Association for Women in Mathematics

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PRESIDENT'S REPORT

Anaheim Meeting. Here is a report on the AWM activities at the Annual Joint Meetings of the American Mathematical Society and the Mathematical Association of America which was held on January 9-14, 1985.

Panel on "Non-Academic Careers in Mathematics". Pat Kenschaft, Montclair State College, organized and moderated an extremely interesting panel consisting of Maria Klawe, IBM; Elizabeth Ralston, Inference Corporation; Bonnie Saunders, Star Consultants; Margaret Waid, Sperry-Sun-Baroid; and Frederick Keene, TRW. Every one of the speakers was originally trained as a mathematician, had held an academic position, and has now left academe to work in an industrial setting. While the circumstances under which each panelist made the decision to go into industry were very different, there were certain underlying themes. The first was a frustration with university problems: teaching low-level courses to under-prepared students, unsympathetic colleagues, and mathematical isolation. The second was a sense of appreciation and accomplishment in working on problems which, while they may not be "one's own," are interesting and give ready gratification. The third was the intellectual stimulation of the industrial environment.

Emmy Noether Lecture. This year's Emmy Noether Lecturer was Professor Jane Cronin Scanlon, Rutgers University. Her title was, "A model of a cardiac fiber: Problems in singularly perturbed equations." For the pure mathematicians in the audience, it was a fascinating description of how ordinary differential equation theory can be used to describe a physical phenomenon.

AWM Cocktail Party. Our traditional party was a great success in spite of smaller quarters than we had expected.

Business Meeting. It was suggested that the AWM change its name to the "Association for Women in the Mathematical Sciences." Please think about this and let us know your reactions. It was pointed out that with the name change we might become AWMS or retain AWM.

Speakers Bureau. There were 22 lectures last fall sponsored by our Speakers Bureau. At the executive committee meeting it was voted to increase the travel allowance for speakers to $150. Those of you who are interested in joining, or have arranged to give talks at a high school or college and want to be reimbursed for your expenses, please write to AWM, Box 178, Wellesley College, Wellesley, MA 02181 for information and vouchers.

Regional Meetings. It was suggested at the business meeting that regional groups try to coordinate their meetings with other professional groups in the

mathematical sciences. Pat Kenschaft and Margaret Waid are compiling a list of people to contact.

Kovalevskaya Symposium. In celebration of the fifteenth anniversary of AWM and the twenty-fifth anniversary of the Bunting Institute at Radcliffe, we are planning a Symposium to honor the mathematical heritage of Sonya Kovalevskaya. The program will have two parts. The first, on Saturday, October 26, 1985, will focus on mathematics education at the high school level (and particularly education for girls) and will involve fifty teachers from the Boston area. Funding for this is being sought from the National Science Foundation program for Precollege Science and Mathematics Education. The second, on Sunday and Monday, October 27 and 28, 1985, will be a series of lectures by prominent mathematicians on their research. These talks will have as a common theme, mathematical problems that have roots in Kovalevskaya's work. Funding is being sought from the National Science Foundation Mathematical Sciences Division.

Linda Keen
Department of Mathematics and
Computer Science
Lehman College, CUNY
Bronx, NY 10468

AWM ELECTION

This year we are electing a President-Elect and three Members-at-Large of the Executive Committee. A list of the current Executive Committee may be found on page 5. Continuing Members-at-Large will be Vivienne Mayes and Evelyn Silvia. Please send any suggestions you may have for candidates to President Linda Keen, who will forward them to the Nominating Committee. Suggestions are due by April 1, 1985.

HONORS AND AWARDS

Erratum:

Judith S. Sunley has been appointed Deputy Division Director, Division of Mathematical Sciences. NSF had previously announced her appointment as Deputy Division Director, Division of Precollege Education in Science and Mathematics.

Cathleen Morawetz, Courant Institute of Mathematical Sciences, New York University, has been appointed to the Board of Mathematical Sciences recently formed by the Commission on Physical Sciences, Mathematics, and Resources. The Board will provide a unified voice for advising the Government on mathematics, applied mathematics, and statistics. The Board will operate mainly through specific projects. Topics will range from the research opportunities in mathematical sciences to advice on newly developed applications of mathematics and statistics that can be used to improve Governmental performance.

As is documented in the recent report, *Renewing U.S. Mathematics*, there is a real risk that support for mathematics research--which forms a basis for scientific and technological advances in many fields--will be inadequate to meet national needs. The new Board can play a crucial role in preventing that from occurring.

Establishment of the Board has been made possible through support from the National Science Foundation, Air Force Office of Scientific Research, Office of Naval Research, Army Research Office and the Department of Energy.

LETTERS TO THE EDITOR

To the editor:

I debated for some time as to whether I should answer the objections to biographies of women mathematicians raised by Jeanne-Marie Silk in her letter to the AWM *Newsletter* (November-December 1984). I finally decided, however, that her comments do require some response.

First of all, Ms. Silk seems to be under a slight misapprehension in her conviction that most work done on male mathematicians is in the form of publication of their notes and writings. Biographies of Hilbert, Courant, Hamilton, Gauss and others come immediately to mind, as does the immensely popular (and flamboyantly inaccurate) *Men of Mathematics*. In my experience, mathematicians of both sexes are eager for knowledge about the lives of their predecessors; it is natural to want to know about the successes and failures, both professional and personal, of one's peers.

Also, I hope that my book covered a bit more ground than merely chronicling, in Ms. Silk's formulation, "who slept with whom or other trivia." Mathematics has an institutional and social framework; the politics of women gaining access to the profession, the ways in which appointments and awards are made, competition between different mathematical schools, the relations of mathematicians and scientists with other intellectuals and society at large--these and other issues are touched upon in my biography of Kovalevskaia. Far from trivializing her, a description of Kovalevskaia within the context of this social framework gives a better idea of her status as a professional mathematician, and of her place in the scientific community of her time.

Biography of any mathematician serves a general informative purpose. But I think that biographies of women mathematicians are especially important and necessary. The term "role model" is perhaps overused. Nevertheless the fact remains that young girls are more likely to consider mathematics as a possible career if they know that women before them have chosen mathematics, and have overcome the obstacles along their way. Ms. Silk's suggestion of compendia of mathematical notes would have no effect in this area. In fact, in view of the changes in notation and mathematical style that have occurred over the past 100 years or so, I question whether a compendium of Kovalevskaia's notes would be of much use even for Ms. Silk.

Finally, I would like to point out that I began my biography of Kovalevskaia partly in response to certain myths about her which were widespread in the mathematical community. Ms. Silk might not care if knowledge of Kovalevskaia remains at the level of: "K was the mistress of Weierstrass;" "K was unhappy in her mathematical success;" "Weierstrass had all the ideas for K's works;" "K had no political consciousness;" "K was an amateur mathematician, but the Cauchy-Kovalevskaia Theorem was the work of her husband, who was the *real* mathematician"--all of which comments I had heard from mathematicians at one time or another. I was not content to have "knowledge" of Kovalevskaia remain at this ignorant level, and I felt that the cause of women in mathematics, and women's causes generally, would be well-served by a less fantastical portrayal of Kovalevskaia and her world.

Sincerely, Ann Hibner Koblitz, School of Social Science
The Institute for Advanced Study, Princeton, NJ

To the editor:

In a recent review of literature on faculty participation in academic governance, I ran across some statements and information which readers of the AWM

Newsletter may find interesting. The following are from *Women in Academe: Steps to Greater Equality* by Judith M. Gappa and Barbara S. Uehling, AAHE-ERIC/Higher Education Research Report No. 1, 1979, published by the American Association for Higher Education, One Dupont Circle, Suite 780, Washington, DC 20036, pp. 21-34.

