File

Association for Women in Mathematics

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PRESIDENT'S REPORT

Summer Meeting. At the joint meetings of the American Mathematical Society-Mathematical Association of America in Eugene, Oregon, August 16-18, AWM's program will focus on the general problem of how teachers of mathematics, at any level from elementary school to graduate school, can encourage girls and women to pursue and succeed in mathematical studies. Our principal speaker will be Kay Gilliland of EQUALS, a group based at the University of California, Berkeley, which has set up a highly successful training program for teachers in California, and is now extending its program to several other sites throughout the U.S. She will be speaking Friday, August 17, at 9:00 a.m. Afterwards we will have a general discussion about ideas which can be used at the college and university level. Come and share your experience! Immediately following will be the AWM business meeting. The AWM party will be held later that evening. As always, we shall have our table open throughout most of the meeting, and we welcome everyone to come over, talk, and find out more about AWM. We also need volunteers to "man" the table.

News from the AMS. At the April meeting of the Council of the AMS there was further discussion of remedies for the current financial difficulties of that organization. A motion was passed proposing that dues for higher salaried members be raised to $66 for 1985 and $78 for 1986. The additional income generated would make it possible to eliminate the current practice of subsidizing other AMS activities by using profits from publishing.

The question of cancelling the summer meetings was also reintroduced. At the January council meeting a motion had been passed to cancel all further summer meetings for which commitments had not yet been made. (The reasons cited were mainly financial: the attendance at summer meetings has declined over the years, and each meeting now loses money.) In asking that the matter be reconsidered, AMS Associate Secretary H. Rossi wrote the following:

"...The Council has to be reminded over and over again that the majority of AMS members are non-research mathematicians with, however, an interest in current mathematics. ...Most of these people have obligations which make attendance at the winter meeting difficult; on the other hand, the summer meeting is easier. ...I think that by appealing to these members, we can revitalize the summer meetings, increase attendance, and stop losing money... ."

The Council voted to delay enaction of the cancellation resolution until after the summer 1985 meeting. If any of you who are AMS members have an opinion about the cancellation of the summer meetings you should write to AMS Secretary Everett Pitcher.

Sloan Foundation Fellowships. At this time we usually congratulate the one or two women who have won Alfred P. Sloan Foundation Fellowships in mathematics in recognition of their superior research and research potential. This year all fifteen of the awardees were men. Before commenting on this, I should give some

background. The fellowships are normally awarded to academic mathematicians five to nine years from Ph.D. chosen from nominees (not applicants). For several years after the fellowships were first awarded in the 1960's, no women were selected. Then, in the early seventies, women began receiving them, one or two every year until now. It seems likely that in the past an effort was made to be sure that outstanding women were nominated and that at least one was chosen every year. Now perhaps people think that this is unnecessary. In any case, it is not likely that this year's lack of women was a result of deliberate discrimination nor the lack of qualified female candidates. It can happen from time to time if no one actively prevents it from happening.

I believe that having no female Sloan awardees in a given year is unfortunate. The Sloan Fellowship is not just an amount of money to spend on released time or other research expenses. These awards have come to represent recognition of research achievement and status. If a candidate for hiring or promotion has been awarded a Sloan Fellowship, this will always be mentioned prominently in the file. Therefore, when a year goes by without any female mathematicians winning the coveted fellowships, some people will conclude that although women are earning Ph.D.'s in ever-increasing numbers, they are not really doing important research. This is not true, and it is unfortunate that the lack of female Sloan awardees will contribute to this misconception. Readers' comments on this are, as always, welcome.

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

RAYTHEON GRANT

The Raytheon Company of Lexington, MA, for the second year has awarded $5000 to AWM for support of a summer program in the Greater Boston Area. The Raytheon grant of last summer was used for partial tuition for women high school mathematics teachers who took summer courses in PASCAL or Data Structures. There were 21 applicants who completed their courses satisfactorily and received grants ranging from $165 to $330 depending on the cost of tuition. As a result, some of these teachers were able to introduce the Advanced Placement (AP) PASCAL program to the students in their computer science courses at their respective high schools last fall. This year's grant will be used for a similar program.

AWARDS AND HONORS

Congratulations to two AWM members who have earned Guggenheim Fellowships: Professor Nancy Kopell of Northeastern University and Professor Susan Montgomery of the University of Southern California. Their proposed studies are Nonlinear dynamics in biology and Studies in ring theory, respectively.

Rita Mae Ehrmann of Villanova University lectured in mathematics for the 1983-84 academic year at the University College of Botswana, Gaborone, Botswana, as a Fulbright Scholar.

Congratulations to the following women who have received National Science Foundation Postdoctoral Research Fellowships. The following list gives name of recipient, current institution, and fellowship institution:

Jennifer Tour Chayes, Harvard University, Harvard University;
Donna Crystal, Cornell University,
Rheinische Friedrich-Wilhelms-Universität, Bonn, West Germany;
Diane M. Meuser, Boston University, Harvard University;
Alice Silverberg, Princeton University, Harvard University;
Virginia R. Young, University of Virginia, Institute for Advanced Study.

from the AMS Notices, 1984, p. 279:

The Courant Institute of Mathematical Sciences has appointed Cathleen S. Morawetz as its new director. According to Institute officials this is the first time a woman has been named to head a mathematical institute in the United States.

Morawetz received her B.S. degree from the University of Toronto (1945), an M.S. from the Massachusetts Institute of Technology (1946), and a Ph.D. from New York University (1951). She began at Courant as a research assistant in 1951 and has been there since that time, serving as associate director since 1979. She has held two Guggenheim Fellowships (1966-67 and 1978-79) and has been a visiting professor at the University of Rome, the Tata Institute, the University of Paris and the Mittag-Leffler Institute. Morawetz has been very active in the Society, having served on numerous committees, on the Council and on the Board of Trustees, of which she is currently the chairman. Her research interest lies mainly in the application of partial differential equations to fluid dynamics and wave propagation.

NSF Visiting Professorship for Women

This is a very worthwhile program that supports visiting professorships for women scientists (including mathematicians). It provides an excellent opportunity to get time to pursue one's research in a stimulating environment. Prospective host institutions can be expected to be receptive, since they get overhead costs plus some teaching (they are encouraged to provide some support, but this is not mandatory). These awards can be used in conjunction with sabbaticals. Women who want to devote full time to research should not be discouraged by the teaching component of the program, which can be satisfied by research seminars and guest lectures. To quote from the current announcement: "The functions of the visiting professor are to conduct research at the frontiers of her discipline, and to serve as a role model, teacher, counselor, and mentor in the sciences in engineering ...Proposals will compete for awards on the basis of (1) scientific merit of the proposed research, and (2) a specific plan for teaching, mentoring, and counseling activities." A word of warning: do not disregard (2) when applying--the plan need not be very elaborate, but must demonstrate consciousness of the problems associated with encouraging women to pursue scientific careers. Some of this year's proposals by mathematicians were highly rated on research, but downgraded because they did not address the other objectives of the program. The application deadline has been moved up from previous years: for awards starting between July 1, 1985 and July 1, 1986, the application deadline is November 15, 1984. If your institution does not have copies of the program announcement, one can be obtained by writing to Visiting Professorships for Women Program, National Science Foundation, Washington, DC 20550.

Congratulations to these recipients of NSF Graduate Fellowships. The first institution listed is that which awarded the bachelor degree, while the second is that at which graduate study will be pursued.

Cheryl Lynn Addy, Furman University, University of North Carolina, Chapel Hill
Bonnie Anne Berger, Brandeis University, Massachusetts Institute of Technology
Sybil Louise Crawford, Carnegie-Mellon University, Carnegie-Mellon University
Theresa Marie Farrah, University of California, Berkeley, University of Washington

Helen Jeannette Giessler, University of Michigan, University of California, Berkeley
Lisa Hellerstein, Harvard University, Stanford University
Judith Mava Silverman, Radcliffe College, University of California, Berkeley.

