

Women...in physics

Female physics students are just as capable as their male counterparts.

Walter C. Michels



Physics Today **1** (8), 16–19 (1948);

<https://doi.org/10.1063/1.3066227>



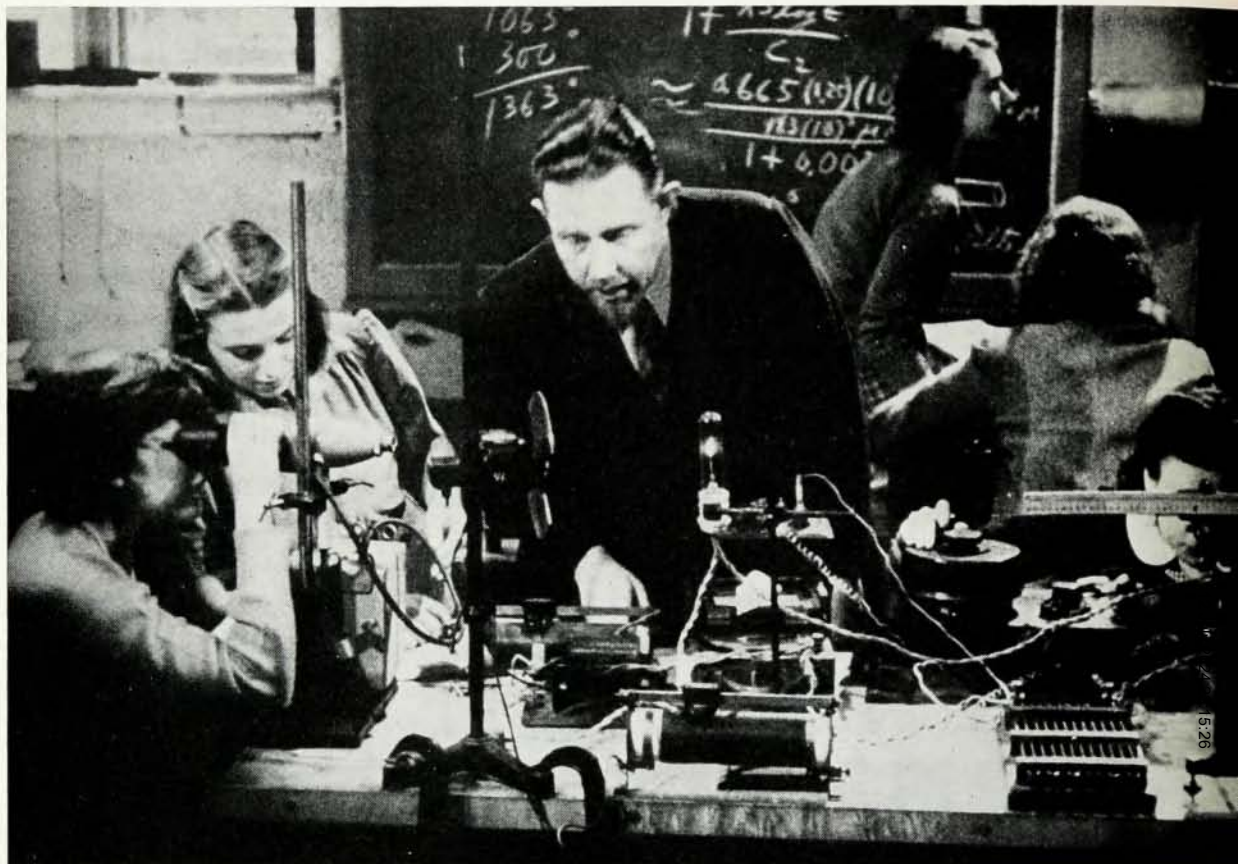
View
Online



Export
Citation

CrossMark

WOMEN



Bryn Mawr College

... IN PHYSICS

by Walter C. Michels

Each stranger we meet through a mutual friend
Asks us the same question, world without end,
No slight variation does providence send
When they hear that we teach at Bryn Mawr.
"Tell me what is it like to be teaching these girls?
Do you find that they have any brains?
Do they take themselves seriously (may I ask) or do you?"
And my answer is always the same.