"*Admissions to Graduate Programs* - According to Solmon (1976), the criteria and methods by which departments make decisions about applications for graduate programs are critically important to women. ...The major problem in determining whether graduate admissions committees are using sex-neutral selection criteria is that most decisions are made within academic departments in closed meetings. Few departments document this selection process or provide specific information about why candidates are denied admission. In such meetings, negative attitudes and assumptions about women's ability, motivation, and perseverance may bias decisions. In any case, attitudes about the motivation of women as graduate students that reflect male bias are found in letters of recommendation. Examples of sex-biased statements in letters for recommendation for National Science Foundation fellowships are:
'I kept wondering how a girl could be so smart.'
'If she were single and plain, I would expect her to be an outstanding Ph.D.'
'Miss K ... is also musically and structurally gifted.'
'I think she'd make some young anthropologist a good wife' (Solmon 1976, p. 13)."

"Research by Harris (1970), Roby (1973), and Sells (1973) showed that if merit is the most important selection variable, women are not being admitted in sufficient proportions. This viewpoint is generally based on studies indicating that women have higher grade-point averages from high school to graduate school (Feldman 1974, Harmon 1965, Hole and Levine 1971, cited in Solmon 1976, p. 12). Scott noted that women should expect to be accepted in higher proportions, in fields where they are in the minority, because women who apply to traditionally male-dominated fields such as medicine, mathematics, physics, or economics do so because they have exceptional ability and straight A's in their fields (Solmon 1976, p. 13)."

(On counseling, p. 26) "Pietrofesa and Schlossberg studied counselor behavior in interviews. They used counselees who presented themselves as recent undergraduate transfers with high mathematical ability, trying to decide between a math or elementary education major. They found that 80% of both male and female counselors advised the young women to enter elementary teaching (U.S. DHEW, Westervelt 1975, p. 27)."

(On role models, p. 33) "Faculty members tend to identify more closely with and support the aspirations of students of their own sex (Tidball 1976, pp. 378-79). Since women constitute a relatively small proportion of faculty on most campuses, positive role models are likely to be in short supply for women students. The situation is exacerbated by the fact that women faculty frequently are lodged in lower ranks without tenure and earn less than their male colleagues in every rank; therefore, whether they are viewed as successful role models in an academic career by women students is questionable."

The effect of faculty and administrators' attitudes (p. 33) "As women students progress through the higher education system, they are influenced subtly by their interactions with faculty administrators. Negative attitudes toward women students are generally manifested by a lack of encouragement or support or by overt and covert expression of sex stereotypes and male expectations regarding women's roles and behaviors. Assumptions about women abound: they will drop out of school to get married and have children; family obligations will limit their productivity if they do earn degrees; investing large sums of money and a great deal of time in the graduate education of women is a risk because they won't be in the marketplace as professionals. The following comment was made by an academic VP:

> Too many young women are casually enrolling in graduate schools across the country without having seriously considered the obligation which they are assuming by requesting that such expenditures be made for them. And they are not alone to blame. Equally at fault are two groups of faculty - undergraduate instructors who encourage their female students to apply to graduate school without also helping them consider the commitment that such an act implies, and graduate admissions counselors who blithely admit girls with impressive academic records into the graduate programs without looking for other evidence that the applicant has made a sincere commitment to graduate study (Scully 1970, cited in Feldman 1974, p. 12)."

"When negative perceptions or stereotypes are expressed by high-level administrators, they are likely to influence faculty, staff, and students and become institutionalized in recruitment, admissions, and financial aid practices. In Solmon's opinion, institutional practices based on such assumptions can cause women to fulfill the prophecy by dropping out or taking longer to finish (1976, pp. 8-9)."

I think all of this fairly well speaks for itself.

Catherine Folio, Math. Dept., Brookdale Community College, Lincroft, NJ

1985 AWM EXECUTIVE COMMITTEE

Linda Keen (President)	Dept. of Math., Herbert H. Lehman College (CUNY) Bronx, NY 10468
Linda Rothschild (Past President)	Dept. of Math. C-012, Univ. of Calif., San Diego La Jolla, CA 92093
Lynell Stern (Treasurer)	Wang Laboratories, Inc., 1 Industrial Ave. Lowell, MA 01851
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Joan Hutchinson (Member-at-Large)	Dept. of Math., Smith College Northampton, MA 01063
Jeanne LaDuke (Member-at-Large)	Dept. of Math., DePaul University Chicago, IL 60614
Vivienne Mayes (Member-at-Large)	Dept. of Math., Baylor University Waco, TX 76703
Vera Pless (Member-at-Large)	Dept. of Math., Univ. of Illinois, Chicago Chicago, IL 60680
Evelyn Silvia (Member-at-Large)	Dept. of Math., Univ. of Calif., Davis Davis, CA 95616
Bettye Anne Case (Meetings Coordinator)	Dept. of Math. & Comp. Science, Florida State University, Tallahassee, FL 32306

REPORT OF THE TREASURER January, 1985

Accounting for the period June 1, 1984 to November 30, 1984

Balance, June 1, 1984		$43,338.14
Total Assets, June 1, 1984	$43,424.39	

Note: The figure $43,424.39 represents $43,338.14 cash-on-hand plus 5 shares of Washington Water Power, valued at $86.25 as of 8/27/84.

Receipts

Dues - Individuals	$10,819.25	
Families	840.00	
Institutional	3,935.00	
Advertising Fees	270.00	
Contributions	560.00	
Interest	1,163.01	
Miscellaneous	361.16	$17,948.42

Expenses

Wages & FICA (1)	$2,579.29	
Newsletter (2)	2,628.42	
Dues & Fees (3)	156.75	
AWM meetings	50.00	
Operating Expenses (4)	830.22	
Speakers' Bureau (5)	4,665.30	
Raytheon Grants (6)	3,960.44	
Bulk Mailing Deposits (7)	400.00	
AMS meetings (8)	599.86	
Miscellaneous	99.51	$15,969.79

Balance, November 30, 1984 $45,316.77

(1) Part-time Administrative Assistant.
(2) Typing, postage and printing.
(3) Conference Board of the Mathematical Sciences, Massachusetts Incorporation Fee, Bulk Mailing Permit Fee
(4) Postage, phone, supplies and duplicating.
(5) Wages for the Director of the Speakers' Bureau, wages for clerical help, plus phone, postage and duplicating expenses.
(6) Grants to women high school teachers to learn Pascal and/or Data Structures.
(7) Deposits placed with the Boston Post Office against which bulk mailings of Newsletters and dues notices are charged.
(8) Travel expenses and honorarium for Emmy Noether Lecturers plus AWM social events.

Membership Statistics: Our mailing list totals about 1500 including institutions and members in Canada and abroad.

Respectfully submitted,

Lynell E. Stern, Treasurer

SESSION ON AMERICAN WOMEN IN MATHEMATICS

by Jeanne LaDuke, Associate Editor

"American Women in Mathematics" was the theme of one of the sessions at the annual meeting of the History of Science held in Chicago 27-30 December 1984. The Saturday morning session was chaired by Helena M. Pycior of the University of Wisconsin at Milwaukee and featured three half-hour papers followed by comment by Ann Hibner Koblitz of the University of Washington at Seattle. Abstracts of the three papers follow.

Jeanne LaDuke (DePaul University): "American Women in Mathematics: The Pre-World War II Ph.D.'s"

The author and Judy Green have identified and gathered biographical, career, and bibliographic information on all 227 American women who received Ph.D.'s in mathematics prior to 1940. Ten such degrees were granted before 1900. The 217 American women who earned Ph.D.'s in mathematics between 1900 and 1939 comprise about 14.3% of the Ph.D.'s in mathematics for that period, a proportion which plunged to a low of 5% in the 1950's. Wellesley produced by far the largest number of baccalaureates in the group, although about 60% of these women received their undergraduate degrees from coeducational or coordinate institutions. Chicago leads by a wide margin in the Ph.D. production of the women, granting about 20% of the total. Although for the most part the graduate work of these women was directed by strong advisors in strong programs, it was rarely the case that they were hired by such research-oriented institutions. About three-fourths of the group had primarily academic careers, mainly in undergraduate institutions, fairly evenly divided between women's colleges and coeducational ones, with an emphasis on teaching.

Judy Green (Rutgers University at Camden): "Christine Ladd-Franklin."

