

ASSOCIATION FOR WOMEN IN MATHEMATICS  
NEWSLETTER

Volume 7, Number 1

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REPORT OF THE PRESIDENT

AWM Meeting in St. Louis in January

AWM events at the Joint Mathematics Meetings in St. Louis will include a discussion session, open executive committee meeting, party, panel and general session. See schedule below. As usual, the AWM table will be a focal point of AWM activity and a good place for us to get together. If you will be in St. Louis, please stop by to help staff the table, or just to say hello.

Our panel "More History of Women in Mathematics: British Women Mathematicians" will be another in a series of panels and other AWM projects aimed at stimulating interest and promoting research in this area. Not only is our intent to explore the more familiar history in more depth, but also to investigate littleknown or new areas. The AWM panel last summer in Toronto focused on the lives and mathematics of some well-known women, Noether, Kovalevsky and Germaine; the St. Louis panel will focus on British women and will also explore some little known areas. For example, Teri Perl of Stanford University will discuss Mary Somerville and Ada Augusta Lovelace as well as the little known "Ladies' Diary", a popular woman's magazine published in England from 1704-1841 devoted in large part to problems and puzzles in mathematics. And, in maintaining our tradition of including a personal element (e.g. last summer Professor Emiliana Noether talked about her aunt-in-law, Emmy Noether), Professor Sylvia Wiegand of the University of Nebraska will talk about her grandmother, Grace Chisholm Young, the first woman to receive a formal Ph.D. in mathematics from Gottingen--indeed, the first woman Ph.D. in Germany in any field. (Women were not yet admitted to graduate schools in England at that time).

Schedule of AWM Events at the St. Louis Meeting:

Saturday, January 29, 4:30-5:30, Phillip Room, Bel-Air West Hotel

AWM Discussion Session: "Changing our Lives"

Moderator: Judith Roitman; Speakers: Elizabeth Bexman, Marion Pour-El

Saturday, January 29, 5:30-6:30, Phillip Room, Bel-Air West Hotel

AWM Open Executive Committee Meeting

Saturday, January 29, 9:00 p.m., AWM Party (Place will be announced)

Sunday, January 30, 12-1, Chase Club, Chase-Park Plaza Hotel

AWM Panel & General Session:

Panel: "More History of Women in Mathematics: British Women Mathematicians"

Moderator: Lenore Blum; speakers; Teri Perl, Sylvia Wiegand

Talks of Special Interest:

--Tuesday, January 25, 4:00-5:15 Grace Wahba "Smoothing and Cross-Validation,"  
(Short course in Statistics)

--Friday, January 28, 10:40-11:10, Judith Roitman,  
"How to do Topology: the Example of S and L"

(ASL invited talk in Special Session on Combinatorial Topology)

--Monday, January 31, 1:30-2:20, Mary Ellen Rudin, "Problems in Products" (MAA-NCTM Joint Session invited talk).

Panels on Education

--Friday, January 28, 7:15-8:30 p.m., NAM panel: "Some different approaches to the teaching of mathematics--success oriented learning principles and techniques"

--Saturday, January 29, 9:00-10:50 a.m., MAA-NCTM Panel: "The Third International Congress on Mathematics Education", moderator: Gail S. Young, panelists include: Shirley A. Hill (who was one of two women from the U.S. invited to speak at the Congress. The other was Elaine Pavelka).

--Sunday, January 30, 11:00-11:50 a.m. MAA-NCTM Panel: "How to Cope with MAA-Math Avoidance and Anxiety", moderator: Alice T. Schafer; speakers: Lenore Blum, Karel DeLeeuw, Deborah Hughes Hallet, Robert A. Rosenbaum

Luncheon for Lee Lorch:

On Saturday, January 29 a group of friends and former students of Lee Lorch is sponsoring a luncheon in his honor at Sam's Restaurant at the Chase-Park Plaza beginning at noon. Tickets for the luncheon are \$6.50 each, and will be available at the registration desk of the Joint Meeting. Vivienne Mayes has written a very moving article "Lee Lorch at Fisk: A Tribute" which appeared in the November 1976 issue of the American Mathematical Monthly", which I highly recommend.

AWM Executive Committee

Because of our discussions concerning the expansion of the executive committee to include wider representation, there have been various requests asking about the present composition of the executive committee. At present there are 9 members of the executive committee: the president, past-president, treasurer, editor of the Newsletter, employment officer and representatives from the east, west, midwest and south--all from academia. See list below. Our intent is to expand the executive committee to reflect a broader spectrum of AWM interest areas as well as to stimulate new activities. If you think a particular area should be represented and would like to nominate someone who would take a active role and initiate activity in that area, please let me know. Self-nominations are encouraged. See back page. Several nominations have already been received. Each nominee will be contacted and asked to furnish a statement for the next issue of the Newsletter.

Present Executive Committee:

- Lenore Blum, President*  
*Mills College, Oakland, CA 94613*
- Evelyn J. Boorman, Representative from the Midwest*  
*University of Michigan, Ann Arbor, MI 48104*
- Mary W. Gray, Representative from the East*  
*American University, Washington, D.C. 20016*
- Judy Green, Employment Officer*  
*Rutgers University, Camden, NJ 08102*
- M. Susan Montgomery, Representative from the West*  
*University of Southern California, Los Angeles, CA 90007*
- Judith Roitman, Editor, Newsletter*  
*Wellesley College, Wellesley, MA 02181*
- Alice T. Schafer, Past President*  
*Wellesley College, Wellesley, MA 02181*
- Ann Stehney, Treasurer*  
*Wellesley College, Wellesley, MA 02181*
- H. Christine B. Stokes, Representative from the South*  
*University of Mississippi, University, MS 38677*

AMS and AAAS elections

Of the candidates receiving AWM endorsement in the recent AMS election, congratulations go to Richard J. Griego and Linda Price Rothschild (elected to the Council) and to Jean Taylor (elected to the nominating committee).

