

# Association for Women in Mathematics

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NEWSLETTER

May-June 1981

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## PRESIDENT'S REPORT

Elections. Elections will be held in the fall for the positions of President-Elect and three Members-at-Large of the Executive Committee. A Nominating Committee chaired by Judy Roitman (University of Kansas) and including Judy Green (Rutgers) and Betty Salzberg (Northeastern University) has been elected by the Executive Committee. If you have any nominations for these positions please send them to me or to Judy Roitman by May 1.

Executive Committee and Business Meetings, San Francisco. Some items from these meetings which were not covered by my last report follow. Lenore Blum reported on the success of her letter drive and other efforts on behalf of Tatyana Velikanova under the auspices of AWM's Human Rights Committee. The AWM Journals Committee now consists of Michele Vergne (Chair), Joan Hutchinson and Linda Rothschild. (Since the meeting, Louise Hay has resigned due to pressure of work as Head.) In my list of members of the new Meetings Committee, Evelyn Silvia's name was inadvertently omitted.

At the Business Meeting Lee Lorch moved that AWM write a letter to the National Academy of Sciences deploring the fact that the National Committee on Mathematics has no women or minority members. We are writing to the National Academy pointing out this fact and urging them to appoint women members to the Committee. Lee Lorch also reported from the Council of the AMS, of which he is a member, concerning the avoidance of meetings in states that have not ratified the ERA. He felt it was desirable to bring this matter before the Council again.

The articles in Science. The AWM statement and the editorial by Mary Gray and Alice Schafer in response to the articles in the December 12, 1980 issue of Science have been published in the February issue of the AMS Notices. Mary and Alice have been flooded with requests for reprints of their editorial. In particular it is gratifying to note that Alice has received requests from many foreign countries including Austria, Bulgaria, Canada, France, E. and W. Germany, Mexico, Poland and Venezuela.

CBMS. Lenore Blum and Vera Pless are AWM Representatives on the CBMS Council. When the Council meetings are held in conjunction with AMS meetings, one of them will attend on behalf of AWM. If any of you are members of other member-organizations of CBMS (e.g. ASA, ASL, SIAM, ACM) and would like to represent AWM when CBMS Council meetings are held at meetings of these organizations, please let me know.

Editorial. I am reiterating my hope that many of you would be willing to be involved in AWM projects. Several members are doing excellent work at the local level, the Math/Science Network and its ramifications being a classic example. But we need more women to be involved at the national level so that AWM will truly become a participatory democracy. The commitment in terms of time can be difficult; Oscar Wilde is supposed to have said that the trouble with socialism is that it takes up too many evenings.

However, a determination to put in the time often yields rich rewards in terms of feelings of satisfaction and excitement that we are directly involved in a movement that brings about change. So please write if you would like to work for AWM in some way.

Bhama Srinivasan  
Math Dept.  
University of Illinois at  
Chicago Circle  
Chicago, IL 60680

### AWM MEETINGS

#### Report on AWM Breakfast Meeting, MAA Ohio Section Meeting

by Suzanne Damarin, Ohio State University

The Ohio AWM held a breakfast meeting on October 18, 1980 in conjunction with the meeting of the Ohio Section of the MAA at John Carroll University. Suzanne Damarin chaired the meeting on behalf of Jessie Ann Engle. Thirteen women attended.

Suzanne Damarin reported on progress in establishing a WAM program in the Central Ohio area. Several members expressed interest in establishing similar programs in other parts of the state. The January conference on "Expanding Your Horizons" to be sponsored by AWISCO was also discussed.

Discussion then turned to the series of talks "Biographies of Famous Mathematicians" given at section meetings. The group was pleased with the change of title for the series. The desirability of having a biography of a woman mathematician in the near future was discussed. Several possibilities were raised:

1. Invite mathematician Sylvia Wiegand of Nebraska to speak about her grandmother, mathematician Grace Chisholm Young.
2. Invite Karen Rappaport of New Jersey to give a talk that she has given frequently on women mathematicians.
3. Sr. Teresemarie McCloskey of Notre Dame College, Cleveland is interested in Lady Lovelace, and could prepare a talk on her life and contributions.

No closure was reached in this discussion.

Once again, the issue of time conflict between the AWM breakfast and the meeting of the Council of Representatives was raised. It was suggested that in the future AWM meet on Friday evening after the last session and that members go to the party late, if at all. The suggestion was agreed to unanimously by the members in attendance.

#### Report on a Chicago Area AWM Meeting

by Jeanne LaDuke, DePaul University

A meeting of AWM was held at DePaul University in Chicago on Saturday, March 7, 1981. Approximately 30 people attended including members from Notre Dame, Bradley, and Northern Illinois University as well as the immediate Chicago area.

Lynn Narasimhan welcomed AWM to DePaul and introduced Bhama Srinivasan, AWM President, who reported on the San Francisco meeting. Bhama noted the great success of Olga Taussky Todd's talk, "The many aspects of Pythagorean triangles," AWM's second Emmy Noether Lecture. Bhama also discussed AWM's response to the recent Benbow and Stanley study which hypothesized that "sex differences in achievement in and attitude toward mathematics result from superior male mathematical ability." She mentioned that a news conference had been held in San Francisco and that Alice Schafer and Mary Gray had responded with an editorial in Science in January.

Jeanne Duflot of Lake Forest College gave a talk on "Cohomology of Groups." In it she gave a general introduction to the area and indicated some problems of special interest to her. This was followed by a talk entitled "American Women Mathematicians: The Pre-World War II Ph.D.'s" by Jeanne LaDuke of DePaul University. She presented some results of a joint project with Judy Green. Much discussion followed. The meeting ended with lunch at a nearby restaurant.

## TATYANA VELIKANOVA

### Press release

by Lenore Blum, Chair, AWM Human Rights Committee

The Association for Women in Mathematics is mailing letters this month to hundreds of scientists in the USSR and the West requesting their assistance in securing the freedom of Soviet mathematician and human rights advocate Tatyana Velikanova.

Tatyana Velikanova, mother of three and grandmother of three, was sentenced to four years in labor camp and five years in internal exile last summer immediately after the Moscow Olympics. She is now in the Mordovian "strict regime" labor camp for "especially dangerous state criminals" where she is allowed only one private visit each year.

Velikanova is one of the earliest and most respected leaders of the Human Rights movement in the Soviet Union. She was accused of editing and disseminating the "Chronicle of Current Events," the major samizdat news publication of the Human Rights movement.

Andrei Sakharov, in his "Letter from Exile" (in The New York Times Magazine, June 8, 1980) described Velikanova as "showing no interest in fame, glory or personal gain, sacrificing much in her personal life, ... always at the center of the battle, committing herself to the fate of hundreds of victims of injustice."

Tatyana Velikanova is an honorary member of the Association for Women in Mathematics, the major international professional association for women mathematicians. After graduating in mathematics from Moscow State University in 1954, Velikanova taught in a rural area for several years, and then worked as a computer scientist for 21 years (12 for the Soviet Academy of Sciences). She is believed to be among the first women entering the field of computer science in the USSR.

Over 600 scientists from the U.S. and Canada have already signed letters supporting the AWM request to the Soviet Academy of Sciences for their help in overturning Velikanova's harsh sentence. A similar outpouring of support has been initiated in Europe. Amnesty International has adopted Velikanova as a Prisoner of Conscience.

