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Association for Women in Mathematics

p. 6

Vol. 13, No. 4 NEWSLETTER July-Aug. 1983

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CHANGE OF EDITOR'S ADDRESS! CHANGE OF EDITOR'S ADDRESS!
My address is changing. Please correct your file. My new address is:
Anne Leggett, Department of Mathematical Sciences,
Loyola University, 6525 Sheridan Road, Chicago, IL 60626.
CHANGE OF EDITOR'S ADDRESS! CHANGE OF EDITOR'S ADDRESS!

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PRESIDENT'S REPORT

Albany meeting. For those of you who are coming to the joint AMS-MAA summer meeting in Albany, AWM has a number of activities planned. Our panel discussion is entitled "Grants: getting them and keeping them." We are fortunate to have as our first speaker Dr. Judith Sunley, who is currently Director of the Algebra Program at NSF and about to become acting head of the Mathematics Section. Dr. Sunley will discuss grants for research. Alice Schafer, Wellesley College, former president of AWM, will discuss grant proposals for nonresearch projects. In between we will have some people speaking briefly about their own personal experiences. Rhonda Hughes of Bryn Mawr will talk about her own (successful) grant writing for research in analysis. Cora Sadosky of Howard University will talk about applying to, and spending a year at, the Institute for Advanced Study. There should be time for some questions and discussion.

As of this writing the panel is scheduled for Wednesday morning August 10, and we also hope to have an informal workshop on Wednesday afternoon. Participants at the panel will have a chance to look through some successful grant proposals.

Following the one-hour panel will be the AWM Business Meeting. Because many people may be planning to leave by Wednesday evening, we are having our traditional party on Tuesday evening, late enough not to interfere with anything else. See you there.

Comments. Because of time limitations the discussion at the panel on grants will be restricted mainly to issues involved with writing applications, rather than possibilities for changing the programs or the

selection process. AWM should, of course, consider broader issues. For instance, is the NSF doing all it can to give women an opportunity to do serious mathematical research? If you think not, and you have some concrete proposals, let us hear about them.

Linda Rothschild
Department of Mathematics
University of California, San Diego
La Jolla, CA 92093

LETTER FROM THE EDITOR

AWM election. Nominations by petition for President-Elect, Treasurer, and two At-large Members may be made by submitting a petition bearing 20 members' signatures to the President by September 1. Any candidate by petition who wishes to have a statement (consisting of a two-line biography and one or two paragraphs on what you feel the goals of AWM should be) printed in the Newsletter along with the ballot should send it to me by September 23.

My change of address. Some of you have heard parts of this story from me already. I am taking this opportunity to bring everyone up-to-date.

Last year both my husband and I were approved for tenure by our department, department chair, and the University Personnel Committee, but not by the dean nor the president. We spent the summer and the fall fighting for our rights--we filed union grievances and went through two stages of grievance procedure. Eventually we won, but by then Gerry was on the job market. The market looked so good that we decided to stay on it.

I don't know what the most sensible way for two people to find jobs is. We used the find-one-job-in-a-large-city-and-the-second-will-follow theory. It worked out pretty well for us--we ended up both getting associate professorships at Loyola University of Chicago. We've closed on our house in Macomb and will have taken possession on a house in Evanston by the time you read this. (This Newsletter is probably late, due to our move and the AWM secretary's vacation.)

I never dreamed I'd be so happy that both of us were leaving tenured positions. It may sound crazy, but it sure feels right.

Honors, etc. A new column with the title "Honors, etc." (unless somebody helps me think up a better name) will begin in this issue. The suggestion comes from Beth Ruskai, who was congratulated in the last issue of the Newsletter for becoming a Science Scholar Fellow of the Bunting Institute. I have been printing all information of this type which comes my way or someone sends to me, but I think it would be a good idea to collect all of it in one column with appropriate subtitles. See the letter to the editor which follows for some suggestions which I hope all you readers will follow through on.

Ruskai's project has two goals in the area of mathematical physics. One is to prove two conjectured inequalities relating the entropy of a quantum mechanical system to that of its two-particle reduced density matrix. The other is to investigate some problems in Schrödinger operator theory, particularly in the area of binding in Coulomb systems and regarding the location of resonances.

LETTER TO THE EDITOR

... It occurred to me that there are probably other women who received fellowships, appointments to the Institute for Advanced Study, and the like, but who were not similarly mentioned because the Newsletter was not notified of their award. Therefore, may I suggest that the Newsletter start a regular column to announce and congratulate recipients of awards, fellowships, prestigious appointments, and the like. In addition to honoring the women who receive such awards, the column could serve another purpose. First, publishing the fact that some women have received awards may encourage others to apply. In addition, the names in the column would be a useful resource, since an AWM member interested in a particular fellowship could write to a recent recipient for information and advice. (I would certainly be happy to discuss the Bunting program with any interested readers.)

In order for such a column to succeed it will probably be necessary for women to overcome their traditional false modesty and notify the Newsletter of their achievements themselves. But I do think that it is worth a try.

Sincerely, Mary Beth Ruskai, Dept. of Math.,
University of Lowell, Lowell, MA 01854

P.S. Any reply should be sent to my home address: M.B. Ruskai
53 Academy St.
Arlington, MA 02174.

HONORS, ETC.

NSF Graduate Fellowships. Each fellowship is awarded for three years of graduate study. The current stipend is $6900 per year. Congratulations to the recipients whose names follow. The first institution listed is that awarding the bachelor's degree; the second, the institution at which graduate study is to be pursued.

Diane Elizabeth Duffy, Boston College, Cornell University; Linda Therese Foster, University of California, San Diego, Carnegie-Mellon University; Gail Rebecca Letzter, Harvard University, University of Chicago; Cecilia B. Rodriguez, California Institute of Technology, University of California, Berkeley; Karen Elizabeth Scholz, Rice University, Stanford University; Janet Ann Walz, Michigan State University, Stanford University.

Sloan Fellowship. Congratulations to Birgit Speh of Cornell University for earning a Sloan Fellowship for Basic Research for 1983-1984. The fellowships, granted by the Alfred P. Sloan Foundation, run for two years and are in the amount of $25,000. Candidates for fellowships are nominated by senior scientists familiar with their talents. Fellows need not pursue a specified research project and are free to shift the direction of their research at any time.

