Y, Z (2 + pqM^2 + pZ^2 = X^2 + qY^2)$, i.e. $\phi(q, p, M)$ holds, if and only if $p \nmid d$ and $q \nmid d$.

Proof: Let $m = 2d^2 + pqn^2$. Then $m/d^2 = 2 + pqM^2$ so it is clear that $\exists X, Y, Z (2 + pqM^2 = X^2 + qY^2 - pZ^2)$ if and only if

$\exists X, Y, Z (2d^2 + pqn^2 = m = X^2 + qY^2 - pZ^2)$, and we need only show that m can be represented in this form if and only if $p \nmid d$ and $q \nmid d$.

Now if $p \nmid d$ and $q \nmid d$, then $p \nmid m$ and $q \nmid m$, so by lemma 1, $\exists X, Y, Z (m = X^2 + qY^2 - pZ^2)$.

Conversely, suppose $p|d$; say $d = pr$. Then $m = 2p^2r^2 + pqn^2 = pk$, where $k = 2pr^2 + qn^2$. But qn^2 is prime to p , so the quadratic character $(k/p) = (2pr^2 + qn^2/p) = (qn^2/p) = (q/p) = -1$. Hence, again by lemma 1, there are no rational numbers X, Y, Z such that $m = X^2 + qY^2 - pZ^2$. If $q|d$, the proof is similar, using quadratic reciprocity.

Finally we have

Lemma 3. If $p \equiv 1 \pmod{4}$ and p is prime, then there is an odd prime q such that $(q/p) = -1$.

Proof: If s is any quadratic non-residue of p , then either s or $p+s$ must be odd and so have only odd prime factors. At least one of these must be a non-residue. Let this prime be q .

Lemma 4. If the rational number $N = n/d$ in lowest terms, satisfies (1) and if p is a prime $\equiv 1 \pmod{4}$, then $p \nmid d$.

Proof: By lemma 3, there is a prime q such that $(q/p) = -1$. Then by lemma 2 we have that $\phi(q, p, M)$ holds if and only if $p \nmid d$ and $q \nmid d$. Since the denominator of 0 in lowest terms is 1 and M and $M+1$ have the same denominator, we have $\phi(q, p, 0) \wedge \forall M (\phi(q, p, M) \rightarrow \phi(q, p, M+1))$. Therefore if N satisfies (1), then $p \nmid d$.

As previously mentioned, a parallel argument establishes that d cannot be divisible by 2 nor by any prime $\equiv 3 \pmod{4}$. So, quoting from the paper: "Combining these results, we see that the denominator of N is not divisible by any prime and therefore must be 1. Hence N is an integer".

The thesis then combines this with results of Tarski, Mostowski and others to extend many of their theorems on undecidability and definability. Moreover there are still more new results which have additional applications found in the book by A. Tarski, A. Mostowski and R.M. Robinson [*Undecidable Theories*. Studies in Logic. North Holland Publishing Co. 1953.]

It was recently pointed out to me by R.M. Robinson that if one could give a purely existential definition of the integers in the rationals, then one could extend the negative solution of Hilbert's tenth problem to show that there is no algorithm for deciding whether a diophantine equation has a rational solution. It would be a fitting tribute to Julia Robinson if someone in today's audience (or a reader of this article) were to do this.

ETHICS AND TECHNOLOGY

The Annual Meeting of the American Association for the Advancement of Science will feature a symposium on "Ethics, Evidence, and the Management of Technological Hazards." The symposium is scheduled for Tuesday, May 27, 1985, 2:30-5:30, in the Commonwealth Room of the Hershey Philadelphia Hotel. Symposium speakers will examine scientific, philosophical, and value issues that arise as scientists and engineers participate in risk management processes.

Participants include William Colglazier, Director, Energy, Environment and Resources Center, Univ. of Tenn.; Roger Kasperson, Director, Center for Technology, Environment and Development, Clark Univ.; Valerie Miké, Clinical Prof. of Biostatistics, Cornell Univ. Medical College; Deborah Mayo, Asst. Prof. of Philosophy, Va. Polytechnic Inst.; Jack Campbell, Deputy Asst. Administrator, Office of Policy, Planning and Evaluation, U.S.E.P.A.; June Fessenden-Raden, Prof. of Biochemistry, Biology, and Society, Cornell Univ.; Jerold Mande, Legis. Asst. for Health, Environment and Science Policy to Sen. Albert Gore, Jr.; Robert Moolenaar, Project Dir., Health and Environmental Sciences, Dow Chemical Co.; Sheldon Samuels, Dir., Health, Safety and Environment Department, AFL-CIO; and Ellen Silbergeld, Senior Scientist, Toxic Chemicals Program, Environmental Defense Fund, Inc.

