CSWP GAZETTE

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

July-August 1985 Volume 5, Issue 2

FOREWORD TO OUR READERS

The focus of this issue of the *Gazette* is science education. The critical shortage of secondary science and math teachers with adequate technical training has led to severe constraints on the science and math courses that can be offered in our nation's schools. For a general discussion of the crisis in high school physics education, see the September 1983 issue of *Physics Today*. Various federal and state programs to improve science education are being considered and implemented. Among the state programs are many aimed at increasing the supply of teachers by offering alternate routes to certification and/or increased salaries. A number of national coalitions of business, labor, and professional organizations are also becoming active, as well as local groups in industry and academe. An example of an industrial-based group is the AT&T Bell Labs Science Education Club whose activities are described in the "guest comment" section of the December 1984 issue of *Physics Today*.

Equal opportunity for women in science education, the natural focus for CSWP, has also become an issue of growing concern as governmental pressures for affirmative action programs have been softened under the Reagan administration. As argued in the main article in this issue, such programs are still very much needed. A number of private industries continue to offer summer research experiences, fellowships, and mentor programs for women and minorities from eighth grade through graduate school. Summer experiences in industry are also being arranged for science teachers. Many colleges and universities also sponsor programs. CSWP's efforts have included the publication of a number of informative pamphlets aimed at elementary and secondary school students and their school counselors. Some examples of successful efforts to increase student interest in science and to encourage greater participation by women and minorities are highlighted in the section "Innovative Efforts." We invite our readers to send us additional ideas that could be implemented by individuals, CSWP, or other organizations. This input can be aired in future issues of the *Gazette*.

We close this foreword on the encouraging note that affirmative action efforts, such as those of CSWP, recently received a boost from the President of The American Physical Society, Dr. Robert R. Wilson. During his acceptance statement he noted that he considers the underrepresentation of minorities and women in physics to be one of the most important issues to be addressed during his term.

Barbara Wilson
Joan Kowalski
Joint Editors

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MARIA GOEPPERT-MAYER AWARD

The APS has just announced this major new award sponsored by the General Electric Foundation. The purpose of this award is to recognize and enhance outstanding achievement by a woman physicist in the early years of her career and to provide opportunities for her to present these achievements to others through public lectures. The recipient receives a $2000 prize, plus an additional $3000 travel allowance to enable her to give lectures in her field of physics at four institutions of her choice and at an APS meeting. The first award will be presented at the April 1986 meeting. There are no restrictions on the nationality of the winners, and the lectures may be given at institutions in any country within two years after the award is made.

The selection committee consists of: Mildred S. Dresselhaus, Chair (MIT); Elizabeth U. Baranger (University of Pittsburgh); Charles P. Bean (GE); Phyllis S. Freier (University of Minnesota); and Stanley G. Wojcicki (Stanford). Suggestions for nominations should be sent directly to Mildred S. Dresselhaus, Room 1-3005, MIT, Cambridge, MA 02139. The deadline for receipt of nominations is 1 December 1985.

This award, which was proposed by CSWP at the suggestion of Mildred Dresselhaus, respectfully remembers Maria Goeppert-Mayer, who shared the 1963 Nobel Prize in Physics with J. Hans Jensen and Eugene P. Wigner "for discoveries concerning the nuclear shell structure." In addition to honoring the recipient and publicly recognizing her excellence in physics research, the lecture series provides a forum for others to learn about her achievements.

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NEWLY ELECTED

Four women were among the 60 new members elected to the Academy of Sciences:

Mary Dell Chilton, executive director of agricultural biotechnology at the Ciba-Geigy Corporation.
Mildred S. Dresselhaus, professor at the Center for Materials Science and Engineering at M.I.T.
Sandra M. Faber, professor of astronomy at the Lick Observatory of the University of California at Santa Cruz.
Martha Vaughn, chief of the Laboratory of Cellular Metabolism at the National Heart, Lung, and Blood Institute of the National Institute of Health in Bethesda, Maryland.