LETTER TO THE EDITOR

Linda Rothschild describes in an article in the November-December issue of the Newsletter a luncheon that she attended at the White House in honor of American Businesswomen's Day. It appears that she received her invitation because of her role as president of AWM. Her comment that the group of women was smaller than she had expected was amusing, although probably not for any reason she had intended. It seems not to have occurred to her that the group might have been small because many women had refused to attend a luncheon sponsored by the current administration. Apparently, the president of AWM felt it was acceptable to signal tacit approval of this, the most misogynous administration in recent history, by attending the luncheon. I strongly oppose such support, and I hope that in the future the AWM will take a stand against the Reagan administration's oppressive policies towards women.

Sincerely, Barbara Simons, Palo Alto, CA

LIPMAN BERS, A MATHEMATICAL MENTOR

a panel, January 26, 1984, Joint Mathematics Meetings, Louisville, Kentucky
The talks were given in order of year of Ph.D. Leslie Sibner was unable to attend the actual panel, but her talk is included here.

Welcoming remarks by Linda Keen, moderator, Lehman College, CUNY

We welcome you here today to our panel, "Lipman Bers, A Mathematical Mentor". Lipman Bers will be seventy this spring. Let me tell you how we at AWM come to hold this event. Linda Rothschild suggested to me that because Bers had many women students it would be most appropriate for AWM to sponsor a panel discussion on Bers as a mathematical mentor. Bers had an unusually large number of students, both male and female. To date 47 individuals have obtained Ph.D.'s under Lippa's supervision, and one student is now studying with him. Of these, 16 are women. Undoubtedly, few people can match this record.

Bers' role as a teacher is only a part of his general influence on the mathematical community. He has made important scientific contributions, of course, and continues to be a leader of the professional community. Bers' mathematical interests span several areas of mathematics. His earliest work was in fluid dynamics; in the late fifties Lippa started working in Riemann surfaces and doing his best work. His collaboration with Lars Ahlfors, which began with a paper entitled "Variable Metrics for Teichmüller Spaces" and contains the theorem which Sullivan dubbed the "Measurable Riemann Mapping Theorem", led to a new and very exciting area of mathematics, the theory of Kleinian groups. This area has blossomed, and Lippa has guided many of his students into it. Bers' mathematical activities are matched by his concern that our world be one in which people can live with dignity and freedom. He has been an activist in the world-wide struggle for human rights.

Let me tell you a little of Lipman Bers' story. He was born in Riga, Latvia into a Jewish intellectual family. Concern for a better society led him into

politics as a teenager. His political activity got him into trouble with the Latvian government and a warrant was issued for his arrest. Bers escaped from Riga and went to Prague. There he studied at the German University with Karl Loewner and received his Ph.D. in 1937. Prescience and luck were with him again, for he left Prague and went to Paris just before the Munich Pact was signed in 1938. Bers left Paris with his wife (who had left Riga and joined him in Prague) and small daughter just ahead of the occupying forces. In Lisbon, he was able to obtain a visa to come to the United States.

In the U.S., his first job was at Brown University. Brown at this time hired many refugees, paid them poorly and exploited their talents. Here, Bers had his first 3 students. After the war, Bers moved to Syracuse University where he had 3 more students and his first woman student. After a stay at the Institute for Advanced Study Bers took a position at New York University. At N.Y.U. he had a disproportionately large share of students, 22 over a period of 14 years. It was during this time that the seminal work on Kleinian groups was done, and it provided fertile ground for thesis topics. There were many women students at N.Y.U., perhaps because of its location in a large metropolitan area. Of the 22 N.Y.U. students, 9 were women. In 1964, Bers moved uptown to Columbia. There again he had a relatively large number of students, 18 and 1 still working. Again, Columbia, because of its location, had a relatively large number of women students, and of the 19, 7 were women.

During his career, Bers has received many honors. I will list only a very few of them today. He was elected to the National Academy of Sciences and has been chairman of their Human Rights Committee. He was elected president of the American Mathematical Society and also served as chairman of their Human Rights Committee. He is a member of the American Philosophical Society and the American Academy of Arts and Sciences. He was awarded the Steele prize for his article "Uniformization, Moduli and Kleinian Groups" in the *Bulletin* of the London Mathematical Society.

We cannot begin to talk about all these aspects of Bers' career today. We will, as a group of his students, try to tell you how we perceived him as a teacher and friend. Each of the panelists will tell you something about his or her mathematics and how its development was related to interaction with Lippa. We will try to convey his generosity with his ideas and his warmth and concern for people, be they students, friends or colleagues.

Tilla Klotz Milnor, Rutgers University

This is a case history, a highly personal account of my interactions with Lipman Bers when I was a student at NYU during the mid 50's, and of the influence which Lippa has had on my work.

The first real contact I had with Lipman Bers was in his course in complex variables which I took during my senior year. It would have been hard for Lippa not to notice me. As the course progressed, I became more and more enormously pregnant. It clearly pleased Lippa to have an extra bit of drama in the class. *Will she or won't she arrive this week, even bigger than before?* But the business of the course was mathematics, and Lippa provided the drama there. *Can this week's lecture possibly be as good as last week's?* It always was, of course.

The next year, during my first three months in graduate school, Heinz Hopf visited NYU. Bers found me in the hallway early that semester, and when he heard that I was registered for Hopf's course in classical surface theory, he insisted that I attend as well the seminar which Hopf was to run for faculty and temporary members. You can imagine then my terror when, at the organizational meeting of that seminar, I heard Lippa's booming voice loudly volunteering me to give a talk.

I can't say that I felt singled out by such attention. Lippa has a highly managerial style with students, and for the goodly number of us who didn't know up from down, it was an incredible boon to receive direction, before we even asked for it.

Later that first year, Lippa urged me to read and explain to him a paper in surface theory which established an important special case of a conjecture due to Carathéodory - and thereby an extremely special case of a much larger conjecture in analysis due to Bers' own mentor, Loewner. I found some gaps in that paper's arguments, and by the time I filled in all the resulting holes, I seemed to have a thesis.

That was a bit of an accident, and Lippa wanted me to do better. He suggested that I work on the conformal imbedding problem. (This was before Garsia proved, partly with Rodemich, that every compact Riemann surface can be conformally realized as a surface sitting in 3-space.) I made some feeble attempts to solve that problem, and didn't get very far. But the pattern of my interests was firmly set. Though I work on the differential geometry of immersed surfaces, I have a marked preference for questions and methods which mix geometry with particularly simple complex analysis.

To give some indication of what that means, let me cite two elementary ideas which I have used a lot, both taken from Lippa's course in Riemann surfaces. First is the fact that any positive definite real quadratic form makes an oriented surface into a Riemann surface. Indeed, Lippa spent several lectures proving in ultimate detail that isothermal coordinates "always" exist. When a positive definite real quadratic form has particularly interesting differential geometric properties, then it often pays to work on the Riemann surface it determines. Thus, for example, you can show that the Codazzi-Mainardi equations from classical surface theory reduce to the Cauchy-Riemann equations not just on surfaces in 3-space with constant mean curvature (as Hopf had noted) but on surfaces in 3-space with constant non-zero Gauss curvature as well. You just need to use the second fundamental form, or the second skew-fundamental form to determine conformal structure.

A second idea which I have often used is a sort of backward version of the first. Once conformal structure is set and determined, it can help to normalize the conformal metric so as to give it nice geometric properties. This notion goes back to the uniformization theorem, which guarantees the existence of a conformal metric with constant intrinsic curvature. But other geometric properties can be convenient too. If you are studying harmonically immersed surfaces, for example, there is always a prescribed metric g, and only the conformal class of g matters. If you want to show that harmonically immersed surfaces with positive definite prescribed metric g behave a lot like minimal surfaces (which they do), it helps to normalize g so that the energy function of the immersion is identically equal to 1. If you want to get some handle on the behavior of harmonically immersed surfaces with indefinite prescribed metric g, it helps to normalize g so that area is preserved by the immersion. In both cases, the Codazzi-Mainardi equations can be shown to hold, and because of the normalizations, you get reduction to the Cauchy-Riemann equations, even in the case when the prescribed metric g is indefinite.

But let me get back to less technical matters. I was a student at NYU during the era of Sputnik. Job opportunities were expanding, and there was room in the field for anyone who loved mathematics, or just one small part of mathematics. The atmosphere at the Courant Institute was open and friendly. Superimposed on this comfortable backdrop was the simultaneously demanding and encouraging omnipresence of Lipman Bers. His courses were a model of clarity and insight, and we all shared in the excitement of Lippa's early work on Teichmüller space. Lippa made us feel like members of an extended family, with Mary Bers, his wife, providing unconditional acceptance and approval.