On March 25, Lenore Blum spoke with Dr. Makarov, attaché for Science and Technology of the Soviet Embassy in Washington D.C., and met with his assistant Mr. Skripko. She expressed the AWM's deep concern for Velikanova's situation, and asked for their assistance in gaining her freedom. Blum was assured that this message would be communicated to their superiors.

### Excerpts from letter from Velikanova's children

Grief has come to our family. Our mother, Tanya Velikanov has been arrested. In the early morning of November 1, 1979, when everyone was still asleep, the doorbell rang. Five KGB agents, including a woman, ordered us to get up and to dress at once. "You will come with us," said the leader of the group to our Mother. We asked them to show us the warrant or at least to explain what all this was about. "No explanation will be given. If you want to, you can consider it an arbitrary action." They did not let us use the telephone. "After we leave, you can tell the foreign correspondents anything you

like. Let them shout all over the world." And to Mother, "If you citizen Velikanov refuse to come with us willingly, we will take you by force." Mother did not resist. We put together a change of underwear and some warm clothes. The parting was short; few words were said.

After our Mother had been taken away, the search began. The agents looked for "anti-soviet documents". They took away all typewritten and handwritten papers, personal letters, notebooks, books and magazines published abroad. With undisguised excitement they pounced on every scrap of paper suspecting heresy. But all they could find were open letters of protest against violations of basic human rights in the USSR, issues of Chronicles of Current Events (a samizdat magazine dealing with the same topic), private letters of political prisoners and their relatives asking for help. That is what they call "anti-soviet slander and subversive literature".

Later we learned that our Mother was put in Lefortovo, a KGB prison. More than a month has passed, and yet they have not told us what the charge is, whether she is well, when we can visit her. None of our telephone calls has produced an official response. "She is a state criminal" is the only answer we hear from the investigator.

...  
We know why our Mother has been arrested. She is one of the founders and most active participants in the movement for civil and religious rights, and the rights of nationalities in the USSR. She is a close associate of Andrey Sacharov, the nuclear physicist. Dozens of her friends have been thrown in prisons, labor camps, psychiatric hospitals or exiled from the country. When friends tried to persuade Mother to emigrate and not to endanger herself and the children, her answer was always the same: "if we go, who will stay here? We are responsible for everything that has been happening in our country, and I do not want to run away from this responsibility".

Her conscience, her concern for human suffering, her readiness to help by word as well as deed, her sense of honor, her self-sacrificing love for human beings, have all been giving her strength. Her distinctive trait was an exceptional modesty in dealing with people and in her family circle; she never needed anything for herself. She wanted no praise or publicity. To help people was her very nature. Many of those whom she has helped do not know her personally, some of them do not even know her name.

...  
People, friends, brothers and sisters! In the name of Love, in the name of Justice, come save our Mother.

She may very well be one of those godly people without whom our country and the whole world will not stand but fall into the abyss of hatred, malice and self-destruction. The crushing weight of the Soviet Judicial System is hanging over her head.

Help us free our Mother. It is not just we, her children and grandchildren, who need her but you do too. Without her love and mercy will wither on the earth. And tomorrow when trouble knocks at your door, there may be nobody to answer your call for help.

Moscow, December, 1979

Natalya Babitsky, daughter, 26  
Fedor Babitsky, son, 24  
Julia Kaydan, daughter, 21  
Vladimir Kaydan, son-in-law, 33

#### AWM letter

We include the latest version of the AWM letter of support. We ask you again to have this letter or a Xerox signed by you and your colleagues. Please return the letter (or copies of letters sent) to AWM, Women's Research Center, Wellesley College, 828 Washington St., Wellesley, MA 02181.

# Association for Women in Mathematics

Office Address: *Women's Research Center, Wellesley College,  
828 Washington Street, Wellesley, Massachusetts 02181*

Academician A. P. Alexandrov, President  
Academy of Science of the USSR  
14 Leninsky Prospekt  
Moscow B-71, RSFSR, U.S.S.R.

Dear Professor Alexandrov,

We, the undersigned scientists, mathematicians and computer scientists are gravely concerned to hear of the harsh sentencing of our colleague Tatyana Velikanova. We support the letter from the Association for Women in Mathematics requesting the assistance of the Soviet Academy of Sciences in overturning this sentence.

Sincerely,

NAME

AFFILIATION

POSITION

NCTM: THE MATHEMATICS EDUCATION OF GIRLS AND YOUNG WOMEN

The Board of Directors of the National Council of Teachers of Mathematics approved the following position statement at their April 1980 meeting:

The Mathematics Education of Girls and Young Women

The National Council of Teachers of Mathematics is committed to the principle that girls and women should be full participants in all aspects of mathematics education, both as students and as teachers.

Often employment opportunities and continuing educational progress are closed to many young women because of powerful social influences that discourage them from continuing their study of mathematics beyond that required by school policy. Mathematics educators, therefore, must make individual and organizational commitments to eliminate psychological as well as institutional barriers to the achievement of women in mathematics. Innovative ways must be explored to convince both students and parents of the vital importance of continuing to take mathematics courses so as to keep open both educational and career options.

Each school or school system that does not have an equal proportion of the sexes in its most advanced mathematics classes should examine both its program and its faculty for influences that lead to "math avoidance" by girls and young women. The teacher is in a key role to stimulate and encourage students to continue the study of mathematics. Teachers at all educational levels must take positive steps and use appropriate learning materials and experiences to overcome the mistaken notion that mathematics is a male domain.

Suitable programs, adequately financed, must be developed to promote the mathematical education of females. Both simple justice and future economic productivity require that we do so without further delay.

In connection with this, NCTM has issued a new information resource "Mathematics Education of Girls and Young Women" providing guidelines for schools to assess the extent of mathematics avoidance by girls and to promote the study of mathematics by girls (and boys). Emphasizing the dependence of many employment and continuing education opportunities on sufficient mathematics background, the resource also includes an instrument for assessing enrollment in mathematics and a list of resource organizations. Single copies are available free on request from the National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 22091; phone (703) 620-9840.

MATHEMATICAL TIDBITS

This column is Bhama Srinivasan's idea, and she has contributed the first two items. Please send me your own "tidbits".

1. One of the main problems in finite group theory is the classification of the finite simple groups; simple groups are "building blocks," via the Jordan Holder Theorem, for all finite groups. At the San Francisco meeting of the AMS it was announced that the classification of finite simple groups has been completed, by the joint effort of several mathematicians. There are the alternating groups, the groups of Lie type, and 26 so-called sporadic groups (introduced to the world at large by Jill Clayburgh). One of the sporadic groups is the so-called Monster, which has attained some notoriety in the media. For a survey article on finite simple groups see Hurley and Rudvalis, Amer. Math. Monthly 84(1977).

2. Another famous problem occurs in Galois Theory. Can every finite group be realized as a Galois group over the rational number field? Shafarevich answered this in the affirmative for solvable groups. Now, apparently, the same answer has been announced for all groups by David Harbater. Since all details have not been checked, caution is suggested. I will follow up on this.

CBMS: AWM REPRESENTATION ON THE COUNCIL

by Lenore Blum, Mills College

The Conference Board of the Mathematical Sciences (CBMS) is the umbrella organization of the major mathematical societies.\* In 1976 the AWM was elected an affiliate member. We viewed this as additional formal recognition of our stature in the mathematical community.

