

Gazette

A Newsletter of the Committee on the Status of Women in Physics of the American Physical Society

The editor for this issue is Ken Lyons;
assistant editor is Amy Halsted.

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A NOTE FROM THE EDITOR

An important highlight of the current issue is the roster enrollment form on the loose center sheet. This enrollment form is for use by ALL women physicists. If you know of women not enrolled, please give them a copy of this form. Note that it has two sides! Also, if you have moved, or if your information has otherwise changed, please use the form to give us an update.

This information is important. In an accompanying article Amy Halsted has described the uses of the roster and summarized the frequency of its use this last year. The more complete it is, the more effective those uses will be. The information in the roster is also going to serve as a starting point for the research being done by Sarah Bolton on women in physics during the coming year (see related article).

Finally, please remember that the members of the CSWP are rotating as editors of the *Gazette*. In serving as editors, we are largely dependent upon the contributions you, the readers, make. If any of you know of a news item you'd like included, or have an article you'd like to suggest (or better yet, to write), please send your suggestions, etc., to Amy Halsted at APS headquarters, 335 East 45 St., New York, NY 10017. She will then forward the information to the appropriate CSWP member.

Ken Lyons, CSWP

OUR NEW NAMEPLATE

Thanks are due to Georgina Guagenti of AIP's Woodbury, Long Island office for her many contributions to the *CSWP Gazette*, and especially for the attractive new nameplate. Somehow

Georgina takes the material we send her and turns it into what you see here, with skill, expediency, and good humor. On her own initiative, Georgina came up with the eye-catching new format for our masthead, and we thank her for it.

WOMEN PHYSICISTS IN THE U.S.: THE CAREER INFLUENCE OF MARITAL STATUS

by Sylvia F. Fava and
Kathy Deierlein

(Editor's note: This article is excerpted from a longer one by the authors shown above, which will be appearing in extended form in *Gender and Society* in the near future. The entire article discusses the larger issue of career paths in general for women physicists. In this excerpt, we concentrate on data with regard to the influence of marital status. Those interested in receiving reprints of the full article when they become available should send their names and addresses to Prof. Sylvia F. Fava, Ph.D. Program in Sociology, The Graduate Center, City University of New York, 33 West 42nd St., New York, NY 10036.)

Physics is a very non-traditional occupation for women, and remains so to a considerable degree even today. In an effort to understand some of the dynamics of this situation, we have utilized the CSWP Roster* in a study of

* We acknowledge the interest and cooperation of the CSWP, without which this study could not have gone forward. Special thanks to Dr. Pam Surko, Dr. Enid Sichel, Dr. Mary Gaillard, and Dr. Irene Engle, former officers of the CSWP. Dr. Miriam Forman, current APS Liaison to the CSWP, and Amy Halsted of the APS staff also assisted us. Dr. Rosalie Genovese, formerly of the Center for the Study of Women and Society, CUNY, was instrumental in formulating the Questionnaire, and Dr. Beverly Porter of the AIP was helpful at many points. Dr. Avigdor M. Ronn and Dr. Lindsey Churchill, both of CUNY, gave extensive technical advice.

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The "CSWP GAZETTE," a quarterly newsletter of the American Physical Society Committee on the Status of Women in Physics (CSWP), is mailed free of charge to all women listed on the computerized "Roster of Women in Physics," all US physics department chairs, and others on request. Because editorial responsibility rotates among CSWP members, please address all correspondence to: "CSWP Gazette," The American Physical Society, 335 East 45 St., New York, NY 10017.

career paths for women physicists. A questionnaire comprised of 14 items was mailed in April 1985 to all names on the roster with U.S. addresses. Of the 986 questionnaires returned (response rate of 44%), 971 were usable. Respondents were anonymous unless they chose otherwise.

Among these physicists, the degree distribution was: B.S., 11%; M.S., 28%; Ph.D., 61%, for a total of 799. The remaining 172 did not answer the question or had not received their degree in physics. A total of 38 subfields were listed, with solid state, astronomy/astrophysics, and elementary particles being the most common. Of this population of 799, 73% were employed full-time, and 12% were students, leaving only 15% divided among those unemployed or employed part-time.

The bulk of the analysis presented here deals only with the 490 who received physics Ph.D. degrees. Although other fields are naturally related, we also recognize that these are fields with their own histories and career niches in regard to women, and therefore worthy of separate consideration.