If this all sounds a bit like Camelot, I suppose that is true. But Lippa's uncommon style in dealing with graduate students has produced similar results during far harder times.

Lippa has always had more to give than I could possible make full use of. For the bounty which I was privileged to share, I am deeply and permanently grateful.

Thank you, Lippa.

Lesley Sibner, Polytechnic Institute of New York

As a graduate student, I did not take the usual route to becoming a student of Lipman Bers. Riemann surface theory was not my forte. Those funny-looking polygons always made me uneasy, and, in fact, they still do. Lippa gave me a problem in partial differential equations instead. It concerned a linear second-order equation in two variables which is much beloved by the Russians, called the Lavrentiev-Bitsadze equation. Solving that problem was the hardest work I have ever done. The entire area of equations of mixed type is still very little understood, and an immense expenditure of effort went into obtaining every small result. However, I really learned how to do hard analysis.

Looking back on it, I see my dissertation as a "warm up" for the next problem suggested to me by Lippa which was then to keep me and my husband busy for the next ten years. Several years after I got my degree, Bob and I flew to an AMS meeting on the same flight with Lippa. He raised the question of proving a "Hodge" theory for compressible fluid flow on a Riemann surface. After all, the actual Hodge theorem for a one-form does describe incompressible fluid flow on a surface. This problem formed the major part of my work thereafter and led me to learn non-linear partial differential equations, the calculus of variations and a fair amount of differential geometry. I had a late start, but I had finally found my field.

When someone asks me who my adviser *was*, I always reply that I *am* a student of Lipman Bers. Being a Bers student is a lifetime experience which does not end when one gets one's degree. Both Mary and Lippa have been extremely close friends all these years. Their generosity, warmth and friendship are things which I value very highly in my life.

Irwin Kra, SUNY, Center at Stonybrook

I had the honor of being Lipman Bers' first Columbia Ph.D. I started graduate work in September, 1963. When I passed the written comprehensive examination in May of 1964, I naturally started to think about areas of specialization. I was vaguely interested in classical analysis, and Columbia in those years offered few choices to would-be analysts. During the summer of 1964 I was at a loss in trying to choose a topic of specialization. When classes resumed in September, Columbia had a new analyst who had moved uptown from NYU and who was giving a course on Riemann surfaces. That course and the one he gave the following year on moduli shaped my mathematical career.

I do not know why Bers moved from Courant to Columbia. From the composition of this panel, one might suspect that he was looking, as part of an affirmative action scheme, for male graduate students. Whatever the reason, the move was an extremely fortunate one not only for a large group of students at Columbia but also for Bers himself.

So in September 1964, without knowing it and certainly without filling out an application, I became a member of a small mathematics fraternity: the Bers-Ahlfors Mafia--a subset of a larger collection of people working on Riemann surfaces, moduli, and Kleinian groups. This larger group consisted of between 50 and 100 people, and Lipman Bers knew each one both personally and professionally.

I learned quite early that Lippa has a selective memory. He, of course, knew or knew of all the work previously done and currently being done in his fields. However, when it came to students he remembered only their good ideas and bright remarks; he conveniently forgot all their mistakes and the many times they came to him with half-baked and foolish ideas. Further he encourages and applauds independence on the part of his students and is happy when a student or former student proves a new theorem--even when it improves one of his results.

In 1948, Bers showed how an open Riemann surface can be reconstructed from its ring of holomorphic functions. His 1964/65 course, referred to earlier, concluded with a discussion of this theorem and the algebraic structure of the ring of holomorphic functions. Because of the atmosphere at Columbia, I was fascinated by this interplay between algebra and analysis. I asked Bers whether I could choose this topic for my Ph.D. dissertation. He tried to discourage me and told me that

his next course on moduli would contain many more promising areas of research. However, we agreed that for a semester I would work on function algebras on Riemann surfaces. Bers relates this incident a little differently. In his recollection, our conversation went approximately like this:

Bers: I am not interested in function algebras any more and besides the area is probably dead.
Kra: Professor Bers, I am not asking you to write a thesis on function algebras. I will do that, I merely want you to guide me to the literature and supervise my efforts.

I, of course, did not have the *chuzpa* for such a reply. But it is quite possible that Lippa's story, when told to chairmen and deans, resulted not only in job offers but also started me on my administrative career. (It is not clear that I should thank Lipman for this.)

Bers, of course, did everything possible to help me in my work on function algebras. Since he was not too interested in the subject, he made sure that Paul Rosenbloom joined the Columbia faculty in 1965/66. Rosenbloom had a long-standing interest in this set of questions and was the possessor of a partially finished manuscript (joint work with Ian Richards) on the characterization of rings of meromorphic functions on open surfaces.

When I obtained, a few months later, an algebraic/topological characterization of the ring of holomorphic functions, I gave Bers an outline of what I hoped would turn out to be a thesis. On a Friday morning, I handed in a list of definitions and theorems without proofs. Bers did not quite believe that my theorems were correct. After a hectic weekend reviewing all the arguments, I presented them to him on Monday morning. That afternoon we met in the elevator and Lippa told me that my arguments looked OK and would be enough for a Ph.D. at NYU--but at Columbia he was not sure.[1] Two days later, in the Commons Room, he asked where I wanted a job. I assumed that Columbia's standards were not higher than those at NYU and proceeded to type my thesis. But, of course, Bers was right in his initial advice. Function theory on open Riemann surfaces was indeed a dead-end for me. It was the material of his 1965/66 course on moduli that was the foundation of much of my research activities during the subsequent 17-18 years.

It was in that course that I first encountered the names and ideas that would constitute my scientific life: Ahlfors, quasi-conformal mappings, Kleinian groups, Teichmüller spaces, Poincaré series, finiteness theorems, extremal problems. We (his students) were there when Bers put the finishing touches on his area inequalities. The excitement of mathematics was more intoxicating than the subsequent fads that swept Columbia.

For quite a number of years, the field in which we were working was on the fringes of "respectable" mathematics. The "we" consisted in great part of students and adopted students of Lipman Bers. It was and is a group of people who generally supported (mathematically) each other and competed in a mostly gentle manner. It is within this group that I made the closest mathematical and personal friendships. In addition to those on the panel and Lippa, I include my two mathematical brothers Fred Gardiner and Bernie Maskit (the latter is also my colleague at Stonybrook) as well as my mathematical cousin Cliff Earle.

As I mentioned earlier, the move uptown also had some benefits for Lipman Bers. He started using with increasing frequency such words as "cohomology" and "fiber spaces",[2] and his mathematics continued to influence even wider groups of mathematicians. Today Riemann surfaces and Kleinian groups are central to mathematical research. The field is no longer the exclusive domain of a small group, but has several hundred practitioners. One of the reasons for this popularity is the influence of the fundamental papers of Lipman Bers and Lars Ahlfors. In speaking about Bers, the mathematical mentor, one cannot forget about his good friend and mathematical collaborator Lars Ahlfors. The papers of these two mathematicians have a number of things in common. Their papers, of course, attack in elegant manners, central mathematical problems. These papers also point

the way to future directions for research; not only for themselves but also for others. Ahlfors and Bers always give generous credit to the accomplishments of other mathematicians. This generosity is part of the cement that helps form the mathematical community of which I am a member.

I never enjoy mathematics more than when telling Lippa about a new theorem. His delight exceeds my own and always renews my enthusiasm for the subject. One of the reasons mathematics is such a pleasure is the presence of mentors such as Lipman Bers and the extended family he has gathered around him; not only students and adopted students are included in this circle. Outstanding mathematicians who have started in quite different areas, for example, Thurston and Sullivan, and outstanding mathematicians who revived entire fields, for example, Ahlfors, are also included. Together, they are breathing new life into an active and healthy old field.

[1] At this point, I thought that I heard a gentle "boo" coming from the direction where Cathleen Morawetz was sitting.
[2] Contrary to rumors, his papers from the NYU period already refer to Eichler cohomology.