Fulbright awards. Congratulations to Rita Mae Ehrmann of Villanova University for receiving a Fulbright award for the 1982-1983 academic year. She has been lecturing in mathematics at University College of Botswana, Gaborone, Botswana.

NSF Postdoctoral Research Fellowships. These awards are made to enable recipients to choose research environments that will have maximal benefit

to their scientific development. The format has been changed to provide increased flexibility for the recipients. The stipend of $52,800 provides support for two nine-month academic years and three two-month summers, with the awardee's having two options for receiving the academic-year support: as full-time support for any eighteen academic-year months in a three-year period, in intervals not shorter than three consecutive months (the Research Fellowship option), or as a combination of full-time and half-time support over a period of three academic years, usually one academic year full-time and two academic years half-time (the Research Instructorship option). Congratulations to Linda June Davis and Deane Yang for receiving two of these fellowships. Davis, currently of Rutgers University, will do her fellowship at Stanford University; Yang, of Harvard University, at New York University.

International kudos. (These have been sent to me by Lee Lorch.)

You may remember the protest AWM made when there were no women invited speakers at the 1978 International Congress of Mathematicians in Helsinki. At least three women are on the invited speaker list for the Warsaw ICM. They are: Olga Ladyzhenska (Leningrad)--"On some non-linear problems from the theory of continuous medium",
Karen Uhlenbeck (University of Illinois, Chicago)--"Variational Problems", and
Michèle Vergne (MIT)--"La formule de Plancherel et la méthode des orbites."

Ladyzhenska has just been elected as Corresponding Member of the Soviet Academy of Sciences. This is an honor few people achieve. It carries a life-time monthly stipend of 300 rubles (in addition to her salary as professor) without imposing specific extra duties.

Professor Olga Oleinik of Moscow University has been elected a Foreign Member of the Royal Society of London.

MATH/SCIENCE INTERCHANGE REVISITED

by Jackie Dewar, Loyola Marymount University

The founding of Math/Science Interchange and its initial activities were reported in the November-December, 1979 issue of the AWM Newsletter. Here is an update on that organization.

The Math/Science Interchange (MSI) is a Los Angeles area organization composed of women and men from industry, government, and public and private education at all levels. It is dedicated to increasing the participation of women in math, science, and engineering. It was founded in August 1978 by four members of AWM to obtain a broader base of support for reaching parents, teachers, counselors and students with the message that math and science are important for young women. It has been successful in enlisting the aid of industry and elementary and secondary school personnel in the fight against math avoidance. In less than five years its membership has grown to over 250: 65% from education (split equally between the college and pre-college levels); 30% from industry; and the remainder are parents or students.

The following summarizes some of the accomplishments of MSI over the past five years of its existence:

* MSI has organized the "Expanding Your Horizons in Math and Science" Career Day for each of the five years. The Career Day is aimed at 7 to

12th grade girls and minority students, and also offers workshops for parents, teachers and counselors. The 1983 EYH Career Day had over 300 preregistered students.

* MSI has published "Calendar of Events" twice a year. Recently this calendar was expanded to a newsletter format. In addition to presenting a listing of upcoming local events and activities related to math, science and engineering education, the MSI Newsletter includes information regarding such items as: career facilitation projects, lectureship programs, call for speakers, call for papers, newly available career literature and materials, available grants, teaching position openings, and descriptions of other organizations with similar math and/or science interests and goals.
* MSI has supported the "Women and Mathematics" (WAM) lectureship program sponsored by the Mathematical Association of America (MAA) which is aimed at 9-12th grade girls. Each year MSI members give many of the WAM talks in Southern California.
* MSI members have given over two dozen presentations at various conferences in Southern California.
* MSI has co-sponsored several events with AWM at Southern California Section meetings of the MAA.

Some of the exciting future plans of MSI are:

* To publish a career booklet highlighting women in math-related careers in the Los Angeles area.
* To focus on improving networking and communication in Los Angeles by inviting representatives of Los Angeles organizations, such as the Society of Women Engineers, the Association for Women in Science and the Association for Women Geoscientists to discuss and share their activities by way of a special MSI Program.
* To make a presentation to local industry representatives to request their increased support for MSI activities.

MSI offers a chance for teachers to interact with women in technical professions as well as with educators at all levels and vice-versa. MSI meetings are held the second Tuesday of every month on the Loyola Marymount University campus in Los Angeles. For further information about MSI contact Dr. Jackie Dewar, Department of Mathematics, Loyola Marymount University, Los Angeles, CA 90045 (213-642-3113).

SOVIET MATH TOUR

"Math Teachers in the USSR", sponsored by the Citizen Exchange Council, will be held December 9-23, 1983 at an all-inclusive cost of $1449. The program gives an opportunity to meet your Soviet counterparts in their institutes and schools and to discuss with them methods and aims in math education. Knowledge of Russian is not essential. For more information, write Citizen Exchange Council, 18 E. 41st St., NY, NY 10017.

WOMEN IN COMPUTER SCIENCE

Women graduate students in computer science at MIT have prepared a report "Barriers to Equality in Academia: Women in Computer Science at M.I.T." Copies can be obtained by writing to: Publications Office, Lab for Computer Science, 545 Technology Square, MIT, Cambridge, MA 02139.

AWM FEATURED IN L.A. NETWORKING SERIES

by Jackie Dewar, Loyola Marymount University

To improve communication and facilitate networking among the numerous L.A. organizations interested in increasing the participation of women in math-related fields, the Math/Science Interchange has inaugurated a series of programs, "L.A. Networking in Math, Science and Engineering." The second program in this series was held March 8, 1983 and featured the Association for Women in Mathematics. All AWM members in Southern California were notified and invited to attend and Jackie Dewar, an AWM Council Member, agreed to make the presentation.

The presentation began with a description of the status of women in mathematics before AWM. This was based on Alice Schafer's talk at the AWM Panel Discussion held at the 1981 joint meeting of the AMS and MAA which was reported in the March-April 1981 issue of the AWM Newsletter. Then the founding of AWM in 1971 was described and AWM's activities were detailed.