Careerism among Women Ph.D. Physicists

This cohort of women physics Ph.D.'s are highly trained, committed to physics, and career-oriented. Fully 25% of them obtained degrees from a small group of prestigious universities: UC-Berkeley, MIT, Harvard/Radcliffe, Cornell, and Univ. of Chicago. Seventy-five percent of them would choose physics again as a career, even though some expressed some dissatisfaction with their current position, future prospects, or some aspects of physics itself. They are relatively young, distributed by degree decade as follows: before 1960, 14%; 1960's, 19%; 1970's, 37%; 1980's, 30%.

As the basis for our correlation analyses, we constructed an "Index of Careerism" composed of five items: current employment status, work setting, job title, whether one would choose physics again, and whether one was in the same subfield of physics as the Ph.D. It was found that high scores under this Index were strongly correlated with attainment of the Ph.D.

These results, even from this crude index, suggest that the "selecting out" process for women physicists occurs before the doctorate is attained. This fact points, once again, to the need to examine the "selecting out" process. In fact, once the doctorate is attained, women physicists are, not surprisingly, committed to careers in physics. Significantly, analysis of our Index results showed that it was *not* significantly correlated with marital status. However, marital status does affect career paths, as the final section of this article will discuss.

The "Double Tie" among Women Physicists

Our analysis separates women physicists into three groups of marital status, as shown in Table 1, where a comparison is given to the field of Chemistry,

on a similar basis. The women who are married to physicists, representing nearly half of the Ph.D.'s responding, are "doubly-tied" to physics, by their professional degrees and by their marital partner. The percentages of such a double tie were far lower for those holding masters and BS degrees (28% and 17%, respectively). In our analysis, discussed below, we have searched for effects of this sociological pattern.

Career Paths and Marital Status

We discovered a significant association between marital status and one of the items not included in the Careerism Index, namely, whether the woman Ph.D. physicist had experienced a period of unemployment. An association was found which was significant at the 0.001 level by chi-square analysis. In other words, while *current* employment (which *was* part of the Careerism Index) did not exhibit significant correlation with marital status, unemployment *history* did. At least one period of unemployment was reported by 32% of our Ph.D. group. However, for the three marital groups, the corresponding percentages were: single, 14%; married to non-physicist, 29%; married to physicist, 41%.

To explain why these marital groups differ in their unemployment histories—and especially why those married to other physicists differ in the pattern and level of unemployment—we turned to an analysis of their open-ended comments about the voluntary/involuntary nature of their unemployment and the reasons for unemployment. The three marital groups were evenly divided about whether their unemployment had been voluntary or involuntary. The chi-square did not reach significance, although those married to physicists were somewhat more likely to report a period of involuntary unemployment.

The open-ended comments show major differences in explanations of unemployment among the three groups. Of the non-married women who gave specific reasons, the most frequent by far were that the unemployment was involuntary and occurred because grants had expired or that there were no job opportunities. Among the Ph.D.s mar-

ried to non-physicists the two major types of reasons were related to their marital status. In about equal proportions the women cited child-bearing and child-care (and almost all labeled this as *voluntary* unemployment) or the husband's job location (and almost all labeled this as *involuntary* unemployment). Much the smallest group of reasons cited were career items unrelated to their marital status—expiration of grants, lack of job opportunities, and so on.

For the Ph.D.s married to other physicists, reasons related to child-bearing and child-care and to husband's location (including husband's sabbatical) also occur as the most frequent reasons for period(s) of unemployment—and in about equal proportions. Non-marital career reasons for unemployment (soft money ran out, sluggish job market) are, as with the women married to non-physicists, a distant third.

The fact that the two groups of married women have broadly similar reasons for periods of unemployment should not

lead us to forget that those women married to physicists were significantly more likely to have been unemployed at some period. Thus, both groups of married women voice problems common to dual-career couples: balancing careers with household and especially child-care demands; the constraints of geographic location and relocation; the possibility of "commuter marriage" to maximize two-career advancement; whose career takes precedence. However, among the women married to other physicists, these translate into more frequent periods of unemployment.

Moreover, a sampling of the explanatory comments of their periods of unemployment by the women physicists married to other physicists indicates that there was often a direct and negative effect to being the *woman* in the marriage. Several of the women introduced a dimension into employment/unemployment that we had not anticipated—they held unpaid positions at institutions where their husbands held paid positions. These are themes that are special to the com-

ments of women married to physicists: so-called "nepotism" rules; the nature of physics jobs; maintaining a physics identity separate from the husband's; discrimination against physicist wives. The "post-doc" period is crucial for career advancement and the comments suggest that the special conditions of women married to other physicists are rooted in this period.

End Note

An exploration like ours raises more questions than it answers. We believe we have shown that further study of women in physics is warranted, especially with attention to the contrast in career paths of non-married women, women married to non-physicists, and women married to other physicists. We need both questionnaire and interview data from the women as well as from the men. Our current plan is to proceed on this basis with respondents in the New York metropolitan area. We welcome comments from readers of the *Gazette*.