The symposium is being organized by Deborah Mayo and Rachele Hollander, Director, Ethics and Values in Science and Technology Program, National Science Foundation. For further information, write the EVIST Program, Room 310D, National Science Foundation, Washington, DC 20550 or call 202/357-7567.

ETHICAL PROBLEMS IN MATHEMATICAL LIFE: Part 1 of 2

edited versions of panel talks, "Ethical Problems in Mathematical Life," Laramie, Wyoming, August 12, 1985
transcriptions by Margaret Munroe, Ruth Rebekka Struik, and Anne Leggett from tape provided by Struik
Marian Pour-El's and Jean Taylor's talks will appear in a later *Newsletter*.

Susan Montgomery, University of Southern California

My topic is quite a bit different than Marian's, because I had received a letter from Linda suggesting we talk about some of the difficulties we have as research mathematicians in dealing with the journal system, about refereeing, and about co-authors. Especially for young mathematicians, how do you deal with some of the difficulties that come up?

One point I want to make first of all. I had a discussion about a year ago with my late colleague, Mark Kac, in which I wanted to gripe about something. I prefaced my remarks by saying "Well, I'm afraid I'm a bit paranoid," and Mark said, "Well, all mathematicians are paranoid," and we should go on from there.

Thus I wanted to say that when you're in a situation in which you feel something is going badly wrong, and you're being mistreated, first of all look at your basic paranoia and try to analyze what's happening. I think we should first look around for simple ignorance, carelessness, and stupidity before we assume that someone is treating us badly deliberately. So that's one of my main points.

Next I'll discuss some of the experiences I've had which were difficult to know how to deal with. Actually, dealing with journals has been a lot easier in the sense that there's a structure to the system. After all, you're dealing with an editor, so, in this case, if you feel your referee has not been fair, you should simply write to the editor. In fact some journals have a policy that they automatically will give you a second referee's report. Others do not, but may if you have cogent reasons. I know of an example recently where a paper was rejected, and the author was furious because he suspected that he knew who the referee was. He wrote to the editor - and then called him up on the telephone - and said "I suspect the referee's report came from X, and therefore I'd like a second referee's report." Now in fact the referee's report had come from X, and the author was absolutely correct. The editor didn't say yes or no, but agreed that he'd get a second opinion. Thus asking for second opinions is actually done. This is certainly one recourse, but in this case there are channels in which to proceed. I'll give some other examples.

One of the unfortunate things that has happened recently to several friends of mine is to have a paper rejected on the grounds that their result is in the literature. Now, unfortunately, these referee's reports didn't say where in the literature. I would make an appeal to anyone who is a referee that, as a courtesy, they could explicitly refer to the author and the journal (and preferably the theorem number). If a result is really known and it's in the literature, then the referee should be able to document this. Anyone who submitted a paper and got this kind of a report certainly has the right to know precisely where the result has appeared.

A colleague recently got a referee's report which said, "Oh, this surely is well known and must appear in work of so-and-so." So you go to the library, and you look all through the papers of so-and-so that could possibly be relevant, and it's nowhere. Now, what can you do? This is simply unjustified!

A more egregious case recently happened to another friend of mine in which the paper was simply rejected because "surely the results were well known". But it turned out they weren't well known, and a year later in a conference the referee (it was clear he was the referee since the author hadn't circulated this paper) used a result from this paper he'd rejected in his talk, and he referred to it as a result of my friend. Thus the referee was willing to use this theorem, and attribute it, because it turned out he hadn't been able to find it in the literature. However, by now the paper had been rejected for six months. So these things do happen; some referees are not fair.

But again, I don't think these are examples of deliberate unethical behavior. It's simply that the referee is lazy. The referee sees a result and thinks "Oh, this looks familiar; oh, surely everyone knows this", and is just too lazy to walk over to the library and spend a half hour and try to look it up.

