"Women's Work" in Canadian Chemistry

by Marianne Gosztonyi Ainley

L'auteure fait un exposé rétrospectif sur le rôle joué par les femmes dans l'histoire de la chimie canadienne, la façon dont elles ont été marginalisées, rendues invisibles ainsi que la discrimination dont elles ont été victimes. L'article nous dit comment on peut utiliser l'examen des facteurs historiques ayant abouti à cette situation pour effectuer des changements aujourd'hui.

Women have been active in Canadian science for more than two hundred years, but few of them have been known outside their small circle of colleagues, family and friends. Why is this so? One of the major reasons is that most women in Canadian science perform what we refer to as "women's work." This is work done largely by women because they are considered suitable for it—it is the work that is assigned to them by a society that is run by men. To a large extent, it is work that men do not want to do, such as taking care of themselves, their bodies, their homes, or the boring, repetitious, undervalued jobs at the work place. Women's work is often taken for granted, and, it remains invisible.

Women's work has been a reflection of their subordinate position in society—and women's subordinate position is located in the work they do. Unemployment, underpaid employment, and part-time employment is more common among women than among men, and when women have full-time employment there is often segregation at the work place. This segregation can be hierarchical, lateral, and a combination of the two. Women in Canadian science have experienced them all.

Canadian women were doing scientific work long before the end of the 19th century. Many of these women were settlers in Upper Canada and the western provinces, or members of the British aristocracy whose presence in Canada depended on their menfolks' work in this country. Most of these women were wives and mothers because, before the institutionalization of scientific work, family life and science were not considered mutually exclusive.

Towards the end of the 19th century, when higher education became a reality for white Anglo-saxon women in Canada, science was also in the process of becoming institutionalized. Several branches of the Canadian government provided job opportunities for male scientists, and a few also began to employ women to do certain types of science related jobs. During the same period, an increasing number of private schools, colleges, and universities employed women teachers. Hospitals needed trained people in scientific and science-related occupations: doctors, nurses, dietitians, laboratory technicians. Industrial laboratories also needed researchers and technicians. By the turn of the century, science became one of several alternatives for women seeking paid work outside the home, and the institutionalization of scientific work initially opened up new vistas for women interested in science.

Although some men supported women's efforts to become scientists, most men, socialized to think that women's place was in the home, rationalized that even with university degrees, women would only marry and leave their jobs and, as a result, there was no point in employing them in challenging, responsible scientific positions. This attitude, combined with a scarcity of interesting, well-paid scientific jobs in the late 19th and early 20th centuries led to competition for such posts. This in turn resulted in systemic discrimination and the segregation of most women into certain kinds of "women's work in science." That is, women were either channelled into certain areas of science, or segregated into undervalued, underpaid positions. Once segregated, they had few opportunities to move up in the salary scale, and to move higher up in the academic or government ladder. Moreover, professional women were expected to remain single—if they married they lost their jobs.

Chemistry has been taught at Canadian universities since the mid-19th century, and chemists have been working in government and for industry for well over a century. They have belonged to British, American, and Canadian chemistry associations, and have published scientific papers in a variety of prestigious journals. But chemistry is an elitist science. A relatively small percentage of chemistry graduates are highly visible in the chemical community by virtue of their prestigious positions, and/or important scientific papers. Many university graduates in chemistry work in lesser positions, and rarely if ever publish papers in prestigious scientific journals. Some graduate with a B.Sc. in chemistry but switch to other areas of science. Others, mostly women, drop out of the work force because of the prevailing attitude that scientific professions and family life are incompatible for women (although not for men).

Archival practices in workplaces create difficulties in researching the work experiences of chemists and there are obsta-

cles to retrieving information on all but the best known chemists. Although one can find various historical documents in university archives, only a small percentage of Canadian chemists work at universities, and there may be a 50 to 75 year restriction on access to such documents. Some of the data in the National Research Council (NRC) Archives is also restricted. The Civil Service—where chemists have been employed in the departments of Health and Welfare, Experimental Farms, Inspection Board, and Defense—retains certain restricted access files concerning department heads and division chiefs, but not others. Information on the majority of working scientists before 1960 is simply not available. Industry, the largest employer of chemists, does not as a rule keep personnel information for more than seven years after leave/retirement, while hospitals keep personnel files for fifteen years.

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The fact that few women chemists teach at universities and/or work at research institutes pursuing their own research, creates further problems for historical research. Most women chemists are employed in low paying, routine jobs as assistants and technicians in university, hospital, and/or industrial laboratories, and their names cannot be identified from lists of research grants awarded to scientists, or from journals that publish the results of scientific research.