Congratulations to Julia Robinson who was elected Member-at-Large of the Mathematics Section Committee of the AAAS and to Gail S. Young, elected Member of the Committee on Nominations.

See you in St. Louis.

Lenore Blum  
Department of Mathematics and Computer  
Science  
Mills College  
Oakland, CA 94613

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"Let me count the ways."<sup>1</sup>

WOMEN IN COMBINATORICS

by Joan P. Hutchinson, Department of Mathematics, Smith College  
Northampton, MA 01063

(Joan P. Hutchinson teaches at Smith College. She has taught at Tufts University and Dartmouth College and received her Ph.D. from the University of Pennsylvania.)

1. Introduction.

Combinatorial analysis as a distinct field is a relatively new and growing one. It encompasses a range of subjects such as graph theory, coding theory, theory of designs, transversal theory, and finite geometry and also relates intimately with matrix theory, number theory, finite group theory and probability. Thus if one thinks broadly about "women in combinatorics" one finds a substantial list of contributors; in fact, one finds a list of individuals and a variety of material far too extensive for one article. This article contains a sampling of contributions by women which hopefully gives some feeling for past and present areas of activity; the work mentioned is not necessarily the most important done by women in the field, nor is the list of contributors complete.

II. Early contributors.

The first half of this century.

Perhaps the earliest contribution made to combinatorics by a woman is that of Louise D. Cummings, a professor at Vassar College. She published at least six papers between 1913 and 1925 on Steiner triple systems; such a system is a set of points together with a collection of triples of these points with the property that every pair of points appears in a unique triple. Cummings points out that these probably should be called Kirkman systems since they were first introduced by T. P. Kirkman. In fact, in one paper she does a bit of historical work, drawing attention to a littleknown Kirkman paper in which he proved several results, later attributed to others. She also notes that Kirkman was rather disappointed that his general work was overlooked in favor of his popularized Schoolgirl Problem: can a school teacher arrange her 15 girls into 5 rows of 3 for each of 7 days so that each pair of girls walks together exactly once in the week? Thus this question requires even more than a triple system.

Cummings' specialty was triple systems on 15 points, and with these she disproved a conjecture that non-isomorphic systems have different automorphism groups (6). Her collected works form an extensive and intricate study of these triple systems, and she notes that many of the details are not published, but are deposited in the Vassar College Library. Perhaps the culmination of her work is in (5) where with Cole and White she classifies all 80 non-isomorphic triple systems on 15 points, including the 7 possible solutions to Kirkman's Schoolgirl Problem.

Another Combinatorist who worked around the same time is Paolina Quarra who in 1918 (22) published a paper on the Catalan numbers; the  $n^{\text{th}}$  Catalan number is the number of ways a product of  $n$  symbols can be parenthesized. Some of her results were known before; in fact there are many equivalent formulations of this problem, one of which was stated in the same year as an unsolved problem in the American Mathematical Monthly. Using now standard techniques she derived an ex-

<sup>1</sup> Elizabeth Barrett Browning, *Sonnets from the Portuguese* XLIII

explicit formula for the  $n^{\text{th}}$  Catalan number and then found bounds on these numbers to show more explicitly their size.

In the search for early women combinatorists it is tempting to stretch the definition of combinatorist, but this is probably not justified. For example, Alicia Boole Stott (1860-1940) worked on sections of regular polytopes, but certainly considered herself a geometer; Christine Ladd-Franklin, around 1880, also worked on some geometry as well as on logic. (See AWM Newsletter, summer 1976.)

The contribution of Esther Klein in 1935, however, definitely belongs to combinatorics. In (9) the authors credit her with proposing and proving the theorem that from any 5 points in the plane, no 3 on a line, it is always possible to find 4 which form a convex quadrilateral; she also proposed the general problem for  $n$  points. More recently she publishes under the name of E. Szekeres and has made contributions to extremal graph theory.

### Contributors from the 1950's

Another relatively early contributor is Vera Sós (also V. Sós-Turán) who continues to be very active in the field. Her earliest work was in geometry, number theory and matrix theory; however, since the 1950's she has also worked with graphs and hypergraphs, especially on extremal problems. For example, Zarankiewicz posed the question of determining the minimum number of 1's in an  $n$  by  $n$   $(0,1)$  matrix which guarantees the existence of a minor of size  $j$  of all 1's ( $1 < j < n$ ). In (13) Kővari, Sós, and Turán answer the question asymptotically for  $j=2$  and obtain an upper bound for general  $j$ . Their work then gives estimates on the minimum number of edges needed in a graph to ensure the existence of a complete bipartite graph with  $2j$  vertices,  $j$  vertices in each band. A widely known theorem, the friendship theorem, states that in a party where every two people have exactly one friend in common, there is one person who knows everyone plus a number of couples (who know no other couple). This result was first proved by Erdős, Rényi and Sós (7) using some results on projective planes. An elementary proof was sought for several years and was first discovered by Judith Longyear with T. D. Parsons (15). Problems closely related to the friendship theorem have been dealt with by Helen Skala, and Joan P. Hutchinson and Sue Whitesides.