I keep wondering in my mind if these are really ethical questions. Again, it's carelessness and laziness, I think, more than anything else.

An area where there are much trickier problems has to do with joint work. Now Marian has mentioned a very good collaboration. But sometimes these things can go wrong, and since there's no formal structure, in terms of editors or official referees' reports, to deal with, it's a much grayer area, and thus much harder to deal with. There are questions as to when someone is a joint author and when they're not, and perhaps even whether you're stealing someone's work or someone's stealing your

work. The worst experience I personally had in this respect was sending someone a small result I'd proved, with details, and asking what they thought of it. And they said, "Well, it's only a page, it's not worth publishing, it's nothing much, I would think." A year later I discovered a new paper by this very same person with the same theorem and the same proof in it. I was rather upset about this. When I asked about it, the person claimed not to remember my having sent them the argument and also said, "Well, it was up to you; you had a chance to publish it." There was very little I could do in a situation like this. In the long run, I decided to chalk it up as a learning experience, to realize that there are some people you can trust as co-authors and some people you can't. Or some people that you can trust in discussing your work and some people you can't. Now I have had very fine collaborations with a number of people, and especially in the last five years almost all of my work has been joint. So I am very much in favor of collaborations. You just have to know the person you are collaborating with.

Another problem was mentioned in Linda's letter: you had discussed a problem with someone and thought you were doing joint work, and later you see a paper just by this person, on the topic you'd discussed. The opposite problem occurs if you are discussing your work with someone, and discover your proof the course of talking to this other person, but they haven't contributed to the proof; on the other hand they've been sitting there the whole time asking you what may have been just the right questions. Now - would you have proved this result if you hadn't spent the previous three days talking to this person? If you wouldn't have done the work without the help of the other person, then perhaps they should be a co-author. On the other hand, you could simply mention them for helpful discussions. It's a decision which you have to make, and it can be awkward. These are not easy questions, and there are no easy answers. I can't give any advice except to say I think I've been on both ends of this, and have made some good decisions and some bad decisions. It's still a continuing concern.

That's all I want to say.

Anne Leggett, Loyola University of Chicago

As someone whose primary interest professionally now is teaching rather than research, I have decided to devote my time to speaking on the ethics of teaching, both with regard to teaching itself and to dealing with students.

I feel that every faculty member has an ethical duty to teach adequately. It is all too common these days for those of us among the untenured to hear, "Well, the administration claims they want good teaching, but research is all that really counts." In defense of this, we also hear that good research promotes good teaching and, even worse, that only good researchers make good teachers.

I agree that someone who is dead in the water intellectually is not going to be a great teacher. But I don't see how being on the frontiers of research automatically endows one with the capability to explain the chain rule or substitution well to the average calculus student, either. I'm sure most of you know plenty of good researchers who are terrible teachers, and lots of mediocre researchers who are great teachers. Hearing would-be hot-shots brag about how poorly they treat their students sets my teeth on edge. Listening to junior faculty explain that they don't have the time to learn how to teach saddens me.

To me, the ideal situation would be one where good teaching is respected and rewarded, independent of research. Young faculty should not be pressured into choosing between writing papers and preparing properly for their courses. I just want to mention one issue in particular that I feel strongly about. Faculty, both junior and senior, should post office hours and actually *attend* them. Students should not be made to feel that they are a necessary evil in the academic enterprise. Many times students have thanked me profusely for giving them a little of my time. After assuring them that I'm happy to be appreciated, I often tell them, "After all, that's what I'm here for." Usually they say, "I wish more of my professors felt that way." I think this is a major ethical problem in academic life.

The academic community has an ethical duty to face squarely the qualifications of the students who are being admitted to their institutions. Demographics are changing, yet we want to keep enrollments up. It is unethical to expect a much less elite student body to be as capable as those fabled youth of days gone by. It's true that math education in high school has its problems. But who trained all these math teachers in their mathematics, anyway? I get tired of hearing, "This isn't college-level material." I think that "college-level" has changed in the last 20 years, whether we like it or not. I make no claims for personal moral virtue here: I have taught relatively little pre-calculus mathematics. All I'm saying is that if we let them in, we have to teach them at the levels they're capable of.