Table 1. Marital Status among Women Doctoral Physicists and Women Doctoral Chemists, 1985.^(a)

	Physicists			Chemists	
	%	<i>N</i>		%	<i>N</i>
Not married	21	(99)	Not married	26	(594)
Married to non-physicist	30	(146)	Married to non-chemist	37	(834)
Married to physicist	49	(234)	Married to chemist	27	(600)
			Previously married. ^(b)	10	(223)
	100	(479)		100	(2251)

^(a)Data for physicists are from our CSWP survey of 1985. Data for chemists are from the American Chemical Society, *Women Chemists*, 1985.

^(b)The American Chemical Society Survey has a separate marital category, "previously married," which includes divorcees and widows, and does not allocate these on the basis of the profession of the former husband. In our physics survey divorcees and widows were counted on the basis of the profession of their former spouses. Consequently, the proportion "married to other chemists" would be higher if the formerly married were allocated as in our survey of physicists.

COLLOQUIUM SPEAKERS LIST: USE, UTILITY, AND UPDATE

by Ken Lyons

One of the physicists listed on the Colloquium Speakers List (CSL) recently gave a talk at a midwestern college. In response, she received a rather revealing letter from a student. In part, it said:

"I am sure you know how hard it is trying to succeed in a class dominated by males. I have learned that to prove myself, I have to be four times better than the average male to be considered 'equal.' *I enjoy seeing women who have succeeded. It recharges my motivation.*" (italics added)

I hope that seeing this quote will help recharge *your* motivation to make use of the CSL and thereby encourage other students into physics careers that might otherwise never happen.

The CSL was distributed with the last issue of the *Gazette*, along with an enrollment form. In preparation for that listing, an update was performed on all the existing entries. As part of that update, the participants were asked to answer a few simple questions about their experience with the CSL in 1986 and 1987, inclusive. Even given the fact

that most of the responses given were probably based on admittedly hazy memories, the answers were rather revealing in some aspects.

Over 50% of the listed speakers responded to the questions. Of these, 62% have experienced contacts directly related to their CSL listings (an average of 3 in two years), of which about 75% were from colleagues who had no prior knowledge of their work save through the CSL. On average, the responding speakers gave at least one talk each in this period which was attributable to their CSL listing. This number represents about 15% of the total talks (average of 7 per speaker). However, for those giving four talks or less in the two-year period (about 40% of the respondents), the CSL-related talks constituted nearly 30% of the total. The conclusion I draw from this is that the CSL is in fact an effective vehicle for increasing the visibility of women physicists, and that it has a larger effect on the women who are less well established.

Of course, we can always make a good thing better, and now that I have taken responsibility for the list, I hope to be able to do that. One feature which will become visible next spring is that all of the data has been entered into a com-

puter database. Thus, the next time you get a request for an update, you will receive a complete listing of your own database entry, in a concise form which will make it simple for you to perform the necessary updates, without digging out your own coffee-stained copy and hunting for your entries to see if they are indeed current.

Second, it has been brought to my attention that certain areas of physics are not well-contained by the existing categorization used in the list. While I do not want to proliferate the number of categories inordinately, neither should there remain ambiguities which impede its effective use. I already plan to add a category for "Accelerator Physics" in the next incarnation of the CSL. If you have additional suggestions along this line, I'd be happy to hear them.

Finally, included in this issue of the *Gazette* is a listing of the speakers who have signed up since the registration form appeared in April. If any of you wish to sign up but can't find the form (or if you have comments/suggestions), please write to me at AT&T Bell Laboratories, Rm. 1A126, 600 Mountain Ave., Murray Hill, NJ 07974. Copies of the CSL itself should be requested from Amy Halsted at APS headquarters.

COLLOQUIUM SPEAKERS LIST: ADDENDUM

After publication of the enrollment form in the summer *Gazette*, a number of you sent in new or modified registrations for the CSL. Just to keep you up to date, a list of those new entries is given below. In this abbreviated list, no division into physics subfields is given. The geographic area abbreviations are given as in part II of the CSL.