Christine Ladd-Franklin (1847-1930) was widely recognized during her lifetime for her contributions to symbolic logic and to the theory of color perception. This paper is concerned primarily with her work in logic, which dates from her period as a graduate student at the Johns Hopkins University from 1878 to 1882. Having become interested in the subject through her contact with Charles S. Peirce, she produced a treatise on the algebra of logic which incorporated a novel method of dealing with universal and particular propositions. She applied her method to give a definitive treatment of the classical syllogism which was described by Professor Josiah Royce of Harvard as "the crowning activity in a field worked over since the days of Aristotle." Starting in about 1890 the theory of visual perception, particularly color perception, became her principal scholarly preoccupation and remained so throughout the rest of her life.

Uta C. Merzbach (Smithsonian Institution): "Mathematics at Bryn Mawr: The First Fifty Years."

For fifty years following its opening in 1885 Bryn Mawr College had one of the strongest mathematics departments in the country. This small institution, with a total enrollment of fewer than 500 students, produced an unusually large number of undergraduates equipped to teach mathematics at the secondary level and served a larger number of women interested in the field than did most other larger institutions with graduate programs in mathematics. The small faculty was strongly research-oriented. Yet few of the graduate students who passed through Bryn Mawr College were encouraged to pursue research careers in mathematics. Those capable of doing superior research, usually urged to teach at an elementary level, were further discouraged by the fact that their research specialty fell out of fashion. Because of this, and the handicap of their sex, an unusually well-trained group of mathematicians chose traditional teaching, government work, marriage, or other professions over careers in mathematical research.

ANNOUNCEMENT OF AWM LUNCH

AMW is planning a lunch for members and friends in conjunction with the Chicago meeting of the AMS on March 22-23 at the University of Illinois at Chicago. The lunch will take place on Saturday, March 23 at 12:15 pm in a Greek restaurant near the campus of UIC. Additional details will be available at the AWM table near the registration area in the Science and Engineering Offices Building.

ANOTHER KOVALEVSKAYA BOOK

The Mathematics of Sonya Kovalevskaya by Roger Cooke has recently been published by Springer-Verlag. This detailed analysis of Kovalevskaya's mathematical work traces parts of the history of the problems she studied and analyzes her methods of proof. By placing these works in the context of the history of mathematics, the author focuses attention on some important areas of late 19th-century mathematics and demonstrates that Kovalevskaya was an important and creative member of the mathematical community of the time.

The book, the first in-depth study of Kovalevskaya's mathematical work, seeks to entertain as well as to instruct where her biography is concerned. Included is material on such topics as the theory of elliptic integrals, celestial mechanics and partial differential equations, as well as six appendices explaining relevant mathematical topics. The bulk of the material is accessible to undergraduates at or above the sophomore level.

Contents:

Childhood and education: Partial differential equations; Degenerate Abelian integrals; The shape of Saturn's rings. Mature life: Biography; The Lamé equations; The Euler equations; Bruns' theorem; Evaluations. Appendices and bibliography. Bibliography. Index.

A DIVERGENCE OF BIOGRAPHIES: KOVALEVSKAYA AND HER EXPOSITORS

a review by Ann K. Stehney, professor of mathematics at Wellesley, currently on leave at the Institute for Defense Analyses, Princeton. She has worked in differential geometry, relativity, and applied linear algebra.

Reprinted with permission from Physics Today, Vol. 37, No. 4, pp. 79-81(1984).

Thanks to Beth Ruskai for bringing this article to our attention.

A Russian Childhood. S. V. Kovalevskaya. B. Stillman, ed. 250 pp. Springer-Verlag, New York, 1978. $19.00.

Little Sparrow: A Portrait of Sophia Kovalevsky. D. H. Kennedy. 341 pp. Ohio UP, Athens, 1983. $25.95 cloth, $12.95 paper.

A Convergence of Lives: Sofia Kovalevskaia: Scientist, Writer, Revolutionary. A. H. Koblitz. 305 pp. Birkhäuser, Boston, 1983. $19.95

Sophia, or Sonya, Kovalevsky (1850-1891) is best known today for the fundamental existence and uniqueness theorem for solutions to Cauchy's problem in partial differential equations. By the time she submitted this work as her doctoral dissertation in 1874, she had also worked on the theory of Abelian integrals and, following Laplace's fluid dynamics approach, the shape of the rings of Saturn. After a six-year break in her scientific career, she published these

results and resumed her research in mathematical physics, primarily optics and mechanics. The problem that made her famous was the motion of a rigid body about a fixed point, which was the subject of the 1888 Prix Bordin competition of the French Academy of Sciences. Her solution, the greatest contribution to the problem since Lagrange and Poisson, earned the prize with special distinction. It also led to her election as a corresponding member of the Russian Academy of Sciences and a permanent appointment at the University of Stockholm.

Although Kovalevsky is best known for her mathematics, none of the present books is a typical biography of a scientist. They all acknowledge those who most influenced her and furthered her career, notably Karl Weierstrass and Gosta Mittag-Leffler, but treat her achievements and impact on contemporary science as distinctly minor themes. What, then, is the point of three books by and about Kovalevsky? Why has she suddenly attracted attention? Our authors' answer is that they have "discovered" a fascinating woman who happened to be a mathematician.

At age 18, Sophia entered into a platonic marriage with a sympathetic would-be paleontologist, Vladimir Kovalevsky, in order to study abroad with her parents' approval. Although European universities, like those in Russia, were then officially closed to women, Kovalevsky managed to audit courses in Heidelberg, study privately with Weierstrass in Berlin, and obtain a doctorate *in absentia* from Göttingen. She returned to Russia and a real family life with Vladimir. About the time she regained interest in her research, her husband committed suicide on the brink of a business scandal and left Sophia with large debts.

The worst fears of the conservative university authorities were then realized. Having earned a degree and established a reputation for her research, a woman wanted a teaching position in one of their institutions. Even after Kovalevsky was honored in other countries, the Secretary of the Russian Academy wrote that "since access to teaching in our universities is completely closed to women, whatever their capabilities and knowledge, in our homeland there is no position for Mme. Kovalevskaia..." (quoted by Koblitz, page 222). The Stockholm position, which carried no salary for the first year and was not permanent for another five, was the only appointment she ever received. The ingenuity and persistence with which Kovalevsky confronted obstacles throughout her career would alone make a good story. In addition, we meet her radical relatives and friends, follow her other career as a writer of literature and criticism, and learn about the political and intellectual climate of Russia and Europe at the end of the last century.

The major portion of *A Russian Childhood* is Beatrice Stillman's translation of a 1974 Russian edition of Kovalevsky's *Memories of Childhood*, first published in 1889. This well-written account by the second child of an aristocratic family describes her early education in their rural home and the influence of two uncles in arousing her scientific curiosity. There are hints of the interest but not of the talent she would eventually demonstrate for mathematics. The main character, in fact, is not Sophia but her adored older sister Anyuta. These reminiscences conclude with Fyodor Dostoevsky's unsuccessful courtship of Anyuta, an aspiring writer, during the family's annual pilgrimage to St. Petersburg society when Sophia was 15.

Although she never wrote a planned sequel to *Memories*, Kovalevsky did write a number of essays, plays, poems, and novellas, mostly with political content. *A Russian Childhood* contains the only recent translations of her writing into English. In addition to her *Memories*, it includes an affectionate biographic introduction (45 pages) by the translator and editor, "An Autobiographical Sketch" (16 pages) covering Kovalevsky's student and professional career, and an article (20 pages) on her mathematics by the Academician P. Y. Polubarinova-Kochina. Numerous notes provide commentary and references; these are especially important since, as Stillman points out, Kovalevsky's memory is sometimes at odds with such records as her mother's diary. The volume is a fragmented but entertaining collection.

Noting that "no adequate biography has appeared" in any language, Don H. Kennedy proposes in his Foreword to *Little Sparrow* to write about "an unusual woman who happens to have a secure place in the history of science as she does in Russian

literature" and to correct the biases that deprived her of recognition. The goals sound worthy enough if somewhat overblown: Kovalevsky is surely a minor figure in Russian literature.