Another area of ethical concern - here I'm speaking more about teaching practice - is in grading. I think many young faculty have problems deciding what to do. Most of us have some kind of numerical scheme which makes hopefully a large percentage of decisions about grading easy. Unfortunately we usually have the dreaded "borderline cases." Life would be much simpler if one could just give the higher grade to the students one likes and the lower one to the annoying jerks and crybabies--often one can rationalize such decisions on the basis of "attitude" or "class participation", but... Early in my teaching career I used a complicated procedure I no longer understand myself to assign grades--I didn't consider it *ethical* then just to add points. Looking over some final grades before I turned them in, I noticed that two fairly similar performances had earned a "C" in one case and a "D" in the other. Then I realized that the "C" student was pleasant and at least appeared to work at the subject, while the "D" student had been observed to walk across lawns skirting buildings in order to avoid passing me on the sidewalk. So I changed the "D" to a "C". And adopted an ethical principle I still maintain: before turning in final grades, compare in some fashion performances *without names attached*.

Another common ethical problem with grading is how to deal with sob stories. How many of us are either so hard-hearted or so principled that we have never changed a grade? Students have many real problems which interfere with their academic performance. Is it fair to them or to their fellows to change grades? Is it fair not to change a grade if you know of genuine extenuating circumstances? I wish I had some better answers here. Probably the best thing to do in a particular difficult case is to talk to your colleagues and try to get some feedback.

How do you deal with cheaters? I have colleagues who feel it is unethical to do anything less than flunk them for the entire course. Personally, I think that's too harsh for an isolated instance probably inspired by panic. Recently in my department we had a particularly repellent case: a student was stealing exams and substituting her own name on them. Everyone's first reaction was, "Off with her head." Certainly she would receive an "F". The question was, should more extreme measures be recommended. We ended up voting that she should be expelled from school. Even so, we could imagine extenuating circumstances (none were offered in this case) which would have led us to recommend heavy doses of counselling instead. I guess my main point here is that I think it isn't really the best procedure just to have an automatic policy to follow when students are found cheating. It's easier on the faculty member that way, perhaps, but I'm not sure it's best for the students in their moral development.

Even most students agree that cheating on exams is unethical. But what about copying homework? or computer science programs? Here most students have no qualms, no matter what stirring speeches one makes to the class (they *do*, of course, understand zeros, but often feel we're just being entirely unreasonable). My question here is, how large is our ethical duty to attempt to instill an ethical sense in our students? I have up to now contented myself with a statement about cheating on course syllabi and the aforementioned speeches when behavior gets out of hand. But lately I wonder if that's enough. I think the fact that I'm in a department that teaches computer science where we do see so much copying of computer science programs, or cases where students feel that if they change the variable names we won't be able to tell that they have copied the program and so on, that has me thinking so seriously about this subject. At my school they take three theology courses and three philosophy courses, but the ethical considerations involved in copying homework and programs do not seem to be among the material of those courses.

I have had many conversations, mostly informal, with many colleagues on these issues. I find the percentage of us who truly care about them to be reassuring. I hope that those of us who have been around a little longer will continue to try to help our younger colleagues develop a truly ethical approach to their teaching. I close with the hope that teaching will again become a more central component of mathematical life.

Gail Young, University of Wyoming

I'm going to talk about a matter I've had a large amount of experience in, namely, the vexing pressures surrounding tenure and its decisions. First of all, I have learned that rather few young scholars understand the tenure procedure until they are going through it. And they're lucky if they understand it at the end. The normal procedure is: a department writes for outside evaluations, conducts an internal review of such matters as teaching and service, reviews all the material, and then the tenured faculty votes. In a good department in a well-run university the vote of the tenured faculty

is the major factor in the tenure decision. (In a poorly run university many other things can happen.) The chairman forwards the recommendation onward. In some universities the chairman writes his own separate opinion, and in some universities that gives him an absolute veto, although that is never written down in the rules. The material goes to the dean, who forwards it usually to a committee of the college, which passes on that case and on all the other cases of tenure for that year. The dean then forwards that recommendation and all the supporting documents from below on to the chief academic officer (again often with his own recommendation, which in poor universities also can amount to a veto). The executive officer goes through some procedure, often involving another committee, and sends a final recommendation on to the Board of Trustees. It's extraordinary for a Board to do anything besides endorse the academic officers' recommendation.