Also from the early 1950's comes the BEST theorem (3,23), a fundamental result of graph theory whose name refers to the four authors of the theorem. The E of BEST belongs to Ms. T. van Aardenne-Ehrenfest, and with three others she has shown that the number of Eulerian paths which can be traced on a directed graph can be calculated by the determinant of an appropriate matrix. (For an application of this result, see (12).) The basic result of characterizing directed graphs that contain at least one Eulerian path is known as Good's theorem as it is due to Euler and I. J. Good, and legend has it that for years there has been pressure on Hazel Perfect to make a contribution to this area of graph theory.

### III. Current contributors

#### Transversal theory.

Perfect's main interest is in transversal theory although she has made contributions also to graph theory. In fact one very important piece of work from her thesis and in (18) is that much of transversal theory can be derived from Menger's theorem on graphs. She and Pym (19) have derived another fundamental result on matchings in an infinite bipartite graph which gives as a corollary a theorem of Banach as well as the Schröder-Bernstein theorem on infinite cardinals. A good place to read about Perfect's work is in the basic book on the subject, Mirsky's Transversal Theory, for there are extensive references to her published and unpublished work throughout. Recently Longyear has also contributed to transversal theory with her work on common transversals.

#### Coding theory.

In the field of coding theory one finds important contributions by F. Jessie MacWilliams and Vera Pless. A central problem is that of determining the number of code words of each weight in a given code; that is, of determining the weight enumerator. The two main theorems which relate the weight enumerator of a code to the weight enumerator of its dual code are known as the MacWilliams identities (16) and Gleason's theorem, a generalization of which has also been proved by MacWilliams. She has also obtained important information on the existence



of the projective plane of order 10 using coding theory (17); namely, if the projective plane exists, the related code has no words of weight 15, only those of weight 12 and 16. The projective plane of order 10 has also been studied by Sue H. Whitesides from another point of view, and she has determined the strong result that the collineation group of the plane is either trivial or cyclic of order 3 or 5 (26).

Vera Pless has made many contributions to coding theory in the area of self-orthogonal codes over GF (2), classifying all such  $(n, 1/2n)$  and  $(n, 1/2(n-1))$  codes for  $n \leq 20$  (20). From her work on symmetry codes over GF (3) she has found some new and rare 5-designs (21) which are of interest to design theorists and also to group theorists as their automorphism groups relate to some of the sporadic simple groups. A new contributor to the field is Emily Moore who has just finished her Ph.D. thesis on double-circulant codes.

### Graph theory

An important area of graph theory is that of coloring and topological problems. The most famous of the former problems is the four color problem, whose solution has just been announced in the affirmative by Appell and Haken of the University of Illinois. Many have contributed to progress on this work including Ruth Bari. If  $P(G, \lambda)$  is the number of ways to color the graph  $G$  in  $\lambda$  colors, then it is known that  $P(G, \lambda)$  is a polynomial in  $\lambda$ , called the chromatic polynomial. The Four Color Theorem says that  $P(G, 4) > 0$  for every planar graph  $G$ . Bari has calculated the  $Q$ -chromial, a closely related polynomial, for all planar triangulations with minimum degree  $> 4$  and at most 19 vertices (1), an extensive piece of work which was subsequently useful in studying the zeros of the chromatic polynomials of planar triangulations. She has also made an investigation of graphs with the same chromatic polynomial which appears in (2), a book which she edited with F. Harary from a conference that they ran in 1973. Other contributions to chromatic and topological graph theory have been made by Elizabeth Kaiser, Jean Larson, Heidi Mahnke, Clare Heidema, and Joan Hutchinson.

Another area of graph theory is that of Ramsey theory and extremal problems. Sós has proved theorems in this area, and more recently Fan Chung has also, improving the known lower bounds for the Ramsey number  $N(3, 3, \dots, 3; 2)$  (4) and determining bounds on other Ramsey numbers. Shari Lawrence and Vera Rosta have also worked in this area.

As is evident from this article, combinatorics covers a great variety of topics; one of the most important tasks in the field is that of fitting the many pieces into a unifying framework. Toward this end Judith Longyear has made an important and extensive contribution through her work on tactical configurations, which are multiregular multipartite graphs. She has shown that almost every combinatorial object is a tactical configuration with appropriate parameters; a good introduction to the subject is in (14). Longyear has also written papers in a wide variety of fields including Latin squares, group theory, transversal theory, Hadamard matrices and block designs.

For more names of women in graph theory, see the last section of this article. One note to those who look for work by women in graph theory: papers written by Blanche Descartes are not written by a woman but rather by a subset of R. L. Brooks, C. A. B. Smith, A. H. Stone, and W. T. Tutte.

### Hadamard matrices

Hadamard matrices are  $n$  by  $n$  matrices of  $\pm 1$ 's such that  $HH^t = nI$ . It is known that if such a matrix exists,  $n = 4k$  for some integer  $k$ , and it is an open question whether there is a Hadamard matrix for each  $k$ . Jennifer S. Wallis has made valuable contributions to the Hadamard problem and has found many new infinite families of Hadamard (and related) matrices. An excellent reference to the whole subject and to her work is her article in (25), a Springer-Verlag Lecture Notes book which Walter D. Wallis, Anne P. Street and Jennifer S. Wallis wrote. Olga Taussky (see next section) has also contributed to the theory of Hadamard matrices as have Joan Cooper and Judith Longyear; Marion Kimberley has worked on the related Hadamard designs.