Jane Gilman, Rutgers University

I was a Bers student at Columbia. I came to Columbia with the idea that I would work in some area of algebra. Bers was teaching the first year Complex Analysis course that year, and I took it. Bers' approach in that course, and in all his mathematical work, is so conceptual that he makes very deep hard analysis seem as simple and elegant as algebra. So I ended up working in Teichmüller theory.

I was not the only graduate student that year who was influenced by Bers' great skill as a teacher and expositor. There were fifteen other students who entered Columbia with me, and eight of us became his students.

Because Bers knew that I was interested in algebra, he suggested that for a thesis problem I try to prove that the moduli space for punctured Riemann surfaces was a quasi-projective variety. I associated to the punctured surface a two-sheeted covering branched over the "punctures" and much of the algebraic problem was reduced to studying involutions. Although this was not the direction Bers intended, it was the beginning of my interest in conformal automorphisms and algebraic properties of the mapping-class group.

In addition to a solid mathematical training, Bers' students were also taught about mathematical style. Once I had a complete and correct draft of my thesis, Bers spent an afternoon with me completely rewriting the first section. He added a definition here and separated a lemma there. Although the mathematical content was not changed, the new document was more elegant, clearer and more likely to be read. I never write up a paper without thinking about the lessons of that afternoon.

After my thesis Bers continued to exert an influence over me and my work. The type of influence has varied at different stages of my career.

Immediately after my thesis I spent time studying automorphisms of Riemann surfaces and their action on homology. During this time Bers left me alone and urged me to follow my own instincts in choosing problems. He was always encouraging: when someone suggested to him that I should speak in his seminar, he told me that "the masses were clamoring for me to speak".

My work became more closely related to his when I discovered that Nielsen had studied what Bers termed parabolic mapping-classes. It was exciting to be able to say to Bers "did you know that Nielsen had studied parabolic mapping-classes?". Bers encouraged me to explain the connections between Nielsen theory, Thurston's topological classification of the mapping-class group and Bers' subsequent analytic classification.

Recently I have been interested in questions about product relations in the mapping-class group. Again Bers' influence is indirect but pervasive, for it is

the context in which he has placed the classification theory which makes these natural questions to ask.

I hope that this personal perspective has served to convey a sense of how and why Bers has such a great influence over everyone working in the field and over the direction in which the field moves. Bers has a great technical ability. He also has a rare ability to conceptualize mathematics so that he gives an individual fact or theorem a significance in and beyond itself. I believe that it is this unique combination of talents that is the source of his great influence.

Jozef Dodziuk, Queens College

...I met Lippa in 1970 when I became a graduate student at Columbia. I took some courses with him and learned some mathematics, but more importantly he helped me to learn what mathematics was and how it was done. For example, Lippa asked me to talk about my thesis in his seminar. I had some doubts since the thesis was not in complex analysis. The gist of what Lippa replied was that it was wrong to label and separate various areas of mathematics. It took me a while to realize how right he was. Ten years later I gave another talk in the same seminar when I reported on some results, unquestionably in complex analysis, which were motivated by and related to the subject of my thesis.

Lippa took great interest in all graduate students at Columbia. I started working with Howard Garland, but Lippa was very helpful in formulating the problem whose solution became my thesis. When Garland left Columbia, Lippa became my official advisor. I was fortunate to be able to continue working with both of them.

My undergraduate education in Poland was highly regimented (courses, assignments, exams etc.). I had to learn in a hurry that mathematics was not like that, that one did things without being told to do them. Lippa set a fantastic example. His enthusiasm, his wide-ranging interests, the quality and quantity of his mathematics were awesome. Yet, I had a feeling that he treated me and other students as equals. Lippa was very generous with his insights and ideas. At the same time he was very demanding. He made it absolutely clear that the responsibility for my success or failure was mine. This created a great deal of pressure but made it easy to be proud of results of my work, if I had the results.

The friendship with Lippa continued and grew stronger. It has been a privilege and good fortune to know him and to have him as a friend.

AWM MEETINGS

FLORIDA SECTION

The Association for Women in Mathematics conducted a session at the Annual Meeting of the Florida Section of the Mathematical Association of America.

Program chairperson for the Annual Meeting was Bettye Anne Case of Florida State University. The AWM session coordinator was Betty K. Lichtenberg of the University of South Florida.

The speakers were Delores Gooding, Director of Industrial and Management Systems Engineering and Denise Strenglein, Data Base Coordinator. Both are on the faculty at the University of South Florida in Tampa and are speakers in the Women and Mathematics Program, a secondary school lectureship program of the MAA. A reception was held for AWM members and other guests at the home of Betty and Don Lichtenberg.

Kathy Timmer and Marilyn Repsher of the Mathematics Department at Jacksonville University will coordinate the AWM session for next year's meeting, to be held at Stetson University in March.

CHICAGO AREA **by Antoinette Trembinska, Northwestern University**

A Chicago area meeting of the AWM was held Saturday, April 14, 1984 at Loyola University. Eighteen people attended the meeting. After coffee and doughnuts, Dr. Eloise Hamann presented a talk entitled "Polynomial Rings and Cancellation." Dr. Hamann is an assistant professor in the department of mathematics at Elmhurst College and is currently teaching at Northwestern University as Visiting Professor, under National Science Foundation sponsorship. After Dr. Hamann's well-delivered and -received talk and a short break, a panel discussion entitled "Opportunities and Women's Organizations: Statistics, Data Processing, and Engineering" took place. Two of the three panel members were Pat Langenberg, assistant professor in the department of biometry at the University of Illinois at Chicago and member of the Caucus for Women in Statistics, and Donna Urbikas, an environmental engineer for Commonwealth Edison and vice-president of the Chicago chapter of the Society of Women Engineers. Kate Doty, Director of Systems Development, Loyola University, and president of the Chicago chapter of the Association for Women in Computing, was unable to attend, and her role as panel member was assumed by Anne Leggett. The panel discussion was followed by lunch at a nearby restaurant. Thirteen people attended.

BOSTON AREA **by Martha Jaffe, AWM Clerk** - Held at Radcliffe

Fifteen Boston area members of AWM got together on the evening of March 7, 1984 for a mathematics talk and an informal discussion. Our speaker was Beth Ruskai, who is on leave from the University of Lowell and is now visiting at Radcliffe as a Bunting Fellow (thank you to the Radcliffe Seminars for providing AWM with space for this meeting). Beth spoke on her research on the number of electrons that can bind to the nucleus of an atom with a full charge - surprisingly, no results were obtained on this problem until the last few years.

The meeting was chaired by Lynell Stern, AWM treasurer, who shared information about AWM's role at the Joint Winter Meeting in January. Topics of discussion included:

-1. We should publish, or at least encourage, a rebuttal to the Stanley-Benbow "study" on the inferiority of teenage girls as students of mathematics. This rebuttal ought to counter their "statistics" with some real statistics, maybe prepared by some of our own members who are statisticians.

Some AWM members have put pressure on the developers of "mathematical time-line" exhibits to include more women mathematicians, even going so far as to send them copies of Lynn Osen's book.

-2. On the positive side, AWM has much to be proud of. There are more women involved in important positions in the mathematical profession - as officers, as invited speakers, as editors of journals, and so on. In fact, at the Winter Meeting, the MAA cited AWM for our contribution to the progress of women mathematicians. We still need to push, however - the Speakers' Bureau is an example of something we can use to exert influence.

-3. Other organizations for women in the scientific professions - MIT Alumnae, Association of Women in Computing (AWC), Society of Women Engineers (SWE), Association of Women in Science (AWIS), and Women and Mathematics (WAM) - share our goals. We discussed the possibility of interacting with these organizations at a national, and certainly at a local, level. In the Boston area we are hoping to arrange a big local event, perhaps a Mathematics Fair for women college students, in cooperation with local chapters of some of these organizations.

-4. The AWM Executive Committee talked about updating our *Careers in Mathematics* pamphlet, along the lines of the *Women in Statistics* booklet published by the ASA. The desirability of updating the *Directory of Women in the Mathematical Sciences* published by the Joint Committee on Women was also mentioned. Perhaps AWM could do this (although by all reports it is a horrendous job).