About 15 people attended, 5 of whom were AWM members. For many, this was their first opportunity to become acquainted with the history of AWM and its activities. Sample copies of the Newsletter, career information brochures, and membership applications were distributed. Members of L.A. Chapters of the Society of Women Engineers and Association for Women Geoscientists were in attendance. Thus the consensus was that the goals of the series, improving communication and facilitating networking, had been met.

Any group or organization interested in participating in this series should contact Ann Carroll, Math Dept., Santa Monica College, Santa Monica, CA (213-450-5150) or Anne Cicero, The Aerospace Corporation, El Segundo, CA (213-648-6333).

LES FEMMES DANS LA SCIENCE BY A. REBIÈRE: part two of four

translated and edited by Lori Kenschaft, Swarthmore College

Saint Justin criticizes the ancient myth which has Minerva, the Goddess of Wisdom and of Science, emerge from the head of Jupiter: "Isn't it the height of absurdity to have taken, in order to establish a symbol of intelligence, the form of a woman?"

Hildegarde (Sainte)

--Physicians invoke her protection.

1100-1180--Founder of the monastery of Mont-Saint-Ruppert, near Bingen, on the banks of the Rhine.

Hildegarde was very curious about terrestrial productions and phenomena; her work, de Physica, contains many observations and personal reflections; it includes four volumes: the first discusses the Elements, the rivers of Germany, the nature and properties of metals; the second, vegetables, fruits, and herbs; the third, trees; the fourth, fish, birds, and quadrupeds.

The book whose table of contents we have summarized was printed along with others: Argentorati, 1533; Collection des médecins, by J.

Schott, Strasbourg, 1544; Fabricius, Patavii, 1754: Oeuvres réunies, Cologne, 1506.

Reuss F.-A. Commentatio de libris physics S. Hildegardis, Wirceb, 1835.

Montalembert, Moines d'occident.

Revues des questions historiques, April 1833, St. Hildegarde and her work by A. Battandier.

In her book Subtilités des natures and in the other, de la médicine, Hildegarde gave us all of the scientific knowledge of her time. Dr. Darembourg has edited the book Subtilités.

The Métallothérapie by Dr. Burcq is entirely from this scientist.

Hildegarde wrote of the reciprocal influence of man on the earth and of earth upon man.

In the chapter on the Sun, Hildegarde shows us this star "in the middle of the firmament" which retains by its force the stars which gravitate around it, the clouds which float in the air, just as the earth sustains the creatures which live on it.

Next, Hildegarde arrives at the inequality of the seasons and tells us that if, during the winter, it is cold in the part of the world in which we live, the part of the world which is underneath us is hot, in order that the celestial temperature is thus brought to equilibrium. (In the twelfth century!!)

The stars (chapter De stellis) have neither brilliance nor grandeur. They are not immobile, but they cross the firmament in its entirety: just as the blood moves in the veins, which makes them wave and bounce, so are the stars situated in the firmament, and they send flashes as jumps of light (the phenomenon of twinkling). (Already circulation of blood! in this epoch.)

Describing the physical phenomenon of waves, Hildegarde put her finger on its cause, and attributed them to the lessening of the depth of the sea near the shore, a fundamental idea which is accepted by science today.

The naturalist will discover in Hildegarde the germ of many other modern discoveries. (According to Battandier.)

Hildegardis. Opera omnia. Editions by Daremberg and by Reuss. Migne, 1882. One volume.

Axiothée

Three hundred years before J.-C., Axiothée of Arcady and Lasthenie of Mantinee disguised themselves as men in order to follow the lessons of Plato. They were not the only ones to do so, according to Clement of Alexandra.

Aspasie

It was around a young woman, Aspasie of Milet, wife of Pericles, that the founders of Greek philosophy and science gathered. P. Zahm has discovered a bas-relief portraying this group.

Aspasie did not abandon writing. As she was the master of Socrates, she was called The Socratic. It was through play that she approached, with Pericles and Socrates, the highest questions of philosophy.

M. Anatole France, the fine critic, put into Aspasie's mouth this declaration: "I have power over men only because I am a musician and geometer... my heart is numbers and rhythm is my soul. All is numbers and there is nothing in the universe, besides geometry.

Do not confuse Aspasie of Milet with another Aspasie whose morals were, frankly, wicked.

ON ABLE WOMEN WHO AVOID MATHEMATICS

by Dorothy Buerk, Ithaca College

I believe that some intellectually able women avoid mathematics because they view mathematics in a dualistic mode. They see it as a discipline that is rigid, removed, aloof, and without human ties, rather than one that is being discovered and developed. It is a collection of answers rather than a dynamic process that is alive and changing. The authorities, the mathematicians, are mistrusted and suspect. This view is in dramatic contrast with their overall world views which are relativistic, committed, and trusting. It also differs drastically from their analytical, self-processing, responsible-to-self approach to other knowledge. In an intervention study I was successful in changing this dualistic conception of mathematical knowledge to one much more consistent with the views these women hold of knowledge in their own disciplines.

Let me describe in greater detail the problem that my study addressed by quoting the following:

A Letter to Myself About My Dissertation

I have a deep concern for the successful, competent, mature woman who has a "block" when it comes to mathematics. I know her as a woman who has achieved some success as a teacher, a mother, a musician, a homemaker, a counselor, a librarian, an administrator, a scholar, and at the same time as a woman who has come to accept herself as a person who has taken charge of her own life. I know her also as a person who feels incapable of doing mathematics. As I listen I realize that when she talks about mathematics, she does not see the subject in the same way she sees her own field of knowledge.

Is the problem in this woman's view of what mathematics is? Has her experience been one that is contrary to its nature? But, then, what is "its nature"?

I will respond to that by reflecting briefly on what in mathematics attracts me. Then I would like to speculate on what it may be about mathematics that has caused some women of the calibre I have mentioned to avoid the subject.