### Contributors from other fields.

Many women who work primarily in other fields of mathematics have contributed to combinatorics. One of the most eminent such mathematicians is Olga Taussky (also O. Taussky Todd) whose main interests lie in the areas of matrix theory, number theory and algebra. Matrix theory enters

continually into combinatorics via adjacency and incidence matrices of graphs, finite projective planes,  $(v,k,\lambda)$ -configurations, etc., and Taussky's work has been of importance directly and indirectly. For example, in the study of projective planes maps between points and lines which preserve incidence are of great importance (see, for example, (7)), and Taussky has contributed to the study of these correlations by using results of algebraic number theory (10). In (24) she has written an excellent review of results of matrix theory which enter into combinatorial problems.

Another combinatorialist whose work lies on the boundary of group theory and number theory is Anne P. Street. Her main interest is in sum-free sets, a subject which also arises in Ramsey theory, and much can be found about her work in the combinatorics book which she wrote with W. D. Wallis and J. S. Wallis (25). Emma Lehmer and Sheila Oates Macdonald also work on number theory closely related to combinatorics, and Margaret S. Smith and Betty Stark work in combinatorial group theory. A number of geometers have done work of interest to combinatorists; for example Marilyn Breen, Margaret Lehr, Ruth Silverman and Jill Yaqub. On the other hand, there are numerous examples above and elsewhere of combinatorists whose work has had relevance to other fields; the author of this article has used techniques of graph theory to solve a problem in matrix theory (11).

#### Other contributors.

The number of women mentioned above and the quality of their work make an impressive list; however, this short article fails to do justice to the much larger range of work they have done and has omitted many important names. Thus in conclusion here is a list of many more women who have worked in combinatorics and at least one field to which they have contributed. The bibliography is short and relates only to the main body of this article; however, the author has collected a more extensive bibliography which will be mailed upon request.

Sabra S. Anderson (graphs), Brenda Baker (graphs), Mary Katherine Bennett (lattices), Elizabeth Berman (matrices, graphs), Laura Bertani (Steiner systems), Vasanti N. Bhat (BIBDs), Marjorie Bicknell (partitions), F. Bories (hypergraphs), Julia M. Nowlin Brown (finite geometry), Jean Butler (graphs), Phyllis Chinn (graphs), Elizabeth Cousins (graphs), Francoise Dejean (comb. word problems), Martha Dennis (graphs), Jane DiPaola (block designs, graphs), Annette Dobson (graphs), Margaret Doherty (fluctuation theory), Ann Dorris (partitions), Marianne Gardner (hypergraphs), Margaret J. Hodel (enumeration), Pauline Hogarth (graphs), L. Aileen Hostinsky (lattices), Charlotte Huang (designs), Margaret M. Humm (comb. algebra), Diane M. Johnson (triple systems, graphs), Renu Laskar (graphs), Linda Lawson (graphs), Linds Lesniak-Foster (graphs), Nancy Lynch (computational complexity), Sister Clare MacIssac (combinatorics), Ingrid Mengersen (graphs), Suzanne Molnar (combinatorial algebra), Evi Nemuth (Room Squares), Maria Overbeck-Larisch (graphs), Ora E. Percus (combinatorics), Jacqueline Shalhevot (extremal sets), Esther Seiden (Latin squares), Kay Shaw (matrices), D. Sotteau (graphs, designs), Marjorie Stein (matrices), Joan Stone (block designs), Tina Straley (Steiner systems), Christine Treash (Steiner triples), Sue Tecker (graphs), Helga Tverberg (posets), Theresa Vaughan (finite fields), Jacqueline Wells (digraphs), Dorothy Wolfe (combinatorics), Jeanne Wright (lattices).

The author wishes to express thanks for help with the historical parts of this paper from Prof. W. G. Brown of McGill University and Prof. P. J. Campbell of St. Olaf College.

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HIRING FACULTY WOMEN

By Gertrude Ezorsky

(Reprinted from the New York Times Op-Editorial 10/11/76.)

Should universities be compelled to remedy sex discrimination by setting numerical hiring goals for women faculty members? Opponents of these goals, required by the Department of Health, Education and Welfare, insist on tagging them as "quotas." Why?

Historically, a quota system--so labeled--was used to restrict fair selection in favor or prejudice. ("How many Jews can we tolerate in our university?") Those who insist that today's hiring goals be called "quotas" imply that the goals, like yesterday's quotas, work against impartiality. But that claim is false. H.E.W.-approved goals for women instructors serve not to restrict but to extend impartiality. Women who by a merit standard deserve faculty appointments will no longer be excluded by sex bias.

H.E.W. goals for women instructors specify the approximate number of women who would, in general, be hired by impartial sex-blind selection. Suppose, for example, that although one in five biology Ph.D.'s are women, a major university's biology department is composed--instructor and up--of 25 men and no women. (Such incredible disparity between the ratio of women as trained Ph.D.'s and as faculty is quite common in major universities.) Since one in five biology Ph.D.'s are women, a goal acceptable to H.E.W. for this biology department would read: one woman among the next five instructors hired.



Thus, hiring goals are set to approximate an impartial, bias-free result. Hence, while yesterday's quotas served bias, today's goals are designed to defeat bias. No amount of "quota" baiting by those skilled in the craft of propaganda can destroy that radical difference of moral purpose.

Sidney Hook, a critic of hiring goals for women faculty, offers an alternative: "Why not drop...sex...bars in honest quest for the best-qualified" candidate? Such advice has all the practical value of suggesting that sin disappear. Where the best candidate competing for a faculty appointment is a woman she has two handicaps. First, there is the fact, by now overwhelmingly confirmed, of prejudice against women's intellect. Studies have shown that in all disciplines, the same work, appraised by both men and women, was always rated lower when attributed to a woman. Second, academics can cover up individual cases of sex discrimination more easily than other employers.

