

Gazette

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

A NOTE FROM THE EDITOR

The lead item in this *Gazette* is the new CSWP Charter. A glance at the Charter shows that the Committee has broad interests in furthering the cause of women in physics in undergraduate and graduate education and in their careers. Since scientific curiosity usually occurs before college, secondary education is important as well. CSWP activities therefore cover a lot of ground, from awards and professional recognition for established women physicists to nurturing an interest in science in young people.

One recent example of CSWP work in the area of professional recognition has been to compile statistics on the election of women to fellowship status in the American Physical Society. These data show that neither the number of women fellows nor the rate of election

to fellowship reflects the fraction of women in the field. The CSWP has called attention to this problem by writing the various divisions of the APS, since most fellows are nominated through these channels.

Another item in this issue is the abolition of the Panel on Faculty Positions for Women Physicists. This is an example of an attempt to increase the tenured women faculty in Ph.D.-granting institutions, which did not work. The CSWP will continue to explore other means to achieve these goals. University procedures for hiring faculty form a very complex subject.

The CSWP continues to maintain a list of women colloquium speakers, which was credited with 50-75 invitations. Some funds may be made available through the APS to defray expenses of women colloquium speakers and thus to encourage their invitation. This is a very positive activity. Be sure to send us current information regarding your participation in the Colloquium Speakers List.

The article in this issue by Mary Beth Ruskai, reprinted from *The Scientist*, discusses the question of nurturing, and points out that interesting more girls in science would result in interesting more boys in science as well, by changing the public perception that science is somehow eccentric and nonconformist.

Lee Pondrom, CSWP

The CSWP is indebted to committee member Robert S. Knox for his work on the new charter, as well as for the faithful and timely minutes he produced during his tenure as secretary of the Committee.

Revised Operating Charter of the Committee on the Status of Women in Physics of the American Physical Society

The purpose and charge of the Committee on the Status of Women in Physics (CSWP) shall be:

- (1) to maintain a base of information, both statistical and qualitative, about the status of women in physics, in order to inform the Society and to form a basis for recommendations to correct any existing inequities;
- (2) to maintain a roster of women in physics;
- (3) to assist women physicists with special employment problems and employers seeking women physicists, both through its own devices and in collaboration with the placement service of the American Institute of Physics;
- (4) to produce a newsletter relating to issues affecting the status of women in physics;
- (5) to provide advice to organizations seeking members of review panels, members of committees, nominees for

The editor for this issue is Lee Pondrom; assistant editor is Amy Halsted.

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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.

(7) to consider the special problems of attracting women to physics courses and programs at all levels of the educational process, and the special problems of keeping them there, ultimately to make recommendations possibly in collaboration with the committees on education and minorities;

(8) to prepare material for women describing the kinds of rewards and opportunities associated with a career in physics;

(9) to organize sessions on women in physics at meetings of the Society for the purposes of examining problem areas and of informing the membership about women's status in physics;

(10) to report annually to the Council on the status of women in physics and

the outstanding problems remaining to be solved;

(11) to recommend its own dissolution when a stable and equitable environment for women in the profession has been reached.

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WHY WOMEN ARE DISCOURAGED FROM BECOMING SCIENTISTS by Mary Beth Ruskai

In recent years, concern about the underrepresentation of women in science, particularly the physical and mathematical sciences, has increased, motivated by both equity considerations and the growing shortage of United States scientists and engineers. In contrast to the traditional focus on questions of ability and discrimination, a new issue has come to the fore, namely, the assertion by some gender theorists that science is inherently masculine, where masculine is understood as a cultural rather than as a biological construct.

Unfortunately, the gender difference debate also has developed in ways that seem to perpetuate stereotypes about science and scientists. Such assertions that science is not creative, that science is not intuitive, or that scientists use numbers as their whole means of discovery are common. Critiques based on such notions not only are incapable of generating constructive criticism, but also may actually contribute to the cultural milieu that discourages women from pursuing careers in science.

That stereotypes play an important role in a student's decision to study science becomes evident if one examines statistics on high school physics compiled by the American Institute of Physics (AIP). AIP's figures indicate that in the U.S., 26% of boys study physics, while only 14% of girls study it. While much can be made of the nearly 2:1 ratio of male:female, it is insightful to also consider the complementary data, that is, that 74% of boys and 86% of girls choose not to study physics. Thus, the overwhelming majority of children of

both sexes do not study physics. One implication is that, for most children, this decision is made before they have any interaction with a physical scientist. Thus, their decision must arise from whatever perceptions about science, whether true or false, exist in our culture. Another implication is that, even for boys, studying physics is a distinctly nonconformist activity.

While the statistics may be less extreme in other fields, the pattern is similar. Girls are less likely to take the advanced math or computer science courses, where they are most likely to encounter an instructor who conveys enthusiasm about mathematics rather than routine skills. Although it may be acceptable for boys to be computer experts in the sense that it is not "unmasculine," such interests are nonetheless regarded as "nerdy," rather than virile or socially attractive. At the adult level, although most engineers are male, it is also true that most men are neither scientists nor engineers. The societal perception of science as eccentric and nonconformist presents a challenge to both sexes. But the point here is not that "men have it tough too," although that may be true. Rather, it is that women face a double social barrier because science is regarded as both unfeminine and nonconformist. Indeed, because of especially strong and longstanding social pressures on girls to conform, the perception of science as eccentric may well be an underestimated factor in its perception as unfeminine.