Now, from the standpoint of a young person beginning this process, where should that person's involvement begin? It should begin in the employment interview. If it is at all possible, you should find out then exactly what will be expected of you for tenure, whether research is really a major component, what emphasis is made on teaching and so forth. There are times when this is awkward to get. You may find yourself wanting to ask, not the chairman, but some other member of the department, if anyone seems sympathetic. That's a piece of practical advice, rather than what the situation should be. The chairman should feel the responsibility to give you that information himself in the interview. That often does not happen.

In a good university, there will be some sort of rather formal review about halfway up to tenure. It's one thing to be told that you will probably not get tenure, and have several years to change jobs, or to improve the record. It's another thing to be up for tenure and denied it with little warning. The first will have rather little effect on your career. The second may make very major changes in your future. If there is no such review, at about three years, you yourself should start asking questions about how you're doing, and try to get a quite clear answer.

In outlining the formal process I mentioned the getting of outside letters. In my opinion, the candidate has the right to suggest some names of people that the candidate believes have standing in his field and who have a knowledge of his work, and to expect that some of the letters going out will be to people on his list. I don't think he has any right to expect that only his names will be used. But this is rather important - and it is very easy for a chairman or committee to influence a tenure decision by picking out carefully who is written to and what is said. I know of a case of a university - then a rather weak one - where the letter to one of the referees - let's say he was at Princeton - it was one of that class - asked, "Would this person receive tenure at Princeton?" The answer was obviously "No". Fortunately, the Princeton professor read through the letter and saw what the real meaning was, never answered that question, but wrote back quite a strong letter. But that is the sort of deliberate attempt to sabotage a decision that can be made. And there is nothing in the wide world that you can do about it, even if you know about it. You are stuck.

Is there discrimination in these things based on questions of race, sex, etc.? Answer: of course, yes. But it's very hard usually to document. Professor Montgomery's point about the paranoia is well-taken. It is very hard to be sure that it is a factor like that that is involved and not your own ability. You can usually get some feeling beforehand. Are you actually treated from the beginning as a real member of the department, listened to on departmental matters, as well as everybody else of your rank? Do you suddenly find that you have more minor duties and chores than anybody else? This particularly happens to women, who frequently find that they are supposed to run the departmental picnics, or supply things for departmental teas or what-not. I think those are bad signs. And you may then have some sort of trouble at tenure. But again it is very hard for a young person to know really what is expected. If you fall into this sort of role, you are asking for trouble. You have to start fighting it right away.

The hidden sexism or racism is remarkable. In the early 60's the MAA had a conference of faculty from traditionally Black universities. I was one of the organizers of it, and about half-way through, I asked if they would like a discussion of the black student in the white graduate department. They were enthusiastic about the idea. I said at one point that they will not run into overt racism in graduate school. I never had so many people mad at me all at once in my life. One person after another got up and gave examples of the crudest sorts of racism, naming the names, and they included people I had regarded as distinguished mathematicians. And I think the same thing - perhaps less crudely - goes on with women. It can be very well-hidden. Professor Pour-El's example of the people who told her they were against the Equal Rights Amendment represents quite honest people. Lots of people would not tell her that.

Suppose things go very badly, and you yourself are convinced that issues other than mathematical and teaching ability were involved. What do you do? Most universities have a faculty grievance committee of some sort which you can appeal to. One place where I was a chairman, I had a woman who was denied tenure at the level above the department, who did just that. The committee endorsed her position (and mine); the administration paid not the least bit of attention to it. She was forced to go to an equal rights commission, which found in her favor and awarded her reinstatement, which she didn't take, and back salary. But there was a case where the evidence was really absolutely clear. It is often very, very hard - even though you and others are convinced that racism or sexism is involved - to react properly. But these are matters which you cannot handle by yourself. You must get help from outside, and advice from outside, preferably from outside your campus. I think this is something that the AWM could do very well indeed.

With some diffidence, I will say that I would be very glad to offer advice on any particular case.

NSF ETHICS AND VALUES STUDIES

The National Science Foundation is continuing to consider preliminary proposals to examine ethical or value issues associated with current U.S. scientific or engineering research or its use.

Preliminary proposals are 3-5 page letters that identify an area of inquiry, methods and prior work, contributions expected, dissemination and evaluation plans, investigators' credentials, and term and budget for the project. The NSF places special emphasis on investigations of ethical or value issues that affect or are affected by the kinds of basic research efforts supported in its research directorates.