Who is the best pitcher for a professional baseball team? Simple arithmetic tells a large part of that story. Hence, prejudice is more easily discernible. Who is the best candidate for a philosophy instructorship? Not so easy. Judgments about the quality of a person's scholarship may differ widely and no mechanical resolution is possible. Where purely objective rules of selection are absent, a sex-biased choice is more easily rationalized.

It is significant that since the advent of anti-bias regulations sex discrimination has disappeared in an area where it is not easily hidden: Salary inequities between men and women instructors at the beginning of their academic careers have now been wiped out.

It is true that intervention by Government bureaucrats and more paperwork do not enhance the quality of life (although academic women may feel that extra paperwork is a small price to pay for decades of injustice).

Most of us prefer to think that left on our own we make objective choices. But what is the likelihood that any of us could have been so lucky--morally speaking--as to escape the mark of social prejudice? Hiring goals serve as a check on the workings of such prejudice, and by voluntarily acceding to that check we free ourselves from culpability.

Universities are now excused by the Department of Health, Education and Welfare from meeting their goals if they can show what the Labor Department calls "good faith" efforts to find qualified women (advertising jobs, contacting women's professional groups, inviting women to apply, etc.). Opponents of goals claim that such "good faith" efforts should suffice to end university sex discrimination. But their claim is challenged by recent reports, from affirmative-action specialists, of "good faith" efforts that are a sham. (A department, for example, first selects the man it wants for the job, then pretends to search for candidates.) Such reports are corroborated by studies showing that women are running a close second to blacks in having the highest unemployment rate among 1974 and 1975 doctoral recipients.

It is not the hiring goals, but the "good faith" efforts, that need critical scrutiny.

(Gertrude Ezorsky is professor of philosophy at the City University of New York (Brooklyn College and the Graduate School). This article was adapted from a paper read to the Bicentennial symposium of philosophy held under the Graduate School's auspices.)

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The following letter was sent by Michele Vergne to Paul Halmos in Aug., 1976.

Dear Professor Halmos:

Reading the May-June Newsletter of the Association for Women in Mathematics, I am quite shocked by the low intellectual level of your answer to the articulate letter of Louise Hay. The tone of your letter is derogatory to all your women colleagues and generally inappropriate. In addition, it lowers the level of communication within the mathematical community; you seem to advise the recipients of discriminatory jokes to take them and with "humor". Would you advise a Jew to participate in racist jokes about Jews? It seems that you do not realize that there is an essential difference between the polluter and the polluted in their feeling about pollution. As editor of that collection, you could have tried to stop the polluter but instead you chose to advise the polluted to buy filters and take lightly the constant delivery of pollution. This tendency encourages such pollution and thereby significantly affects the quality of our life.



As in the perceptive letter of Louise Hay, I advise you, as any mathematician should do naturally, to consider enlightening examples to find out if your answer is adequate: Would you, for example, make a joke about the shameful situation of the wage differentials between blacks and whites and conclude, white earns more than blacks, don't they?

A considerate answer on your part to Louise Hay should have included an apology for the publication of a book by a prejudiced author. This is still to be done. A reexamination and more careful editorial supervision of the text in question is mandatory. Any other attitude will hurt your reputation as an editor and as a colleague.

I have sent a copy of this file to the publishing company.

Michele Vergne  
Maitre de recherches  
Centre National de la Recherche  
Scientifique  
15 quai Anatole France  
75007 - PARIS

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NO COMMENT DEPT.:

Statement by the General Counsel of the National Science Foundation on the Women-In-Science Program

Section 901 of Title IX of the Education Amendments of 1972 (Public Law 92-318) states "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." In developing and implementing the Women-in-Science program, the Foundation has proceeded carefully to assure that no element of this program violates the law. The Women-in-Science program has as its objective the development and testing of methods to attract women to and retain them in scientific careers. The projects under the program are experimental, and the Foundation considers that the women participating in such projects are not beneficiaries, but rather the experimental subjects of research aimed at discovering and promoting more effective methods of increasing the flow of women in scientific careers. Only incidentally do they receive personal benefits, and these are not at the expense of or in discrimination against others.

The Women-in-Science program is also specifically mentioned in the National Science Foundation Authorization Act, 1976 (Public Law 94-86), section 2 (a) of which provides:

Notwithstanding any other provision of this or any other act--...not less than \$7,000,000 should be available for "Ethnic Minorities and Women-in-Science Programs"; and not less than \$1,500,000 thereof shall be available to develop and test methods of increasing the flow of women in careers in science.

Thus, the Congress has specifically approved both the Women-in-Science program in general and the projects under it as proposed by the Foundation in its Fiscal Year 1976 Budget presentations to Congress. Moreover, the language of the NSF Authorization Act, "Notwithstanding any other provision of this or any other act ...", makes Title IX inapplicable.

Finally, although projects under the experimental program are targeted exclusively to women, grantees may in their discretion admit male observers or participants when time and facilities permit and the project would not otherwise be adversely affected. Principal investigators/project directors, advisors, assistants, conference and workshop speakers, administrators, and other roles under awards may be of either sex and cannot be restricted to women only. The only exception to this rule is the Visiting Women Scientists Project, which requires the visiting scientists to be female, because the purpose of the project is to introduce the participants to active women scientists who, as models, will share their experiences and goals.