In any case, Kennedy fails to establish this point of view in the book itself. To start, the title hardly suggests an interesting intellectual; the nickname "Little Sparrow" was used to indicate Sophia's small size and lively nature as a child. And in so far as this book has a focus, it is Kovalevsky's private life. Kennedy spares the reader no details, no matter how trivial, from his limited collection of sources, giving a somewhat disorganized and unbalanced picture. For example, Kennedy says relatively little about Weierstrass, who destroyed Kovalevsky's letters after her death, yet he describes her quarrels and (purported) trysts with two men whose letters have survived. He gives short shrift to her literary career, confusing in the process two novellas whose Russian titles are the feminine and masculine forms of *The Nihilist*. (Stillman apparently made the same mistake.) We should at least be grateful that Kennedy avoids Kovalevsky's mathematics as much as he does; his description of her approach to the Bordin Prize problem muddles it beyond recognition.

Kennedy is neither a historian nor a scientist--nor, apparently, a writer. His literary style consists of extensive quotation, some speculation, little integration, and no evaluation. Comparing his work with *A Russian Childhood*, we see that he appropriates ideas as well as words. With scanty basis he attributes feelings, opinions and motives to Kovalevsky and those around her (that he labels "supposedly," "probably," and even "doubtless"). Kennedy admittedly knows no Russian and relied on his wife for translations. He seems not to have used the archives in Sweden and the Soviet Union, where much of the important material resides. There are no footnotes, and the bibliography is notable for its careless and confusing entries. More seriously, Kennedy provides no assessment of the reliability of his sources, a large number of which are secondary. Far from guaranteeing an accurate account, his reporting method perpetuates old myths and introduces new errors. But he does cover much ground, and readers unfamiliar with its story and unconcerned with its failings may find this biography acceptable.

In contrast, Ann Hibner Koblitz' *A Convergence of Lives* is a biography worthy of its subject and respectful of its reader. In addition to the facts of Kovalevsky's life, several important political themes are coherently and convincingly developed:

- Kovalevsky consistently held the idealistic beliefs of the early Nihilist movement, which inspired her unconventional lifestyle and bolstered her determination to succeed on her own terms. Her lifelong devotion to her more radical associates jeopardized her life in the Paris commune of 1871, her position in Stockholm, and probably her future in Russia. The evidence contradicts Kennedy's charge that she adopted the political sympathies of her latest friends.
- A champion of education for women, Kovalevsky faced discrimination from conservative university administrators, academicians and faculty in other fields. She was largely respected and honored by mathematicians outside her native land.
- Her Russian colleagues, who never allowed her to address their Academy, were motivated by more than political and social conservatism; they mistrusted foreign scholarship, particularly the "German tendency" in science. The Jena-trained Vladimir Kovalevsky had encountered such bias when he sought a position in Russia, and the Weierstrass school of analysis was especially controversial. We cannot know if the Academy could have continued to deny her full membership (and its salary) if she had lived longer.

Two themes that the book's title suggests did not materialize. First, Kovalevsky did not share a *salon* with the leading intellectuals of her day. While she met many luminaries through mutual acquaintances, her interaction with the most famous was inconsequential. Second, as Koblitz herself argues, Kovalevsky may have been a radical who admired and befriended intellectuals of the revolutionary *émigré* community, but she was hardly a revolutionary herself. Who chose the subtitle of this book?

Indulging in the "psychological theorizing" for which she criticizes Stillman, Koblitz writes, "In some sense, it is a pity that there was no sexual relationship between Kovalevsky and Weierstrass" (page 116). Far from proving her point, Koblitz' own evidence argues that a liaison would have been stormy and would have endangered a friendship that was important to both of them. Fortunately, Koblitz rarely commits such offenses.

Koblitz' understanding of Russian and European social, political and intellectual history permeates this enjoyable book, and her analysis and conclusions are particularly enlightening. She points out, for example, how Kovalevsky's scientific legacy exceeds the theorems she proved and the problems she solved. Not Weierstrass' most creative student, she was quick to understand, persistent, and a gifted expositor. She demonstrated the power of methods that remain useful today. Her correspondence and visits with mathematicians in France (Charles Hermite, Henri Poincaré) and Russia (P. L. Chebyshev and others) as well as Germany and Sweden provided a significant conduit for ideas, especially between Russia and the West.

The story of Sophia Kovalevsky, very *au courant* in feminist scientific circles since the appearance of *A Russian Childhood*, deserves a wider audience. Be assured that in *Convergence of Lives*, the feminist Koblitz has avoided using her for political ends. It is the somewhat shoddy *Little Sparrow* that exploits Kovalevsky's popularity with the women's movement.

WOMEN AND MATHEMATICS

Last issue contained information about *Women and Mathematics* edited by Chipman, Brush, and Wilson. A special price has been established for individuals who prepay their order and submit it directly to the publisher (Lawrence Erlbaum Associates, Inc., Publishers, Suite 102, 365 Broadway, Hillsdale, NJ 07642). That price is $29.95 (rather than $39.95), which includes postage and handling.

A VISIT WITH KURT MAHLER

by Carole B. Lacampagne, Associate Professor, The University of Michigan - Flint

One of the most delightful aspects of my trip to Australia last "winter" was a visit with Kurt Mahler. Professor Mahler had invited us to come to the Institute of Advanced Studies, Australian National University, and to hear his lecture "On the integers with digits 0 or 1." When we arrived in Canberra the evening before the lecture, we gotthe sad news that Professor Mahler was in the hospital. But as I was soon to learn, health problems do not deter Professor Mahler from mathematics; he has been plagued with such problems most of his eighty-one years. The next morning Professor Mahler was waiting at the hospital entrance, "paroled" for the day.

During the morning Mahler reminisced about his life-long love affair with mathematics. He received his doctorate from the University of Frankfurt in 1927 and did research at Gottingen from 1925 to 1933. Mahler states, "Of particular relevance to my later research was what I learned from Courant about direct methods in the calculus of variations, and from Emmy Noether about modern algebra and in particular about fields with valuations and p-adic numbers."[1] I was curious about Professor Mahler's impressions of Emmy Noether, and in a letter to me he wrote, "My time as a student of Emmy Noether was over 50 years ago... In general Emmy Noether was not well prepared for her lectures and spoke much too fast. With one hand she wrote on the blackboard, while with the other hand held a very wet sponge for

obliterating what had just been written! However, I once took part in a seminar lecture when she was well prepared, and this lecture was a pleasure to listen to.

"I may add that we, her students, had to pass small examinations at the end of semesters. Although she knew us all, she was quite strict on these occasions. Otherwise she was quite friendly to us all."

Professor Mahler fled Nazi Germany in 1933. At the invitation of Mordell he went to the University of Manchester where he remained until 1963. Then he accepted a position at the Australian National University where he has been ever since, except for four years at Ohio State University.

During his 50 years in mathematics, Professor Mahler has published over 200 papers. He is most pleased with his work on rational approximations of algebraic numbers, transcendence numbers, and the geometry of numbers.

By now it was time for lunch. And armed with reprints of a goodly number of papers for later reading, we followed Professor Mahler down the hall, knocking at doors, and picking up colleagues wishing to join us for lunch. We went to a Chinese restaurant. Mahler is a sinophile, having learned how to read Chinese and enjoying Chinese cooking. The luncheon conversation was lively, ranging from mathematics to politics.

Upon returning from lunch, it was time for Professor Mahler's lecture "On the integers with digits 0 or 1." Professor Mahler is a fine lecturer, clearly defining all terms at the beginning of his talk and proceding in a lively and logical manner with the problem at hand. He proved that the congruence $z \equiv a \pmod{x}$ has either infinitely many or no solutions for z having only digits 0 or 1, base g ($g \geq 3$). Toward the end of the hour, he became tired. Who wouldn't be tired after coming from the hospital to a full day of activity? He completed his lecture sitting down.

After tea, a somewhat tired but still enthusiastic Mahler returned to the hospital, undoubtedly to spend his time there doing mathematics. I enjoyed getting to know Kurt Mahler and am grateful to him for letting me get a glimpse of his interesting life.