Letters should have a cover page with name and address for further correspondence. They should be sent to Dr. Rachele Hollander, Directorate for Biological, Behavioral, and Social Sciences, Room 310 (202/357-9894).

FOR BOYS ONLY

In February, the Museum of Science, Boston, announced its spring program of Cabot Seminars for High School Students. There were 29 advertised. Number 16, LISP, Computer Algebra and Expert Systems, was described; the description ended with the comment "For Boys Only." Many people have protested this sexism, and the course has subsequently been canceled.

AWM sent the letter which follows to Dr. Roger L. Nichols, Director of the Museum. A second letter sent by Dr. Judith Obermayer is also included. The AWM letter was written by Eleanor Palais. We hope our readers will stay alert to such issues and will also protest unfair practices when they occur in their areas.

Dear Dr. Nichols:

Though many of us may have contacted your organization individually, we feel compelled to write to you on behalf of the Association for Women in Mathematics to officially respond to what our organization feels was a serious disservice to women of all ages and disciplines. I am, of course, referring to your brochure of the Cabot Seminars which advertised the LISP Seminar for high school students (for boys only). The only good news came from the many horrified comments of disbelief that such a brochure could still be printed from anywhere...to say nothing of coming from an organization we have previously respected for its professionalism and contribution to science and math education. The bad news is, the blurb is still being dismissed as an oversight by those whom we called at the Science Museum, and whose comments have been "the course has been canceled" or "the blurb was written by a teacher at a boys' prep school who was uncomfortable with girls."

We feel at the very least the course should be offered still to young men and young women students and even more seriously we feel you owe an apology and explanation to all those to whom the

brochure was originally sent. We understand that the Museum mailed 60,000 of the brochures in its original mailing. We urge that you send a second mailing of 60,000 with your apology and explanation.

As college, university, and high school teachers we see that many of our most talented students are women who often are faced with intolerance ranging from veiled comments to blatant sexual bias as yours appeared to be. Please help us support and encourage women in Mathematics and do not undo the small yet significant inroads we have made toward wiping out sexual bias in education.

Sincerely,

Eleanor G. Palais, AWM Council and Mathematics Teacher, Belmont High School
Alice T. Schafer, Former President of AWM
Lynnell T. Stern, AWM Treasurer

Dear Dr. Nichols:

A few days ago I received an announcement of the Cabot Science Seminars for Spring, 1986. Since I have a great deal of interest in stimulating interest in science and math among young people, I looked at the course offerings. Generally I was very impressed with the types of seminars offered. However, in one instance, I was offended and disappointed. The Museum of Science has lent its full weight as an institution to sex discrimination and has reinforced the myth that women should not pursue careers in mathematics and computer science. By allowing a course to be offered FOR BOYS ONLY (#16 Introduction to LISP, Computer Algebra and Expert Systems) you have sent a clear signal to young women to stay away from computer science--you will not be accepted--and subconsciously to stay away from the Museum as well. It is bad enough when faced with such attitudes in individuals, but for the Museum of Science to perpetuate such attitudes is appalling and certainly not in the best interest of science.

I hope you will publicly retract the restriction on this seminar and establish a formal policy which prohibits such practices in the future.

I would appreciate being informed about how you intend to deal with this issue.

Sincerely,

Judith H. Obermayer, Ph.D., Chairman of the Board
Moleculon Research Company, Cambridge, MA 02139

SEX DISCRIMINATION IN ACADEMIA

press release

The publication of *The Campus Troublemakers: Academic Women in Protest* by Athena Theodore, a landmark book on sex discrimination in the hallowed halls of Academe, is announced by Cap and Gown Press. *The Campus Troublemakers* documents the struggle for sex equity by academic women in American higher education. Through their personal accounts of their experiences, we follow their protests from the first moments of rising consciousness to the seeking of redress through campus channels, then law enforcement agencies and finally the courts.

All aspects of the academic employment process are covered: graduate study, job seeking and entry, promotion, salary, tenure, and other benefits. Administrative roles are included as well as part-time and temporary employment. These conditions and events are presented within a theoretical perspective of social movements that views the protest actions as an early stage of social unrest and rising consciousness. Despite the existence of laws prohibiting sex discrimination and efforts of affirmative action, these protest actions were largely unsuccessful.