Dr. Lynn R. Cominsky [NW]
Dept. of Physics and Astronomy
Sonoma State Univ.; Rohnert Park, CA 94928.
(707) 664 2655

1. *X-ray binary star systems*
2. *Arms control and disarmament*
3. *How I finally learned physics*
4. *Physics of nuclear bombs and weapons*

Dr. Gail G. Hanson [SW]
Stanford Linear Accelerator, Bin 78
PO Box 4349; Stanford, CA 94305
(415) 926-2510

1. *Physics of the neutral weak vector boson Z⁰*
2. *Physics and detectors at the SSC*
3. *Results from the Mark II detector at the SLAC Linear Collider*

Dr. Cheryl A. Hanzlik [NE]
Edward C. Hanzlik and Co.
917 Gravel Road
Webster, NY 14580
(716) 671-4358

1. *Picosecond fluorescence and biological physics*
2. *Lasers in medicine*
3. *Picosecond fluorescence and medical photochemistry*
4. *Picosecond fluorescence and photosynthesis*

Dr. Ruth Howes [MW]
Department of Physics and Astronomy
Ball State University; Muncie, IN 47306
(317) 285-8868

1. *Verification of arms control agreements*
2. *The physics of nuclear weapons*

Dr. Cynthia Mueller [MW]
Nat'l Center for Atmospheric Research
P.O. Box 3000; Boulder, CO 80307
(303) 497-8805

1. *Use of Doppler radar in short-term weather forecasting*

Dr. Shang-Fen Ren [MW]
Dept. of Physics, 1110 W. Green St.
University of Illinois; Urbana, IL 61801
(217) 244-4246

1. *Anisotropy of optical phonons and interface modes in GaAs-AlAs superlattices*
2. *Orientation dependence of phonons in GaAs-AlAs superlattices*
3. *Study of phonons in GaAs-AlAs superlattices with a rigid-ion model*
4. *Surface phonons for the vacancy-reconstructed model of III-V semiconductor surfaces*

Dr. Janet Sisterson [NE]
Harvard Cyclotron Laboratory
44 Oxford St.; Cambridge, MA 02138
(617) 495-2885

1. *Medical applications of proton beams*

Dr. Virginia Trimble [SW]
UC-Irvine, Physics Dept.; Irvine, CA 92717
Univ of Maryland, Astronomy; College Park, MD 207
(714) 856-6948/(301) 454-5822

1. *Existence and nature of dark matter in the universe*
2. *Supernova: Bigger and better bangs*
3. *A field guide to the binary stars*
4. *Cosmology: Man's place in the universe*
5. *Your lucky stars: An introduction to stellar evolution*

Dr. Barbara L. Whitten [MW]
Physics Department; Colorado College
Colorado Springs, CO 80903
(719) 473-2233 x2579

1. *X-ray lasers and their (potential) applications*
2. *Kinetic studies of soft x-ray lasers*

INTERN TO RESEARCH CAREER PATTERNS OF WOMEN IN PHYSICS

By dint of her persistence and commitment, Sarah Bolton has obtained a year-long internship with the American Institute of Physics and APS to design and conduct research into career patterns of women in physics. As the only woman physics major in her 1988 class at Brown University, Sarah has firsthand experience of the difficulties and rewards. She tutored freshman women in physics, researched the available histories and autobiographies of women in the field, and approached the CSWP last spring about an internship.

In her internship, before going on to graduate work in physics, Sarah will work with Beverly Porter of the AIP Employment and Statistics Division, and with Miriam Forman, APS Deputy Executive Secretary. Sarah has plans to update and analyze data in the Roster of Women in Physics, and suggest changes to improve its function as a demographic data base. She will also use data which have been gathered by Beverly Porter to analyze factors associated with career changes, movement among subfields, and job locations and activities.

Sarah hopes to study physics bachelors degree recipients, and how their choice of either graduate school or a first job was affected by aspects of their undergraduate experience. The bachelors data and the roster data could be correlated to show the influence of prominent women physics professors as role models.

As is evident in Sylvia Fava and Kathy Deierlein's article in this issue, there are many unexplored factors that influence the career patterns of women in physics. When we understand how women succeed and fail in physics, we can devise programs that will specifically address the underrepresentation of women in the field. But until more research is done any well-meaning program is something of a shot in the dark. We wish Sarah luck in her research, and hope to hear of it periodically in the *Gazette*.

APS INVITED TALKS AND FELLOWS

The June APS *Bulletin* contained a re-

quest for invited talk and symposium proposals for the March APS Meeting, as well as a call for APS Fellow nominations. Readers are encouraged to consider their female colleagues for possible nominations. Of the 300+ invited talks in 1988, only about 15 were by women. Careful effort in the nomination procedure could change this situation for 1989.

Remember that the APS has certain rules that must be followed in proposing invited talks. The speaker and topic must not have appeared within the last two years at an APS symposium. (This situation is sometimes confused by the fact that speakers at the Topical Group Symposia, also a part of the meetings are *not* constrained by this rule.) Remember that proposals must be as detailed as possible and, in the case of symposia, must contain specific recommendations of speakers to round out the program.