Three more women scientists have been elected to Fellowship in the APS, bringing the total number for 1985 to twelve:

Bunny Kay Cowan Clark of Ohio State University, Division of Nuclear Physics, "For contributions to relativistic treatment of nucleon scattering from nuclei."
Lynn Woodard Jelinski of AT&T Bell Labs, Division of High Polymer Physics, "For development and application of the technique of solid state deuterium NMR to problems in the structure and dynamics of polymers."
June Lorraine Matthews of M.I.T., Division of Nuclear Physics, "For important contributions in photo-nuclear reactions."

Aviva Brecher, Irene Engle, and **Barbara Gross Levi** were among the five newly elected members of the Executive Committee of the Forum on Physics and Society.

Mary Kelley of the University of Rhode Island, **Sandra Krueger** of the University of Maryland, **Ann Parsons** of the University of Michigan, and **Diandra Leslie-Pelecky** of North Texas State University, are among the newly elected Associate Councillors of

the Society of Physics Students. The continuing councillors include **Marie Machacek** of Northeastern University and **Peggy A. Dixon** of Montgomery College.

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INNOVATIVE EFFORTS

We highlight here some innovative programs from academe aimed at increasing student interest in science and/or increasing the participation of women and minorities in science.

The TWIST Program—The Training Women in Science and Technology (TWIST) Project, sponsored by the American Association of Physics Teachers, was held at George Mason University in Fairfax, Virginia. In the autumn of 1983 thirty eighth-grade girls from Northern Virginia schools attended classes on seven consecutive Saturdays in the physics building. Lectures and laboratory workshops were conducted by several women who were professionally involved in the physical sciences and engineering. The young girls had experiences with lasers, electrical circuits, simulated space modules, geiger counters, oscilloscopes, computers, and the like, and learned of the many career doors open to women proficient in mathematics and the physical sciences. In subsequent workshops in the spring and summer of 1984 the parents and future high school teachers of the TWIST participants viewed slides of the girls' activities during the lab sessions and discussed the problems of women entering these fields and ways to encourage interested and/or capable females to get the necessary math and science foundation during high school years. A slide presentation "TWIST at George Mason University" is available from AAPT.

For more information contact: Dr. Joan P. Sullivan Kowalski, George Mason University, Fairfax, VA 22030.

Student Institute and Open House—The Indiana University Science, Medicine, and Engineering Departments have held a summer institute for high school students of science for the past 29 years, with or without Federal support. The program consists of lectures, demonstrations, field trips, tours, and laboratory experiences designed to explore the interrelationships and interdependencies of the sciences. Students conduct individual laboratory and field research under the direct supervision of the university research scientists. The program is highly successful.

The physics, astronomy, and biology departments hold an annual open house. The event was started some 12 years ago by the physics department, and now attracts about 800 teachers and students from around the state. The event takes over the buildings for two days during which faculty, graduate students, and staff work hard to put on a good show. All of the teaching labs are full of hands-on demonstrations. The research facilities are open and short talks are given on a variety of interesting topics such as "Voyage To the Planets," "FUNdamental Physics Demonstrations," etc. Some schools send bus loads of students who travel 3—4 hours each way.

For more information contact: Judy R. Franz, Clark Hall LASSP, Cornell University, Ithaca, NY 14853.

Industrial Sponsored Summer Program in Science and Engineering—Since 1976, Clark College, with the help of several industrial concerns, has been conducting programs for high school students for eight weeks in the summer. The students are carefully selected and become "Rowland Scholars," receiving tuition grants, fees, room, and books. The program is designed to strengthen skills in mathematics, science, and engineering as well as in communication areas. In addition, courses in computer science and scientific instrumentation are provided. Participants earn up to 8 semester hours of Clark College credit. After completion, the participants enter Clark College in the fall.

Special emphasis is placed upon helping minority students make up any deficiencies in their preparation for college. In addition to the academic program, the following activities are included: discussion of career opportunities in the field of science and engineering, industry and laboratory tours which give students first-hand knowledge of practices in various fields, and guidance sessions which cover concepts on how to study, how to take tests, and how to get along in college.

For more information contact O.O. Puri, Division of Natural Science and Mathematics, Clark College, Atlanta, GA 30314.