[1] Mahler, Kurt, "Fifty Years as a Mathematician," *Journal of Number Theory* 14, 121-155, 1982.

SWE NATIONAL CONVENTION

"Engineering: The Key to Survival" will be the theme of the annual convention for the Society of Women Engineers held June 23-June 30, 1985 in Minneapolis, Minnesota. The Society is a nonprofit educational and technical society dedicated to the advancement of women and minorities in furthering their potential in engineering and science. Tutorials, briefings, technical programs, and tours will cover such topics as genetic engineering, robotics, energy and professional development. For more information contact Glynis Hinschberger, Convention Chair at P.O. Box 9542, Minneapolis, MN 55440 or call 1-612-330-7684.

OL'GA ALEKSANDROVNA LADYZHENSKAYA (ON HER SIXTIETH BIRTHDAY)

By A.D. Aleksandrov, A.P. Oskolkov, N.N. Ural'tseva, L.D. Faddeev. Reprinted from Russian Math. Surveys 38:5 (1983), 171-181 by permission of the London Mathematical Society. Translated by A. Dowker. Thanks to Lee Lorch for bringing this article to our attention.

Ol'ga Aleksandrovna Ladyzhenskaya was born on 7 March 1922 in the Kologriva Kostromka region, the daughter of a teacher of mathematics. Her father Aleksandr

Ivanovich was passionately in love with mathematics and transmitted this love to his pupils. Ol'ga Aleksandrovna's interests developed under his influence and from childhood on she showed a talent for logical thinking. In 1939 she was admitted to the Leningrad Teachers' Training College. For the first two years of the war she taught mathematics to the senior classes of the Kologriva Secondary School. In the autumn of 1943 she enrolled at the University of Moscow from which she graduated in 1947. The scientific atmosphere at the University of Moscow could not have been better suited to the development of her natural gifts. She attended the seminars of Kurosh, Delone, Gel'fand, and Stepanov, the seminar on differential equations conducted by Petrovskii, Sobolev and Tikhonov, and was herself one of the organizers of Petrovskii's junior seminar. For her diploma paper she chose one of the topics suggested by Petrovskii: to find exact uniqueness classes for the equation $u_t + u_{xxxx} = 0$. When she found a way of solving it (by going into a complex domain with respect to the parameters of the Fourier transform), she could include general 2b-parabolic equations with coefficients depending on t [1]. This turned out to be useful also in the study of more general objects (systems).

In the autumn of 1947 owing to family circumstances Ladyzhenskaya arrived in Leningrad and became a research student at the University of Leningrad. This was the beginning of her long scientific and personal relationship with Smirnov, which was of great importance to her. Altogether the traditions of the Petersburg-Leningrad school of mathematical physics, with its concentration on difficult and important problems in physics, which were embodied in the work of Lyapunov, Steklov, Gyunter, Smirnov, and Sobolev, and the development of the mathematical apparatus required for their solution were congenial to Ladyzhenskaya and largely determined the direction of her research. She began to work in Smirnov's seminar, where her participation soon became decisive. As the subject of the Ph.D. dissertation she chose the development of the method of finite differences, for the prospects of which Petrovskii had high hopes. The topic also had the approval of her supervisor Sobolev. At the end of 1947 she announced her first results in Leningrad and Moscow: embedding theorems for functions given on condensing grids, a finite-differences analogue of the Fourier method and its use for constructing and analyzing difference schemes for various differential equations with constant coefficients. In subsequent years Fourier analysis was taken up as a tool by many scientists, including computing specialists. Abroad it developed at approximately the same time in Los Alamos under the influence of von Neumann and became known through a paper by O'Brien, Hyman, and Kaplan, which appeared in 1951. Ladyzhenskaya herself used it basically as a first step in the construction of converging difference schemes for equations and systems with variable coefficients. In her Ph.D. thesis, which she submitted in the spring of 1949 ([86], [9], [13]) she included research on the Cauchy problem for general linear and quasilinear hyperbolic systems, constructed explicit and non-explicit converging difference schemes for them and so gave a more "direct" proof of unique solubility compared with Petrovskii's famous paper.

After this, she moved on to studying boundary-value and initial value problems for equations of all classical types. As her basic object she chose equations of the hyperbolic type, as having been least studied. First of all, she gave an exhaustive justification of the classical Fourier method--a problem whose solution had only been given for the case of a single space variable in Steklov's papers ([4], [7], [10]). She based the justification on establishing for various boundary-value problems coercive estimates of the norms $\|u\|_{W_2^l(\Omega)}$, $\Omega \subseteq R^n$, $l > 2$, in terms of the norm $\|u\|_{L_2(\Omega)}$ and the norm $\|\mathcal{L}^{(m)}u\|_{L_2(\Omega)}$ in the case $l=2m$, or the norm $\|\mathcal{L}^{(m)}u\|_{W_2^1}$ in the case $l=2m+1$ (here $\mathcal{L}^{(m)}$ is the m-iteration of the second order elliptic operator . These estimates played an important role in the investigation of many problems for differential operators (among them spectral operators). In particular, with their help she gave a precise description of the domain of definition of the closure in $L_2(\Omega)$ of elliptic and parabolic operators under classical boundary conditions [7], a problem that had been raised by Gel'fand in the early 40's. Its solution opened up new possibilities for the penetration of functional analysis into problems of mathematical physics. In her research of

hyperbolic equations of general form she created a new method of studying non-stationary boundary-value problems. With each problem there is connected a whole scale of generalized solutions, in which the "parameter" is the function space W and a generalized solution is defined as an element of W satisfying a "suitable" integral identity. The freedom of choice of W allows one to move the centre of gravity of the investigation between existence theorems and uniqueness theorems. She moved it towards uniqueness theorems, working out direct methods of proof. These her results were summed up in the monograph [12], which was her D.Sc. thesis at the University of Moscow in the spring of 1953 [87]. Following on from this she took the final step in the realization of her program: she proved uniqueness theorems for the generalized solutions in the space $L_2(Q_T)$, $Q_T = \Omega \times (0,T)$, for initial value problems of all basic types, hyperbolic, parabolic, and Schroedinger. The existence of such solutions was obtained "almost as a gift" (from duality arguments), without any approximations [17]. She extended all this to the Cauchy problem for the operator equations

$$\sum_{k=0}^{m} S_k(t) \frac{d^k u}{dt^k} = f(t)$$

with unbounded operators $S_k(t)$, singling out from them classes of abstract parabolic, hyperbolic, and Schroedinger equations ([123], [26]), and showed that initial value problems for the classical types of equations, as well as for many important systems of mathematical physics (the systems of elasticity theory in smooth and discontinuous media, linearized Navier-Stokes systems, Maxwell systems, etc.), are included in these classes [35]. Stationary boundary-value problems for the above equations and systems are also included in the class of abstract elliptic problems, by reducing them to equations of the form $u+Au=F$ with a completely continuous operator A. She performed such reductions with the help of "well" selected function spaces, and she did it with minimal assumptions about the smoothness of all data of the problems and without the use of any analytical representations of their solution.

Precisely this path brought forth a new stage in the study of Navier-Stokes (N-S) equations, beginning with her work in the 50's. She embedded linearized problems for them in the framework of the abstract elliptic and abstract parabolic problems, which she had studied earlier; she reduced non-linear stationary problems in bounded domains to equations of the form $u+Au=F$ with non-linear completely continuous operators A, and she proved their global solubility. With the aid of the latter result she also proved the global solubility of external stationary problems. For non-stationary non-linear boundary-value problems, she proved unique solubility for all $t \geq 0$ in the case of two space variables and on an interval of length $T>0$, depending on the sizes of the norms of the free term and the initial data in the general three-dimensional case (here $T=\infty$ if these norms are less than a certain number). An important role was played here by new a priori estimates of the solutions and new multiplicative inequalities she established. Of the latter we note these:

$$\|u\|^2_{L_4(\Omega)} \leq C_1 \|u\|_{L_2(\Omega)} \|u_x\|_{L_2(\Omega)}, \qquad u \in \overset{\circ}{W}{}^1_2(\Omega),\ \Omega \subset R^2,$$

$$\|u\|^4_{L_4(\Omega)} \leq C_2 \|u_x\|^2_{L_2(\Omega)} \|u\|^2_{L_2(\Omega)},$$

and

$$\|u\|_{L_3(\Omega)} \leq C_3 \|u_x\|^{3/2}_{L_2(\Omega)}, \forall u \in \overset{\circ}{W}{}^1_2(\Omega),\ \Omega \subset R^3,$$

where C_i are constants independent of u and Ω. These and other results on N-S equations formed the basis of her monograph [53], which was translated into many languages and exerted a great influence on subsequent research.