The CBMS sponsors regional mathematical conferences, has various committees and panels which deal with areas of interest to the mathematical community, and periodically issues reports and studies. Its Council meets twice a year in conjunction with national meetings of member societies. The Council serves as a forum for communication between different groups in the mathematical community; as such, AWM can both benefit from and contribute to this interaction.

Lenore Blum has been AWM's representative on the CBMS Council since our affiliation. She is now joined by Vera Pless as alternate representative. We are very interested in having other AWM members represent us on the Council, particularly at meetings of professional societies that they attend. Please let Lenore know if you are interested. (Math & Computer Science Dept., Mills College, Oakland, CA 94613).

Future CBMS Council meetings are scheduled for:

August 9, 1981 in Detroit, Michigan, at the American Statistical Association (ASA) Meeting;

Jan. 16, 1982 in Cincinnati, Ohio at the AMS Meeting;

Sometime during July 19-23, 1982 in Stanford, CA at the SIAM Meeting.

\*Constituent members of the CBMS are: American Mathematical Society (AMS), Association for Symbolic Logic (ASL), Institute of Mathematical Statistics (IMS), Mathematical Association of America (MAA), National Council of Teachers of Mathematics (NCTM), Society for Industrial & Applied Mathematics (SIAM).

Affiliate members of the CBMS are: American Mathematical Association of Two Year Colleges (AMATYC), American Statistical Association (ASA), Association for Computing Machinery (ACM), Association for Women in Mathematics (AWM), Operations Research Society of America (ORSA), Society of Actuaries (SA), The Institute of Management Sciences (TIMS)

SOPHIE GERMAIN: AN UNKNOWN MATHEMATICIAN

by Christine Ladd Franklin

reprinted from Century, Vol. 48, October, 1894

thanks to Pat Kenschaft, Montclair State College, for bringing this article to our attention.

[Christine Ladd Franklin might also be called an unjustly unknown mathematician. Although she completed the requirements for the Ph.D. in mathematics at Johns Hopkins University under J. J. Sylvester in 1882, she was not awarded the degree at that time solely because she was a woman. In 1926 at the fiftieth anniversary ceremonies of the university, she was finally granted her Ph.D. She taught at Columbia and Johns Hopkins without the degree and published numerous papers in both mathematics and psychology (the Ladd-Franklin theory of color perception is named for her). Her husband was Fabian Franklin and her daughter, the author Margaret Franklin.]

If a thin circular sheet of metal be fastened firmly at the center by a clamp, and if a violin bow be drawn across its edge, a musical note will be produced. The plate is thrown into vibration by the bow; the vibration does not all come up at once and all go down at once, but it divides itself into some even number of sectors, say six or eight, and as one sector goes up the sector on each side of it goes down. The line between two

adjacent sectors goes neither up nor down, but remains at rest. If sand be scattered evenly over the plate before the musical note is produced, it will be shaken off the parts which are most in motion, and it will collect in the lines of rest, or "nodal lines", as they are called. Different musical notes cause the plate to be differently divided up, and the state of vibration of the plate is made plain to the eye by the lines of sand marked out on it. This experiment, a very striking one, which is still performed in all physical laboratories, was exhibited at Paris, soon after its discovery by Chladni, in 1808. It created a great sensation, and a commission was appointed to repeat it with various modifications, and to make a report upon it. The Institute of France, at the suggestion of Napoleon, offered its grand prize for a mathematical discussion of the phenomenon. There were not wanting great mathematicians in Paris at that time--Lagrange, Laplace, Legendre, Poisson, Fourier, but none of them were inclined to undertake this question; Lagrange, in fact, had said that it could not be solved by any of the then known mathematical methods. The offer was twice renewed by the Institute, and in 1816 the prize was conferred upon a woman, Mlle. Sophie Germain. It is very remarkable that so great a distinction as to have received the prize of the Institute of France for a profound mathematical discussion should not have preserved the name of Sophie Germain from oblivion, but it has not done so. There are probably not a score of persons in this country who have ever heard of her, and in her own country she is not usually mentioned among its famous women. As proof that women may be pure mathematicians, Mrs. Somerville has had, outside of Italy and Russia, to stand alone. This is unfortunate, for the detractors of her sex have maintained that her work, though exceedingly profound, was not remarkable for originality. That charge cannot be brought against Sophie Germain. She showed great boldness in attacking a physical question which was at that time entirely outside the range of mathematical treatment, and the more complicated cases of which have not yet submitted themselves to analysis. The equation of elastic laminae, which is still called Germain's equation, formed the starting-point of a new branch of the theory of elasticity. In her later years Sophie Germain turned her attention to questions of philosophy, and high German authority has recently discovered that her philosophical writings contain the germ of the Positive Philosophy of Comte. It is a curious thing that a woman so deserving of recognition has not received it in a fuller degree; it must be looked upon as one of those accidents by which the distribution of praise for merit is too often badly regulated. A mathematician, so remote is his subject from the ordinary concerns of men, has to be a very great mathematician indeed to be so much as heard of by the general public. Sophie Germain, besides deserving remembrance on account of her contributions to science, had a charming personality, and the few details that have been preserved concerning her life will not be found to be without interest. The authority for them is an article by Libri, the Italian mathematician, which appeared in the "Journal des Débats" at the time of her death. Later writers, including the author of the biography prefixed to the new edition of her philosophical works, which was published in 1879 (Paris:P.Ritti), have added little that is important to his account.

On April 1, 1776, in a modest house in the Rue Saint Denis, in Paris, Marie Sophie Germain was born. Her parents were Ambroise François Germain and Marie Madeleine Gruguelu. Not much can be said about her family. It is only known that her father, a skillful goldsmith, belonged to the cultivated and liberal bourgeoisie, and that he was the partizan, if not the friend, of the philosophers and the political economists. It is plain that she must have passed her earliest years in a family in which there were plenty of serious subjects for conversation. She soon exhibited great maturity of intellect, and remarkable depth of feeling. Her gloomy anticipations concerning the future of her country were a distinct cause of suffering to her, and she sought for some occupation sufficiently absorbing to distract her attention from her fears. At the age of thirteen she was one day turning over the pages of Montluca's "History of Mathematics" in her father's library, when she came upon the eloquent account of the death of Archimedes--how he was so absorbed in the consideration of a geometrical figure that he heeded nothing of the taking of Syracuse, or of the plundering of the city, and that, when a Roman soldier appeared before him, he met death at his hands without raising his eyes from his work. She conceived a sudden passion for a science which could procure such absolute

concentration and such total oblivion from the cares and griefs of life, and she resolved at that moment to devote herself to the study of mathematics. That resolution she carried out. She had no teachers, she had few books, but she had an unlimited store of energy. She studied by day and by night. Her family were alarmed at so much ardor, and endeavored to turn her attention to more ladylike pursuits. They tried the plan of putting out her fire and taking away her clothes at night, but she was found in the morning wrapped up in blankets, absorbed in her studies in a room so cold that the ink was frozen in the inkstand. It is a curious coincidence that Mrs. Somerville, at that very same time, in her little village in Scotland, was obliged to wrap herself up in blankets to pursue her studies before breakfast, because her whole day had to be devoted to the practice of music and painting, and to her lessons at the shop of a pastry-cook. [Footnote: The general law that women's learning must be got by heroic measures, if at all, is not yet obsolete. Ellen Watson, the highly gifted young woman, Clifford's pupil, who died at the Cape of Good Hope at an early age, did all her studying before breakfast, because she was required to spend the day-time in teaching her younger brothers and sisters; and the very last number of the "Nineteenth Century" contains an account of a girl whose sympathetic family secure her two uninterrupted hours every day for an afternoon nap on account of her delicate health, not knowing that her afternoon sleepiness is due to hours of hard work before breakfast--work for which, it goes without saying, she would not dare to ask for two uninterrupted hours in the afternoon.] Before a strength of will so remarkable at her age Sophie Germain's family at last yielded, and she was allowed to dispose of her time and her talents at her pleasure.