The deadline for 1989 Fellow nominations is 15 January. By the time this issue of the *Gazette* makes it to your hands, little time will remain for invited talk and symposia suggestions. The deadline for these is 23 September. Such deadlines come up all the time, though, for other conferences, and this can serve as a reminder for those instances as well. The nomination form may be found on page 1327 of the June APS *Bulletin*, with the instructions beginning on page 1329.

PRECOLLEGE SUMMER PROGRAMS: A WAY TO ATTRACT WOMEN TO PHYSICS?

The present editor recently became aware of a summer program for ninth grade girls, hosted by the Chemical Engineering Department at the New Jersey Institute of Technology (NJIT) in Newark, New Jersey. We have known for sometime that high school is a critical period in the career of a would-be female physicist (see the article by Barbara Wilson, in the July 1985 *Gazette*, "Where Have All the Women Gone?"). The NJIT program has been quite effective at encouraging girls to "hang in" during those difficult high school years, and has been a factor in many of them eventually choosing majors in technical fields. It is a model that some of you may wish to emulate in some way at your own institution.

The program was begun by Dana Levine at NJIT in 1980, under the acronym FEMME (Females in Engineering: Methods, Motivation, and Experience). It is now run by Lisa Novemsky. The goals of the program are helping the girls selected to overcome misgivings about technical careers, increasing their confidence, and encouraging them toward the appropriate academic preparation. In addition, the program provides some extra course work as well as a healthy dose of role-model exposure. The rationale of the ninth grade program is that it is possible to identify some of the promising students at this point, but it is still early enough to influence their remaining high school program. The students are selected from all of New Jersey, but roughly half of the 25 slots are reserved for minority students. Selection is based on grades and interests, as well as interviews for the finalists. The program is run at NJIT but makes use of the facilities and personnel available in the technical community of the larger North Jersey area.

The program places an emphasis on bringing the students into contact with women scientists and engineers, both in the classroom and on field trips. This year it ended with a day-long visit to AT&T Bell Laboratories at Murray Hill, where the students visited women staff members in their labs, heard lectures, and watched numerous demonstrations. One of the most popular questions asked of the female scientists and engineers that day was "How did you get here?" or some variant thereof. These students were clearly making their plans.

The effectiveness of the program is indicated by the statistics. While less than half of the female high school students take even three years of math in high school, nearly all of the FEMME participants take four. Nearly 90% take four years of science, as opposed to one in three for the general population. Fully 75% of the participants have chosen technical majors in college.

While the idea of a summer program directed at women and/or minority students certainly isn't new, there are key features of this program that make it a worthwhile model for other efforts around the country. One of these keys is the age of the participants, namely, *early* high school, when they know

enough to be interested but have most of their academic preparation yet to come. Another key factor is the cooperation with many different local laboratories and universities. Finally, the emphasis on interaction with women scientists and engineers in the field trips and classroom discussions provides the students with valuable role models that they might never see elsewhere.

HIRINGS AT UNIVERSITY OF COLORADO

Ellen Zweibel, CSWP chair, reports that the University of Colorado has been very successful this year in finding and hiring women physicists. Fran Bagenal, a planetary scientist and space plasma physicist was hired in the Department of Astrophysical, Planetary & Atmospheric Sciences, where Ellen has a permanent position. The Physics Department has hired Patricia Rankin, an experimental high energy physicist. Bon-

ny L. Schumaker, winner of the APS Maria Goeppert-Mayer Award for 1988 (see the *Gazette*, December 1987) for her work in theoretical quantum optics, has been offered a position, but as of 15 August had not accepted or declined.

WINNER OF LUISE MEYER-SHUTZMEISTER AWARD

Jiahong Zhang is this year's winner of the Luise Meyer-Shutzmeister Memorial Award. The award commemorates the career of the former senior physicist in nuclear spectroscopy at Argonne National Laboratory. The award was established in 1981, the year of Meyer-Shutzmeister's death at the age of 66, by friends and through the education foundation of American Women in Science. The \$500 award goes to an outstanding woman candidate for a physics Ph.D., studying at a university in the

United States.

Ms. Zhang is involved in the development of thermal microcalorimeters as x-ray photon detectors. This high-resolution high-efficiency device has many applications in particle physics, solid state physics, and astrophysics. Her thesis project is the design of a sounding rocket payload with this type of calorimeter to observe x-ray emission lines from the interstellar medium. Her work is being performed at the University of Wisconsin at Madison, under the supervision of Dr. Dan McCammon.