She constructed the first converging difference schemes for two-dimensional and three-dimensional Navier-Stokes equations; later she also analyzed schemes of

fractional steps (see [76], [113], etc.). For many years she expounded the idea that in the three-dimensional situation for large Reynolds numbers, the Navier-Stokes equations do not give a complete deterministic description of the dynamics and need either modernization or a supplementary principle of choice (one of the serious arguments for this is the non-uniqueness that she established in the class of weak Hopf solutions ([108]). In the paper [84] (see also [100], [113]), she proposed two types of modernization and proved for them unique global solubility of boundary-value and initial value problems; and the paper [136], which contains the proof of the global solubility of the Cauchy problem for the statistical Hopf equation, was directed to a search for a principle of choice. She attracted her students, among them Solonnikov, Golovkin, Rivkind, to the study of problems in hydrodynamics. Jointly with Solonnikov she wrote a number of important papers: on the solubility of initial value problems for equations in magnetohydrodynamics [43], [50] and equations of viscous incompressible fluids [132], on the theory of stability in hydrodynamic problems [128], and on the study of boundary-value problems for N-S equations in domains with non-compact boundaries ([137], [143], [149], etc.). They showed that for domains with more than one passage to infinity the specification of set boundary-value and initial value conditions is insufficient--they must be supplemented by a specification of the dispersal of fluids (or any other functionals) through all exits except one. Such problems are more complicated than those considered above, especially when there are "insufficiently wide" exits, because in these cases the flow has unbounded energy dissipation.

We mention another important contribution of fundamental significance that she made to the study of problems of dissipative type. In the paper [124] she proved that all solutions of initial value problems for two-dimensional N-S equations with stationary external forces approach a compact set $\mathfrak{M}$ as $t\to+\infty$. On this set the problem being studied gives rise to a one-parameter group V_t, $t\in R^1$, and the complete trajectories $v(\cdot,t) = V_t(v(\cdot,0))$, $t\in R^1$, corresponding to it are determined by their projections to some Euclidean space R^N whose dimension is dictated by the Reynolds number. In the paper [148] analogous results are established for one of the modifications of the three-dimensional Navier-Stokes equations, and in [160] and [161], majorants are calculated for the Hausdorff dimensions of $\mathfrak{M}$. She holds the view that the sets $\mathfrak{M}$ must be the basic object of study in the theory of turbulence. The methods she developed for the study of the Navier-Stokes equations and the results she obtained by means of them extend to many other dissipation problems, among them operator equations of parabolic type, as she, her students, and other writers demonstrated.

Yet another field in the theory of partial differential equations is indebted to a significant extent to her achievements. We are talking of boundary-value problems for quasilinear elliptic and parabolic equations. She turned to this topic in the mid-50's. At that time she had obtained a priori estimates for the maxima of the moduli of the gradients of the solutions in many-dimensional problems ([24], [40]). Subsequent work on these problems was completed by her and her student N.N. Ural'tseva. Moving on from [24] and using some important arguments of Di Georgi, they worked out new strong methods of obtaining estimates and studying the smoothness of solutions for a wide class of linear and quasilinear equations and systems of elliptic and parabolic types. As a result, a very complete theory of the solubility of boundary-value problems for uniformly parabolic and uniformly elliptic quasilinear second-order equations was created and a study was made of the smoothness of generalized solutions ([52]-[60]). In particular, it follows from it that for regular variational problems the smoothness of solutions is determined exclusively by the smoothness of the data of the problem. Thus, definitive results in a certain sense were obtained for Hilbert's 19th problem (for one second-order equation). These methods turned out to be effective also in the study of certain classes of non-uniformly elliptic equations, in particular, Euler equations for functionals of surface area type. In [153] and [158] Ladyzhenskaya and Ural'tseva generalized the recent results of Krylov and estimated the Hölder constant for solutions of quasilinear elliptic and parabolic second-order equations of general

form, which in combination with their earlier results made it possible to bring to the analysis of global solubility the same degree of completeness as for equations of divergent form.

Above we have conventionally divided Ladyzhenskaya´s work into four large cycles. But she has also written many papers on other areas of mathematics, among them papers on a small parameter, on diffraction problems, on the construction of modifications to the Galerkin method, on the foundations of the principle of limiting amplitude, on one-dimensional equations of gasdynamics, on the spectral model of Friedrichs, on the Euler equations, on a problem with a free surface over a sphere, etc. Of her recent work we note the interesting paper [142] on collapses in non-linear problems, which eliminates, in particular, a number of candidates for complete integrability, the paper [159] on global unique solubility of the Cauchy problems for one-dimensional systems of the theory of chiral fields, and her most recent joint paper [162] with Kapitanskii on the foundations of the "Coleman principle" for finding symmetric solutions of many-dimensional variation problems in field theory. Her books have had a great influence on the development of the corresponding areas of mathematics. Apart from the monographs [12] and [53] mentioned above the fundamental works [67], [81], [127] on non-linear equations of elliptic and parabolic type were written by her (jointly with Ural´tseva and Solonnikov). Her lectures on boundary-value problems [126] are widely known.

Ol´ga Aleksandrova Ladyzhenskaya´s services to the education of young mathematicians have been great. For many years she has given excellent lectures to students. Her Ph.D.´s are Faddeev, Ural´tseva, and Buslayev; among her students are Solonnikov, the prematurely deceased Golovkin, Ivanov, Oskol´kov, Rivkind, and many others. The Smirnov seminar which she conducts has been for many years a centre of attraction for all Leningrad specialists in mathematical physics.

Her enthusiasm for mathematics, her concentration of her interests on it, and her sociable temperament are infectious. She loves art, poetry, and music--hence her friendship with creative artists. It is impossible not to mention her personal and feminine charm, her sympathy and selfless devotion to her friends. Her firmness of character and her principles are characteristically combined with kindness and gentleness towards people and readiness to help.

Her merits as a mathematician have won wide repute and recognition both in the Soviet Union and abroad. In 1954 she was awarded the first Zhdanov prize of the University of Leningrad; she again won first Zhdanov prize of the University of Leningrad in 1961; and a Chebyshev Prize of the Academy of Sciences of the USSR and a State Prize of the USSR in 1969 (the three latter jointly with Ural´tseva). In 1981 she was elected a Corresponding Member of the Academy of Sciences of the USSR. Since 1954 she has worked in the Leningrad section of the Steklov Mathematical Institute, where she is in charge of the Mathematical Physics Laboratory.

Ol´ga Aleksandrovna Ladyzhenskaya continues to work untiringly and enthusiastically at her beloved mathematics. We wish her health and happiness and have no doubt of her future successes.

