The Measure of a Meter

In "Femtosecond Comb Technique Vastly Simplifies Frequency Measurements" (PHYSICS TODAY, June, page 19), MIT's Daniel Kleppner is quoted as saying, "The definition of the meter is based on the measurement of the frequency of light, which means that an ultra-precise length measurement requires an optical frequency." In 1983, the meter was redefined based on the speed of light. The official SI definition is: "The meter is the length of the path travelled by light in vacuum during a time interval of 1/299 792 458 of a second."

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KLEPPNER REPLIES: This is a case where the legal definition of a unit seems to be at odds with common sense, for nobody knows how to measure a time interval of "1/299 792 458 of a second," much less mark the distance traveled by light in that interval. However, one can count the number N of interference fringes of light with a known frequency f as the arm of an interferometer is displaced. The displacement D is then given by $D = N \times c/f$. This operational definition of distance became practical only when practical ways were devised to measure the frequency of light.

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Women Authors, Scientists Critiqued

In his condescending review of Ruth H. Howes and Caroline L. Herzenberg's *Their Day in the Sun: Women of the Manhattan Project* (PHYSICS TODAY, July, page 59), Benjamin C. Zulueta exemplifies the exclusionary mind-set that the women delineated in the book had to put up with throughout their careers. It was their catch-22 to be constrained to minor positions and thereafter to be dismissed as minor themselves.

To support his derogation of the book, Zulueta picks the nits of the authors' language (passive constructions) and research methods (questionnaires), and ignores their extensive bibliography (dead women don't answer questionnaires!). He further criticizes the authors for not adhering to Stephen G. Brush's dictum about not glorifying a woman's achievement if the same achievement by a man would not elicit equal glorification. In actuality, a far higher rate of the converse has occurred: if a woman did it, "it" could not be significant (or else credit went to her male lab director).

Had Zulueta read the book carefully and open-mindedly, he would have found greater understanding in the hindsight of other men, who provided the authors with positive professional impressions about the women they had known on the Manhattan Project. Among the men cited in the book's prologue for their contributory information are H. H. (Heinz) Barschall, Glenn Seaborg, and Edward Teller. Most significant, some of those nominally minor women, putatively undeserving of recognition, defied the prevailing prognoses and became major: Isabella Lugoski Karle, Leona Woods Marshall Libby, Maria Goeppert Mayer, Edith Hinkley Quimby, Mina Rees, and Chien-Shiung Wu, to list only the most obvious and indisputable examples.

The book is not free of shortcomings, which have been variously pointed out in other reviews.[1] But those other reviews are much more balanced, having been composed without presumptions.

Reference

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ZULUETA REPLIES: I regret that Frieda Stahl has misinterpreted my criticisms of *Their Day in the Sun: Women of the Manhattan Project* as evidence of a position that I do not hold. My review argues not only that the women who participated in the Manhattan Project are worthy of recognition, but that the story of their contributions deserves further investigation and analysis, especially for what it promises to reveal about gender discrimination, both in science and in the histories of science.

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Physics Students Are Masters of Industry

The article entitled "Physics Graduate Programs Train Students for Industrial Careers" (PHYSICS TODAY, August, page 39) was interesting, but it raises two troubling issues. First, only two ongoing physics programs that stress academic collaboration with industry are mentioned, and both are at foreign institutions (in Sweden and Ireland). Second, the article emphasizes only PhD-level programs. [For a look at similar master's-level programs, see PHYSICS TODAY, June 1999, page 54.]

We believe that industrial opportunities are much more prevalent at the MS level, so significant educational emphasis should be focused here as well. The University of Texas at Dallas (UTD) has just begun offering a master of science degree in applied physics.[1] Texas Tech University[2] and the University of Oklahoma[3] already have such programs in place.

The UTD focus is to reinvigorate the physics department, establish closer ties with industry through internships and summer employment, and offer opportunities for interdisciplinary research. Distinct from our PhD track, the new program is made up of courses that emphasize breadth of exposure over depth of coverage.

In the UTD program, almost half of the required credit hours can be chosen from other university departments, including chemistry, biology, computer science, electrical engineering, and operations research. This breadth of course choices allows students with industrial experience to select the combination of courses that will best enhance their career opportunities. Time will tell whether this new degree program will successfully augment our enrollment, but early indications are promising.

References

1. http://www.utdallas.edu/dept/physics/ MSAP.htm.
2. http://www.phys.ttu.edu/msi.
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