-5. AWM is also trying to raise funds for projects at both a national and local level. The Speakers' Bureau has been funded by a grant from the Alfred P. Sloan Foundation. Eleanor Palais, head of the Fundraising Committee, reported on a Raytheon Company grant last summer (which we hope will be renewed) to provide support for women high school teachers taking courses in PASCAL. Local fundraising seems to be the key - many local industries seem inclined to support projects that provide local benefits, e.g., improving local mathematics and computer education, math fairs, and so on.

We speculated that perhaps we could induce Apple Computer Co. (or IBM or Digital) to give women mathematicians a special group rate on personal computers - a Macintosh for $1K?

-6. The Bunting Institute, which has 4 visiting women mathematicians this year, seems favorably inclined to hosting a math conference. We will look into the possibility of a Conference or Symposium, rather like the Emmy Noether Symposium, next year.

-7. The meeting concluded with a lively discussion about how our women students react to terrifying, intimidating math courses, e.g., at Harvard. People noticed that the women's perceptions are that they are not as good students as the men, although this was not true in most cases. It was felt that we should take responsibility to support the women, perhaps by arranging study groups for them.

Helping her LOOK AHEAD...

by Nancy Johnson, Chicago State University

On March 8, 1984, a second "helping her LOOK AHEAD..." workshop was held at Illinois Institute of Technology, Chicago, IL. (The first was held in the Chicago suburb of Naperville in March, 1982.) The workshop was organized by members of the Association for Women in Science, the Society of Women Engineers, and AWM. Nancy Johnson and Lynn Friedman represented AWM. Anne Leggett and Jill Trembinska assisted during the workshop, and Susanna Epp led one of the sessions.

The workshop consisted of concurrent sessions for 7-10th grade girls, and for their math and science teachers and counselors. The purpose of the workshop was to encourage girls to seek careers in science, math, and engineering. The girls received information about such careers through short sessions, some of which were led by female role models. The adults attended sessions on science, engineering, and math, and a panel on resources available from business, government, professional societies, and universities. Folders of career information were handed out along with a bibliography of resource materials.

The keynote speaker was Dr. Cecily Cannon Selby, Co-chair of the National Science Board Commission on Precollege Education in Mathematics, Science, and Technology. The title of her talk was: "Mathematics, Science, and Technology: Basic, Beautiful, and Bountiful." The plenary speaker was Professor Elizabeth Fennema of the University of Wisconsin-Madison. She spoke on "Mathematics and Gender."

The conference was well-attended: there were 415 students and 93 adults. The evaluations from both groups were favorable. Nearly one-third of the students said the workshop introduced them to careers they were not aware of. One commented, "I didn't know women could be engineers." Nearly half the students thought they would need to take more math and science courses.

At the luncheon five awards were given to teachers. The award winners were chosen on the basis of essays that students had written about their math and science teachers.

Copies of the bibliography are available from Michelle de Bruler, CAC-AWIS, P.O. Box 13, Lemont, IL 60439.

SOME THOUGHTS ON MATHEMATICAL COLLABORATION

The following was contributed by Professor Joan Birman of Columbia University in response to the request by AWM President Linda Rothschild for suggestions about mathematical collaboration (March-April 1984 Newsletter).

I'll answer your questions, but begin by adding one you did not ask; to me it is the central one:

-1. Why collaborate? For me, the reasons are clear and unambiguous. First, it's more fun than working alone. Second, the mathematics may be easier. Third, at least one other person besides the referee reads what I've done. Fourth, it reduces (but does not eliminate) the possibility of mistakes. The first is the most important reason for me. Some of the most meaningful human contacts I've had have occurred in the process of working with others, and I treasure them.

-2. How do you choose a collaborator, and how do you start working together? The word "choose" is misleading. One has only to be alert to the possibility and open to sharing one's ideas, and it happens.

-3. What do you do if one of you feels that he or she is doing all the work or providing all the ideas? That one has never come up. In my collaborations, we began by sharing our ideas in an informal way. A few times I have made the mistake of saying to someone whom I like very much "Let's try to work on such and such together". In those cases we were both interested and eager to work together, but we didn't have the key ingredients for successful work, i.e., a joint set of ideas and techniques; we made no progress, and the collaboration died a natural death. Other times I have begun by sharing ideas, but stopped when I did not sense the feeling of mutual respect or trust without which one cannot proceed.

-4. What happens if your joint efforts lead nowhere? Are there any choices? Well, maybe there are - (a) the garbage pail, or (b) if you can summon the energy, a note to your files describing where you got stuck and what you learned. Then, forget it and get on with other things. Eventually, some such projects resurface years later when a new technique or result comes on the scene, and you can use what you learned earlier, but most of the time they do not.

-5. How to write up the results? I don't dare to say a word on that - it's been the source of too much pain in my own joint work.

WHAT'S HAPPENING IN THE NORTHEAST?

by Sally Lipsey, Department of Mathematics, Brooklyn College, Brooklyn, NY 11210

As a member of the Mathematics Education Committee of AWM I am writing this report about three different types of programs to encourage women to persevere with mathematics and related careers. They are illustrative of the many programs that exist.

Wellesley College is offering a Discovery Course in Mathematics and its Applications. The course is run as a discussion group, informally guided by an instructor, where students analyze problems and debate conjectured solutions with each other. Results indicate that students have been encouraged to continue their study of mathematics and related courses.[1] The syllabus is flexible, and curricular materials are available to the public.[2]

The Stevens Institute of Technology, which first began admitting women in 1971, established an Office of Special Programs for Women in 1977.[3] Special programs for prospective women students have included three-week residential summer sessions and one-day conferences. Women in Engineering summer sessions have alerted high school women to opportunities in engineering and the importance of strong preparation in subjects such as mathematics. Activities included panel

discussions, laboratory experiences, lectures, field trips, and career workshops. The students also enjoyed meeting other women with similar interests and abilities who were their peers, or already in college, or practicing a profession. A majority of those who attended did pursue engineering or related studies after high school graduation.

Residential summer programs for women have also been conducted by Bell Laboratories.[4] Their purpose is to attract college women into scientific careers (such as mathematics, statistics, information science, and operations research) by hiring the young women as salaried assistants to mathematicians and other scientists for ten weeks. In addition, Bell Labs has a graduate program for women, designed to encourage those with research ability. This graduate program provides financial support for outstanding women newly enrolled in a doctoral program in any of a number of math-related fields. Each student, while not on campus, works with an established scientist at Bell Labs who serves as a mentor.

If you know of any other (relatively new) programs in New York or the East Coast States, please let me know.

[1] Suchat, A., Wason, J., et al., "A Discovery Course in Mathematics and Its Applications." Department of Mathematics, Wellesley College, Wellesley, MA 02181. p.(vii).
[2] Ibid.
[3] Susan S. Schwartz is the Director of Special Programs for Women, Stevens Institute of Technology, Castle Point, Hoboken, NJ 07030.
[4] Susan Fahrenholtz is the administrator of Programs for Women, Bell Laboratories, 150 Kennedy Parkway, Short Hills, NJ 07078.

REENTRY COMPUTER SCIENCE

by Barbara Simons, Palo Alto, CA

The goal of the reentry computer science program at the University of California, Berkeley, is to prepare a small group of adults for graduate study in computer science. These people are to be carefully selected from among the large pool who already have some technical background, who wish to become educated in computer science, who are highly motivated, but who would have difficulty getting into graduate school without such a program. We anticipate that they will be very successful both while in the program and as graduate students. It is felt that the majority will be women who did not have such an opportunity presented to them at an early stage of their careers. In addition, the program could become a model for the education of highly motivated adults.

The program is being implemented without displacing current undergraduates. Money is being solicited from industry and foundations specifically to cover the additional instructional costs of the students in the program; industry is being invited to provide visiting faculty to cover the additional teaching load.

This program was initiated largely in recognition of the needs of reentrant women. Women still comprise the largest pool of underutilized workers that can supply scientific and technical personnel to meet present and future demands. For example, in 1981-82 fewer than 10% of all doctoral degrees in computer science were awarded to women, only one was awarded to a black, and none was awarded to a Mexican-American (although an Hispanic did receive one). More specifically, out of 220 Ph.D. recipients in computer science in 1981-82, 20 are female, 1 is black, and 1 is Hispanic (*Chronicle of Higher Education*, Sept. 7, 1983).