The lack of women in scientific careers represents waste of a great national asset. The Foundation believes that its program to develop and test methods of attracting women to and retaining them in scientific careers is not only valuable but necessary. Charles H. Herz  
General Counsel

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There will be a local AWM meeting at Loyola Marymount University in Los Angeles on March 12, 1977, in conjunction with the MAA meeting (Souther California Section).  
for further information, contact:

Professor Jacqueline Dewar  
Department of Mathematics  
Loyola Marymount University  
Los Angeles, CA 90045

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OF POSSIBLE INTEREST

Another math anxiety workshop, this one at Temple University's program for continuing education of women, is taught by Marion D. Cohen. Aside from using supportive techniques for teaching mathematics, the workshop also includes consciousness-raising on feminism and on the processes of education.

HEW is holding hearings in all 50 states to obtain testimony relating to the regulations it will write on vocational education. The National Coalition for Women and Girls in Education, Suite 821, 1832 M Street N.W., Washington, D.C. 20036, has the schedule of these hearings.

Another career workshop: Ohio University held a science career workshop for women on November 6.

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JOBS

The vacancies listed below appear in alphabetical order in an alphabetical listing of states. EO/AA means Equal Opportunity, Affirmative Action Employer.

California State Polytechnic University, Pomona, Dept. of Math., Assoc. Prof., Comp. Sci., tenure possibility. Requirements: Ph.D. Comp. Sci, research exp and strong interest undergrad teaching. Duties: some overall responsibilities for comp. sci. program with Math. Dept., will work to develop internship programs w/industries and governmental agencies, will work w/other departments on campus involved in comp. sci. program. Some professional exp. industry and/or government desirable. Deadline 2-1-77. Send vita and have three letters of ref. sent to Search Committee, Math. Dept., California State Polytechnic University, Pomona, CA 91768 EO/AA.

Univ. of California, Davis, Dept. of Math., Prof. of Statistics. Start Fall, 1977. Salary and rank depend upon qualifications. Requirements: demonstrated interest in assuming leadership role in departmental & univ. statistical activity, competence in teaching, research and statistical consultation. Applications, consisting of resume and four letters of recommendation, must be completed by 2-15-77. Contact: David G. Mead, Chairman, Univ. of Calif., Davis, Dept. of Math., Davis, CA 95616. EO/AA.

University of California, Riverside, Dept. of Math, Asst. Prof. Ph.D. in some aspect of Comp. Sci required. Strong interest in teaching and research in Comp. Sci. Send applications to Professor A. R. Stralka, Chairman, Dept. of Math., University of California, Riverside, Riverside, CA 92502.

Mills College, Dept. of Math. & Comp. Sci. Two positions of Assistant Professor (or Instructor) available: one in Math., one in Comp. Sci. Ph.D. required for asst. prof. rank. Strong commitment to excellent teaching, interest in applications of math and comp sci to other disciplines, be willing to participate in and develop further interactive academic program. Teaching load 3 courses per semester. Start Sept. 77. Send vita & refs by Feb 15 to Lenore Blum, Head, Dept. of Math & Comp Science, Mills College, Oakland, CA 94613. EO/AA

University of the Pacific, Coordinator of Educational Computer Services. \$13,000 - \$16,000. Preference to candidates w/Masters degree in Comp. Sci. and who have had experience w/Burroughs 6700 computer system. Contact Dr. R. W. Pulleyblank, Chairman, Search Committee for the Coordinator of Educational Comp. Services, Academic Vice President's Office, University of the Pacific, Stockton, CA 95211. Deadline 2-15-77. EO/AA.

Whittier College, Mathematics, two one-year faculty openings. One may become permanent. Prefer 1977 Ph.D. w/no prior full-time teaching exp. Some background and interest in one or more of the fields of computer science, elementary math. ed., or business applications & stat. Salary \$12,500 plus benefits. Send vita, transcripts of all grad. work, three letters of recommendation and statement of teaching philosophy to Search Committee, Dept. of Math., Whittier College, Whittier, CA 90608.

Yale University, Dept. of Math, two or three Gibbs Instructorships for Ph.D.'s with outstanding promise in research. Two-year appointment starting 7-1-77. Teaching load light. Deadline for applications 2-1-77. Applications from women and minority group members welcome. Salary \$14,500. Contact: Chairman, Dept. of Math., Yale University, New Haven, CT 07520.

University of Delaware, Dept. of Math, 2 assist. prof. start 9-77. One in unspecified field and other in general area of optimization and mathematical programming (our sr. prof. is Adi Ben-Israel.) Ph.D. and active research interest required. Teaching load 6-7 hrs. One sr. position as well as one-year visiting position may also become available. Contact: I. Stakgold, Chairman, Department of Mathematics, University of Delaware, Newark, DE 19711. AA

University of Delaware, Dept. of Mathematics, possible position, rank open, fall 1977. Freshman Honors Program. Ph.D., teaching excellence, qualifications for honors program required. Teaching load one or two honors courses/semester in introd. math., independent study, tutorials or multidisciplinary projects. Contracts max. 4 yrs. Contact Dr. Robert B. Scott, Jr., University of Delaware Freshman Honors Program, 28 N. State Street, Dover DE 19901. EO/AA.