But no matter what the energy brought to bear upon them, the higher mathematics present a long and toilsome course of study to any one who wishes to master them. Sophie Germain carried on this laborious work with constantly increasing satisfaction. Toward the end of her life, she still spoke with animation of the happiness she experienced when she first found herself in a position to take up the Differential Calculus of Cousin. But soon a new difficulty presented itself. It was absolutely necessary to her further progress that she should read certain works which were written in Latin, and she did not understand that language. Unaided and alone, she proceeded to learn it, and in a short time she was able to read the works of Euler and Newton. Her ambition at this time took a wider range, and, carried away by the philosophical spirit which held sway in the great encyclopedia, she extended her reading over the entire field of the sciences, and laid the foundations for that work which, forty years later, was to secure her a place among the founders of the Positive Philosophy.

In 1794 the Ecole Polytechnique was founded. Lagrange, Prony, Fourcroy, Monge, were among its lecturers. Sophie Germain was then eighteen years of age. Anxious to profit by so valuable a means of instruction, she procured for herself students' note-books specially of the courses in chemistry of Fourcroy, and in analysis of Lagrange. She did more. The students were in the habit of handing in to the professors, at the end of a course, their observations in writing on the lectures which they had attended. Under the supposed name of a student, Le Blanc, she sent her note-books to Lagrange. He noticed them, publicly praised them, found out the real author, and having made her acquaintance, became the friend and counselor of the young mathematician. The circumstances under which she was discovered, the approbation of the illustrious author of the "Mecanique Analytique," her youth, some details concerning her studies--all this excited attention, and procured for her sympathetic friends. Soon she had established relations, either directly or by correspondence, with all the learned men of the period. Every one was solicitous of the honor of being presented to her, learned works were dedicated to her, and her house became a center for the brilliant conversation of the most distinguished men of the day.

Some years later, Gauss's great work on the "Theory of Numbers" appeared. Mlle. Germain at once turned her attention to this subject. She made numerous researches in it, and, under the pseudonym of Le Blanc, she sent her notes to the celebrated professor of Göttingen, persuaded, she writes, that "he will not disdain to enlighten with his advice an enthusiastic amateur of that science which he cultivates with such brilliant success." M. Le Blanc was far from being a simple amateur, and Gauss was soon well aware of it. His

answer contained a warm recognition of her talents, and a friendly intercourse was kept up between them for several years without his becoming aware of the sex of his correspondent.

In 1808 Sophie Germain contended for the prize offered by the Institute for the best memoir giving the mathematical theory of elastic surfaces, and comparing it with experience. She deduced the equation of those surfaces from a certain hypothesis concerning the forces of elasticity, but there was an error in her mathematics, and her equation was not correct. Lagrange, to whom the paper had been referred, deduced from the same hypothesis the equation which is still recognized as the correct one. She did not receive the prize. Two years later she sent in a second memoir, in which the same equation is correctly given, and a more complicated hypothesis leads to the equation for the state of things which obtains at the boundaries of the elastic plate. Her theoretical solution she had also confirmed by a long series of experiments. This paper received honorable mention. Nothing daunted, she tried a third time, and received the prize, although the commission was not absolutely satisfied with the rigor of her demonstration. Germain's equation for elastic plates is still the fundamental equation of the theory. Her boundary-equations have not stood the test of time; Poisson, fourteen years later, gave a different set of boundary-equations based upon a different hypothesis, and Kirchoff, in 1850, showed that neither hypothesis was tenable, and that neither set of equations was correct.

In 1824, she sent another paper to the Institute entitled, "On the Employment of the Thickness in the Theory of Elastic Surfaces." This paper was given to a commission, consisting of Poisson, Prony, and Laplace, to report on. They never brought in their report, and she was never able to regain possession of the manuscript. Only a few years ago it was discovered among the papers of Prony, and it was reprinted entire, in a supplement to Liouville's "Journal des Mathématiques."

Not spoiled by her success, Sophie Germain continued her studies with all her former enthusiasm. She attended the sessions of the Academy of Sciences, kept herself abreast of the scientific researches of her contemporaries, and found time to perform various friendly offices for her acquaintances. She contributed to the "Annales de Physique et de Chimie" an examination of the principles which lead to the laws of movement of elastic solids. In this paper she establishes, in opposition to Poisson, that no hypothesis in regard to the molecular constitution of bodies is necessary in a discussion of elasticity. Her views on this subject have been abundantly confirmed. Two papers of hers in "Crelle's Journal"--one on the curvature of surfaces, and one on the theory of numbers--were composed by her during the noise of the cannon of July, 1830. Her hope of finding a profound absorption in the study of mathematics had not been disappointed.

There are many testimonials to the charm of her character and of her conversation. She was imbued with a pure love of science, and she was remarkably indifferent to her own fame. She rejoiced when ideas which she had let fall in conversation were appropriated by others. It made no difference, she said, from whom an idea came; it was only of consequence that it should be true and useful. Fame she defined to be the small space which one occupies in the brain of his neighbors--a definition which Schopenhauer has since repeated. Virtue she looked upon as a sense of order, which the cultivated understanding must admire, even when the heart does not love it. Her conversation was full of gaiety and freshness, and bore constant marks of originality of thinking, and of a poetic handling of her thoughts. She died at the age of fifty-five. Her grave at Père la Chaise, fifteen steps from that of Comte, is in a neglected condition. The railing is rusty, the stone has fallen, the border of box is wild and overgrown.

The philosophical writings of Sophie Germain were given to the world two years after her death, by her nephew, Lherbette. Besides some detached thoughts, they consist of a long article entitled, "Considerations on the State of the Sciences and of Letters at the different Periods of their Culture." Her main idea is the extension of the principles of law, and of the harmonious interaction of causes which prevail in the physical sciences to the regions of politics, of morals, and of art--the same idea which Comte expounded with much greater detail in his "Cours de Philosophie Positive." Comte's indebtedness to Condorcet and to Saint-Simon has frequently been mentioned. It is only recently that it

has been discovered how distinctly he was anticipated in the main features of his system by Sophie Germain. Dühring, in his "Critical History of Philosophy from its Beginnings to the Present Time" (third edition, Leipsic, 1878), says, after giving a full abstract of her work, "One sees from the above that the Positivism which, without the use of the word, one finds in the writings of Sophie Germain, contains the essential features of that which has hitherto been associated with the name of Auguste Comte." The "Zeitschrift für Philosophie" has had two long articles by Goring entitled: "Sophie Germain as the Predecessor of Comte." Her "Considerations" are still very interesting reading, and they would well repay translation.

