Why so few women in science?

by Dan Falk

We are now in the 1990s, and women are active in many professions that only a few decades ago were virtually closed to them. But science is one area where, even today, women remain a minority.

While more women are employed as scientists today than ever before, they are still vastly outnumbered by men in most fields. In Canada, about five per cent of men earn their living as scientists, compared with just one per cent of women.

Many of the barriers that once prevented women from entering science have been greatly reduced over the years. Most importantly, a university education — essential for the pursuit of a career in science — is now fully available to women as well as men. And, in fact, women and men do attend university in nearly equal numbers in Canada today. However, a significantly smaller proportion of women are studying science in univeristy than men.

"When the time comes to choose a career, many girls, for a number of reasons, don't see science as a logical choice, even if they have some talent in that direction," says Dr. Rebecca Jamieson, a geology professor at Dalhousie. She is the first (and so far the only) woman on the faculty of that department.

Disproportionate numbers

It is the physical sciences, including mathematics and engineering, where the underrepresentation of women is particularly acute. As shown in Fig. 1, about 45 per cent of Canadian women undergraduates are studying some aspect of science, compared with 62 per cent of men. But consider how these students are distributed over the various sciences: 39 per cent of women study the social or biological sciences, just slightly larger than the proportion of men (37 per cent). But only six per cent of women study math of the physical sciences, including engineering, compared to 25 per cent of men. So while men outnumber women overall in the sciences, the actual numbers vary considerably, depending on which discipline we look at.

Fig. 1

Undergraduate enrolment (Canada)
(Statistics Canada, 1987/88)

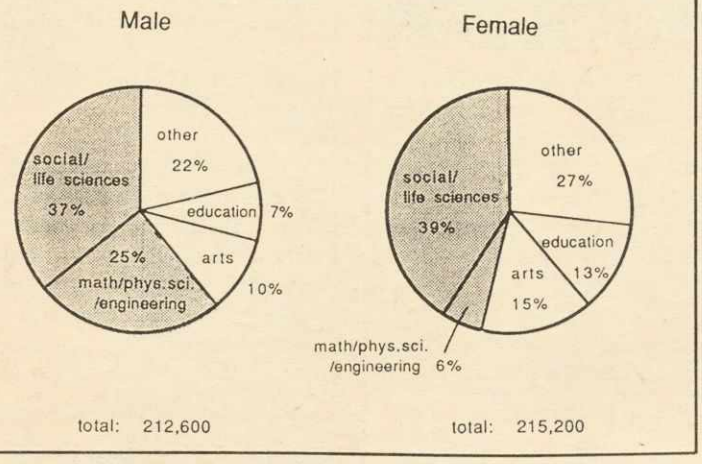

Figure 2 shows the numbers of men and women undergraduates in eight branches of science, including engineering, in Canadian universities. Clearly, women form the majority in certain fields. For example, almost three quarters of psychology undergraduates are women. Biology is about 50-50, while men outnumber women by a wide margin in mathematics and the physical sciences.

These figures are reflected here at Dahousie. At the undergraduate level, women are the majority in four disciplines within the Faculty of Sciece — biochemistry, biology, microbiology, and psychology. In the remaining seven areas, women make up less then one third of enrolled students. The figure ranges from 32 per cent in chemistry to 13 per cent in engineering. In the social and life sciences as a whole, women make up 59 per cent of Dal undergraduates, but in mathematics and the physical sciences, women account for only 20 per cent of students.

Science as a Career

Dr. Donald Betts, Dalhousie's Dean of Science, points out a major distinction between the career plans of life-science students and those in the physical sciences: many women studying towards a degree in the biological or social sciences still don't see science as a career, but rather they see their degree "as a stepping-stone to a career in pharmacy, medicine, dentistry, or some other health-related profession." Dr. Betts says this applies to both men and women students.

The large numbers of women enrolled in biology or psychology don't translate into large numbers of women seeking careers in those fields. "From my conversations over the years with women students in the Faculty of Science," says Dr. Betts, "many of them don't regard their career options as including becoming a professional scientist, even though they're doing a degree in science."

"I think women are pragmatic," says Dr. Mary Anne White, a professor in the Chemistry department. "They want to do something they think is going to pay off." She also points out that many women may not know what science can offer them: "If they don't know what a career in science is all about, they're not going to take that as their career path."

Both Dr. Jamieson and Dr. White expressed concern over the drop in the proportion of women between the undergraduate and graduate (especially Ph.D.) levels. Dr. White suggested that women are less pressured than men to "stick with it", and may give up more easily. The proportion of women among Master's students is lower than the corresponding undergrad figure in virtually all the science fields, and lower still among Ph.D. students.