Women Scientists Speakers Bureau—With support from the NJ Board of Higher Education, the Women's Center of Jersey City State College organized a speakers bureau of women scientists to provide much-needed role models for grade school and high school girls. The program matched requests from NJ schools for speakers, both on areas of science and on careers in science, with female scientists in the NJ, NY area. An honorarium was offered to the speakers so that the schools did not have to provide funds. The program was very successful, meeting about 75 requests during 1984—85. The Women's Center also sponsors four "Science Career Days" per year which present panels of local women scientists and are attended by more than 1000 high school girls yearly. A recent workshop sensitizing teachers and counselors to gender equity issues in the classroom was also very successful.

For more information contact: Helen Hotch, The Women's Center, Jersey City State College, Jersey City, NJ 07305.

Workshop on Unconscious Sexism in Physics Education—Beverly Taylor (Department of Physics, Miami University, Oxford, Ohio), Joan P. Sullivan Kowalski (Department of Physics, George Mason University, Fairfax, Virginia), and Judith E. Parker (Technical Development Department, 3M, St. Paul, Minnesota) conducted a workshop entitled "When Equal Isn't Really Equal: A Workshop on Unconscious Sexism in Physics Education" at the June 1985 AAPT Summer Meeting in Flagstaff, Arizona. The objective of the workshop was to help participants become aware of their attitudes and behaviors which discourage or encourage female students, children, or acquaintances to enroll in physics courses or pursue careers in physics and related areas. Of the 30 participants in the workshop 20 were male. Lively discussions followed the viewing of video tapes which portrayed unhealthy attitudes toward females in elementary, high school, and college classrooms. The workshop was sponsored by the AAPT Committee on Women in Physics. Some material from the recently revised AAPT "Developing Student Confidence Workshop" were used.

For more information contact: Joan P. Sullivan Kowalski, Department of Physics, George Mason University, Fairfax, VA 22030.

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WE HEAR THAT . . .

Margaret Burbidge of the University of California, San Diego, was awarded the National Medal of Science by President Reagan on 27 February 1985. . . **Miriam A. Forman** has been selected by the Council of APS to serve as Deputy Executive Secretary. A Fellow of APS, Foreman has also just been elected vice-chair of the APS Astrophysics Division. . . **Judith L. Pipher**, professor of astronomy at the University of Rochester and director of the C. E. Kenneth Mees Observatory, has been awarded the Dudley Observatory's 1984—85 Ernest F. Fullam Award.

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WHERE HAVE ALL THE WOMEN GONE?

The underrepresentation of women and minorities in science is well recognized, but the mechanisms leading to this imbalance are not so well documented. A recent Rockefeller Foundation study by Sue E. Berryman entitled "Who Will Do Science?" examines these issues in detail. She finds that, at least up to the master's level, the gap between the total number of women and men receiving degrees in all fields is closing rapidly. Nevertheless, a severe discrepancy persists in quantitative fields, due to the different distributions of the fields in which women and men obtain their degrees. Prior to undertaking Ph.D.-level work, there is no evidence of higher drop-out rates for women than for men among those pursuing "demanding" quantitative programs as is often assumed. The attrition occurs primarily at those points where choices must be made about future educational investment. Unfortunately, her study shows little sign that this pattern of attrition is changing. The increase during the last decade in the number of women receiving degrees in quantitative fields is entirely attributable to the overall increase in the number of women pursuing degrees in all fields. The fraction of women choosing quantitative fields did not increase appreciably. (For this statistical analysis, "quantitative fields" include math, physical sciences, biological sciences, computer science, engineering, and economics.) Thus programs aimed at encouraging young women to pursue science are still very much in need, and an understanding of the underlying patterns and mechanisms is useful in optimizing the effectiveness of these efforts.

Looking at the educational history of women and men who do achieve degrees in quantitative fields, the pool of potential scientists can be identified at a very early age. By ninth grade, over one-third of those who will later earn a quantitative bachelor's degree already expect to pursue a career in science. By the end of twelfth grade, the pool is fully established, i.e., there is essentially no further growth of the pool; only migration out of the pool occurs after this point. A necessary component of the pool's educational profile is the completion of advanced high school math. This optional sequence, which is elected by one-third less girls than boys, marks the first point at which the educational profiles of the two sexes diverge.