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142. On the origin of collapses in quasilinear equations of parabolic and hyperbolic type, Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov(LOMI) 69(1977), 77-102, 274 (with V.A. Kalantarov). MR 58 #29269. =J. Soviet Math. 19(1978), 53-70.
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151. Mathematical problems of the dynamics of a viscous incompressible fluid (Japanese translation of the second Russian ed.), 1979.
152. On estimates of the Hölder norms for solutions of quasilinear elliptic equations of non-divergent form, Uspekhi Mat. Nauk 35:4(1980), 144-145 (with N.N. Ural'tseva).
153. Estimate of the Hölder norm of solutions of second-order elliptic equations of general form, Zap. Nauchn. Sem. Otdel. Mat. Inst. Steklov(LOMI) 96(1980), 161-168 (with N.N. Ural'tseva). MR 81k:35061. =J. Soviet Math. 21(1983), 762-768.
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157. Estimates of the solutions of quasilinear parabolic equations of non-divergent form, Uspekhi Mat. Nauk 36:4(1981), 230 (with N.N. Ural'tseva).
158. Estimates of the Hölder constants for bounded solutions of second-order quasilinear parabolic equations of non-divergent form, LOMI Preprint, E-11-81, 1981 (with N.N. Ural'tseva).
159. On the unique solubility of the Cauchy problem for equations of two-dimensional relativistic chiral fields taking values in complete Riemannian manifolds, Zap. Nauchn. Sem. Leningrad. Otdel.

Mat. Inst. Steklov (LOMI) 110(1981), 81-94 (with V.I. Shulov). MR 83h:81051.

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162. On the Coleman principle of the discovery of stationary points of invariant functionals, Zap. Nauchn. Sem. Leningrad. Otdel. Mat. Inst. Steklov(LOMI) 127(1983), 84-102 (with L.B. Kapitanskii).

BOSTON AREA MEETING
AWM Joint Meeting with AWIS

Date: April 9, 1985

Speaker: Mary W. Gray

Topic: Statistics and the Law

Place: Smithsonian Astrophysical Observatory
Harvard University, Cambridge, MA 02138

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OF POSSIBLE INTEREST

Women in Particular: An Index to American Women by Kali Herman. A thoroughly indexed guide to biographical information about prominent American women. Oryx Press, 2214 North Central at Encanto, Phoenix, AZ 85004.

Women's Studies. St. Martin's Press, Scholarly & Reference Division, 175 Fifth Ave., NY, NY 10010.

Essential titles in women's studies. Beacon Press, 25 Beacon St., Boston, MA 02108.

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

Job Ads

Institutional members of AWM receive two free ads per year. All other ads are $10 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 AL, University. Dept of Mathematics, P.O.Box 1416, University, AL 35486. Martyn Dixon, Chmn., Math Search Committee. Assoc. Professorship (and possibly 2) in applied math with excellent records in research teaching. Will expect candidates to help develop research group & graduate programs in applied math. Send inquiries & applications to Chmn., Math Search Committee.

Loyola Marymount University. Dept of Math, Los Angeles, CA 90045. Tenure track asst professorship, Fall, 1985. Must teach a wide variety of undergraduate courses. Maximum teaching load is 12 hours. Dept has master's program in applied math. Required: PhD in math. Send resume & 3 letters of recommendation to Dennis G. Zill at above address.

San Francisco State University. Dept of Math, 1600 Holloway Ave, San Francisco, CA 94132. Newman Fisher, Chair. Two tenure track asst professorships in Math Statistics Fall, 1985. Required: Ph.D. & demonstrated competence in teaching & research. Must be U.S. citizen or permanent resident. Teaching load 12 hrs per week. Salary: $22,000 to $27,000. By 3/15/85 send vita, graduate transcripts & 3 letters of recommendation to Chair.

University of CA, Berkeley. Dept of Stat, Berkeley, CA 94720. Rudy Beran, Chmn. Visiting Lecturer with annual contract renewable for 3 years to teach large beginning stat. courses & train graduate student teaching assistants. Want outstanding individual with demonstrated commitment to intellectual quality in teaching. Experience required. Salary negotiable in range of $27,468 to $39,000, depending on qualifications. Some possibility of conversion to permanent position. By 5/15/85 send inquiries to Chmn.

Trinity College. Dept of Math, Hartford, CT 06106. Ralph E. Walde, Chmn. Tenure track asst professorship 9/1985. Required: PhD in one of math sciences; demonstrated excellence in teaching, especially at first & second year levels; specialty in one of following areas: combinatorics, graph theory, numerical analysis, theory of computation, analysis of algorithms, or modeling; desire to teach in two of above areas; familiarity with computing. Teaching load: 3 courses per semester. By 2/15/85 send detailed curriculum vitae, academic record & at least 3 letters of reference to Chmn.

University of New Haven. Dept of Math, West Haven, CT 06516. B. K. Sachdeva, Chairperson. Full time tenure track asst/assoc professorship 9/1/85. Required: PhD in math with specialization in applied math preferred; demonstrated excellence in teaching & potential for research. Teaching load 24 credit hours per academic year. Opportunities to participate in development of courses, programs & research activity. Salary & rank commensurate with qualifications. By 3/15/85 send resume, transcripts & 3 letters of reference to Chairperson.

Florida State University. Dept of Math, Tallahassee, FL 32306-3027. Ralph McWilliams, Chmn. Three instructorships 8/2/85 subject to renewal not to exceed total of 4 years. Salary competitive. Required: master's degree in math plus one year of full-time college or university teaching experience. Send resume to Chmn. Application deadline: March 8 or until filled.

Kansas State University. Dept of Mathematics, Manhattan, KS. R. Richard Summerhill, Head. Several temporary (9-month) asst professorships 8/15/85. Salary commensurate with qualifications. Will consider all fields of math. Strong interest in teaching and research expected. Required: PhD or equivalent. By 4/1/85 contact Head.

Northeastern IL University. Dept of Math, Chicago, IL 60625. Dr. Barry Dayton, Chairperson. Tenure track asst/assoc professorship. Candidates must be able to provide leadership in Dept in area of scientific computing or operations research & must direct Master's Theses in this area. Required: at least a master's degree & 30 hours toward PhD in an appropriate field. Prefer candidates with PhD & PhD required for tenure. Salary $20,000 - $30,000 for 10 mo. academic year. By 3/20/85 send resume & 3 letters of recommendation to Chairperson.

University of Northern Iowa. Dept of Math & Comp Sci, Cedar Falls, IA 50614. Dr. David Duncan, Head. Tenure track asst/assoc professorship in comp sci. MA/MS in comp sci required; doctorate in comp sci or related field preferred. Salary & benefits competitive. Closing date 4/1/85. For complete announcement, contact Dept. Head at above address.

Hampshire College, Amherst, MA 01002. Prof. D. C. Kelly, Box SS.
(1) Two year faculty asst professorship in math in School of Natural Science fall,1985. College is committed to excellence in classroom & tutorial teaching. Normal teaching load: 2 courses per term & supervision of student independent study. Hampshire is an experimenting liberal arts college of approximately 1000 students, located in Amherst, MA and allied with Amherst, Smith, and Mt. Holyoke Colleges and the University of MA in a unique academic consortium. The setting provides a flexible small-college teaching atmosphere, coupled with the stimuli of nearby research depts in math and active experiments in mathematics education. Sensitivity to the needs of women math students and to the role of women in the mathematical professions is a major concern of the search committee. Send resume, statement of research and teaching interests, and 3 letters of reference by 3/17/85. (2) Summer Studies in Math. Now in its 13th year. Intensive 6 week program for high ability high school students. Invite applications from qualified students. Please encourage talented students to consider this program & feel free to request additional information.

University of Lowell. Dept of Math, Lowell, MA 01854. Prof. Alan Doerr, Personnel Comm. Several tenure track positions 1985-86. All areas considered but prefer statistics & applied math. Required: PhD, strong research credentials, evidence of active interest in quality teaching & U.S. citizenship or permanent resident status. Rank & salary commensurate with experience. Send vita, statement of current research & 3 letters of recommendation to Prof. Doerr.

Worcester Polytechnic Institute. Dept of Math Sciences, 100 Institute Rd, Worcester, MA 01609. Bruce McQuarrie, Chair. Tenure track asst professorship in stat/applied probability. Required: strong commitment to scholarship, excellent teaching & interest in statistical consulting. Send resume to Chair.

Michigan Technological University. Dept of Math & Comp Sciences, Houghton, MI 49931. Dr. Deborah Frank Lockhart, Acting Head. Tenure track & visiting positions in math, statistics & comp sci available 9/1985. Required: excellent teaching & commitment to research. Some 3 year instructorships may be open. Apply to Acting Head.