Applications for the Meyer-Shutzmeister Award can be obtained by writing to Prof. Gerald Hardie, Department of Physics, Western Michigan University, Kalamazoo, MI 49008-5151. These must be submitted, along with transcripts and recommendations, by a deadline in mid-January, indicated on the application.

WOMEN IN PHYSICS BIBLIOGRAPHY

The following bibliography is taken from "The History of Women and Science, Health, and Technology: a Bibliographic Guide to the Professions and the Disciplines," edited by Susan E. Searing. The publication contains sections on women in astronomy, chemistry, and mathematics as well. While supplies last (hurry, they are going fast) you can request a free copy from: Susan E. Searing, Women's Studies Librarian, 112A Memorial Library, 728 State Street, Madison, WI 53706.

REFERENCE

Grinstein, Louise S. "Women in Physics and Astronomy: A Selected Bibliography." *Sch. Sci. Math.* **80**, No. 5 (May/June 1980): 384-398.

GENERAL

American Physical Society. Committee on Women in Physics. "Women in Physics." *Bull. Am. Phys. Soc.* **17** (1972): 740-753.

Ancker-Johnson, Betsy. "Women's Lib and Physics." *Physics Teacher* **10**, No. 9 (December 1972): 499-508.

Brush, Stephen G. "Women in Physical Science: From Drudges to Discoverers." *Physics Teacher* **23** (January 1985): 11-19.

Couture-Cherki, Monique. "Women in Physics." In *Ideology of/in the Natural Sciences*, pp. 206-216. Edited by Hilary Rose and Steven Rose. Boston: G. K. Hall, 1980. (Discusses the status of women physicists in France.)

Hughes, Rhonda. "Status of Women in the Physical Sciences." In *Choices for Science*, pp. 27-32. Cambridge, MA: Bunting Institute, 1980.

Henderson, Bonnie C. "State and Society—Discrimination Against Women in Physics." *Phys. Today* **25** (1972): 61-72.

Jackson, Shirley A. "From Clerk-Typist to Research Physicist." In *Expanding the Role of Women in the Sciences*, pp. 296-299. Edited by Anne Briscoe and Sheila Pfafflin. New York: New York Academy of Sciences, 1979. (*Ann. NY Acad. Sci.* **323**.)

Kahne, Hilda. "Women in Physics." *Bull. Am. Phys. Soc.* **17** (1977): 740-751.

Keller, Evelyn Fox. "The Anomaly of a Woman in Physics." In *Working It Out: 23 Women Writers, Artists, Scientists, and Scholars Talk About Their Lives and Work*, pp. 77-91. Edited by Sara Ruddick and Pamela Daniels. New York: Pantheon, 1977.

Kelley, Alison. "Women in Physics and Physics Education." In *New Trends in Physics Teaching*. Edited by J. Lewis. New York: Unesco, 1976.

Kistiakowsky, Vera. "Women in Physics: Unnecessary, Injurious and Out of Place?" *Phys. Today* **33**, No. 2 (February 1980): 32-40.

Kistiakowsky, Vera. "Women in Physics and Astronomy." In *Expanding the Role of Women in the Sciences*, pp. 35-47. Edited by Anne Briscoe and Sheila Pfafflin. New York: New York Academy of Sciences, 1979. (*Ann. NY Acad. Sci.* **323**.) (A look at women's status in the 1970's. Includes statistical tables.)

Lubkin, Gloria. "Women in Physics." *Phys. Today* **24**, No. 4 (April 1971): 23-27.

Pollack, B. L., and L. K. Little. "Experimental Project in Physics Education, or New Avenue for Women." *Physics Teacher* **11** (1973): 391-399.

Traweek, Sharon. "High Energy Physics: A Male Preserve." *Technol. Rev.* **87**, No. 8 (November/December 1984): 42-43.

Walberg, Herbert J. "Physics, Femininity, and Creativity." *Developmental Psychology* **1**, No. 1 (1969): 47–54. (Research showing that "the apparent trait discontinuities in feminine and scientific roles help to account for the relatively poor showing of women in science.")

Weeks, Dorothy W. "Women in Physics." *Phys. Today* **13**, No. 22 (August 1960): 22–23.

BIOGRAPHIES AND STUDIES OF INDIVIDUALS

NOTE: In *Notable American Women*, see entries for Margaret Maltby and Sarah Whiting. In *Notable American Women: The Modern Period*, see Elda Anderson, Maria Mayer, and Marie Rand. *Women in the Scientific Search*, by Patricia Siegel and Kay Finley, covers ten women physicists.

Ancker-Johnson, Betsy. "Physicist." In *Successful Women in the Sciences: An Analysis of Determinants*, pp. 23–28. Edited by Ruth B. Kundsinn. New York: New York Academy of Sciences, 1973 (Ann. NY Acad. Sci. **208**.) Repr. with title, *Women and Success: The Anatomy of Achievement*. New York: Morrow, 1974.

