Why so few women in science?

by Dan Falk

Part 1, in last week's Gazette, began with a look at the numbers indicating the under-representation of women in science, especially the physical and mathematical sciences. Part one ended with a look at the male image of science, which is where we continue with Part 2:

Debbie Hanley, a fourth-year physics students, says that the male image of disciplines like physics may be a deterrent to women who might otherwise choose that field of study. She and classmate Gisia Beydaghyan are the only women in their class of eleven.

"Some women would be scared (to take physics)," Hanley says. "A girl would feel she'd really have to prove herself." A girl's experience in high school may be the deciding factor, she says. "Chances are, you had male teachers in physics and chemistry. If you had a woman as a science teacher, it was probably in biology."

Lamothe says a woman considering a non-traditional subject for study may be intimidated at the thought of being the only female in a class.

Since one needs to study science in order to become a professor, and so few women are choosing to study in science, a self-perpetuating situation results. "A problem like this needs to be worked on from both ends," says Dr. Betts. "It can't be solved overnight."

The only field where women make up a smaller proportion of the total students than in physics is in engineering. In Canada, only 12 per cent of engineering students are women — in other words, men outnumber women by more than seven to one. The proportion of women in certain sub-groups is even smaller — only eight per cent for mechanical and electrical engineering.

The small proportion of women in engineering has received a great deal of attention since the murder of fourteen women engineering students in Montreal last year. Engineering schools have been under the spotlight, accused of promoting activities that make women unwelcome.

Role Models

Everyone agrees on the importance of role models; women scientists that have at least some contact with children would enable girls to "picture themselves" in those roles. Women science teachers and professors can probably do the most to show female students that a career in science is a real possibility.

Among university faculty, the proportion of women in science fields is very small. In Canada, 16 per cent of full-time professors in the social and life sciences are women. In mathematics and the physical sciences, only five per cent of professors are women, and in engineering and the applied sciences that figure drops to two per cent.

Like other universities, Dalhousie has an affirmative action hiring policy. This means, essentially, that if a choice is to be made between equally qualified men and women applicants, the position will be given to a woman. But policies of this sort are only helpful if qualified women apply for the positions.

Women have faced blatant discrimination or harassment

Discrimination?

Women have faced discrimination in many non-traditional fields, and science is no exception. How big a problem is this today? It seems almost impossible to make generalizations: some women have faced blatant discrimination or harassment, while others seem to have had much more positive experiences.

But at Dalhousie, not everyone's view is that bleak. "If anything, more doors have opened to me because I am a woman scientist than would have been open to me otherwise," says Dr. White. "I think I'm just young enough that I came through with a group of people who have always been treated quite well. Most women chemists of my age group haven't had much difficulty."

Dr. Jamieson's story is also a very positive one: "I have no complaints about my own experience." She adds, though, that there used to be problems for women geology students looking for work. Petroleum and mining companies, which provide large numbers of geologists with their first jobs, simply "didn't hire women, period." She says this was mostly because employers thought there would be trouble in the field camps. "This discipline used to be very male-dominated," she says, but points out that things have improved a great deal since she was a student.

Lack of Encouragement

Acording to Dr. Betts, since students get their views from a combination of sources — teachers, counsellors, parents, peers — there is probably no particular group that is primarily to blame for promoting "traditional subjects" for boys and girls.

However, one sometimes hears of teachers and guidance counsellors — the people who have the greatest opportunity to encourage girls to enter non-traditional fields — actively discouraging them from doing so. Dr. Betts knows of instances where guidance counsellors (both men and women) admit they don't encourage girls to take physics because "it's too hard for them." Dr. White knows of similar occurences; for example, girls who were told in school, "Don't worry about math — it's not important for a girl."

Parents, too, have the responsibility of giving the same encouragement and support to a daughter as to a son — even if the subject she shows interest in is not a "traditional" one.

The Mathematics Issue

Over the years, many have suggested that women simply aren't as good at mathematics as men. Today, most researchers say that sex-related differences in performance on math tests don't show up until adolescence. In her editorial in the *American Journal of Physics*, Button-Shafer writes, "Most mathematics educators believe that girls and boys are about equal in mathematics achievements up to their teens," and she gives references to research that supports the claim.

In a recent Canadian study, Roberta Mura, Meredith Kimball, and Renee Cloutier found that when differences in performance between males and females do show up, it is usually on standardized math tests that measure learning both inside and outside the classroom — on this type of test, boys, on average, score better than girls. But when tests cover mathematical skills learned only in school (i.e. material which girls and boys had received equal training in), no sex-related differences are found.

What can be done?

Besides the affirmative action policies already mentioned, scholarships and other financial assistance can provide incentive for women to pursue science at all levels of university education.

The Natural Science and Engineering Research Council (NSERC) has recently introduced a series of scholarships for women in the sciences. A 1989 NSERC strategy document stated: "NSERC will also develop means by which it can encourage more women to enrol in science and engineering programs."

The need for better-educated science teachers is another concern. Making children more aware of science at an early age would encourage girls as well as boys to consider science as a career.

Dr. Jamieson says scientists need to speak directly to school children, to say, "This is what I do: you can do it too if you keep up your grades." Dr. White agrees: she will soon be talking to a grade two class about temperature.

Lamothe suggests raising the minimum number of math and science courses required to get a university degree. She also says raising such levels in high school would mean men and women would have the same choices open to them when they reach university.

Today, the world around us is rapidly changing, largely for the better, and science, as much as anything else, is helping to bring about these changes. It would be most unfortunate, to say the least, if women were left out of these developments. The time to put science in the hands of both women and men is now.