Although the backgrounds of the reentry students tend to be diverse, it is anticipated that each student will be in the program for one year. During this time the student will be doing intensive undergraduate coursework in computer

science and related areas. The only special course for the reentry students is a weekly seminar; all other classes are taken with other students from the department. The reentry students will be judged by the same standards as any Berkeley undergraduate and will be subject to the same competition. In addition, they will be able to request letters of recommendation from the regular department faculty, a necessary prerequisite for admission to a good graduate department.

The program began spring semester 1984 with the admission of ten students: eight women, a black man, and an Hispanic man. This is a very small number compared to the total undergraduate enrollment in the department. We expect that the program will remain relatively small, partially because of its very high goals. There is no other program for reentry students in the country which has as its goal the production of Ph.D.'s in computer science.

If you know of any qualified individual or if you are interested in additional information about the program, please write:

Dr. Sheila Humphreys
Computer Science Division
Evans Hall
U. C. Berkeley
Berkeley, CA 94720.

LOS ANGELES HOPKINS CENTER

press release

The Johns Hopkins University Center for the Advancement of Academically Talented Youth (CTY) announces the opening of a West Coast Office and the initiation of educational opportunities using the Johns Hopkins model for verbally and mathematically precocious youth in the Greater Los Angeles area.

For a decade CTY has assisted thousands of students, parents, and school representatives throughout the country to identify and educate highly able youth. Now, The Johns Hopkins University is delighted to make our initiative in education available directly to youth in the Los Angeles region.

The Hopkins model, complete with the Talent Search, will be initiated this spring with a special search for current (1983/84 school year) seventh graders. Students who participate in the spring search and qualify for the CTY academic programs on the basis of SAT scores will be able to take challenging coursework in subjects such as Latin, Precalculus, Mathematics, and Writing Skills. During the summer of 1984, these classes will be offered at the Windward School and one public school site (to be announced). It is expected that several other weekend or other kinds of school programs will be available in the fall at sites throughout the Greater Los Angeles area to provide qualified Talent Search participants with additional educational opportunities.

The first CTY full-scale Annual Talent Search in the Los Angeles area will begin in the fall of 1984 for 1984/85 seventh graders. Summer academic programs are planned in several key locations in 1985.

Directing the West Coast Office will be Dr. Nathan Kravetz. Dr. Kravetz, who received his doctorate from UCLA in gifted and talented education, was a teacher and principal in the Los Angeles Unified School District as well as Dean and Professor of Education at California State University. In addition, Dr. Kravetz was a fellow in Education at Harvard University; Senior Staff Officer, UNESCO, Paris, and Director for Evaluation Research of the Center for Urban Education, New York, N.Y. Dr. Kravety also served as Chairman of Elementary and Early Childhood Education, Lehman College, New York. CTY is delighted to welcome Dr. Kravetz to The Johns Hopkins University.

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HISTORICAL NOTE

A TRIBUTE TO MILDRED LENORA SANDERSON

by L.E. Dickson, The University of Chicago, June, 1915
Reprinted from the American Mathematical Monthly, 1915, vol. 22, p. 264.
Thanks to Moe Hirsch for bringing this article to our attention.

The remarkable mathematical ability and originality shown by Miss Sanderson in her master's and doctor's theses and the very unusual ease with which she assimilated ideas in all branches of pure and applied mathematics, combined with her enthusiasm for that science, gave full promise of a highly successful career for her in research. Her death on October 15, 1914, only a year after completing her graduate studies, was not only a distinct loss to progress in mathematical research in America, but was a very keen blow to her fellow students, to all of whom she had endeared herself by her most lovable personality.

Miss Sanderson was born May 12, 1889, in Waltham, Mass., on the place where her ancestors had lived for over 200 years. She graduated from the North Grammar School at 13 and was valedictorian of her class in the Waltham High School. One of her instructors in the latter school writes that "Miss Sanderson was gentle-mannered, of brilliant intellect, an exact student, broad-minded, self-reliant, and courageous." She entered Mt. Holyoke in 1906, received "Sophomore Honors" in June, 1908, for general scholarship, and "Senior Honors" in mathematics at graduation in 1910. She held the Bardwell Memorial Fellowship for 1910 and 1911, and began her graduate work in mathematics at the University of Chicago, taking the degree A.M. in 1911. The subject of her master's thesis was "Generalizations in the Theory of Numbers and Theory of Linear Groups." Of this original and valuable thesis a very brief extract was printed in the *Annals of Mathematics*, Ser. 2, Vol. 13, 1911, pp. 36-39. This work might well have served for her doctor's thesis; but she was quite willing to undertake a new investigation in a wholly different field. The resulting thesis for the degree Ph.D., taken at the University of Chicago in 1913, was entitled "Formal Modular Invariants with Application to Binary Modular Covariants," and appeared in the *Transactions of the American Mathematical Society*, Vol. 14, 1913, pp. 489-500. This paper is a highly important contribution to this new field of work; its importance lies partly in the fact that it establishes a correspondence between modular and formal invariants. Her main theorem has already been frequently quoted on account of its fundamental character. Her proof is a remarkable piece of mathematics.

During the years 1911-13, she held a fellowship in mathematics in the University of Chicago. From October, 1913, to February, 1914, when her final illness began, she was instructor in mathematics in the University of Wisconsin.

If I may be permitted to add my personal tribute to the universally expressed tribute to her remarkable ability, it would be to say that she was my most gifted pupil.

ON CAMPUS WITH WOMEN

reprinted from the publication of the same name published by the Project on the Status and Education of Women, Association of American Colleges, 1818 R St., NW, Washington, DC 20009

Summer 1983

Not To Be Recommended: Sex Bias in Reference Letters

An analysis of letters of recommendation written on behalf of applicants for an assistant professorship concludes that hiring practices continue to show sex bias. All of the letters of recommendation recommended consideration of the applicant, but differences were as follows:

* some letters (all written by males) contained information on the marital and/or parent status of the applicant. In these, the marital and parent status of the male applicants was presented as a positive factor; the parent status of the female applicant was presented ambiguously.

* letters referring to personal appearance (written by males on behalf of female applicants) noted "attractive appearance" and "pleasing to look at" as part of the summation of the applicant's academic abilities and personality/character traits.

The letters were noted in three categories: Very Positive, Positive, and Ineffective. Letters concerning women were less likely to be rated as Very Positive and more likely to be rated in the category of Ineffective. "A Study of Letters of Recommendation," by Margaret-Mary Franz, Department of Sociology, California State University, Hayward, was reported in the *Sociologists for Women in Society Network*, Vol. XIII, No. 1, January 1983.

Technical Fields: More Room for Women

Technical fields have an edge over most non-technical fields in terms of opportunities for women, despite the fact that employment and advancement opportunities for women in science or engineering still lag behind those for men. The proportion of women graduates in science and engineering has increased dramatically since 1965, jumping from 22 percent to 37 percent of all bachelor's degree awards in these fields, and from seven to 23 percent of all doctoral degrees.

The statistics are noted in *Opportunities in Science and Engineering*, which reports results of a Scientific Manpower Commission study funded by a National Science Foundation grant. The 102-page chartbook includes information on the present supply of scientists and engineers, their labor force participation and employment opportunities, with special emphasis on the entry and advancement of women in these fields. Single copies are available for $1 while supplies last from the Scientific Manpower Commission, 1776 Massachusetts Ave., NW, Washington, DC 20036.

Retaining Women in Higher Ed

Closing the Revolving Door: The Retention of Women in Higher Education was designed to chronicle the impressions, insights and concerns of women faculty at the University of New Hampshire regarding factors involved in the failure of women faculty to stay at the university and to move up in the faculty ranks. The 38-page handbook, which is the result of a study by the Women's Commission Committee on the Retention of Women, also discusses how both statistics and atmosphere at the school can be changed in order to address the high turnover rate of women faculty. While the study relates especially to women at UNH, it may prove useful to women at other institutions. Copies are available at. $5 prepaid from the Women's Commission Committee on Faculty Retention, Batchellor House, University of New Hampshire, Durham, NH 03824.