### SEX DISCRIMINATION SUITS

Shyamala Rajender filed suit in 1973 against the University of Minnesota. The case later became a class-action suit for all nonstudent female academic employees as well as for applicants and potential applicants. After the case was in and out of court for several years, the university made an out-of-court settlement admitting no wrong-doing in April, 1980. Rajender was awarded \$100,000 in damages and attorneys' fees. Women who were discriminated against when they applied for a position at the university may file for damages. Salaries for men and women will be equalized at all university campuses. A court-appointed attorney, paid by the university, is to supervise the university's hiring practices related to women until 1989. Claims must be filed by June 1, 1981. Write: Leonard E. Lindquist, Attorney-at-Law, IDS, 80 S. Eighth St., Minneapolis, MN 55402. [Source: Minneapolis Tribune, April 19, 1980 and August 2, 1980. Thanks to Linda Carlstedt for sending in the articles.]

Friends of the Cornell Eleven, Box 67, Lansing, NY 14882 need contributions from concerned university women and men to finance a class-action suit against Cornell. They see their effort as one with important implications for all academic women:

- women who have been shuttled into part-time lectureships and research posts while men with comparable credentials have been appointed as Assistant Professors;
- women who, despite a decade of Affirmative Action, still can't get information about faculty openings on their campuses until the posts are filled with white men;
- women who, with seemingly excellent records in research, teaching, and service, are turned down for tenure while men are routinely promoted;
- women who have languished as Associate Professors for years while comparable men have been named Full Professors; and
- all faculty women who take home smaller paychecks than men doing comparable work.

Women's Times, a newsletter on sex discrimination in higher education with special emphasis on the determined fight being waged by the Cornell Eleven, may be obtained by writing to the address above.

The Women's Equity Action League (WEAL) has been at the forefront of the struggle for equal rights for women. WEAL filed more than 300 sex discrimination complaints against colleges and universities in the early 70's and took the Departments of Labor and HEW to court for failure to enforce the laws and regulations under their charge. As a result of the court order WEAL won in 1977, both departments have made increased efforts to eliminate the backlog of cases they have to investigate. More recently, WEAL lobbied very hard on behalf of the Women in Science Bill which passed this year. Its final version was less than hoped for, but a step in the right direction. [Ed. note: the funding for the bill is expected to be a casualty of the budget cut.] The primary purpose of a discrimination complaint recently filed by WEAL is to push indirectly for promotion of a woman mathematician who has already gone through considerable stress via an unsuccessful EEOC case.

THE CULT OF OBJECTIVITY IN THE PHYSICAL SCIENCES

by Jill C. Bonner

reprinted from Choices for Science, proceedings of symposium, the Mary Ingraham Bunting Institute of Radcliffe College by permission of Marion Kilson, Director

Abstract

Professionals in the physical sciences are dedicated to the ideal of objectivity: in their investigations of the nature of the physical world, they strive to eliminate factors rooted in the human condition which might affect the objectivity of their theories or experiments. Such factors include subjective considerations, emotional involvement, biases conscious or subconscious, and illogical or irrational arguments. Such a philosophy requires rigorous intellectual discipline, usually acquired after years of training. It may require the abandonment of a cherished theory, nurtured over many years of research, overnight in the face of a "counterexample", i.e., the emergence of an incontrovertible result inconsistent with the existing theory. Objectivity is what gives science its international flavor, since, ideally, national cultural influences are subtracted out. Scientific practitioners take pride in their pursuit of objectivity. However, in this talk, I examine rather critically the degree of objectivity actually attained, in terms of both current research in the physical sciences and attitudes and the structure of the profession. Specifically, the objectivity of professional criteria as they affect women scientists will be examined.

I am presenting this talk not as a sociologist, behavioral scientist, philosopher or historian, but from an individual perspective, as a practicing solid-state physicist and someone who has encountered severe obstacles at several crucial points of career development. These setbacks have caused me to examine the nature of scientific research and, particularly, the underlying structure of the scientific profession, with considerable interest and a rather critical eye. I trust these personal observations will prove stimulating, and perhaps lead to further, more quantitative, research into the professional structure of the physical sciences.

I shall first sketch what I consider to be the popular view of science and then comment on the salient personality features of scientists as I have known them. This will lead into a discussion of what is understood by "objectivity" in the scientific profession.

Science is chilling to many people, since it thoroughly excludes what are regarded as normal characteristics of human nature, namely, emotionalism, psychological moods, sudden impulses, inadvertence, incompetence and inefficiency. This view is, on the whole, an accurate perception. Specifically science is regarded as cold, impersonal, abstract, symbolic, and mathematical, with no room for emotion and error. Consequently, science attracts people who not only have mathematical aptitude and good physical perceptions, but also have very special personality characteristics. As I perceive them, scientists enjoy investigating their environment: they have a natural curiosity about physical phenomena and how things work. They enjoy problem posing and problem solving, in both a specific and a general sense. They like logic, order and having control over their lives and environment. They fear and dislike messy emotional involvement. This fear is so strong that a scientist exhibiting emotional characteristics becomes instantly suspect to colleagues, who fear that the accuracy of his [Note: since the physical sciences comprise, roughly, 90% males and 10% females, in this work the pronouns he/his and she/her will be used 90% and 10% of the time, respectively.] experimental data or the logical details of his theory may be unsound, i.e., that emotionalism may compromise his scientific objectivity. Scientists value reason and strongly distrust emotion. Since research scientists are, by and large, insulated from the day-to-day struggles of a commercially oriented society, they are less likely to vote job-related self-interest and are politically rather liberal as a class. Their attitudes to women and minorities are much less liberal. Their aversion to emotional extremes results not only from the

non-emotional character of science, but also from the high level of abstract concentration sustained over long periods required for success in the physical sciences. Their social and sexual lives tend, therefore, to be conservative and conformist. Successful scientists have no energy left to spare for emotional roller coaster living. The important corollary is, that since scientists are predominantly men, conventional family lives accord with correspondingly conventional and conservative attitudes to women. The high level of concentration, hard work, dedication, drive, and isolation from the emotional frustrations of daily living make men scientists extremely dependent on the life-support system provided by their wives. Thus, older scientists at prestigious institutions tend to be overwhelmingly inegalitarian in their attitudes to women. Younger men, while they are more likely to realize intellectually and appreciate the inequities of the traditional female role, nevertheless find it overwhelmingly advantageous to their professional lives and success to maintain the status quo. The vital importance of wives as career-support systems seems to me to imply that discriminatory attitudes to women may be harder to eradicate in the sciences than in other professions.

Let us, however, return now to the philosophy of science itself and the cult of objectivity which makes science so strikingly different from other professions. As examples, we might take the world of commerce, the advertising profession, the military and politics. None of these professions is noted for the candor and objectivity of its official utterances. The goal of all is the psychological manipulation of the public or of military subordinates. The world of science is very different. It is practical, logical, and dispassionate. It transcends national and cultural differences. It imposes a rigid intellectual discipline. A theory retains its credibility only until it is demolished by a sufficiently compelling counterexample; and all theories are constantly under attack, i.e., examination in this light. For example, a theory may explain one thousand experimental observations correctly. However, if it fails on just one, it must either be discarded or radically modified. A theory which has to be constantly modified to accommodate new facts eventually loses its credibility. This imposes a considerable strain on an individual scientist who may spend years of devoted time and effort on his theory, with corresponding inevitable emotional involvement, only to see his efforts overturned overnight as new data come to light. Hence, the existence of the common phrase: "Many a beautiful theory slain by an ugly fact."