What about scientific associations? As opposed to astronomy, physics, and biology, where scientists can be identified from the membership lists of the appropriate scientific societies, the Chemical Institute of Canada (CIC) does not regularly publish such lists. Moreover, the elitist practices of the CIC prevent many chemists from becoming members. For instance, the original entrance requirements of the CIC in 1921 stipulated that a Fellow had to be a graduate of a recognized university or college, be recommended by three Fellows..."and [have] two years' additional experience in chemistry in a responsible capacity." This requirement excluded all but one woman chemist, Dr. Clara Benson, Associate Professor of Food Chemistry at the University of Toronto, who became a founding member. In 1935 there were still only three women fellows: Benson, now full professor of food chemistry, Muriel E. Whalley, a technical translator and abstractor at the NRC (1927), and Ida McLachlan, Assistant at the Department of Preventive Medicine, Queen's University (1929). They constituted one per cent of all CIC Fellows! Benson, McLachlan, and Whalley represented food and medicinal chemistry, and library work—precisely the three areas considered suitable for women.

The requirements for associate status in the CIC were less stringent, because the "practice of Chemistry in a responsible capacity" was not crucial for this category; but in spite of the fact that dozens of women chemists graduated from Canadian universities, in 1930 there were still only two, and in 1935, six women associates—constituting three per cent of all CIC associates.

The by-laws were revised in 1932; membership criteria now explicitly stated, that "women shall be eligible....upon the same conditions as men, and in the ...By-Laws any personal pronouns shall be read as applying equally to either sex." Still, few women joined the CIC. In 1936, a membership campaign became necessary because there were "still a great many well-qualified chemists in the Dominion" who, for various reasons, had not become members. Perhaps women were not persuaded to join by this campaign, because their numbers only increased slowly in the late 1930s, and 1940s. Dr. Helen Chathaway, Mary Chisholm, and Audrey Tweedie of the NRC, Dr. Margaret Greig, of the Pulp and Paper Research Institute, and several women who taught at the various Canadian universities did not even become Associates during this period. This was perhaps because their position as researchers, lecturers, and instructors was not considered responsible enough. It is evident that in spite of what the revised by-laws stated the requirements for men and women were far from equal. D.V. Mossman, for instance, was an Instructor at Hunter College in New York, in 1935, yet he became a Fellow of the CIC in 1933. By contrast, Helen Reynolds, who taught at the Halifax Ladies College, and in 1940 became Head of the Science Department at Havergal College in Toronto, and other women who worked as University instructors (e.g. Ruth Fulton, M. A. at UBC, 1922-23, and Norah McGinnis, M. A. at Queen's, 1935-38) did not even become Associates. It is difficult to determine whether this was because no one encouraged or invited them to become members, or because they did not find three Fellows willing to write letters of recommendation on their behalf!

A clear indication of the type of thinking that has kept women out of interesting well-paid jobs in chemistry can be seen in a 1950 publication, the first vocational guidance booklet sponsored by the CIC. *The Professions of Chemistry and Chemical Engineering in Canada: A Vocational Guidance Booklet* by L. H. Cragg described the origin and development of chemistry and chemical engineering in Canada. It discussed the prospects for both chemistry and the chemical professions, the work of chemists and chemical engineers, and conditions of employment. Two out of eight tables provided relative numbers of male and female chemists. From these it is evident that in 1938, towards the end of the Depression, 55 women as opposed to 2,082 men worked in Canadian "scientific laboratories." In 1941, when women were increasingly employed because of the Second World War, 264 women worked as chemists as opposed to 7,938 men. These "visible" women were obviously the tip of the iceberg. Most others who did not work in "scientific" laboratories as researchers because they were segregated in low paying routine work, in the biochemistry labs of hospitals and quality control labs in industry, were not included in the cen-

suses and surveys. They remained invisible in the larger scientific community.

The booklet provides examples concerning the attitude of Canadian chemists towards women. For instance, while the author stressed that the "The future of the chemical profession is a very bright one," he projected that the participation of women would "probably not reach 10 per cent for many years." In a section entitled "Opportunities for Women," he explained why:

> Statistically speaking, chemistry is...a profession for men; at present indications are that it will remain so. For example, there were in December 1946, according to the records of the Bureau of Technical personnel, 137 positions in chemistry open but only 65 chemists available to fit them; at the same time there were 13 positions for which women would be accepted with 20 women chemists available to fit them! Nevertheless there are many opportunities in the profession for the strong-minded and well-qualified woman (and there would be many more if she could give a commitment not to get married and leave her work just when she had began to be of value to her firm or institution).