I am fascinated by the beauty of interrelationships in mathematics like the relationships between the Fibonacci sequence and the Golden Section and the many diverse and surprising places that one or the other can be found. I enjoy the historical perspective, particularly the realization that things I take for granted, like irrational and negative numbers, were developed with great difficulty and were not readily accepted by the world, even the scholarly world. I continue to be awed by the power of the calculus to analyze a function so completely and to describe a situation so concisely. I am amazed and delighted by the purely abstract development of axiom systems that go nowhere. I am excited when these developments go somewhere, like non-Euclidean geometries. In problem solving, there is a joy in solution; but I find an even greater pleasure in questioning, in pursuing my intuitions, in the surprise of results, in creating new problems from old ones, in wondering "why?" in addition to "how?"

That begins to touch the surface of what in mathematics has attracted me.

With this background in mind, I want to look again at the women about whom I expressed concern in the beginning of this letter. When I talk with them I find that they know nothing of the mathematics that has attracted me. They tell me that mathematics is tedious and irrelevant, and that it involves learning the answers to other people's questions. For them it is drill that must be done quickly. It involves immediate recognition of the proper method to use. It is something that no one understands. These comments seem very strange and out of place when I remember the calibre of the women who are speaking.

It is my belief that exposing these women to a less rigid view of mathematics will ease their burden.

Let me digress a moment to look at the cognitive-developmental scheme of William G. Perry, Jr. My intellectual growth has followed the outline of his scheme. That is why it made so much sense when I read it. I didn't know until then that other people experienced the changes and doubts and confusions that I experienced. According to Perry, we move through a series of positions in the way we view knowledge, values, and personal responsibility. In the dualistic phase, knowledge is known by authorities in a world of right and wrong. In the multiplistic phase, we see diversity of opinions without a means to judge among them. Some answers are legitimately not known yet. Then we realize that the world is indeed relativistic. Well-documented theories are in disagreement. There is not a best answer to every question even when all the evidence is weighed. I, alone, must make my own choice in the context of relativism, because no one else can know what is best for me.

The women of whom I speak know the relativistic world, and many are making their own commitments in the face of it. They have moved through the scheme away from dualism. Their comments about mathematics sound so strange because their view of mathematical knowledge remains so dualistic.

To meet the needs of these women I designed a study in which five women, with general data rated as relativistic in Perry's scheme but retaining dualistic beliefs about the nature of mathematical knowledge, shared as a small group in mathematical experiences designed to help them to see the discipline of mathematics from a new perspective. I chose experiences and presented them in ways that would encourage growth through successive positions in the Perry scheme. A particular emphasis in the sessions was placed on "experiencing" a problem or question individually before discussing it as a group. When discussion did ensue, its focus was on the question rather than an answer. The women were encouraged to ask questions about the meaning of the problem, to clarify any puzzling terms, and to share the mental images that the problem brought to mind. I believe that this "experiencing" step was important since it allowed each woman to make the problem meaningful for herself and to clarify it both visually and verbally. Once each woman "saw" the problem, resolution became the focus.

In addition, I asked the women to reflect on statements about mathematics and challenged them to articulate their own perceptions of mathematics, of mathematicians, and of the nature of the work mathematicians do. These reflections, and also their reactions and responses to the five sessions, were recorded in a journal which circulated among the participants during the 10 to 21 day intervals between the sessions. In

addition, the women were interviewed before and after the sessions to determine their background and past experience with mathematics, and to allow them to express their feelings about mathematics.

As a result of the group experience each of the participants showed significant movement toward a relativistic conception of mathematical knowledge as well as a reduction in her apprehension about mathematics.

While my sample was small and very specialized, the changes in attitude were profound. I share this study for two reasons:

1. There is so much that we can learn from listening to the way people view mathematics as a discipline. These women (through the journal) have provided a particularly articulate voice.
2. The use of a cognitive-developmental scheme like William Perry's allows us to see "math avoidance" from a new perspective.

For more information let me recommend the following references:

Buerk, Dorothy, Changing the conception of mathematical knowledge in intellectually able, math avoidant women (Doctoral dissertation, SUNY at Buffalo, 1981). Dissertation Abstracts International 1981 42 (1), 119A.

Buerk, Dorothy, An experience with some able women who avoid mathematics. For the Learning of Mathematics, 1982, 3 (2), 19-22.

Copes, Larry, The Perry development scheme: a metaphor for learning and teaching mathematics. For the Learning of Mathematics, 1982, 3 (1), 38-44.

Perry, William G., Jr. Forms of intellectual and ethical development in the college years: A scheme. New York: Holt, Rinehart and Winston, 1970.

Perry, William G., Jr. Cognitive and ethical growth: The making of meaning. In A. Chickering (Ed.), The modern American college. San Francisco: Jossey-Bass, 1981, 76-116.

For more information, please contact: Dr. Dorothy Buerk
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Ithaca, New York 14850.

WOMEN IN THE AMERICAN MATHEMATICAL SOCIETY BEFORE 1900: part one

by Betsey S. Whitman, Professor, Florida A&M University

Abstract

The article chronicles the lives of the 22 women who were invited to join and were elected members of the organization from 1891 through 1899.

Research for the article was done during 1981-82 while the author was on a sabbatical leave. It involved using the archives and libraries at Radcliffe, Smith, Wellesley, Mt. Holyoke, and Bryn Mawr colleges, as well as talking and corresponding with archivists at Cornell University, Wells College, Case Western Reserve University, Purdue University, Vassar College, Carleton College, and Eureka College. This research was supported in part by funds from The Andrew W. Mellon Foundation given by Radcliffe College for research at the Arthur and Elizabeth Schlesinger Library on the History of Women in America.

All of the women in the study were remarkable. They pursued an education during a time when it was believed that women's brains were

smaller than men's and that they were not suited for intellectual activity. These 22 women were some of the pioneers who helped to change the attitudes about the subordinate role of women that prevailed during the nineteenth century. They provide examples for present and future generations to admire.

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In 1888 the New York Mathematical Society (NYMS) was formed. This group changed to its present name, the American Mathematical Society (AMS), in 1894. The first women were invited to join the organization in 1891, and by 1900 there were 22 female members. These women were all interested in mathematics, and many had earned either master's degrees or Ph.D. degrees in mathematics at the time they joined the Society.