#### Objectivity: Success and Failures

After sketching out my impressions of science, the nature of the people who practice it, and perhaps the most salient feature of its philosophy--objectivity, I come to the second part of my talk. All scientists agree on the importance of scientific objectivity. We now examine to what extent they succeed or fail in their pursuit of the ideal.

First of all, scientists, though they may become a little strange in the course of their professional development, still remain members of the human race and must constantly struggle with the concomitant non-objective features. Nevertheless, it must be said that overall there are some significant successes. I have already mentioned the international character of science, one of its more striking aspects. Further, there is a remarkable consensus of opinion in the field of science among scientists of all ability levels on who does good science, middling science, and poor science. This social perception is aided by a number of quasi-objective criteria, such as prestige of the home institution, number of publications, the prestige of the journals in which they are published, invited presentations at scientific gatherings, prizes, fellowships, and other honors and awards. A really innovative scientist may initially have some difficulty in getting her ideas accepted, if they radically confound conventional wisdom, but the problems are over well within her lifetime and usually within a couple of years. Good work rather rapidly receives appropriate recognition. This is not to say that individual scientists are without bias, but an average over a group of five or six of them appears reasonably reliable. This is the conclusion of an evaluation of the peer-review system of grant proposals submitted for funding to federal agencies like the National Science Foundation.

Conflicts between a scientist's carefully developed scientific integrity and objectivity and his financial security may arise, however, when a scientist depends for his living on, say, a commercial institution. The general community appears to view with increasing suspicion scientists who speak out on behalf of commercial organizations on subjects like the safety of appliances or vehicles or the safety of new drugs. There is a fear that these scientists may have "sold out", and this fear is certainly not without foundation. Public suspicion of those scientists speaking out on behalf of nuclear-power safety seems to be even greater. University scientists are rarely in opposition. This may account, in part, for the continuing popularity of academic over industrial professional positions despite the relatively much lower salaries of the former.

If one looks carefully, however, subversions of scientific objectivity start to become apparent even within the academic wing of the scientific community. One phenomenon has recently been highlighted in the popular literature of the physical sciences [Vera Kistiakowsky in Physics Today, February 1980] under the title of the "Matthew Principle" (after a celebrated quotation from the Gospel according to St. Matthew). It may also be stated succinctly in the form "the rich get richer and the poor get poorer." Suppose two young scientists start out in comparable fields and with comparable abilities. One is fortunate enough to be offered a position at a high prestige institution; the other (since permanent academic positions remain in short supply) has to make do at a mediocre institution. After a few years, the former scientist has, say, 20 publications and the latter, say, five. Does this mean the first scientist is really the better scientist? That would be the (naive) conclusion of the scientific community. However, on looking closely, one observes that the first scientist has several advantages over the second. The higher prestige institution usually will have a lower teaching load; the students, in particular the graduate students, will be much better, support facilities including travel funds and grants-in-aid will be superior, faculty colleagues will be more active and more stimulating, and the prestige of the institution will enhance the reputation of the young scientist and help in bringing in invitations to participate in select workshops, give invited talks, etc., thus enhancing chances for successful grant applications. There is a powerful instability called, in economic terms, a "multiplier effect" at work here. Since the hallmark of good science is objectivity, individual scientists pride themselves in the "objectivity" of their scientific judgment. This example shows just how suspect that judgment might be. As presently exercised within the scientific community, judgment or peer evaluation of a scientist's credentials rests solely on present achievements, without regard to the level of opportunity experienced by the scientist in attaining those achievements. Hence an advantaged scientist appears "better" than a disadvantaged scientist. Advantage and disadvantage are highly cumulative, as has recently been forcefully pointed out. [Jonathan Cole, Fair Science: Women in the Scientific Community]

Therefore, I firmly believe the objective criterion for evaluation of the career achievements of a scientist should not be present qualifications but rather present qualifications IN RELATION TO THE LEVEL OF OPPORTUNITY EXPERIENCED. Unfortunately, I am virtually alone in advocating this modified criterion. My fellow scientists are so convinced of the objectivity of their observations I find it impossible to modify their thinking. The problem I have to contend with is that the effects of non-objective misevaluation of, say a young scientist are completely masked by the self-fulfilling prophecy aspects of academic selection. "The guy who gets the breaks does well; the guy who doesn't does not." Of course, it sometimes happens that breaks are given at an early stage to a real loser. In this case, success is unlikely and the scientist drops from sight. His embarrassed colleagues then tend to play down or ignore the whole thing. Hence, failures of the professional selection system are never very apparent, which enhances the complacency of the scientific profession. A further, related phenomenon with immense possibilities for abuse is the widespread use of "potential ability" as a reason for giving opportunities to young scientists who do not have the seniority necessary to establish actual track records. No criterion could possibly be less objective. Further, "potential" seems to be a prerogative of a favored subclass of young

white men: women seem genetically defective in scientific potential, or so one would tend to conclude observing the scientific profession making judgments. Here, then, we have a prime example of failure of objectivity in the scientific profession which tends to affect women adversely as a class.

An even more serious problem for women scientists lies in the very structure of the science profession. The whole profession is tailored to the life style of the (white) male. For example, the prestige of the initial appointment strongly determines eventual career success, and therefore the location must be carefully chosen. Bargaining for both salary and work or status occurs at every stage of a scientific career, and frequently exploits competing offers from a number of institutions. I state the obvious when I say that women, far more than men, have their mobility and therefore also their bargaining capability restricted by spouse and family. Women are all too frequently big losers in the scientific race through this factor alone. Male scientists tend to be totally unsympathetic. They assert that obviously and objectively "that's the way that science is run." Women and any others who do not or cannot fit in must pay the inevitable price. I strongly contest this point of view. I assert that the professional structure of science should be such as to bring to the top of the profession the most able scientists, regardless of color, sex, race or other secondary considerations like mobility. This is not to say that mobility is irrelevant to scientific advancement. It is important to visit other institutions or other countries for relatively short periods of time, of the order of a few months. But this is not the long-term type of mobility that restricts opportunities for women. Suggestions for tackling this problem to give an even break to a wide class of young scientists are: (a) to put starting salaries on a uniform, nationwide basis (except for cost-of-living adjustments), and (b) to tie advancement within the institution more to actual achievement than to competitive outside offers. The establishment of grievance procedures at certain universities is also helping immobilized women.

A feature that strikes me most forcibly is the deep conviction of established male scientists, which they feel is based on unimpeachable objective and dispassionate grounds, that the present system is the best and only way to operate the scientific profession. This seems to them an utterly self-evident and objective fact. It doesn't seem that way at all to me.

In summary, therefore, I am concerned that the ideal of objectivity, which is an essential ingredient in the conduct and evaluation of scientific research itself, is being compromised in a very widespread fashion when it is extrapolated to situations involving social values and human judgment. A successful scientist who is satisfied by his level of objectivity in scientific research seems convinced he is equally objective in his judgments in other areas. This is why physical scientists appear to be the class of male professionals most resistant to the idea that pervasive discrimination and lack of equal opportunity can exist within their profession.