Sex Discrimination Cases

The University of Texas at El Paso: A federal judge charged the University of Texas with discrimination for paying a woman less than men teaching comparable courses in the same department. The plaintiff, an assistant professor of mathematics, in her complaint filed with the Equal Employment Opportunity Commission ten years ago, argued that a male assistant professor with whom she shared an office received a higher salary, despite the fact that he taught fewer students, was in class for fewer hours each week, and maintained shorter office hours. In his decision, the judge noted that, although university policy requires that instructors be promoted or dismissed after seven years, the plaintiff had been kept at the instructorship level for a total of fourteen years. "This court," he declared, "cannot accept the defendant's explanation that it simply 'forgot' to promote her for seven years."

Fall 1983

AAUP Reports Women Still Behind, Despite Rise in Faculty Salaries

A 6.4 percent increase in faculty salaries across the nation during academic 1982-83 still meant lower earnings for women than for men, according to a report of the American Association of University Professors (AAUP). Even in the top faculty ranks, women received as little as 85 percent of men's salaries in private institutions, 94 percent of their earnings in public institutions.

Copies of the survey, *The Annual Report on the Economic Status of the Profession*, 1982-83, are available at $25 each, prepaid, from AAUP, Suite 500, One Dupont Circle NW, Washington, DC 20036.

However, the National Science Foundation reports that the gap between men and women's salaries in the sciences may be shrinking, especially among recent graduates. Salaries of women scientists and engineers with doctorates average about 76 percent of their male colleagues. For those who received their doctorates in 1979 and 1980, the gap is 88 percent. The data appeared in the January/February 1983 issue of *Manpower Comments*.

Job Market for College Women in '80's: The Word is "Bleak"

A survey of the past and future job market for college graduates reports that:

> By 1980, a greater proportion of young female college graduates were working in clerical jobs than 20 years earlier. While the 1960's had improved opportunities for women, declining opportunities in the 1970's all but eliminated those gains. Over all, female college graduates in 1980 were worse off than graduates in 1960.

Teaching jobs, while increasing in number by 50 percent during the 60's, saw very little increase during the 70's. Only 28 percent of new jobs in the 1980's will be in professional and managerial occupations, compared with 45 percent in the 1970's.

The data are reported in *The Job Market for College Graduates, 1960-1990*, by Russell W. Rumberger. Copies are available at $2 prepaid from the Institute for Research on Educational Finance and Governance, CERAS Bldg. 402, Stanford Univ., Stanford, CA 94305.

Science/Engineering: Despite Increase in Doctorates, Women Still Lag Behind in Academic Job Market

A recent report from the National Research Council maintains that despite recent gains, women scientists are still underrepresented in industry and on campus, and tend to earn less than their male counterparts.

The report, *Climbing the Ladder II: An Update on the Status of Doctoral Women Scientists and Engineers*, surveyed women earning doctoral degrees in science in

1977 and 1981, and was prepared by the Council's Committee on the Education and Employment of Women in Science and Engineering.

Highlights:

* The number of women doctorates in the sciences and engineering grew from 18 percent in 1977 to 23 percent in 1981.

* On campus, the number of women appointed to assistant professorships slightly exceeded their proportions among recent doctoral recipients.

* However, women were also more likely to wait longer for promotions than their male colleagues and to earn less at the higher ranks, particularly in the medical sciences, chemistry and economics.

* Women also continued to hold a disproportionate number of "off-ladder" positions--e.g., as instructors or lecturers--which do not lead to tenure.

Copies of this report are available at $8.95 prepaid from the National Research Council, 2101 Constitution Ave., NW, Washington, DC 20418.

"Laws of Navigation" in the Working World

Part-Time for a Life-Time: The Limits Facing Most Working Women discusses the economic realities of life for the working woman. For example:

* Thirty-seven percent of all women over 16 in this country must work to support themselves and their families.

* There are 31.3 million women in this situation--or 73 percent of all working women.

* One in every five mothers in the labor force is maintaining her own family.

* Thirty-eight percent of all women over 40 currently have no husbands, and most of them are therefore supporting themselves.

* The fastest-growing poverty group in the country today consists of single women over 50. (Single does not mean spinster--it means women who currently have no husbands.)

The need for women to prepare to meet these realities--psychologically, academically, and technically--is an urgent one, notes author Margaret E. Mahoney, president of the Commonwealth Fund. The monograph is a reprint of her speech given at Wellesley College (MA) in 1981. Copies are available at $3 from Women and Foundations/Corporate Philanthropy, 70 W. 40th St., New York, NY 10018.

Pioneering Work on American Women Scientists

Women Scientists in America: Struggles and Strategies to 1940 by Margaret W. Rossiter has been hailed as "pioneering" in both subject and methodology. The book asks such questions as "How do women work in science? What are the professionalizing processes for them?", and explores the patterns that both help and hinder women scientists.

Rossiter documents ways in which the growing "professionalization" of science worked against women, especially by invoking higher standards to exclude them. Published by Johns Hopkins University Press, the 439-page book costs $27.50.

Stats on Minority Women

Asian, Hispanic, Black and Native American women held roughly one percent of doctorates in science and engineering in the U.S. in 1979. That same year, Anglo males in the country held 77 percent of the Ph.D.'s in the science and engineering fields. Of the women doctorates in those fields, Asian women represented 64 percent of the total group. Altogether, women make up only twelve percent of the minority Ph.D.'s employed as scientists in the labor force.

In the previous year, of the total undergraduate enrollment in U.S. colleges and universities, minority women made up only 9.6 percent. Those majoring in the biological sciences formed a dismal 8.7 percent, in the physical sciences, only 3.5 percent. Percentages shrink still further at the graduate level, with minority

women forming only 4.5 percent of total enrollment. Among these, only 3.5 percent were pursuing degrees in the biological sciences, only 1.5 percent in the physical sciences.

The above statistics appeared in the Winter 1983 issue of *Intercambios Femeniles.* The issue contains other related articles on women, as well as a list of resources focusing on minority women in science. Single copies of the issue are available at no charge from Intercambios Femeniles, D.O.S.A., Old Union 323, Stanford, CA 94305.

Resources on Minority Women in Science and Engineering

A list of 14 resources focusing chiefly on minority women in science and engineering appeared in the Winter 1983 issue of *Intercambios Femeniles.* The list gives brief descriptions of publications as well as projects across the country, together with address and name of contact person. For a free copy of the issue, write to Intercambios Femeniles, D.O.S.A., Old Union 323, Stanford, CA 94305.

Winter 1984

Studies Show Salary Gap Growing for Women in All Fields

The average faculty woman made $5,374 less than the average man last year, according to a bulletin released by the National Center for Education Statistics. The pay gap has grown steadily since academic year 1977-78, when the difference was only about $3,500. Male faculty members received higher raises at every rank except lecturer during academic 1982-83, and got an average pay boost of 7 percent in contrast with 6.7 percent for women. While the average male salary was $28,394, the average female salary was $23,020, with salary differences between men and women ranging from $1000 for instructors to $3,854 for professors. The bulletin notes that the overall salary difference was even higher due to the fact that more women are at the lower-paying bottom rungs of the academic ladder. Additional salary information, as well as copies of the bulletin (*College Faculty Salaries Average $26,292 for Academic Year 1982-83*) are available at no charge from the Statistical Information Office, National Center for Education Statistics, Brown Building, Room 600, 400 Maryland Ave., SW, Washington, DC 20202.

Like women faculty in general, women who have doctorates in nontraditional fields continue to earn substantially less than their male counterparts in research and development, regardless of the field, level of work experience or type of employer. According to a recent report from the Scientific Manpower Commission, in 1981, the average woman doctorate took home a paycheck that was $8,600 less than that of her male counterpart, and the salary gap widens with age. In addition to providing information about salaries in every field of science and engineering, the report also offers comparative information in the academic, managerial and professional occupations. Copies of the 196-page report, *Salaries of Scientists, Engineers and Technicians--A Summary of Salary Surveys*, by Eleanor L. Babco, are available for $30 prepaid from the Scientific Manpower Commission, 1776 Massachusetts Ave., NW, Washington, DC 20036.