The need for mobility can be another potential barrier. "If you get a Ph.D. in chemistry, you're almost certainly going to have to move out of the province where you're studying," says Dr. White. "You may even have to leave the country." She points out, though, that this can be a plus, especially for unmarried women who may welcome the opportunity to travel that a science career can offer.

Women who plan to marry and raise a family may also feel that such plans could conflict with the pursuit of a career in science. Some people (both women and men) are put off by the long time period one has to spend in university to become a scientist — typically ten to thirteen years from high school graduation to completion of a Ph.D.

Reina Lamothe, a Ph.D. student in the physics department, points out that while raising a family and maintaining a carrer at the same time is a problem for women in other professions as well, it is particularly relevant in the "publish or perish" world of the research scientist. In some fields, like solid state physics (where it seems a new advance in superconductivity is announced every week), it might be impossible to catch up after a three-month absence.

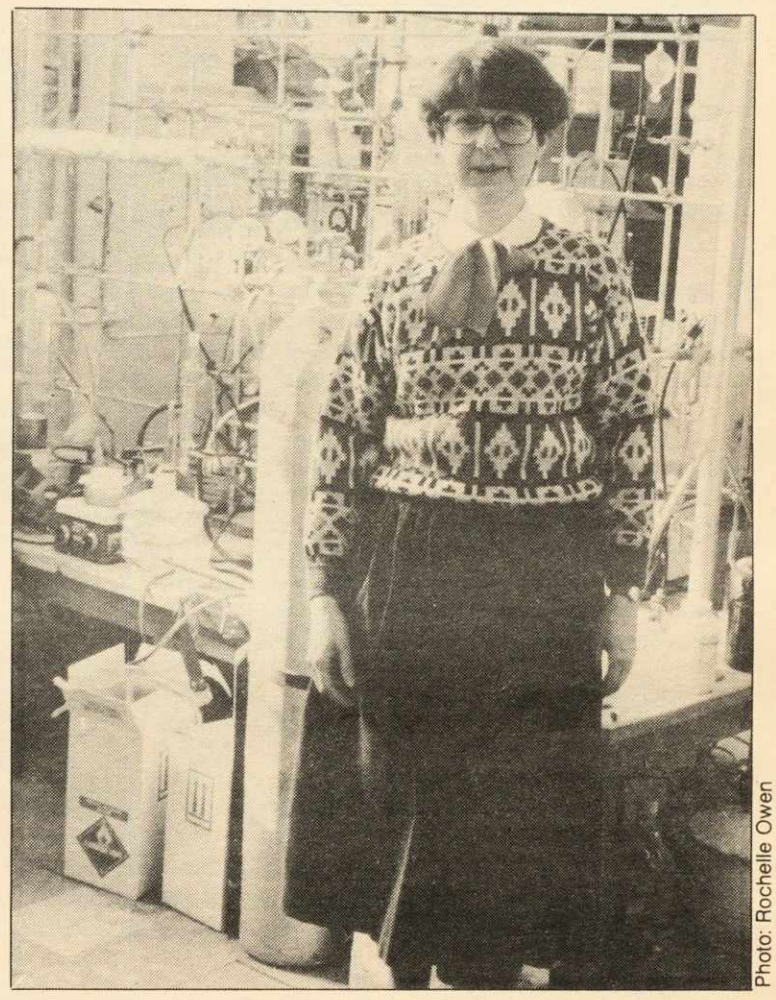

Photo: Rochelle Owen

Dr. M. A. White: Many women "don't know what a career in science is all about."

The Male Image of Science

Perhaps the single most significant barrier faced by women who consider studying science is the idea that science is a profession for a man, and that it's somehow "inappropriate" for a woman.

"We have to go back to junior high school, where students begin to get the idea that science is a boy's subject, or a career in science is a man's career," says Dr. Betts.

In a recent editorial in *The Physics Teacher*, Judy Franz writes, "upon entering 'nontraditional fields,' people still receive subliminal messages that say: 1) you are strange, and 2) strange is bad." In another physics journal, Janice Button-Shafer says that "a major problem for a young girl is her fear of being considered a 'nerd' or at least somewhat eccentric if she shows interest in physics ideas."

Dr. White agrees that the 'nerd' stereotype is a problem: "There's still a pervasive attitude among youths that scientists sit around wearing lab jackets and thick glasses," she says. "A lot of girls aren't attracted to a life that they think only includes people like that for social interaction." She adds that such stereotypes simply aren't valid: "Science can accommodate people of all personalities."

Next week: role models, discrimination and more

Fig. 2 Undergraduate enrolment in Canadian universities in eight branches of science (including engineering). The percentages shown are the proportion of females within each particular field.
(Data from the academic year 1987/88 -- Statistics Canada.)