Barr, E. Scott. "The Incredible Marie Curie and Her Family." *Physics Teacher* **2** (1964): 251–259. (Includes Irene Joliet-Curie.)

Barr, E. Scott. "Margaret Eliza Maltby." *Am. J. Phys.* **28** (1960): 474–475. (First woman to receive the Ph.D. from a German university.)

Bigland, Eileen. *Madame Curie*. New York: Criterion Books, 1957.

Crawford, Deborah. *Lise Meitner, Atomic Pioneer*. New York: Crown, 1969.

Curie, Eve. *Madame Curie*. Garden City, NY: Doubleday, 1937. Repr. Jersey City, NJ: DaCapo, 1986. (Classic biography of Marie Curie by her daughter.)

Dash, Joan. "Maria Goeppert-Mayer." In *A Life of One's Own: Three Gifted Women and the Men They Married*, pp. 229–346, 368–369. New York: Harper and Row, 1973.

Frisch, O. R. "Lise Meitner, 1878–1968." *Biogr. Mem. Fellows R. Soc.* **16** (1970): 405–420. (Nuclear physicist, co-discoverer of fission.)

Hodgkin, Dorothy H. C. "Kathleen Lonsdale, 28 January 1903–1 April 1971." *Biogr. Mem. Fellows R. Soc.* **21** (1975): 447–484. (Crystallographer, physicist, chemist. First woman president of the British Association for the Advancement of Science.)

Julian, Maureen M. "Dame Kathleen Lonsdale (1903–1971)." *Physics Teacher* **19** (1981): 159–165.

Libby, Leona Marshall. *The Uranium People*. New York: Crane Russak, 1979. (Chatty memoir by a nuclear physicist.)

McCann, Mary. "No Parity in Science: Being a Woman in Nuclear Physics." *Science for the People* No. 46 (1980): 9–11. (Autobiographical.)

Patterson, Elizabeth C. *Mary Somerville and the Cultivation of Science, 1815–1840*. (International Archives for the History of Ideas **102**) The Hague: Nijhoff, 1983.

Reid, Robert William. *Marie Curie*. New York: Saturday Review Press, 1974. (Includes photographs.)

Rife, Pat. "Lise Meitner (1878–1968). Part 1: The Early Years." *Association for Women in Mathematics Newsletter* **10**, No. 3 (May/June 1980): 8–13.

Rife, Pat. "Lise Meitner (1878–1968). Part 2: The Mathematical Interpretation of Nuclear Fission." *Association for Women in Mathematics Newsletter* **10**, No. 4 (July/August 1980): 9–14.

Sachs, Robert G. "Maria Goeppert-Mayer, June 28, 1906–February 20, 1972." *Biogr. Mem. Natl. Acad. Sci.* **50** (1979): 311–328.

Sharp, Evelyn. *Hertha Ayrton: A Memoir*. London: Arnold, 1926.

Teitz, Joyce. "Physicist: Devrie S. Intriligator." In *What's a Nice Girl Like You Doing in a Place Like This?*, pp. 124–144. New York: Coward, McCann & Geoghegan, 1972.

Watkins, Sallie A. "Lise Meitner and the Beta-Ray Energy Controversy: An Historical Perspective." *Am. J. Phys.* **51** (1983): 550–553.

Watkins, Sallie A. "Lise Meitner: The Making of a Physicist." *Physics Teacher* **22** (1984): 12–15.

VISITING PROFESSORSHIPS FOR WOMEN SPONSORED BY NSF

The National Science Foundation (NSF) is again sponsoring Visiting Professorships for Women (VPW). The program provides opportunities for women to advance their careers in science and engineering, increases the visibility of women in these fields, and encourages other women to pursue similar careers.

Awards are made to enable experienced women scientists and engineers to serve as visiting professors at U.S. academic institutions. 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 interactive activities with students.

To be eligible to compete for these awards, women applicants must hold a doctorate in an NSF-supported field and have independent research experience. They must be affiliated with a U.S. institution, but may not have a salaried position at the proposed host institution at the time of application. Candidates select and make all arrangements with the host institution.

Ellen Zweibel, 1988 CSWP chair, has received a VPW. She reports to the *Gazette*:

"I will be spending fall of 1988 and 1989 at the University of Chicago. I chose to divide my visit into two parts so as not to be away from home for too long at once; this arrangement should also help extend collaborations. I proposed to the VPW program at the suggestion of a faculty member at Chicago; the astronomy department there has been very supportive. In fact, the University of Chicago is contributing about half of my salary, which indicates that they have a commitment to the idea of the VPW program.