According to statistics published by the Scientific Manpower Commission, the next major loss to the pool of potential female scientists occurs during the first years at university when students declare undergraduate majors. Of those who completed the necessary high school math sequence, only 21% of the young women, compared to 51% of the young men choose a quantitative field. Attrition during the undergraduate program appears less problematic. In fact, a slightly larger fraction of the women than of the men declaring quantitative majors go on to earn their bachelor's degree in these fields. Nevertheless, 50% fewer women than men remain in a quantitative field as they continue towards their master's degree. Further loss occurs before attaining the Ph.D. In contrast to the data for bachelor's and master's programs, however, this loss includes a significant factor associated with a higher attrition rate for women than for men pursuing Ph.D.'s in all fields.

From this overview one may conclude that by and large women leave science by choice, not by failure to achieve in these fields. To some extent, this exodus reflects a larger variety of socially acceptable options available for young women who are not under the same pressures as young men to prepare for a financially self-sufficient future. In fact, however, our society does not guarantee life-long support for anyone, male or female. Thus, in reality, these additional options which offer the appearance of freedom can often act as a trap; the lack of early educational investment can severely limit future possibilities. Thus, the most effective strategies to increase the participation of women in science should address such mechanisms that cause women to make these statistically skewed choices in educational and career paths. Efforts assisting women to complete Ph.D. programs are also well directed. The remainder of this article focuses on the first two "sinks" in the educational pipeline—the decision about enrollment in advanced high school math, and the choice of undergraduate major field. These two turning points account for more than two-thirds of the extra loss of women compared to their male peers all the way through the Ph.D. degree.

The decision to sign up for advanced math has particular importance since it represents the first choice made by young students that impacts on their future possibilities in science, and the first point at which females lose ground in the educational sequence. While there is no significant gender difference in math achievement through ninth grade, there is, nevertheless, a substantial discrepancy in the fraction of girls and boys who choose to enroll in these courses. The decision is based less on objective measures of math ability than on attitudes concerning the perceived relevance and appropriateness of pursuing a more advanced math sequence. In general, the extent of educational investment elected by young women depends on their expectations of the amount of time they will spend in the paid labor force. Daughters of women working continuously in the paid labor force themselves expect to spend extended periods of their lives working for pay, and tend to make choices about educational investments and career paths that are more similar to their male peers. As long as young women expect to expend their major efforts in child rearing, with only limited time in the paid labor force, there is little incentive to elect quantitative occupations that require substantial educational commitment. Unfortunately, these expectations are not consistent with today's reality. Most women spend a considerable fraction of their adult lives in the paid labor force, and often find themselves restricted to low-paying and uninteresting jobs due to their lack of education in quantitative areas.

Another factor in the shortage of girls enrolling in advanced math is their self-perception of their mathematical abilities. A student who feels less gifted in math is obviously less likely to select more advanced courses. Berryman has noted that children's perceptions of their math ability primarily reflect the judgment of their parents, and that parents tend to think that math is harder for their daughters than for their sons regardless of the objective reality. In this way, the stereotypes of the parents' generation become self-fulfilling prophecies for their daughters who shy away from advanced math courses in high school and consequently score lower than their brothers on college entrance math tests. Gender stereotypes may contribute to this pattern in an additional way. As long as our society views the pursuit of careers in science as primarily masculine activities, women in these fields will experience discord with others' expectations of them as females. The middle and high school years, when young people are seeking to establish clear sexual identities, is then a particularly difficult time to make choices that oppose existing gender stereotypes.

Efforts to increase the participation of women in science aimed at the high school level may be most effective if they focus on these underlying mechanisms that discourage young women from considering science careers. As a start, it would be useful to counter some of the damaging misinformation and incorrect assumptions that are still prevalent. It is crucial that young women be aware that they are likely to spend a substantial fraction of their adult lives in the paid labor force, whether or not they choose to be extensively involved in child-rearing activities. They should also be informed that many higher-paying jobs require more quantitative educational background. In particular, the importance of the advanced math sequence should be stressed. Deciding to skip these courses effectively closes the doors on many enjoyable and rewarding jobs they may wish to hold during their tenure in the labor market. Since young women hear much of their information about science careers

and almost all of the relevant feedback about their individual abilities in math and science from parents, teachers, and school counselors, programs aimed at educating the educators on these issues may often be the most efficient way to break the cycle of misinformation. This is an approach that is often overlooked. Such efforts can be one on one, or group programs at teachers' conventions and local PTA meetings. When presented in a nonaccusatory way, this can increase sensitivity in these areas and even stimulate self-evaluation of attitudes and behaviors in the classroom and home.