The first six who joined in 1891 included the eminent, but somewhat eccentric, astronomer Mary Emma Byrd. She received her A.B. from the University of Michigan in 1878 and, after serving as principal of Wabash High School in Indiana, she became the first assistant at the Goodsell Observatory at Carleton College from 1883 until 1887. She then became director of the Smith College Observatory and a professor of astronomy at Smith. However, she resigned in 1906, protesting the $62,500 gift from Carnegie and Rockefeller which the college accepted to build either a laboratory or a library. She felt the gift was "tainted" because of the manner in which the benefactors had made their money.

She wrote two textbooks, A Laboratory Manual in Astronomy, published in 1899, and First Observations in Astronomy, A Handbook for Schools and Colleges, which was finished in 1913. Carleton College awarded her a Ph.D. degree in 1904 and used as one "proof of fitness" for the degree her first book, in lieu of a dissertation. She seemed to find it hard to leave Smith after teaching there nineteen years. In 1911, she wrote in a letter to the Colloquium Committee, "It is my wish that my name be dropped from your list. Perhaps I may never again attend a Smith Commencement. The thought of it is painful even now, five years after resigning from the college." After resigning from Smith she taught only one year, as an instructor in astronomy at the Normal College of the City of New York (later Hunter College) during 1913-14. She continued to write many articles, mainly for Popular Astronomy, from her home in Lawrence, Kansas, for many years. She made an observatory station on her porch roof and sometimes used the astronomical instruments of the State University of Kansas for her observations. Two years before she died she was stricken with cerebral hemorrhage. She died at her home in 1934 at the age of 85.

Susan Jane Cunningham, another one of the first six to join the NYMS, was on the first faculty when Swarthmore College opened in 1869, and she remained until she was made professor emeritus in 1906. She was successively instructor, assistant professor, and professor of mathematics, and she taught both mathematics and astronomy. She had studied both subjects at Vassar as a special student during 1866-67. She took special courses in astronomy and mathematics during several summers at Harvard, Princeton, Newnham (Cambridge, England), and Williams colleges. She founded the astronomy department and conducted both the mathematics and astronomy departments until her retirement. When she retired in 1906, the President of the College said, "Susan J. Cunningham has the distinction of being the only one in the Faculty who has been connected with the College since its beginning in 1869." When she was elected a member of the New York Mathematical Society in 1891, she was obviously pleased. She wrote to secretary Thomas Scott Fiske, saying, "It gives me great pleasure to accept the honor you have done me, in electing me a

member to the New York Mathematical Society. It will not be possible for me to attend many meetings. I would therefore ask that I might receive the cards of announcements regularly." She remained a member for the rest of her life.

All of her life's efforts were bound up with Swarthmore and its students. She frequently raised money for buildings and equipment for the school. The school newspaper, The Phoenix, reported at the time of her death that she had "assisted more Swarthmore students than any other person." She frequently denied herself various pleasures in order to give some money to a needy student, and she also asked alumni for money for this purpose. She died at home, fully clothed, after a day of visiting with friends in January, 1921.

Another of the 1891 members of the Society was Ellen Amanda Hayes, who grew up in a family of early settlers in Granville, Ohio. She later wrote about the happy days of her youth and said, "I know no other place where I would rather I had been turned loose to live and grow. Through the loveliness of that valley I believed the wide world was lovely, and in its shelter I was prepared to regard the whole earth as home and all the dwellers in the earth as my kinfolk." She worked her way through Oberlin College by teaching in district schools and graduated in 1878. She was principal of the women's department of Adrian College in Michigan for a year and then accepted a position as instructor of mathematics at Wellesley College. She then became successively associate professor of mathematics, professor of mathematics, and professor of applied mathematics. From 1904 until she retired in 1916, she was professor of astronomy and applied mathematics. In 1912 she was nominated for Secretary of State in Massachusetts on the Socialist ticket, the first woman to be a candidate for a state elective office in Massachusetts.

She wrote eight books and after her retirement wrote and published a monthly paper, The Relay, gave many addresses, and founded the Vineyard Shore Workers' School in West Park, New York, a resident school for women workers in industry.

In the history of Wellesley College it is recorded: "A dauntless radical all her days, in the eighties she was wearing short skirts; in the nineties she was a staunch advocate of Woman's Suffrage; in the first two decades of the twentieth century, an ardent Socialist. After her retirement, and until her death in 1930, she was actively connected with an experiment in adult education for working girls. Fearless, devoted, intransigent, fanatical, if you like, and at times a thorn in the flesh of the trustees, who withheld the title of Emeritus on her retirement, she is remembered with enthusiasm and affection by many of her students." Ellen Hayes died at her home in West Park, New York, in October, 1930, when she was 79 years old. The obituary in her hometown newspaper, The Granville Times, on November 13, 1930, recorded: "The life of Ellen Hayes was a literal dedication to the welfare of others."

Amy Rayson also joined the NYMS in 1891. She taught mathematics and physics at the Brearley School in New York from 1891 until 1898. In 1899 she was the joint principal of the School for Girls at 168 West 75th St. in New York City.

Probably the most eminent woman mathematician in the U.S. in the late 19th century was Charlotte Angus Scott, the first mathematics professor at Bryn Mawr College. Miss Scott, born in Cambridge, England, had been given special permission in 1880 to take the Tripos Exams, the final undergraduate exams at Cambridge University. She tied for eighth place in the mathematics exam, and if she had been a man, she would have been named Eighth Wrangler. However, since women were permitted to take the University Examinations only by informal permission of the Examiners, her

name does not appear in the University Calendar. Beginning the next year, in 1881, women were formally admitted to the Tripos Exams and the names and positions of successful candidates were recorded in the Calendar.

She graduated from Girton College in Cambridge, England, in 1881, and in 1882 she graduated in Honours at the University of London. She received her Sc.D. in 1885 from there. She came to Bryn Mawr when it opened in 1885 as an associate professor of mathematics. She later became full professor and remained an active and renowned teacher for 40 years. She was one of the six invited to join the NYMS in 1891.