#### WOMEN AND MATHEMATICS EDUCATION

I would like to remind you that dues for WME are only \$3 a year. Send it along with name, address and phone numbers to WME, c/o Judith Jacobs, George Mason University, Education Department, 4400 University Drive, Fairfax, VA 22030.

WME aims to promote the mathematics education of girls and women by:

1. Promoting leadership among women in the broad mathematics education community.
2. Encouraging research in the area of women and mathematics, especially research which isolates factors contributing to the dropout of women in mathematics.
3. Emphasizing the need for programs for elementary and secondary school students that help reverse the trend of avoidance of mathematics by females.
4. Serving as a clearinghouse for ideas and resources in the area of women and mathematics.

5. Establishing communications for networks with specific foci for doctoral students, elementary and secondary school teachers, and teacher educators.
6. Publishing a newsletter to serve as a general communications link among all educators interested in the problem of women in mathematics.
7. Monitoring NCTM publications for sexism.
8. Encouraging NCTM to help develop programs, activities, and/or materials for students, teachers, and teacher educators that would promote awareness of the need for women to continue to study mathematics.
9. Effecting change within NCTM and the mathematics education community in general with regard to issues of women and mathematics.
10. Organizing programs and meetings focusing on women and mathematics at the annual NCTM meetings.

#### OF POSSIBLE INTEREST

"The Sky's the Limit", the career booklet prepared by the Math/Science Network, was reviewed in January by a panel at Wellesley College. It will be distributed by the Educational Development Center (EDC) in Newton, Mass. Center for Teaching/Learning of Mathematics, P.O. Box 3149, 754 Old Connecticut Path, Framingham, MA 01701. Various publications. Multiplication table T-shirt. Focus on Learning Problems in Mathematics, an interdisciplinary journal.

The Project on the Status and Education of Women mails quite interesting publications to a large mailing list. Also, the Project speaks out for both women and institutions against bureaucratic doubletalk and delay and prods the federal bureaucracy to produce regulations which are not onerous or disruptive. It asks us to become Associates of the Project. You will receive all regular mailings and a Special Report only for Associates. Your contribution of \$15 or more is tax-deductible. Association of American Colleges, 1818 R St., NW, Washington, DC 20009.

The Directory of Significant 20th Century Minority Women in America did not appear when the publisher discontinued publishing. Under the new title Minority American Women: A Biographical Directory, it will be printed in 1981 by Neal Schuman Publishers.

The listing will be of living minority women who have made a significant contribution in areas of local, state, regional, national or international concern. If you have recommendations, write: Jessie Carney Smith, University Librarian and Editor, Fisk University, Nashville, TN 37203.

June 2, 1981 is the closing date for preliminary proposals for Public Service Science Centers to the National Science Foundation's Science for Citizens Program. For further information, write NSF Forms and Publications or The Science for Citizens Program and order the Guidelines, Publication Number SE 80-64.

Women's Studies, Cambridge University Press, 32 E. 57th St., New York, NY 10022.

The Woman Scholar Series, distinctive posters for education and inspiration, Federation of Organizations for Professional Women. FOPW/Posters, 2000 P St., NW, Suite 403, Washington, DC 20036.

Women and Culture, 1981, The University of Michigan Press, P.O. Box 1104, Ann Arbor, MI 48106.

Women's Studies, The University of North Carolina Press, P.O. Box 2288, Chapel Hill, NC 27514.

Women as Interpreters of the Visual Arts, 1820-1979 and other titles, Greenwood Press, 88 Post Road West, P.O. Box 5007, Westport, CT 06881.

Florence Nightingale in Rome, The American Philosophical Society, 104 S. 5th St., Philadelphia, PA 19106.

DEADLINES: May 23 for July-Aug., July 24 for Sept.-Oct., Sept. 24 for Nov.-Dec.

ADDRESSES: Send all newsletter material except ads to Anne Leggett, Math. Dept., Western Illinois University, Macomb, IL 61455. Send everything else, including ads, to AWM, Women's Research Center, Room 204, Wellesley College, 828 Washington St., Wellesley, MA 02181.

#### JOB ADS

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

Western Illinois University. Dept. of Mathematics. One or more tenure track positions Fall, 1981. Applications encouraged from those with recently completed Ph.D's in math sciences including computer science and operations research. Required: strong commitment to excellence in undergraduate teaching. Beginning salaries & rank depend on experience. Send vitae, application & 3 letters of reference to Larry Morley, Chairperson, Dept. of Math, Western IL Univ., Macomb, IL 61455.

McPherson College. Dept. of Mathematical Sciences. Faculty position 9/1981 to teach introductory and advanced Computer Science. Required: college teaching experience. Ph.D. preferred; MA acceptable. Salary competitive with private colleges in Kansas. Address inquiries and send credentials to Dr. Norma Tucker, Vice President for Academic Affairs, McPherson College, McPherson, KS 67460.

University of Maine, Orono. Dept. of Mathematics. Asst. Professor of Mathematics as of 8/1/81. Opening for one year to replace faculty on leave and/or sabbatical. Salary negotiable. Closing date 5/10/81 and bi-weekly thereafter until positions are filled. Please send vita, transcripts, and 3 letters of recommendation to Gary Haggard, Chmn., Dept. of Mathematics, University of Maine, Orono, ME 04469.

University of Maine, Orono. Dept. of Mathematics. Instructor in Mathematics, full time academic year appointment starting 8/31/81. Required: Masters in Mathematics, Statistics or Computer Science. Previous teaching experience desirable. 1/2 hour teaching load. Base salary \$11,660. Please send vita, transcripts, and 3 letters of recommendation by 5/10/81 to Gary Haggard, Chmn., Dept. of Mathematics, University of Maine, Orono, ME 04469.

Hood College. Dept. of Mathematics. Tenure track Asst. Professorship starting Fall, 1981. Required: Ph.D. and desire and ability to teach undergraduate mathematics courses (introductory and advanced) and introductory computing courses (algorithmic analysis and programming). Send resume, graduate transcript and 3 letters of recommendation to Chairperson, Dept. of Mathematics, Hood College, Frederick, MD 21701.

Moorhead State University. Dept. of Mathematics. Two tenure track positions at Instructor or Asst. Professor level available 9/1981. Asst. Prof. salary range \$15,330-23,225. Duties: teaching (12 hrs. per quarter) undergraduate mathematics, advising students and university and departmental committee work. Required: Ph.D. in Mathematics, but a Master's will be considered; evidence of successful college teaching experience. Send completed Moorhead State Univ. application form, transcripts and 3 to 5 professional references to Dr. Milton Legg, Chmn., Dept. of Mathematics, Moorhead State University, Moorhead, MN 56560.

University of Minnesota, Duluth. Dept. of Mathematical Sciences. Asst. Prof. of Statistics to teach undergraduate statistics & math 6 to 8 hrs. per week. Ph.D. required. Interest in consulting within the college is desirable. Publishable research is required for tenure. Salary \$21,000+ (9 mos.) starting 9/1/81. By May 20 send application, resume, official transcripts & 3 letters of recommendation to Richard F. Green, Dept. of Mathematical Sciences, University of Minnesota, Duluth, Duluth, MN 55812.

Stockton State College. Dept. of Mathematics. Faculty position in dynamic interdisciplinary program for someone with commitment to excellence in teaching of mathematics. Normal course load 5 to 6 courses per year including offerings in general education curriculum and supervision of independent student projects. Ph.D. or near completion required. Send resume & names of 3 references to Edward Paul, Dean, Faculty of Natural Sciences and Mathematics, Box 7446, Stockton St. College, Pomona, N.J. 08240.