We need to assure that more women have the opportunity to develop their scientific interests and abilities. However, there is an important, but subtle, distinction between this laudable goal and the suggestion that more women scientists are necessary to make scientific careers more socially acceptable for women. It is debatable whether, in a perfect world, 50% of physicists would be women; however, it is certain that more than 50% of women would not be physicists. The acceptability of science as a career for a woman should not be dependent on the percentage of physicists, chemists, or mathematicians who are women.

One difficulty with the gender-difference theory is that it necessarily emphasizes normative behavior, while ignoring the much greater differences

that exist among individuals within a given category, whether that category is defined by gender, ethnic classification, or some other parameter. Significant gender differences exist only when masculine and feminine are defined in terms of narrow cultural norms, some of which are peculiar to our North American society. There is, no doubt, opportunity for interesting sociological research in this vein; however, there is also a grave danger that studies of gender differences will aggravate the existing emphasis on conformity to the norm, rather than encouraging women to pursue a greater diversity of interests.

Gender theorists often describe science as objective, abstract, analytical, unfeeling, and masculine. While science certainly possesses some of these attributes, characterizing it solely in these terms, while ignoring its creative and intuitive sides, constitutes a double error. Not only does it present a very inaccurate picture, but also it sets up a supposed contradiction between scientific values and traditional intuitive, nurturing, feminine ones. For example, abstraction has been described by some gender theorists as the opposite of feminine "connected reasoning," but these theorists ignore the fact that one important consequence of abstract reasoning is the ability to find connections between seemingly dissimilar entities. Or, to be more concrete, consider double-blind drug trials. To read the popular press, one would think they were invented solely to satisfy data-hungry scientists, despite an abundance of evidence that such trials are essential to benefit humans and minimize harm. Indeed, it was the collection of objective data that finally halted the practice of treating breast cancer with debilitating (and unnecessary) radical mastectomies, a procedure that was an intuitively appropriate response to the prevailing theories about the way cancer spread. Finally, one ought not forget that objective measures, including test scores, often played an important role in convincing skeptics of the past that women were capable of many things, such as scientific achievement, at times when female inferiority was commonly regarded as intuitively obvious.

Despite my criticisms of the school of gender theory alluded to above, I do think that those who attribute the gender differences we observe to cul-

ture are correct. Indeed, studies of both adult women, such as physicist Barbara Wilson's survey of women scientists in various countries, and of children, such as mathematician and math educator Gila Hanna's comparison of math scores of children in 20 different countries, provide ample support for this view. Hanna's work also can be interpreted as supporting the hypothesis that girls and boys may respond differently to good or bad educational practices. (She found a statistically significant sex differential in only one country whose students had very high geometry scores, whereas boys significantly outperformed girls in most countries with low scores, including the U.S.)

For example, if boys are more likely to explore things on their own, they may learn to use a computer even in the absence of quality instruction or encouragement. Conversely, there is evidence that girls thrive in high-quality, but gender-neutral, science education environments. High school "intervention programs" and "math anxiety workshops" undoubtedly have a role in our imperfect society, but improving basic math and science education for all students is more important. Emphasizing intervention impresses me as expending a lot of effort trying to cure what ought to be a preventable disease.

It is also worth pointing out that the most successful workshops, whether for girls or for ethnic minorities, are those that challenge students rather than those that offer remedial work. Improved basic education not only means development of better essential skills for all students, but also must include programs to encourage and stimulate talented students. That the attrition rates of science students are higher for girls than for boys is a serious concern; but it also is significant that dropout rates are high for both sexes. People studying educational reform have observed that (with the obvious exception of women's colleges) schools with high success rates for women often have above-average retention rates for both sexes. To paraphrase an old adage, "what's good for women is good for science."

To summarize, increasing the participation of women in science requires changes in both the educational system and societal perceptions about science.

I would encourage all scientists to involve themselves in both efforts. I do not believe constructive change will result from slick publicity efforts by professional societies. Rather, scientists must seek more opportunities for interactions with nonscientists; individual scientists should make a particular effort to increase their contact with children. We must all try to share our joy and enthusiasm for science with a wider audience.

Mary Beth Ruskai is a professor of mathematics at the University of Lowell, Mass.

HONORS, AWARDS, OPPORTUNITIES

- Luisa F. Hansen of Lawrence Livermore National Laboratory was chosen as a Fellow of the American Nuclear Society in November 1989. The citation reads "For development of the Lawrence Livermore National Laboratory pulsed sphere program; and for accomplishments in the measurements of neutron cross sections for defense programs; also for fission, fusion, and radiation shielding efforts in the United States and worldwide."
- Esther M. Conwell was recently elected to the National Academy of Sciences. Conwell is a research fellow at the Xerox Webster Research Center and a former member of the CSWP.
- The 1990 Laura Eisenstein Award has been awarded to Sarah A. Hughes. The award recognizes that woman at the University of Illinois at Urbana-Champaign who has achieved academic excellence in her undergraduate studies or who has distinguished herself in teaching or research while pursuing a graduate degree. Hughes is a graduate student doing research on experimental nuclear physics on the JETSET detector at CERN with Assistant Professor D.W. Hertzog. The CSWP extends its congratulations to Ms. Hughes.
- Priscilla Auchincloss of the University of Rochester has been chosen as the 1990-1991 APS Congressional Fellow. She will spend a year in Washington, D.C. on the staff of a member of Congress or working with a Congressional committee that deals with sci-