Academic women reveal the reasons for their failure to achieve their goals: the many structural and institutional obstacles, strong resistance by administrators and male faculty peers, lack of support, inefficiencies of the governmental bureaucracy, sexism in the courts and the legal profession, and the weaknesses inherent in their small number.

This book reveals the devastating impact of protest on the professional careers and lives of women. It speaks of power and powerlessness and of how academia is institutionalized, both formally and informally, to perpetuate discrimination against women teachers and scholars, and punish those who dare to speak out against injustice.

Athena Theodore, the author, was one of the first sociologists to offer courses in Women's Studies. Her early research on voluntary action and the professional work roles of women led to her earlier book, *The Professional Woman*. She is now Professor Emerita of Simmons College.

The book may be ordered from Cap and Gown Press, Inc., Educational Books, Box 58825, Houston, TX 77258.

NATIONAL SCIENCE WEEK 1986

A joint resolution has been introduced in Congress designating May 11-17, 1986 as National Science Week to focus the nation's attention on the importance of science and technology. The National Science Foundation is coordinating the Week's activities which are expected to include the efforts of thousands of individuals and organizations. The House Joint Resolution 484 is sponsored by Representatives Don Fuqua (D-FL), Manuel Lujan (R-NM), Doug Walgren (D-PA) and Sherwood Boehlert (R-NY) and requires the cosponsorship of 218 members of the House for floor action. In the Senate, S.J. Res. 251 was sponsored by Senators Orrin Hatch (R-UT) and Slade Gorton (R-WA).

The joint resolution points out the vital role science and technology plays in improving the quality of life. The resolution also notes that the nation's rate of scientific discovery and technological innovation is growing more rapidly than ever before, and that our nation's leadership is being increasingly challenged by foreign countries.

While National Science Week '86 is structured to reach many segments of the general public, its primary aim is to communicate with today's young students who will be the scientists, researchers, engineers, teachers, and citizens of tomorrow. The first National Science Week, held in May 1985, involved schools and universities, libraries and museums, professional organizations, businesses, and individuals in all fifty states, plus the territory of Guam. Special exhibits, lectures, student and teacher awards, workshops, research facility open houses, outreach programs and many other activities were planned as part of the Week.

Corporate sponsors for National Science Week include: Amoco Foundation, Atlantic Richfield foundation, the Dow Chemical Company Foundation, DuPont Company, Eastman Kodak Company, the General Electric Foundation, and IBM.

Close ties will be maintained with key scientific, professional and civic organizations such as the State Academies of Sciences and State Science Supervisors, the American Association for the Advancement of Science, the National Science Teachers Association, the Association of Science and Technology Centers, the Triangle Coalition, the National Academy of Science and the U.S. Chamber of Commerce.

NATIONAL WOMEN'S HALL OF FAME

The National Women's Hall of Fame is located in Seneca Falls, New York, the birthplace of women's rights. The focus of the Hall of Fame is to provide a unique place to honor and learn about American women. This concept is most clearly stated in its purpose: "to honor in perpetuity those women citizens of the United States of America whose contributions to the arts, athletics, business, education, government, the humanities, philanthropy and science have been the greatest value for the development of their country."

Today the National Women's Hall of Fame provides quality programming through its educational component and exhibits. To date educational information has been provided to over 30,000 people throughout the country, and the exhibits have been seen in many locations.

For more information, write National Women's Hall of Fame, P.O. Box 335, Seneca Falls, NY 13148.

PARENTS WITH CAREERS

press release

Parents with Careers, Inc., announces the availability of a unique, thought-provoking videotape. The videotape consists of six "trigger" vignettes which dramatize issues relevant to working and parenting. The videotape can be used by mental health professionals, employee assistance program practitioners, women's groups and professional organizations, trainers and educators, and universities.

The videotape is accompanied by a comprehensive leader's guide which gives instructions on how to conduct the seminar or workshop. It contains a list of goals to be met, and points to be emphasized. It has been successfully tested and used in major corporations, public agencies and professional organizations.

Each vignette can be used in numerous ways ranging from large lunchtime seminars to small parents' support groups. The vignettes can also be incorporated into existing programs such as stress management, time management, couple communication, interviewing techniques and decision making.