Rutgers State University. Dept. of Mathematics. Possible tenure track position in mathematics. Research and teaching both important. All areas considered, some preference for differential geometry or PDE. Send vita, 3 letters of recommendation, reprints and preprints to Search Committee, Dept. of Mathematics, Rutgers State University, Camden, N. J. 08102.

Rutgers State University. Dept. of Statistics. Professorship. Academic year appointment starting Fall, 1981. Ph.D. in Statistics. Teaching graduate and undergraduate courses in Statistics and Research in statistics. Record of distinguished scholarship required. Send resume to Dr. William E. Strawderman, Chairperson, Dept. of Statistics, Hill Center, Rutgers State University, New Brunswick, N. J. 08903.

Russell Sage College. Dept. of Mathematics. Asst. Professorship starting 9/1981. Duties: teaching 9-12 hrs. per week; 21 hrs. per academic year. Courses include upper mathematics especially Probability, Statistics, Analysis, Algebra; lower level math courses; and service courses in comp. science & math. Participation in curriculum planning & departmental programs. Required: Ph.D. in math and teaching experience. Salary negotiable. Deadline 5/1/81 or until position is filled. Send inquiries & supporting materials to Dr. Rita Murray, Chairwoman, Dept. of Math, Russell Sage College, Troy, N. Y. 12180.

University of Pennsylvania. Dept. of Mathematics. Several tenure track positions available starting with academic year 1981/82 or 1982/83. Preference for one of these positions may be given to candidate in general area of algebra. Candidates in all areas should apply. Salary negotiable. Write to Prof. Stephen S. Shatz, Chmn., Personnel Committee, Dept. of Mathematics (E1), University of Pennsylvania, Philadelphia, PA 19104.

Vanderbilt University. Dept. of Mathematics. Subject to Administration approval. Positions of Instructor with one year renewable appointment or of Assistant Professor (Ph.D. required) with 3 year appointment. These are not tenure track positions but are intended for people with a record of enthusiastic and effective undergraduate instruction who would enjoy teaching at a small, private university with good students. Teaching load 9-11 hrs. per week. Have vita and letters of recommendation sent to R. R. Goldberg, Chmn., Dept. of Mathematics, Vanderbilt University, Nashville, TN 37235.

Marshall University. Dept. of Mathematics. At least one Instructorship available 9/1981. Master's in mathematics required. College or university teaching experience desirable. Teach 3 or 4 introductory level courses per semester plus service. Please send resume and 3 letters of reference by 4/30/81 to Dr. John Lancaster, Chmn., Dept. of Mathematics, Marshall University, Huntington, W.V. 25701.

University of Wisconsin, Eau Claire. Dept. of Mathematics. Asst. Professor or higher, starting 8/24/81. Duties: teaching a wide variety of undergraduate courses for majors and minors as well as service courses for other majors. Required: Masters, and Ph.D. preferred. Preference given to those with training or experience in applied areas; strong commitment to teaching & evidence of potential for teaching excellence. One year appt. with tenure track position. By 5/20/81 send application, vita including official transcripts of undergraduate & graduate work, and at least 3 letters of recommendation to Dr. Marshall E. Wick, Chmn., Dept. of Math, Univ. of Wisconsin-Eau Claire, Eau Claire, WI 54701. (Phone: 715-836-3301)

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FLIER

May, 1981

To All AWM members

From Boston Area members

At a meeting of the Boston Area AWM members on April 5, 1981, we decided to ask Anne Leggett, Newsletter Editor, if we might insert a page in this Newsletter requesting each of you to exert any influence you have to encourage federal support of educational programs which affect women and girls. As you are probably aware, the proposals of the Reagan Administration for rescissions in the 1981 federal budget and the proposal cuts in the 1982 federal budget are very severe in the area of educational programs. The "Women in Science" part of the National Science Foundation Authorization and Equal Opportunities in Science and Technology Act, passed by the Congress last fall and signed by the President on December 12, 1980, is to be cut entirely. The Act set aside \$30 million for projects designed to increase the participation of women and girls in science and to provide better opportunities for women scientists.

Many members of the AWM and other women scientists worked long and hard for a period of over three years to get this law passed. This Act was the result of S. 568 (Women in Science and Technology Equal Opportunity Act) which Senator Edward M. Kennedy and the Subcommittee on Health and Scientific Research, of the Senate Committee on Labor and Human Resources, sponsored in the Senate. One of the arguments used was that the country can ill afford to waste the capabilities and talents of 51% of its population.

Among other proposed cuts, all of which would affect women adversely, are those in the student loan program, the Women's Educational Equity Act Programs, research funds for recent recipients of the Ph.D. degree, and the Science Education Directorate of the NSF.

Some people to whom AWM members can write are listed below. You may know many others whom you can contact. The matter is urgent for the Congress may begin to act on these proposed cuts as early as the first week in May.

President Ronald Reagan  
The White House  
Washington, D. C. 20500

Dr. John B. Slaughter, Director  
National Science Foundation  
1800 G Street, N.W., Room 520  
Washington, D. C. 20550

(PA) Representative Doug Walgren, Chairman  
U. S. House of Representatives  
Subcommittee on Science, Research and Technology  
117 Cannon House Office Bldg.  
Washington, D. C. 20515

(over)

The following are members of the Senate Committee on Labor and Human Resources:

(Rep) Chairman Orrin G. Hatch (UT)  
411 Russell Senate Office Bldg.  
Washington, D. C. 20510

Republicans: Jeremiah Denton (AL) 110 Russell Senate Office Bldg.  
Washington, D. C. 20510  
John P. East (NC) 5313 Dirksen Senate Office Bldg.  
Washington, D. C. 20510  
Paula Hawkins (FL) 1327 Dirksen Senate Office Bldg.  
Washington, D. C. 20510  
Gordon Humphrey (NH) 4203 Dirksen Office Bldg.  
Washington, D. C. 20510  
Don Nickles (OK) 125 Russell Senate Office Bldg.  
Washington, D. C. 20510  
Dan Quayle (MD) 363 Russell Senate Office Bldg.  
Washington, D. C. 20510  
Robert Stafford (VT) 5219 Dirksen Senate Office Bldg.  
Washington, D. C. 20510  
Lowell P. Weicker (CT) 313 Russell Senate Office Bldg.  
Washington, D. C. 20510

Democrats: Thomas F. Eagleton (MO) 1209 Dirksen Senate Office Bldg.  
Washington, D. C. 20510  
Edward M. Kennedy (MA) 2241 Dirksen Senate Office Bldg.  
Washington, D. C. 20510  
Howard M. Metzenbaum (OH) 347 Russell Senate Office Bldg.  
Washington, D. C. 20510  
Clayborn Pell (RI) 325 Russell Senate Office Bldg.  
Washington, D. C. 20510  
Jennings Randolph (WV) 3203 Dirksen Senate Office Bldg.  
Washington, D. C. 20510  
Donald W. Riegle (MI) 1207 Dirksen Senate Office Bldg.  
Washington, D. C. 20510  
Harrison Williams (NJ) 352 Russell Senate Office Bldg.  
Washington, D. C. 20510

Please write your own Senator and Representative.