Northwestern University, Department of Mathematics. Two post doctoral positions in Partial Differential Equations, Stochastic Differential Equations and related areas. Exceptionally strong applicants in other fields will also be considered. Contact: Avner Friedman, Chairman, Personnel Committee, Northwestern University, Evanston, IL 60201

University of Maryland, Div. of Mathematical & Physical Sciences & Engineering. Assist. Prof. positions (Math & Stat) are available beginning academic year 1977-78. Submit vita and have three letters of recommendation sent. Offers, if any, will begin to be made Jan. 77, but applications accepted after that date. Contact: Professor J. K. Goldhaber, Dept. of Mathematics, University of Maryland, College Park, MD 20742. EO

Massachusetts Institute of Technology, Dept. of Mathematics, one or two assist. prof. in pure mathematics will be appointed if sufficiently strong candidates can be found. The criteria are superior ability as a research mathematician, demonstrated effectiveness as a teacher, two years or more of postdoctoral experience. Contact Philippa Bovet, Dept. of Math., Massachusetts Institute of Technology, Cambridge, MA 02139. EO

Massachusetts Institute of Technology, Department of Mathematics, one assist. prof. in computer science field will be appointed if a sufficiently strong candidate can be found. The criteria are superior ability as a research mathematician, demonstrated effectiveness as a teacher, one or more years of postdoctoral experience. Contact Philippa Bovet, Massachusetts Institute of Technology, Department of Mathematics, Cambridge, MA 02139. EO.

Tufts University, Department of Mathematics, two positions at assist. prof level; strong research and teaching necessary. Preference will be given to algebraic or geometric topology, classification of finite simple groups, computer science, combinatorics, functional analysis. Applications until 2-19-77. Contact George Leger, Chairman, Dept. of Math., Tufts University, Medford, MA 02155. EO/AA

Michigan Technological University, Instructor, Math/Comp. Sci., MS level. 1 year renewable appointment to teach lower div. math/programming. For further info: Z. Motteler, Head, Math Dept., Michigan Technological University, Houghton, MI 49931. EO

Michigan Technological University, Asst. Prof., Comp. Sci., Ph.D. required. Tenure track. For further info: Z. Motteler, Head, Math Dept., Michigan Technological University, Houghton, MI 49931. EO



University of Montana, Department of Computer Science, openings at assist. prof. level, tenure track. Start 1-1-77 or 9-1-77. Ph.D. in Comp. Sci or closely related field. Industrial or governmental lab. exp. highly desirable. Should have strong interest in teaching & research, an interest in minicomputers, graphics, software development and/or theoretical comp. sci. Interdisciplinary interests are encouraged. Contact: R. P. Banaugh, Professor and Chairman, Dept. of Comp. Sci., University of Montana, Missoula, MT 59801. EO.

University of Nevada, Accounting. Start 9-77. Completion or near completion of doctorate with major in accounting. Assist or Assoc. Prof. Send vita to Dr. Duane Baldwin, Chairman, Dept. of Accounting, University of Nevada-Las Vegas, Las Vegas, NV 89154. EO/AA.

Rutgers University, Department of Mathematics at New Brunswick, several openings assist. prof. level. Ph.D. (or nearly) w/outstanding research ability and concern for teaching. All specialties in math. except that applicants whose primary interest is in math. ed., comp. sci, stat., or probability usually not considered. Contact Daniel Gorenstein, Chairman, Dept. of Math at New Brunswick, University Heights Campus, New Brunswick, NJ 08903.

New Mexico Institute of Mining and Technology, Computer Center Manager. Must be able to organize the Center and its services to provide convenient, effective computing for variety of users. Minimum qualifications: bachelors or masters degree and 3 - 5 yrs exp. in supervisory and service roles in a computer center with time-sharing capability. New Mexico Institute of Mining and Technology, Computer Center, Socorro, NM 87801. EO/AA.

SUNY, Albany, Dept. of Math., Professor, start 9-77. Should have distinguished reputation in research work and would be expected to provide strong leadership in intellectual & professional activities of Dept. Reg. faculty position. Preference to candidates in fields of major strength of Dept., including algebra and algebraic geom, complex analysis, functional analysis, real analysis and topology. Send vita, publications, names of reference to Professor Thomas H. MacGregor, Chairman, Dept. of Math., SUNY at Albany, Albany, NY 12222. EO/AA

SUNY, Binghamton, Dean of School Advanced Technology. Major emphasis of School's program is on design and application of problem-solving techniques dealing specifically with systems problems which transcend traditional discipline boundaries. For more info: Narendra S. Goel, Professor, School of Advanced Technology, Chairman, Search Committee for Dean, School of Advanced Technology, Administration Building, Room 229, SUNY, Binghamton, NY 13901

State University of New York at Buffalo. Department of Mathematics George William Hill and Emmy Noether Research Instructorships. 2 year appointment, one in applicable, one in pure math. Salary - \$16,200 + benefits. Teaching load - 2 courses per year. Applications and supporting letters should be sent to the Chairman, Department of Mathematics, SUNY at Buffalo, 4246 Ridge Lead Road, Amherst, NY 14226.

SUNY, Stony Brook, Dept of Appl. Math & Stat, fall, 1977 expect 2 regular positions as assist (possibly assoc.) professors; 1 in statistics and 1 in operations research. Strong background in time series & in computer-oriented numerical methods preferred. Possibility for visiting appointments in numerical and analytical fracture mechanics & mathematics modelling. Exceptional candidates in other areas considered. Research & teaching equally emphasized. Teaching load usually 6 hrs/wk. Ph.D. w/demonstrated potential for research and aptitude for teaching Contact Prof. Ram P. Srivastav, Acting Chairman, SUNY, Stony Brook, Dept. of Appl. Math & Stat, Stony Brook, NY 11794.

Syracuse University, Dept. of Mathematics. Several regular renewable faculty positions w/initial appointment of up to three years at Assist. Professor level. One or more one-year non-renewable positions also open. Ph.D. required all positions. Research potential of primary importance & compatibility w/research activity in the department will be considered. All positions teaching load - 6 hrs. At least one of regular positions and the one-year position are open to all fields. For other positions, preference will be given to qualified candidates in Statistics or Numerical Analysis. Contact J. E. Graver, Assistant Chariman, Syracuse Univ., Math. Department, 200 Carnegie Library, Main Campus, Syracuse, NY 13210. EO/AA.