—By S. J. Herben, 1935. To be sung to the
tune of "The Man on the Flying Trapeze."



It was a little over sixteen years ago that I accepted, with considerable inward doubt, a teaching appointment at Bryn Mawr College. My previous teaching experience had been with men and the few women physicists I had known had not created an overwhelmingly favorable impression. It was my intention at the time to spend not more than a few years at a women's college. Yet I am still teaching there and enjoying it.

Because people are curious to know whether women can be good physicists and because of the part women can play in a world which is short of technically trained people, the questions put in the above verse deserve an answer. I do not pretend to have made an objective study of women's place in physics but I can summarize my impressions of several hundred women students in physics—graduates and undergraduates—and of the professional women physicists I have been fortunate enough to know.

Dolls vs. Construction Sets

It would be silly to pretend that there is no difference between the teaching of men and of women, particularly at the level of the introductory course. The students who come to any institution are the products of complex environments which affect their abilities and interests in many ways. In particular, social pressure encourages the small boy to do things, while it encourages the small girl to look and act nicely. As a result, the average feminine freshman

comes to college without the mechanical and electrical background which her brother has acquired. She is not likely to have used tools to any great extent, she has probably not been a radio ham, and she has therefore never obtained that rule of thumb grasp of physical principles which an instructor can use as a springboard. On the other hand, her lack of concentration on such hobbies has allowed her, if she is blessed with reasonable intelligence, to develop added interest in broader questions and has prevented her from storing up misconceptions which must be overcome in her first course in physics.

The introductory course designed for women students must, if it is to be successful, take their peculiar background into account. It must place more emphasis on the laboratory than the usual course does, and must use the laboratory to develop those manual skills which the average man brings to college with him. On the other hand, the theoretical part of the course for women can emphasize, without arousing their impatience, those general principles which makes physics a unified theoretical science rather than an empirical one, and the methods by which we have reached our understanding of the physical universe. For example, it has been my experience that women students accept the ideas of special relativity and of wave-particle duality with considerably more ease than men, merely because they have less background—which we used to label “common sense”—than men do.

Those of us who have tried to adapt our courses for women are fairly well convinced that a woman with an aptitude for physics can, in the course of a year, overcome a large part of the disadvantage from which she suffered at the start and that she can in that time advance at least as far in theoretical concepts as can a man of equal ability. Consequently the intermediate and advanced courses which are planned for her need not differ greatly from con-

Walter C. Michels, distinguished by a red beard and a deep, booming laugh (among other things) is professor of physics at Bryn Mawr College in Pennsylvania. He has taught there since 1932, with the exception of the war years, which he spent with the Navy.





ventional courses for men. There is one difference, however, which is likely to become increasingly apparent as students begin to acquire professional competence. It is very difficult to persuade most women students to develop the degree of self-confidence which is desirable in professional work and which comes naturally to most men.

The tendency to defer to the superior male has such strong social advantages that it has become deep-rooted. Here, unless she can differentiate clearly between her intellectual and social life, is one of the greatest handicaps of the professional woman. The ability to make the necessary differentiation varies widely from individual to individual, but, given reasonably sympathetic surroundings, most capable women can reach a satisfactory compromise. Of the students I have known, one of the most successful in this respect was a very attractive blonde who could meet colleagues, male or female, with a sharp and critical mind but who, on a social occasion, gave a convincing performance of being without a brain. I later had the opportunity to observe her in a laboratory job and was pleased to find that she could carry out the same division there, in spite of the fact that she spent many evenings with her daytime colleagues. Neither she nor they suffered from this procedure, or seemed to resent it in any way.