The videotape was developed by Parents with Careers, Inc. in cooperation with the C&P Telephone Company. The videotape is 32 minutes long, in color, and is available in all video formats. For further information, contact Parents with Careers, Inc., 2513 Oakenshield Drive, Rockville, MD 20854.

NWSA CONVENTION

The 1986 National Women's Studies Association Convention, "Women Working for Change: Health, Cultures and Societies," will be hosted by the Office of Women's Studies at the University of Illinois, Urbana-Champaign, June 11-15. The convention will address both conceptual and practical issues regarding the health and status of women in societies and cultures throughout the world. The major goals are to share ideas, research, and newly emerging knowledge; to equip participants with effective models and strategies for positive change; and to develop coalitions which will continue after the conference. There will be approximately 200 workshops, panels, and presentations. A set of three special symposia--"Women's Health in the Year 2000: Getting There from Here," "Creating New Metaphors to Live By: Women Changing Cultures," and "Deconstructing and Reconstructing Power: Women Designing Societies"--will be held.

For a registration form, write National Women's Studies Association, University of Maryland, College Park, Maryland 20742.

OF POSSIBLE INTEREST

Feminist Studies. 3 issues per year, \$19.50. Women's Studies Program, University of Maryland, College Park, MD 20742.

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

JOB ADS

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

Fairfield University. Dept of Math & Computer Science, Fairfield, CT 06430. George E. Lang, Chair. One year position teaching a total of 21 credits. Fairfield is a Jesuit school located near Long Island Sound about 70 miles from New York & 30 miles from New Haven. Prefer PhD in math; AMS or ABD are encouraged to apply. Please send cv including name and phone of 3 references. Position will remain open until filled.

Amherst College. Mathematics Dept, Amherst, MA 01002. Prof. Norton Starr, Chmn. Applications are invited, pending approval, for a tenure track or a visiting position in Computer Science, preferably at the Asst. Professor level beginning 8/1986, or January, 1987. Amherst College is a competitive, private liberal arts college which emphasizes scholarship and creative teaching. Applicants holding a PhD in Computer Science, mathematics or a related field, experience in teaching undergraduate Computer Science courses are preferred. Reply to Chairman or Bitnet mail to: NSTARR @ UMASS.

Grand Valley State College. Math & Computer Science Dept, Allendale, MI 49401. Dr. Donald W. VanderJagt, Chair. (1) Math: Asst or Assoc Prof. Required: PhD with emphasis in stat or math education. Prefer candidate with strong teaching recommendations. (2) Comp. Sci: Asst or Assoc Prof. Required: PhD in Comp Sci or Information Systems. Prefer candidate qualified to assist in development of a graduate program. (3) Comp Sci: Instructor or Asst Prof. Required: Masters in C.S. with emphasis in IS or a Masters in related field with significant applications - oriented industrial-computing experience. For all positions duties include teaching, curriculum development, student advising & professional development. Salary: commensurate with experience; good fringe benefits. Send complete resume to Chair.

Northern Michigan University. Dept of Math & Comp Sci, Marquette, MI 49855. Dr. Terrence L. Seethoff, Head. (906) 227 2020. Temporary position to teach undergraduate math or stat or comp sci, depending on preparation, & must have at least a Masters degree in one of these areas. By 6/1/86 send resume, transcripts, & 3 letters of recommendation to Head.

Oakland University. Dept of Math Sciences, Rochester, MI 48063. Prof Donald E.G. Malm, Chairman. Tenure track asst professorship. Required: PhD & strong research potential. Send resume, graduate transcript & 2 letters of recommendation to Chairman.

University of Michigan, Dearborn. Dept of Math, 4901 Evergreen Road, Dearborn, MI 48128. Dr. Stephen J. Milles, Chairman. (1) One or more visiting positions for 1986/87. Will consider a variety of research interests including pure or applied math or computer science. Teaching load 9 credit hours per semester undergraduate level. Required PhD in math or a related area by 9/86. (2) Also several tenure track positions 86/87. By 5/31/86 send resume & 3 letters of recommendation to Chairman.

ASSOCIATION FOR WOMEN IN MATHEMATICS
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The AMM membership year is October 1 to
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Make checks payable to:

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Box 178, Wellesley College
Wellesley, MA 02181
May-June, 1986

Marie A. Vitulli
Univ of Oregon
Dept of Math
Eugene, OR 97403