Information provided to students can be reinforced by providing concrete examples of female achievement in scientific areas in the form of role models with whom students may identify on a personal level. Women scientists can help to promote positive attitudes about careers in science simply by expressing their enthusiasm for their own work and their satisfaction with their career choices. They can also, by their very presence, dispel gender stereotypes restricting such careers to men. Hands-on experiences in science can go one step further in encouraging young women to consider science careers. This is especially true when a relationship is established with a person who is actively involved in some phase of science, be it a teacher, engineer, or researcher. Mentors can furnish information about careers in science with the credibility gained from direct, personal experience. Depending on their sex, they can also act as role models themselves, or introduce the students to women colleagues. In addition, they can provide much needed positive feedback on quantitative abilities and scientific potential to help counter unrealistic negative feedback based on gender stereotyping. Finally, through personal experience, the young women can learn that doing science is fun!

Within a year or two after high school graduation, college students reach a branching point that marks the second large loss of women from the pool of potential scientists, i.e., the point at which they declare a major field. Less than half as many women as men who have the necessary background in math select a quantitative discipline. Although the mechanisms behind this imbalance have been less carefully analyzed, studies suggest a number of factors that may contribute. A recent survey by Terry Denny and Karen Arnold of the University of Illinois indicates that the first year on campus can have devastating effects on the self-esteem of bright women. Their study of top-ranked high school graduates found that while 21% of the women and 23% of the men rated themselves as far above average in intelligence during their senior year in high school, by the end of freshman year only 4% of the women (compared to 22% of the men) still perceived themselves to be in this category. According to a report by the Women's College Coalition, this effect is absent at all-women's colleges whose graduates almost unanimously agree that their undergraduate experience enhanced their self-confidence. The report also includes statistics on graduates from women's colleges during the late 1970's which show that they were almost twice as likely to major in science as their female peers at coed institutions. In fact, by combining the results of this study with those of Sue Berryman, one finds that the fraction of 1979 women's college graduates receiving their degree in a quantitative field was comparable to the national average for men. Thus it is worth examining the inherent differences in the college experience of women at coed and single-sex schools to identify possible sources of discouragement for potential science majors.

In comparison to women's colleges, coed institutions across the nation have few women among the tenured science faculty. Thus role models of women achievers in science are scarce. At the same time, a common complaint of female science majors is that their male faculty members are more likely to establish a sense of camaraderie with their male students, and to take their educational and career aspirations more seriously. The withholding of such positive feedback and encouragement can clearly have a deleterious effect on the development of self-confidence in female students and thus on the likelihood that they will select a more "demanding" major. They will also be less likely to select a major department where they receive less reinforcement that their abilities and goals are valued. Placing young men and women together in the classroom may, in itself, cause difficulties for bright female students. By our society's norms, women are still by and large expected to defer to men socially, and to avoid direct competition. These expectations are in clear conflict with the need of female students to compete academically with their male peers, and to take an assertive role in classroom and laboratory interactions. Breaking with cultural norms may be particularly stressful in environments such as science departments, in which women represent only a small minority of the population, and have few role models or even peers to turn to for support and validation of their new behavior.

The insights from this comparison of coed and single-sex academic environment may be used as a guide in considering strategies to increase the number of female science majors. First it is clear that programs providing additional female role models are called for. Probably even more important, however, are efforts to establish mentor relationships for female students through which they can receive more positive feedback about their abilities and encouragement for their career aspirations. Mentors, whether men or women, should be sensitive to the conflicts experienced by young women pursuing nontraditional goals. In order to be most effective, such efforts must be timed to reach students before or during freshman year, before they make significant educational investments in other fields. The potential conflicts between social and academic expectations in coeducational environments are difficult to address. Hopefully, as more women enter scientific disciplines, they will be better able to support each other in forging new cultural norms in their academic and work-force environments.