Michigan Technological University. Dept of Math & Comp Sciences, Houghton, MI 49931. Position of Department Head. Required: well-established reputation in research & special interest in applied math, statistics or computer science. Commitment to active research and effective teaching is necessary. Send resume & have 3 letters of recommendation sent to MACS Search Committee at above address.

Mankato State University. Dept of Math, Mankato, MN 56001. F.T. Hannick, Chairperson. Tenure track position(s) fall, 1985 in Math/Math Education. Want PhD's in all areas of math, especially applied math & math education to apply. Duties: teach math, supervise masters level graduate students & conduct modest research. Salary at least $23,000 depending on qualifications. Send application, vita & 3 letters of reference to Chairperson. Deadline 2/15/85 or until filled.

Moorhead State University. Math Dept, Moorhead, MN 56560. Dr. Milton Legg, Chmn. Tenure track asst professorship 9/1985. Required: PhD in math or math education. Desirable: some background in stat, applied math or math education & evidence of successful college teaching. Application deadline: 3/29/85. Contact Chmn for application materials.

College of St. Teresa. Winona, MN 55987. Tenure track appt in comp sci & math 9/1985. Required: PhD preferred; master's degree in comp sci or math required; ability to teach upper division courses in comp sci & math. Willingness to work with students on CST computer equipment (DEC PDP/11 and IBM PCs). Send resume to Dr. Susan Smith Batell, Dean of Academic Affairs.

New Mexico State University. Dept of Math Sciences, Las Cruces, NM 88003. Carol L. Walker, Head. Visiting position(s) & possible tenure track position(s) in math, numerical analysis or stat, computer vision. Start 8/26/85. Salary for 85/86 $21,000 or higher, dependent upon rank, qualifications & experience. PhD (or equivalent) & strong commitment to teaching & research essential. Positions filled as openings occur. Send vita & have 3 letters of reference sent to Head.

Hamilton College. Dept of Math & Comp Sci, Clinton, NY 13323. Anne L. Ludington, Chair. Two tenure track positions 9/1985. One asst professorship (PhD required); one instructorship (level for A.B.D.). Six courses per year. Excellent teaching & continued professional activity expected. General computer science training required. Send vitae & 3 letters of recommendation to Chair.

Herbert H. Lehman College (CUNY). Dept of Math & Comp Sci, Bronx, NY 10468. Prof. Robert Feinerman, Chmn. Tenure track positions anticipated. Need applicants who can participate in both comp sci programs and math programs. Required: PhD & strong commitment to teaching & research. Rank & salary commensurate with qualifications. Send resume to Chmn.

Rensselaer Polytechnic Inst. Dept of Math Sciences, Troy, NY 12180. R.P.I's Dept of Math Sciences is searching for Chairperson of Dept. Required: experience in both research in applied math & academic administration. Send vitae & names of 3 references to Prof. M. Slemrod at above address.

Rensselaer Polytechnic Institute. Dept of Math Sciences, Troy, NY 12180. J.G.Ecker, Acting Chmn. Anticipate tenure-track openings at all levels 9/1985. PhD and strong research potential in applied mathematics and/or scientific computation required for junior-level appts and demonstrated record in one of these fields for senior-level appts. Teaching 6 to 7 hours/week per semester. Also anticipate two or three visiting & postdoctoral appts - all levels.

Bryn Mawr College. Dept of Math, Bryn Mawr, PA 19019. F. Cunningham, Jr., Chmn. One year asst professorship, possibly renewable in one year. Candidate must have or be close to completion of PhD & be committed to both teaching & research. By 3/15/85 send materials to Chmn.

Drexel University. Dept of Math & Computer Science, Philadelphia, PA 19104. Dr. Loren Argabright, Head. Several tenure track openings 1985/86. Areas of special interest include classical & modern analysis, differential equations, special functions, applied statistics & stochastic modeling, numerical analysis, operations research, scientific computing, computer graphics, operating systems, languages & compilers, computer architecture, database systems, & artificial intelligence. Send resume & names of 3 references to Head.

Pennsylvania State University, Capitol Campus. Middletown, PA 17057. Tenure track faculty position in Computer Science 8/18/85. Rank & salary dependent on qualifications. Preferred: PhD in comp sci or related area. Required: potential for growth as a computer scientist. Duties: undergraduate teaching & research. Send resume, transcripts & references to Dr. Ruth Leventhal, Provost/Dean, Box AWM, at above address. Position open until filled.

Rhode Island College. Math & Computer Sci. Dept, 600 Mt. Pleasant Ave, Providence, RI 02908-2340. (1) Three year faculty position for PhDs in math. Will consider applicants with substantial progress made toward PhD & strong background in comp sci and/or stat. Successful teaching experience preferred. Duties: teaching math, stat and/or comp sci & conducting research in one of them. Salary competitive & commensurate with qualifications. Attractive fringe benefits. Apply by 4/22/85. (2) Looking for person with PhD in comp sci to teach advanced level comp sci majors & conduct research in this or related area. Tenure line, fall, 1985. Will consider PhD in math with strong comp sci background. Candidates with master's degree in comp sci & at least one year add'l work in comp sci will be considered for 3 year (renewable) term appt. Salary competitive depending on qualifications. Attractive fringe benefits. Summer employment available. Computer resources include IBM 4341 MOD 11VM, DEC PDP 11/70, DEC VAX, & several micro labs supplied with IBM PCs, APPLEs & RAINBOWs. Apply by 4/15/85. For both positions send application, resume & 3 current letters of reference to Office of Personnel Services, attn: Chair, Math & Comp Sci Dept.

University of Texas, Austin. Math Dept, Austin, TX 78712. Three asst professorships & six instructorships Fall, 1985. All candidates should have PhD. Asst professor candidates should have strong research records, & instructor candidates should have research interests in areas in which Dept has strength. Early rounds of decisions will be made in mid-January, followed by later rounds. Send inquiries to Peter A. Tomas at above address.

George Mason University. Dept of Math Sciences, 4400 Univ. Dr., Fairfax, VA 22030. Dr. Stephen Saperstone, Acting Chmn. Tenure track asst professorship(s) 9/1/85. Required: PhD in a math discipline, strong research potential & teaching ability. Will consider candidates in both areas of pure & applied math. Send vita & have 3 letters of recommendation sent to Math Search Committee.

Beloit College. Dept of Math & Comp Sci., Beloit, WI 53511. Philip Straffin, Chair. Tenure track asst professorship,fall, 1985. PhD in math or comp sci & strong interest in undergraduate teaching. Prefer candidates who can teach some computer courses. Send letter & resume by 3/31/85 & have 3 letters of reference & transcripts forwarded to Chair.

University of Wisconsin, Platteville. Dept of Math, Platteville, WI 53818. Lectureship (renewable for up to 5 years) 8/21/85. Position description: broad undergraduate teaching responsibilities in math, primarily at freshman-sophomore level. Salary $18,500 - $22,000+ depending on qualifications & experience. Required: master's degree in math & demonstrated excellence in teaching; prefer specialization in applied math or analysis. By 4/1/85 send application to Dr. Kenneth R. Kundert, Chmn, Dept of Math.

Late Arrival

Glassboro State College, Glassboro, NJ 08028
(1) Assoc professorship (tenure track) 9/1/85. 10 months. Salary, $25,941. Teach advanced undergraduate courses in comp sci. Prefer candidates who can teach operating systems, compiler theory & programming languages. Experience with networks desirable. PhD & teaching experience required. (2) Asst. professorship in math (tenure track) 9/1/85. Ten months. Prefer candidates in fields of stat & applied math. Salary $21,341. PhD or ABD in math & teaching experience required. (3) Asst professorship in Math/Comp Sci (tenure track) 9/1/85. Ten months. Salary $21,341. Teach undergraduate math & computer courses. Prefer candidates who can teach math & data structures. Send resumes by 3/30-4/1/85 to William C. Morris, Acting Vice President for Academic Affairs, Bole Adm. Bldg., Glassboro State College, Glassboro, NJ 08028. 1 (609) 863-5318.

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