OF POSSIBLE INTEREST

The Women's Review of Books, Wellesley College Center for Research on Women, Wellesley, MA 02181. Well-written feminist literary criticism. $12.00/yr.

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

Feminist Teacher, a quarterly magazine that will deal with ways to combat sexism and other types of oppression in the classroom, is now accepting charter subscriptions for its first issue scheduled for Fall 1984. It will serve as an interdisciplinary forum that will help develop a nationwide network of feminists teaching at all grade levels--preschool through graduate school.

Subscription prices are $12 for individuals living in the United States and $15 for those living outside of the U.S. Institutional subscriptions are $20 a year. Write: Feminist Editorial Collective, Ballantine 442, Indiana University, Bloomington, IN 47405.

Dr. Lillian Little, School of Management, Suffolk University, Beacon Hill, 8 Ashburton Place, Boston, MA 02108, is engaged in researching how certain individuals are able to find and maintain purpose in their work. The research builds upon work done by Abraham Maslow, Gail Sheehy, and others. She is seeking referrals (self or others) of people who have such a purpose--people who are committed and have a sense of responsibility, almost a mission, in their work.

Women's Studies from Yale, Yale University Press, 92A Yale Station, New Haven, CT 06520.

The Douglass series: On Women's Lives and the Meaning of Gender. Rutgers University Press, 30 College Ave., New Brunswick, NJ 08903.

Women's health and psychology. Haworth Press, Inc., 28 E. 22 St., New York, NY 10010.

Science and Gender. Pergamon Press, Inc., Maxwell House, Fairview Park, Elmsford, NY 10523.

REPORT ON SPEAKERS' BUREAU - Judy Wason, Director

After a spurt in activity this spring, planning is underway for next fall's program for the Speakers' Bureau. Listed speakers currently number 112. This summer's AWM membership renewal notices will include a Speakers' Bureau option. All AWM members are strongly encouraged to register. You are by no means obligated to accept an invitation which does not fit into a busy schedule, or is otherwise inconvenient. If you want a copy of the current Speakers' Bureau pamphlet, write to the AWM office.

From now on please return all expense reports directly to the AWM office.

For August to December 1984 the Regional Coordinator in the Mid-Atlantic Region will be Professor Abba Newton, Box 72, Vassar College, Poughkeepsie, NY 12601, (914) 452-6646.

Volunteers are needed for the Publicity Committee in the Western Region. Also needed are Metropolitan Coordinators for cities in addition to those already covered. (Boston, Philadelphia, Washington, DC, Chicago, Los Angeles & San Francisco areas) Please contact the AWM office for further details. We are investigating maintaining our directory via computer and would also appreciate hearing from anyone with experience with a "bulletin board" file accessible by a published telephone number.

Most of all, help is needed from ALL AWM members in the form of encouraging your contacts at schools and universities to make use of this resource. Extend your invitations NOW for the fall.

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

Job Ads

Institutional members of AWM receive two free ads per year. All other ads are $10 apiece and must be prepaid. The vacancies listed below appear in alphabetical order by state. All institutional members below are Affirmative Action/Equal Opportunity employers.

University of California, Berkeley. Dept of Mathematics. Alan Weinstein, Vice-Chair for Faculty Appts. One tenure faculty position (pending budgetary approval) Fall, 1985 with rank to be determined by qualifications, in area of algebra, analysis, applied math, foundations or geometry. Applicants should have demonstrated achievement in research & teaching. By 9/30/84 send curriculum vitae, list of publications, a few selected reprints or preprints, and the names of three referees.

Yale University. Dept of Mathematics, Box 2155 Yale Station, New Haven, CT 06520. Assoc. Prof. or Prof. in algebra or topology. Candidates must be distinguished in research and recognized as successful teachers. Send vita, copies of publications, & names of 3 references by Dec. 15 to Richard Beals, Chairman.

Wesleyan College. Division of Science & Math, Macon, GA 31297. Ms. Pat Lewis, Chmn. (1) Tenure-track position in math 8/1984. Will consider applicants with M.S., but prefer those with Ph.D. Duties: Teach both introductory & advanced undergraduate math courses. Salary is competitive & commensurate with qualifications. (2) Tenure-track position in Computer Science 8/1984. Will consider applicants with M.S. in computer science, but prefer those with Ph.D. Teaching experience desirable. Responsibilities include undergraduate teaching & curriculum development. Equipment: HP-3000 Series 33, TRS-80, Apple IIe. Salary & rank based on qualifications & experience. For both positions send application, resume, transcripts & 3 letters of recommendation to Chmn by 7/9/84.

University of Kansas. Dept of Mathematics, Lawrence, KS 66045. Anticipate several instructorships, Fall, 1984, which are normally renewable for second & third year. Salary to be determined. Research interests should be in areas closely related to those of current staff. Ph.D. or dissertation accepted with only formalitites to be completed. Send detailed resume & dissertation abstract; arranged for 3 letters of reference to be sent to C. J. Himmelberg, Chmn., Dept of Math. Closing date: 2/1/84, then monthly until search is ended.

MIT Artificial Intelligence Laboratory. Room N E 43-817, 545 Technology Square, Cambridge, MA 02139. Research Scientist, to collaborate with members of the Programmer's Apprentice project, whose long-range goal is to develop tools that act as intelligent assistants to expert programmers. Applicants must have substantial experience developing large-scale programs in LISP, preferably on LISP Machines (Franz LISP and InterLISP are acceptable alternatives), and experience writing programs that manipulate other programs (such as program editors, compilers, or analyzers). Applicants must understand artificial-intelligence problem-solving techniques and have experience in the areas of knowledge representation and automated reasoning. The position requires an advanced degree in Artificial Intelligence or a closely related field, or a combination of education and experience developing knowledge-based systems. The salary will depend upon background and experience. Send curriculum vitae together with representative sample of research papers or projects to Karen A. Prendergast, Asst. to the Director.

Cornell University. Dept of Mathematics, White Hall, Ithaca, NY 14853. Possible Full Professorship in Probability Theory. Required: outstanding publication record, international reputation & research interests close to those of the probability group in Cornell Math Dept. In particular, it is desirable that the applicant has worked in the area of probability which borders on statistical physics. By 7/15/84 send curriculum vitae, reprints & names of seven referees to Prof. Anil Nerode, Chmn., Dept of Math.

Ohio State University. Dept of Math, 231 West 18th Ave., Columbus, OH 43210. Chair in Applied Mathematics, funded jointly by the Ohio Eminent Scholars Program and The Ohio State University and has an initial endowment of $1,000,000. Seek applicants with outstanding credentials in Computational Mathematics & Scientific Computation. Recipient will hold rank of Professor of Mathematics and will also serve as Director of newly established Center of Scientific Computation. The University has committed funds to purchase of computing equipment required for Center, and the Mathematics Dept has allocated 4 new junior positions to be filled by young researchers working in this or closely related areas. Please contact Prof. James M. Greenberg, Chmn.

Office of Naval Research, Arlington, VA 22217. A Civil Service position (Mathematician/Mathematical Statistician) at the GM-14 or GM-15($42,722 - $65,327) level is available. Responsibilities are to formulate, implement and monitor a contract research program in the areas of probability theory, applied probability and stochastic processes. Applicants must have a Ph.D. or equivalent and one year of experience or three years of progressively responsible professional experience. Submit a resume or Standard Form 171 to be received by July 31, 1984 to: Office of Naval Research, Civilian Personnel Division, Code 791SC, Attn: Announcement #84-19(AWM), 800 North Quincy Street, Arlington, VA 22217. For further information or supplemental forms call (202) 696-4705.

University of Wisconsin, Eau Claire. Dept of Mathematics, Eau Claire, WI 54701. Dr. Marshall E. Wick, Chmn. At least two non-tenure track lectureships 8/20/84. Duties: teach undergraduate math courses, with some opportunity for graduate courses designed for teachers of mathematics. Teaching load: 12 semester credits. Salary: $16,000 - $20,000, dependent on training and experience. All specialties considered; some preference for those in algebra modeling, operations research, or statistics. Send application, resume, undergraduate & graduate transcripts, & 3 letters of recommendation to Chmn. Closing date: 5/1/84, or until positions are filled.

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Association for Women in Mathematics
Box 178, Wellesley College
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July-August, 1984