This article has examined the patterns of the loss of women from the pool of potential scientists through the educational sequence. The data show that women do not fail out of science, they opt out, and that the fraction of women choosing careers in science versus other areas is not increasing significantly. The article has focused on the first two decision points—taking advanced high school math and selecting a major—which together account for the majority of the imbalance between the numbers of women and men in science. Some of the underlying mechanisms that lead to this skewed distribution have been considered, along with strategies aimed at increasing the representation of women in science that focus directly on these mechanisms. It is clear that informational programs supported by role models and mentors are still very much needed. In addition, hands-on programs can provide an invaluable personal experience for young women. In closing, concerned readers are encouraged to keep in mind that all of these approaches are possible on an individual basis. In fact, one-on-one interactions probably offer the best opportunity to influence a young woman to broaden her horizons to consider a career in science.

NEW PUBLICATIONS FOR YOUNG READERS

Winners: Women and the Nobel Prize, by Barbara Shiels, is a book for young readers about women who have received the Nobel Prize. Shiels interviewed and corresponded with living Nobel winners and with relatives and friends of both living and deceased winners while gathering firsthand materials for her book. Extensive treatment is given to the biographies of Pearl Buck, Dorothy Crowfoot Hodgkin, Nelly Sachs, Maria Goeppert-Mayer, Rosalyn Yalow, Mother Theresa, Alva Myrdal, and Barbara McClintock. The chapters on Hodgkin, Goeppert-Mayer, Yalow, and McClintock portray warm, human interest stories about female scientists who were wives and mothers as well as persevering and determined researchers. Appendices offer a complete listing and brief biographies of the other women winners. The book is available from Dillon Press, Minneapolis, MN.

If You Were an Astronaut, by Dinah L. Moché, is a Golden book also geared to young readers. It was released in May 1985 by Western Publishing Company Inc. Moché, a professor of physics and astronomy, has written a number of highly successful books and pamphlets aimed at stimulating interest in science among youngsters.

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TRENDS IN S/E DOCTORATES

The length of time required to earn a science or engineering doctorate has been increasing since 1970 according to statistics published recently by NSF. Between 1960 and 1970, the median time between B.A. and Ph.D. declined from 7.5 to 6.6 years. Between 1970 and 1983, however, the median time for men increased from 6.5 to 7.8 years, and for women from 7.1 to 8.4 years. An increase in part-time attendance has contributed to this trend. In 1982 35% of the women and 30% of the men were attending on a part-time basis. The report also noted that a larger proportion of women than men in full-time graduate study relied on self-support. Over the 1977 to 1982 period, about 37% of the women compared to 28% of the men depended on self-support.

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BICE SECHI-ZORN

Bice Sechi-Zorn, professor of physics at the University of Maryland, died 10 December 1984. After receiving her *Dottore in Fisica* from the University of Cagliari, she worked at the University of Padua and Brookhaven National Laboratory. In 1962 she joined the staff at the University of Maryland, where she became a full professor in 1976. During her career she made many significant contributions to the field of high-energy physics, including her definitive new work on the decay of the η meson. Her work on the decay of hyperons into leptons helped trigger and then confirm Nicola Cabibo's theory of weak interactions, which has since been accepted as the standard model for electroweak interactions.

Sechi-Zorn was also known as a dedicated teacher to undergraduates, graduate students, and colleagues alike. Her life-long commitment to the visual arts is demonstrated by the Vita Nouva art gallery which she and her sister founded in Alexandria, Virginia. At the time of her death, Sechi-Zorn was on sabbatical leave to DESY laboratory in Hamburg.

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LETTERS TO THE EDITOR

The following responses were stimulated by letters in the March-April issue of the *Gazette.*

Dear Editor:

I have finally gotten around to reading the March-April issue of the *CSWP Gazette.* The letters by Dr. Ward and Dr. Bagenal have inspired a few reflections of my own.