In 1922, M. Carey Thomas, then president of Bryn Mawr, who had offered Miss Scott her position in 1885, said of her: "She has been a very distinguished teacher, the best we have ever had at Bryn Mawr in my opinion. She filled the women's colleges of the U.S. with her pupils, a few of whom are already becoming distinguished mathematicians." After she died in Cambridge, England, November 8, 1931, mathematician F.S. Maclaulay wrote in the Journal of the London Mathematical Society: "Miss Scott was a geometer who whenever possible brought to analytical geometry the full resources of pure geometrical reasoning. She was also an enthusiastic searcher and propounder of new ideas and an interpreter of the work of others, adding simplification and extensions of her own. ...Her rank as a writer was of the highest and all of her writing was singularly clear and attractive." One of her favorite topics was higher singularities and she wrote several papers on them and influenced some of her graduate students to study them for their dissertations.

The sixth woman who joined the Society in 1891 was the astronomer Mary Watson Whitney who studied at Vassar under the eminent astronomer Maria Mitchell. Mary was born in Waltham, Massachusetts, September 11, 1847. She graduated from high school there a year before Vassar College opened in Poughkeepsie, New York. She was disgruntled that there was no higher education readily accessible to girls and was therefore delighted to hear that Vassar would open in 1865. After a year as a private pupil in a Swedish-run school near Waltham, she and her father arrived at Vassar on its opening day. She was able to enter the first class with advanced standing. She early became attracted to the learned astronomer Professor Maria Mitchell, who in return recognized Mary as a superior student. In later years it has been reported that Miss Mitchell "frequently said she did not know which was her greatest feat, to discover the comet which made her famous or to find Mary Whitney." Mary and five classmates studied astronomy and finished their college course in three years at Vassar. Mary's father had died the year before her graduation and she returned home for a year. Then in 1869, Professor Benjamin Pierce, at Miss Mitchell's urging, invited Mary to attend his lectures at Harvard on quaternions. She would wait outside the gate and enter the classroom with him until she felt that the Harvard students had a friendly attitude toward her. She, William Byerly, and James Mills Pierce (the latter two, future Harvard professors) studied a graduate course in celestial mechanics with Benjamin Pierce also. Then she worked several months at the Dearborn Observatory in Chicago, and in 1872 received a master's degree from Vassar. When her sister entered the school of medicine at the University of Zurich in 1873, Mary and her mother accompanied her, and Mary studied mathematics and celestial mechanics. After three years there, they returned to Waltham where Mary taught for a while at Waltham High School. The five years from 1876 until 1881 "were perhaps the least satisfactory to her," according to Caroline Furness in a tribute to Mary Whitney after her death. She found there was no position open to her that used her training and talents.

However, in 1881, Professor Mitchell's health failed, and she called Mary to come to Vassar to be her private assistant. Except for a brief time in 1887 when she worked at Harvard Observatory, she remained at Vassar until she retired. When Miss Mitchell resigned in 1888, Mary succeeded her as professor of astronomy and director of the Vassar College Observatory. Mary was adamant in her desire to prove that women could be as good in research as men. She undertook projects that included the determination of the longitude of the Smith College Observatory and the observation of double stars, asteroids, and comets. Her students were in demand in many American observatories after they finished their training with Miss Whitney. In 1910, partial paralysis forced her to retire at the age of 62. She became an invalid and survived for over ten years. On January 20, 1921, she died of pneumonia at her home in Waltham. In her will she left $5,000 to Vassar to be used by the astronomy department solely for research work. Before she died, it had been reported that she said, "I hope when I get to Heaven I shall not find the women playing second fiddle."

The only woman who became a member of the NYMS in 1892 was Ella Cornelia Williams, who had been the very first fellowship graduate student in mathematics at Bryn Mawr when it opened in 1885. She had studied at Cornell in 1876-77 and then attended the University of Michigan for the next three years and graduated in 1880. Next she went to Newnham College, Cambridge, and Göttingen in Germany to study privately. When she applied for the fellowship at Bryn Mawr, she wrote that she had spent the previous year reading the whole of Jacobi's Fundamenta Nova, some of Modern Geometry by Chasles, and Boole's Differential Equations. After studying she taught at the Spence School in New York City and retired in 1926. Her name was frequently on the list of AMS members present at regular and summer meetings of the organization during her years of membership from 1892-1923. She died near Pittsburgh, Pennsylvania, in 1938, at the age of 84.

During 1893, the only woman elected to membership in the NYMS was Ida Griffiths. She studied mathematics at Newnham College, Cambridge, England, during the years from 1885 until 1888 and then taught in private schools in the United States for nine years. During 1897-98, she took her senior year at Radcliffe College, studying astronomy, semitic, economics, advanced psychology, and philosophy. She and Ella C. Williams were the only women attending the first summer colloquium of the AMS held in Buffalo, New York, in September, 1896.

RADCLIFFE RESEARCH SCHOLARS PROGRAM

Radcliffe College invites proposals to two programs of support for post-doctoral research. The Radcliffe Research Scholars Program awards stipends and research expenses to as many as four post-doctoral scholars whose research draws substantially on the resources of the Arthur and Elizabeth Schlesinger Library on the History of Women in America or of the Henry A. Murray Research Center, a national repository of social science data on the changing life experiences of American women. Applicants are encouraged to contact the program early for assistance in preparing proposals that make effective use of these resources. The application deadline for stipends for the summer of 1984 or for the 1984-85 academic year is November 4, 1983. The Radcliffe Research Support Program offers small grants up to $3000 for research expenses to post-

doctoral scholars whose research draws on materials in the Schlesinger Library or the Murray Research Center. Requests for assistance and complete program information should be addressed to: Radcliffe Research Scholars/Support Programs, The Henry A. Murray Research Center, 10 Garden St., Cambridge, MA 02138.

STATEMENT OF FY 1984 NSF BUDGET

press release

The National Science Foundation's budget for FY 1984 is $1,292.3 million, an increase of $195.1 million or 18 percent above the FY 1983 level of $1,097.2 million. The total includes $1,250.7 million for research and related activities, and $39 million for science and engineering education, including graduate research fellowships and two Presidential initiatives in precollege science and mathematics education.