"My proposal was written very much as a standard NSF proposal, except that I pointed out where collaborations with Chicago faculty were likely, and also

wrote down my thoughts on how the VPW program could enhance the position of women in science. I very much look forward to my time in Chicago. There are several people there with whom I want to collaborate, and I was an undergraduate there also."

Visiting Professorships for Women proposals are evaluated on the basis of scientific merit and the quality of the proposed interactive activities. This year's deadline is 15 November. Program announcements may be obtained from the Forms & Publications Unit, Room 232, National Science Foundation, Washington, D.C. 20550.

CONFERENCE: WOMEN AND SCIENCE IN THE THIRD WORLD

Science International, the newsletter of the International Council of Scientific Unions reports that a conference on the role of women in science and technology in the third world will be held 3-7 October, at the International Centre for Theoretical Physics in Trieste, Italy. Presented by the Third World Academy of Sciences and the Canadian International Development Agency, the conference will highlight achievements of women in the sciences, and profile the status of women in science in different countries. The conference aims to formulate specific follow-up activities, and make recommendations to governments, the scientific community, funding agencies and international organizations for increasing the participation of women in science and technology.

The conference will be attended primarily by distinguished women scientists. A database inventory to identify and describe the work of women scientists will be considered at the conference, as will the design of collaborative research which ensures that women scientists have the opportunity to contribute equally with their male counterparts.

Attendance is by invitation only, but further information can be obtained from the: Executive Secretary, TWAS, c/o In-

ternational Centre for Theoretical Physics, P.O. Box 586, Strada Costiera 11, 34100 Trieste, Italy.

The *Gazette* would be very interested in a report from any reader who attends this conference.

THE ROSTER OF WOMEN IN PHYSICS: AN UPDATE

Almost everyone who reads the *CSWP Gazette* knows something about the Roster of Women in Physics, but here is a review of the functions of the Roster.

About a year ago, the Roster was moved from an aging mainframe computer at Argonne National Laboratory, where it had been since 1975, to a personal computer in the New York office of the American Physical Society. Barbara Wilson, a former CSWP member, has done a great deal to facilitate the transition. A custom-written database management program was prepared by BAFL Inc., a Los Angeles consulting firm. Barbara worked closely with Blair Lewis of BAFL, and she prepared a detailed manual for the new system. Barbara's documentation and the user-friendly software makes it easy and pleasant for APS staff to maintain and update the Roster.

The Roster has two main functions. First and foremost, it serves as the mailing list for the *CSWP Gazette*. When we generate labels for mailing the *Gazette*, we exclude "bad" addresses, i.e., addresses to which the Post Office has not been able to deliver. Of the 3500 records in the Roster, about 500 have bad addresses, and this is due to several factors. The first is that contrary to what you might think, a change of address submitted to APS membership is NOT reported to the CSWP Roster. The two databases are in separate computer systems, and there is no mechanism to correlate them at the moment, although we hope to have one soon. Secondly, the mobility of the physics community and the unknown percentage of women who drop out of physics, result in many obsolete addresses.

The list of names with bad addresses

was printed in the May 1988 *Gazette*. Many, many thanks to those of you who were able to provide updated addresses. When your address or your name changes, fill out one of the change of address forms, which appears periodically in the *Gazette*. If your career situation changes, put the new information on a roster questionnaire from the December directory issue of the *APS Bulletin* or from the *Gazette*. A new questionnaire appears in this issue.

The Roster is also used by universities who want to send notice of faculty openings to women with particular qualifications. The institution describes the kind of person they need, and we design a search of the Roster that will pick out those people. Usually the search parameters are a Ph.D. received in a particular time period, plus a current interest in the desired subfield. We do the search, generate labels, and tell the institution how many names we found. They send us corresponding stuffed envelopes, and we send the announcements from APS headquarters. This procedure protects the confidentiality of the Roster.

There is a \$100 charge for a Roster search, and in the last year there have been 25 searches, most for physics positions and a few for academic deans. The income generated by Roster searches helps to offset expenses such as postage and printing costs for the *Gazette*. If you apply or are hired for a position you were informed of through a Roster search, please let CSWP know.

A third function of the Roster is as a source of demographic data for the study of women in physics. Sylvia Fava and her associate Kathy Deierlein have used the Roster in this way, and so will Sarah Bolton. See related articles in this issue.

The more accurate and complete its listings are, the better the Roster can serve the community of women in physics. Send in updated information for your record whenever you have it, and encourage other women in physics to get listed.

Amy Halsted
Assistant Editor
CSWP Gazette

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