I have a B.A. and M.S. in physics. The latter degree was obtained as a part-time student during my four-year-old's first two years of life. For the last two years I have been trying to establish myself as a professional physicist. The only doors open were for teaching positions. However, although I am a respectably good teacher, I knew that without a Ph.D. I had no future in college-level teaching. Finally the frustrations became too great, and I quit to take a clerical job (that paid noticeably better than my almost-full-time "professional" teaching job ever paid). Three weeks later I was offered a job as a scientific programmer at a research hospital where I'd interviewed six months earlier.

To my surprise, after spending two years attempting to legitimize my claim to be a physicist, I now find it a great relief to be able to call myself something else. I never felt less than accepted by my physics professors or fellow students. However, I always felt that my non-physics contacts regarded me as a freak. Not only did I study physics by choice rather than by compulsion, but I enjoyed it and was good at it. Gender seems to have little to do with it—my father, who has taught university physics for years, has experienced the same social stigma. However, it may be more pronounced for women in physics—or perhaps the women simply don't have as strong a support group (i.e., other women in physics) as male physicists have.

For the last three months, then, I have been happily denying any pretensions to being a physicist. Computer programming is a recognized field for women, and one with acceptance and status. Perhaps some day I'll want to be identified as a physicist again. For now, I'm enjoying being considered "normal" for the first time in my life.

Johann F. McKee

The Editor, *CSWP Gazette*

I agree whole-heartedly with the sentiments expressed by Dr. Bagenal in the March-April 1985 issue of the *Gazette.* Having done considerable research on the contributions of women to astronomy and space science, I have the feeling that the degrees of these women are pretty equally distributed between physics and astronomy. Also, it is often hard to say whether the contributions are to astronomy or physics, even when the word astrophysics is used.

The American Physical Society publishes a *Directory of Physics and Astronomy Staff Members,* and many women working in astronomy are undoubtedly included in the Roster of Women in Physics. Many of us with degrees in physics teach undergraduate courses in astronomy and vice versa. Galileo's studies of motion (with Jeanne Dumee's defense of the opinion of Copernicus and support for a moving earth) and Newton's Law of Universal Gravitation (preceded by the proposal of Hildegarde of Bingen of a heliocentric universe with a force exerted by the sun) belong in both disciplines. And where would astronomy be without optics and electromagnetic waves?

The AAS has a Committee on the Status of Women in Astronomy, but much of the news about women in astronomy and space science appears in the *CSWP Gazette.* Why don't women in the two disciplines join forces with more than a liaison? We could only enhance the image and status of women in both of these demanding fields and reinforce and extend existing networking.

Shirley W. Harrison, Ph.D.
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Finally we excerpt from a longer letter suggesting that the *Gazette* may focus too often on issues relevant only to Ph.D.'s with academic research positions. The author offers many stimulating ideas for alternate topics of possible interest to a broader group. Since the CSWP's charter covers all women physicists, this is a more than legitimate concern. How do other readers respond?

Editor:

What can CSWP do to address the needs of the wider community of women physicists? Perhaps some space in the newsletter could be devoted to a restatement of the goals of CSWP. Perhaps some of the articles could explore life outside that of the Ph.D. with a tenured university position. What's happening to women in industry? Do physicists find happiness in product development? What about cross pollination with biology, chemistry, geology, computer science, and instrumentation? Maybe some articles could address the needs and career problems of the B.S. degreed physicist. Maybe some quotes from people representing different "wifestyles" (*Wifestyles* by Dawn Sangrey, 1982). How about a short course for the reentry woman physicist? An example might be "what's happened in the last ten years in solid state" and gear it for understanding by people who haven't been dreaming Maxwell's equations for the past ten years. Most high schools are terribly understaffed in math, chemistry, and especially physics. Maybe mommies at home could teach a class or two . . . or give a special lecture to a science club. How about a debate on "Can science be a part-time job?" Many employers think that the answer is no. How about suggestions to coping with the idea that childcare is not an employer's problem. I was moved by the poetry of Siv Cedering in a recent *Science 84* issue. Would others like to know of this literary work? Maybe some of these ideas are crazy, maybe some are good, but things will only change if we collectively make it happen.

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