Univ. of Oklahoma, Dept. of Math. Analyst. Preference to exp. candidates. Ph.D. and demonstrated ability to do quality research and teaching required. Candidates should be in areas complementing those of current analysis faculty: differential equations, optimal control, functional analysis. Send vita, at least three letters of referece. Deadlines 2-1-77; 3-10-77 Dr. Gene Levy, Chairman, Dept. of Math, University of Oklahoma, Norman, OK 73019. EO/AA.



Univ. of Oklahoma, Dept. of Math., Algebraist. Asst. Prof. New or recent Ph.D. regardless of age. Preferred research interests: algebraic geometry, algebraic groups, algebraic number theory, commutative algebra, representation theory of groups and algebras. Quality teaching & research expected. Send vita and at least three letters of reference. Deadlines: 2-1-77; 3-10-77. Dr. Gene Levy, Chairman, Dept. of Math, University of Oklahoma, Norman OK 73019. EO/AA.

Oregon State University, Department of Mathematics, assist. professors. Start 9-77. Ph.D. required. Preference to recent grads. 6 - 8 class hrs teaching/week. One position in pure mathematics - active research interests in any area. One position in applied mathematics - broad background in modern applied mathematics. Possibility of other positions. Deadline 2-1-77. Contact Dr. J. R. Brown, Chairman, Dept. of Math., Oregon State Univ., Corvallis, OR 97331. AA.

Bucknell University, Dept. of Math., Instructor or Assistant Professor with Ph.D. (or nearly so) Start 9-77. Must have strong commitment to teaching and high research potential. Desired specialty statistics w/broad training in both mathematics and statistics. Potentially tenurable. Deadline 1-15-77. Contact Davis S. Ray, Chairman, Bucknell University, Department of Math., Lewisburg, PA 17837 AA/EO.

Bucknell University, Department of Mathematics, Instructor or Assist. Professor w/Ph.D (or nearly) Start 9-77. Must have strong commitment to teaching and high research potential. Desired specialty is applied math. Potentially tenurable. Deadline 1-15-77. Contact David S. Ray, Chairman, Department of Mathematics, Bucknell University, Lewisburg, PA 17837. EO/AA.

Brown University, Program in Computer Science, two openings assist prof. Start 2-1-77. Appointments will be made jointly w/Div of Applied Mathematics or the Division of Engineering. Ph.D. or equiv in Comp. Sci., Elect. Eng., or Applied Math and strong general background in Comp. Sci. Contact John E. Savage, Professor of Computer Science and Engineering, Brown Univ., Providence, RI 02912. EO/AA.

University of Wisconsin-Madison, Mathematics Research Center. A limited number of one-year visiting research appointments beginning July or Sept., 1977; postdoctoral level and up. Candidates should have keen interest & demonstrated competence or promise in applied or applicable mathematics. Positions offer excellent opportunities to broaden contacts. Contact: Prof. Ben Noble, Director, Mathematics, Research Center, University of Wisconsin, Madison, Madison, WI 53706.

University of Winnipeg, Dept. of Mathematics & Statistics, subject to funding, reg. position of lecturer or asst. prof. Ph.D. in analysis preferred. Duties: undergrad teaching. Start 9-1-77. Contact W. C. Campbell, Chairman, 515 Portage Avenue, Winnipeg, Manitoba R3B 2E9.

University of Winnipeg, Dept. of Mathematics & Statistics, probable sabbatical leave replacement, lecturer or assist. prof. Ph.D. in Statistics preferred. Duties: Undergrad teaching in math & statistics. Start 9-1-77. Contact: W. C. Campbell, Chairman, Department of Mathematics, University of Winnipeg, 515 Portage Avenue, Winnipeg, Manitoba R3B 2E9.

REMINDER: We're expanding our executive committee. If you have any nominees, please nominate them on the following form. If you're a nominee, please send us your statement on the following form.

Additional areas to be represented on executive board:

Nominees for these positions:

Statement for newsletter if nominee:

Additional suggestions:

Volunteer for Correspondence Committee:

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

PLEASE RETURN THIS FORM TO:

Lenore Blum  
Department of Mathematics and  
Computer Sciences  
Mills College  
Oakland, CA 94613

ASSOCIATION FOR WOMEN IN MATHEMATICS  
MEMBERSHIP APPLICATION

Name and  
Address \_\_\_\_\_  
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Institutional affiliation, if any \_\_\_\_\_

Position \_\_\_\_\_

Make checks  
payable to ASSOCIATION FOR WOMEN IN MATHEMATICS

and mail to Association for Women in Mathematics  
c/o Department of Mathematics  
Wellesley College  
Wellesley, MA 02181

The AWM membership year is October 1 to  
October 1. Dues may be pre-paid at the  
current rate for up to 2 years.

Dues for October 1, 1976, to October 1, 1977:

- \_\_\_\_\_ Individual, \$8.00.
- \_\_\_\_\_ Family, \$10.00 (one newsletter sub-  
scription).
- \_\_\_\_\_ Retired, student or unemployed \$3.00.
- \_\_\_\_\_ Contributing Membership (\$15.00 or  
more per year)
- \_\_\_\_\_ Institutional, \$20.00 (includes two  
free advertisements in Newsletter).

Contributions are welcome and tax deductible.

MEMBERSHIP RENEWALS WERE DUE OCTOBER 1.

AWM  
c/o Department of Mathematics  
Wellesley College  
Wellesley, MA 02181

Jan.-Feb. 1977