Dr. Edward A. Knapp, Director of the National Science Foundation, said, "Science and technology have been at the heart of our economic competitiveness and national security. Whether it be the computer in the business world or high technology for national security, energy, or health, scientific discovery and scientifically-trained leaders have fundamentally changed and improved our lives. Our nation must move forward into the 1980's with a vigorous program of scientific research and training to assure our continued economic well-being and competitiveness in the world as well as to assure a stable and secure defense posture. The National Science Foundation's programs of basic research, primarily at the nation's universities, play a critical role in supporting excellence in science and engineering in a mode which assures the training of the scientists of the future. Unfortunately, we have allowed part of these university-based programs to deteriorate markedly in the last decade. University research no longer has the equipment or the influx of new talent to assure America's technological leadership in the decades ahead.

"The increase in NSF's budget request for FY 1984, coming at a time of large Federal deficits, reflects the great importance the President attributes to basic research for laying the groundwork for long-term economic growth. It also recognizes the Administration's universities and colleges to help assure the continued development of world-class scientists and engineers in the years ahead. This focus on development of human resources represents a new emphasis for the Foundation.

"In addition to expanded fundamental research support," Dr. Knapp said, "the vitality of the Nation's scientific research base depends critically on the strength and quality of the human resource pool, the quality of the educational system that produces the human resources, and the quality and availability of sophisticated instrumentation necessary to undertake advanced scientific research."

The President's Science Adviser, Dr. George A. Keyworth, has recently stated that, "Over the past twenty years, our academic institutions have grown shabby. With few exceptions they have become less and less attractive places to pursue research. Equipment and instrumentation are not as good as that in national labs, or in many industries. Somehow, we have arrived at the indefensible position of creating the poorest climate for research in the place that ought to have the best."

According to Dr. Knapp, NSF's program for FY 1984 directly responds to these issues in the following ways:

--Increased support for the conduct of basic research amounting to more than 18 percent over the FY 1983 level. Average grant sizes will be increased, with the increases specifically targeted on instrumentation and development of the human resource pool.

--A Presidential initiative aimed at encouraging and supporting young scientific investigators, and, at the same time, assuring improved and stronger ties between universities and industry. The Presidential Young Investigators Awards would be made to young faculty at research universities who are within 7 years of their doctorate in a field of science or engineering where there are demonstrated needs for increasing the attractiveness of academic careers. Funds from the private sector would be required to match the NSF contribution.

--Increased stipends for graduate research fellowships.

--Continuation of two FY 1983 programs as 1984 Presidential initiatives aimed at improving the knowledge and skills of teachers of mathematics and science in grades 6 through 12. Presidential Awards for Teaching Excellence will identify outstanding secondary school science and mathematics teachers who can serve as models for their colleagues. The Presidential Secondary School Science and Mathematics Teaching Improvement program, supporting workshops and training activities for teachers in those fields in grades 6 through 12, will be increased.

--Increased support for sophisticated instrumentation, measuring devices, and data processing and manipulating equipment vital to the conduct of research in virtually every field of science and engineering. Support of research instrumentation for NSF as a whole will increase by over 100 percent between FY 1982 and FY 1984, and by 61 percent (from $112.3 million to $180.2 million) between FY 1983 and FY 1984. The change is most marked for engineering, though all of the Foundation's major research activities estimate sizeable increases in their support of instrumentation in FY 1984.

--Several research programs aimed at selected groups and institutions will be integrated into the Foundation's research directorates in order to achieve the strength and excellence required by their programs. Included in this new management initiative will be the Minority Research Initiation, Research Initiation for Minority Institutions and the Visiting Professorships for Women Programs, and international cooperative research efforts. The Scientific, Technological and International Affairs Directorate will coordinate this new management approach. It is anticipated that this approach not only will increase the scientific pertinence of these programs, but eventually will expand support for the most worthy ones as they become integrated into the mainstream of the Foundation's research activities.

--Also included in the new management scheme will be a new program, Undergraduate College Research Support, funded at $3 million. In prior years, NSF operated two separate activities oriented toward this audience: the Two- and Four-Year College Research Instrumentation Program, aimed at institutional physical resource improvement, and a small college faculty research opportunities effort that provided a way for motivated faculty at these small institutions to participate in research under the aegis of NSF investigators at larger institutions. The new Undergraduate College Research Support Program builds on and refocuses these previous efforts. The new program will be coordinated centrally but managed and budgeted for in the Foundation's major research activities.

--Continuation of the work of the National Science Board Commission on Precollege Education in Mathematics, Science and Technology to develop

an agenda defining the roles of all sectors of society in improving education in science and mathematics in the Nation's public school system. The final report of the Commission is scheduled for October 1983 and will form the basis for NSF, other Federal agencies, universities and colleges, private industry, and state and local officials, including school officials, to examine their roles and suggest appropriate programs and activities to improve science and mathematics education.

NSF's programs for FY 1984 include the following:

Mathematical and Physical Sciences support is $363.4 million, an increase of $64.6 million or 22 percent above the current plan for FY 1983 of $299.7 million. This substantial increase in the FY 1984 budget request will:

--Provide enhanced support and improved opportunities for graduate students, postdoctoral scientists, and young faculty investigators.

--Increase support for acquisition of equipment in the intermediate cost category by $7.7 million, or 61 percent, to a total of $20.3 million. The MPS total for all categories of research instrumentation and equipment is increased by $29.9 million or 53 percent, to a total of $86.3 million.

--Strengthen research awards to provide the resources necessary to conduct high quality research programs, with emphasis on improved experimental capability. Substantial increases are provided in chemistry, mathematics, computer research, and materials research.

--Continue the planned development of modern experimental computer research facilities at academic institutions by adding 4 or 5 new facilities to bring the total number of facilities to 18-19.

Engineering support is $123 million, an increase of $22.2 million or 22 percent above the FY 1983 current plan of $100.8 million.

--Emphasis is placed on research in microelectronics and on work related to automated manufacturing, robotics, biotechnology and the development of novel chemical and separation processes central to chemical process technology.

--Support of research in geotechnical engineering, structural mechanics, and water resources and environmental engineering is increased by 10 percent.

--Provision is made for additional funding for research and equipment, research initiation grants for young faculty, opportunities for interdisciplinary research, and for graduate students.