On the Job

A more important issue is the performance of women physicists after they have completed their college work and are ready for graduate or professional activities. The research record of women physicists like Lise Meitner, Katharine Blodgett, Rose Mooney, and Edith Quimby shows that the best women can do work comparable with that of the best men. The average employer or university department head, however, can expect to get the

proven best only occasionally. He is more interested in deciding whether a young and untried woman is worth employing or admitting to a graduate school in competition with men having academic records similar to hers. The questions frequently asked in an effort to make this decision are: Will she show sufficient initiative to enable her to carry on more than routine work? Will she trade on her femininity to avoid unpleasant jobs? Will she take her profession seriously, or will marriage be her only real concern?

Among the fifty or so graduate students and assistants who have passed through the Bryn Mawr physics department in sixteen years, difficulties of the sort implied by these questions have occurred, but the fraction of unsatisfactory students has not been much greater than is expected among men. Beginning graduate students have frequently suffered from the same lacks of mechanical aptitude and self-confidence that have been remarked in undergraduate work. Generally it takes only a few months to separate those in whom these difficulties are intrinsic from those in whom they are a result of faulty undergraduate training. Since ten of our graduate students have satisfactorily completed work for the master's degree and another ten for the doctorate (six here and four in other institutions), the ability of women to overcome their initial difficulties seems to be reasonably well demonstrated.

Do women continue professional work for a long enough time to justify the effort spent on them? The whereabouts of the twenty degree-holders just mentioned may help to answer the question. Three of them are in industrial laboratories and five in government laboratories. Five of the ten doctors are engaged in college teaching or in academic research, and five of the masters are continuing their graduate work. Only two of the twenty, therefore, are not today engaged in professional activities, and

both of these expect to return to physics actively when their children are a little older. Both, incidentally, are married to scientists, and keep in close touch with the work of their husbands.

It is interesting to note that at least a quarter of our graduate students married before or during their graduate careers. I will choose just one of them to show how well a professional career and marriage can be mixed. She came to Bryn Mawr after taking her bachelor's degree in a large co-educational college. Completing her studies at the master's level, she went to work in an industrial laboratory, where she spent several years. During this time she married and then left work to have her first child. Now she has two boys. Between times, however, she has done part-time teaching and research and has been highly valuable in her community as a physicist, available during a period when competent people were very hard to find.

The success of the women physicists I have known convinces me that much of the feeling against women in both academic and industrial laboratories results only from prejudice. The woman I have just mentioned is a case in point since she was the first woman employee that the particular laboratory had hired for technical work. Ever since she broke through the wall of resistance, however, the laboratory has sent us repeated calls for other women physicists. In another instance a government laboratory took in a few women under pressure of the war. Within three months the personnel officer was asking for more "just like the others," and the laboratory has used women in technical positions ever since.

The cumulative effect of hiring women shows up in papers published by the various physical journals. It happens that the optical industries started, even before the war, to employ some women in technical positions. A look at the title pages of the *Journal of*

the Optical Society of America for the first six months of 1948 shows that, out of sixty-six long papers published, one was written by a woman and that women were joint authors of another five. On the other hand, the *Physical Review* (which is more typical of general practice) during the same period carried 165 articles, other than letters to the editor, of which only two showed women as joint authors. While these figures by themselves are not statistically significant, they show a tendency toward the continued use of women in those laboratories where the ice has once been broken—with apparently no disrupting effects.

The high proportion of joint authorships is typical of women physicists, but it is not necessarily an evaluation of the responsibilities of the work they can do. Too many women are satisfied to continue indefinitely as assistants to men, not because they like it but rather because they feel it is what they deserve. As pleasant as it is for the men to have these loyal assistants at their beck and call, this means a waste of some of the country's brains and it is the job of every academic or industrial laboratory that deals with women to encourage them to more independent work.

It has been repeatedly emphasized in recent years that this nation faces a serious shortage of trained physicists. Part of the gap can be filled if wise employers will make increasing use of capable women. This may mean changing personnel policy somewhat—to provide maternity leaves, for example, or to offer women beginners special encouragement toward independence. But tapping a source of "manpower" now largely neglected would far more than justify these changes. The experience of the governmental laboratories, where discrimination against women is at a minimum, and the experience of the armed forces during the war point the way for the rest of us.