Biological, Behavioral and Social Sciences support is $223.6 million, an increase of $33.4 million or 18 percent above the FY 1983 current plan of $190.2 million. Within the amount requested:

--Physiology, Cellular and Molecular Biology programs will provide sophisticated instrumentation; enhance research in the plant biology, with special attention to young investigators; and meet scientific opportunities arising from new developments in genetics.

--Biotic Systems and Resources programs will provide for research initiation for young investigators, expand the refurbishing of research equipment and facilities at marine laboratories, and meet special opportunities in plant biology and other fields.

--Most of an increase of $3.5 million or 18 percent in Social and Economic Sciences will be used to develop major social science data bases and for methodological research to improve the scientific usefulness of these bases.

--Neuroscience research will be expanded in areas where increasingly sophisticated instrumentation and techniques can now enhance detailed investigations of the nervous system.

Astronomical, Atmospheric, Earth and Ocean Sciences support is $334.9 million, an increase of $58.8 million or 21 percent above the FY 1983 current plan of $276.1 million. This provides for:

--Special emphasis on improved astronomy instrumentation at universities and national centers and design studies on the Very Long Baseline Array.

--Upgrading of the computing facility at the National Center for Atmospheric Research with the purchase of a new mass storage system and project support increases in all subdisciplines.

--A special committee of earth and ocean scientists will recommend a long-term program in crustal dynamics with special emphasis on the role of ocean drilling in these studies. The FY 1984 budget provides for significant upgrading of instrumentation and a major research thrust on the evolution and structure of the continental crust. It also includes an increase in Ocean Drilling of $9.8 million from $16.5 million to $26.3 million for continuation of the Deep Sea Drilling Project in FY 1984.

The U.S. Antarctic Program for FY 1984 is $102.1 million, an increase of $18.9 million or 23 percent above the FY 1983 current plan of $83.2 million. This will allow:

--Increased support in research areas including glaciology, geology, biology, upper atmosphere physics and others.

--Replacement of a large vehicle maintenance facility destroyed by a fire in December, 1981 ($5.8 million) and initiation of a Service Life Extension Program that will permit additional years of useful work from the program's two oldest LC-130 Hercules ski-equipped aircraft ($5.0 million).

--Resumption of equipment procurement, facilities upgrading, and maintenance in the Operations Support Program that have been deferred in FY 1983 and prior years.

Scientific, Technological and International Affairs support will undergo an apparent decrease of $7.4 million below the FY 1983 current plan of $44.2 million to $36.8 million. However, an estimated $22.1 million supported within the Foundation's discipline oriented research activities will bring the effective total for programs described in this activity to $58.9 million--on a comparable basis with FY 1983. The $36.8 million in programs to be funded through the STIA activities include:

--Funds for establishment of 3-4 Industry/University Cooperative Research Centers and planning grants for 6-10 additional centers.

--A 17 percent increase in the Industry/University Cooperative Research Project program.

The additional $22.1 million from the Foundation's discipline oriented research programs will include:

--Approximately $6 million of first-year support for up to 200 Presidential Young Investigators Research Awards. Awards will average about $30,000 per year. Matching funds will be required from private sources, with emphasis on contributions from industry.

--$5.9 million for support of research conducted under bilateral agreements and an additional $2.0 million to initiate a new U.S./India Joint Program.

--Up to $3 million for a new program to encourage independent faculty research in the Nation's predominantly undergraduate colleges and other programs in this area.

Science and Engineering Education support is $39 million, an increase of $9 million or 30 percent over the FY 1983 current plan. The request includes $19 million for the NSF Graduate and Minority Graduate Research

Fellowships and $20 million for the Precollege Teacher Improvement in Science and Mathematics activity.

--$4 million of the increase will be used to raise the stipend and cost-of-education allowance of approximately 1,390 graduate fellows. The stipend will be increased by $1,200, from $6,900 to $8,100, while the cost-of-education will be increased by $900, from $4,000 to $4,900.

--$5 million will be used to expand the Presidential Secondary School Science and Mathematics Teaching Improvement program. This program will support workshops and training activities to improve the subject matter knowledge of science and mathematics teachers in grades 6 through 12.

--The second initiative, Presidential Awards for Teaching Excellence in Science and Mathematics, will continue in FY 1984 at the same level as in FY 1983. The program will identify 100 outstanding secondary school teachers of science and mathematics each year who can serve as models for their colleagues.

"The FY 1984 budget request," Dr. Knapp said, "represents a bold step in the direction of enhancing the vitality, strength and overall quality of the science and technology knowledge base in the Nation's universities and colleges. Thus, it also increases their ability to produce the next generation of creative scientists, engineers, technicians, and managers."

OF POSSIBLE INTEREST

Women's Studies, Greenwood Press, 88 Post Road West, Box 5007, Westport, CT 06881.

The Abortion Dispute and the American System, report based on a symposium, Gilbert Y. Steiner, Editor, is available from Brookings Books, The Brookings Institution, 1775 Mass. Ave., NW, Washington, DC 20036 for $6.95 + $1 postage.

Women's Studies, Indiana University Press, 10th & Morton Streets, Bloomington, IN 47405.

Women's Studies, SAGE Publications, Inc., P.O. Box 5024, Beverly Hills, CA 90210. New offering: Too Many Women? The Sex Ratio Question by Marcia Guttentag & Paul F. Secord.

Women's Studies, Rowman & Allanheld, 81 Adams Drive Box 368, Totowa, NJ 07511.

FRONTIERS, A Journal of Women Studies, University of Colorado, Boulder, CO 80309.

RESPONSE to violence in the family and sexual assault (a newsletter), Center for Women Policy Studies, 2000 P St., NW, Suite 508, Washington, DC 20036.

DEADLINES: July 22 for Sept.-Oct., Sept. 23 for N-D, Nov. 23 for J-F
AD DEADLINES: Aug. 5 for Sept.-Oct., Oct. 5 for N-D, Dec. 5 for J-F
ADDRESSES: Send all material except ads to Anne Leggett, Dept. of Math. Sci., Loyola University, 6525 Sheridan Rd., Chicago, IL 60626. Send everything else, including ads, to AWM, **P. O. Box 178, Wellesley College, Wellesley, MA 02181.**

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July-August, 1983