The author added that women were "relatively more welcome in university or government positions than in industry...Their generally-recognized competence as nurses and dietitians may in part be responsible for the fact that women are often successful in the fields of food and nutrition, and in medical and biological chemistry."

The CIC sponsored booklet, reflecting the prevailing attitudes of the times, neatly categorized Canadian women's opportunities in chemistry in the first half of the 20th century: a) They were suited for the fields of library work, and food, nutrition, and the bio-medical side of chemistry—areas that have long been associated with "women's work": cooking and healing within the family, teaching, nursing, and domestic work in the labour market; b) Only certain positions were open to women and women were not to aspire to fill positions open for men; c) Women chemists were expected to remain single. One begins to see why women graduates who had received NRC bursaries, such as Dr. Carol Robertson, later Mrs. Otto Maas, rarely had careers. They dropped out because of marriage—which was seen, by society, the employers, and even many women scientists, as incompatible with scientific careers.

How did the prevailing attitudes influence Canadian women's experiences in chemistry?

We know that by the turn of the century science became one of several options for educated women. Canadian women studied chemistry. As undergraduates they could work as assistants and demonstrators, and they continued to work as assistants and demonstrators as graduate students, and even after obtaining their graduate degrees.

From the foregoing it seems that: 1) hierarchical, lateral, and combined job segregations have been widespread in Canadian chemistry, and 2) even the most successful women scientists experienced some sort of job segregation at some point in their careers, either within their discipline or at the work place. A good example of a successful woman chemist who experienced lateral segregation is Clara Benson (1875-1964), Ph.D. 1903, University of Toronto. Although her graduate research was on mainstream physical chemistry, she found no appropriate work in her area. She switched to food chemistry—a lateral move. In this new field, considered suitable for women, she had a good career, becoming full professor and head of the department of food chemistry at the University of Toronto in 1926.

Most other women chemistry graduates experienced hierarchical segregation at the work place. Edna Eastcott (d. 1963), Ph.D. 1925, University of Toronto, remained a lecturer in the Chemistry Department until her retirement in 1960. Many hundreds of other chemistry graduates from Canadian universities worked as invisible assistants or technicians in university, hospital or industrial laboratories. Some women experienced both lateral and hierarchical segregation. Norah Toole (1906-1990) graduated from McGill University in 1929 with a B. Sc. She worked as a technician and a high school teacher in Montreal before marrying the chemist Frank Toole and moving to Fredericton in 1934. She worked as her husband's unpaid assistant until 1942 when, because of a shortage of teaching staff during the war, she became a chemistry instructor at the University of New Brunswick. She was much respected by her students and colleagues, but remained an underpaid lecturer for nearly 40 years a clear case of hierarchical segregation.

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The men who attempted to exclude women from the best scientific positions were mostly concerned with scientific work and employment in their own time, but, to a lesser extent they also wanted to avoid setting a precedent. Unfortunately, their efforts to keep women out of the mainstream of science has had serious implications both for women and for science. Few women became well-known in the larger scientific community. Their work and accomplishments are minimized, or forgotten, excluded from textbooks and histories of science. The exclusion of most women from mainstream science also means that science continues to be pursued in an androcentric way, that it has become exclusive rather than inclusive and that certain areas of science are favoured while others are neglected.

Much more research is needed on Canadian women chemists to understand the various types of job segregation and their full implications for women and for science. What pressures have forced them to abandon their research in, for instance, analytical, physical, and organic chemistry to switch into areas considered more suitable for women, such as food chemis-

try? Why have so many women with Bachelor and Masters degrees worked in subordinate positions within the universities while men with similar degrees have taught less, earned more, had better careers and received more recognition? Have women consciously chosen certain areas and levels where they could carve out careers of their own, rather than competing with men in other areas of science? Have they been victims of systemic discrimination, or resourceful actors who have deliberately chosen alternative professional opportunities?

More research is needed to: a) form a clearer picture of the experiences of women with university degrees who have worked as invisible assistants in hospitals, research laboratories, and industry; b) evaluate the contributions of a slightly more visible group of women, those who have remained in low-paying university positions, even with a Ph.D., and taught large introductory classes, and assisted their husbands, or other professors in their research, for little money and recognition; c) provide material for biographies of women scientists, the forgotten ones, such as Dr. Helen Plummer (1896-1981), the first woman faculty member at Mount Allison in 1920, who later taught at the School of Preventive Medicine at the University of Toronto, and others who became well known, such as Clara Benson (1875-1964), University of Toronto, and Dr. Eleanor Hill Venning (1900?-1988), McGill University.

More research will provide role models for aspiring women scientists and, more importantly perhaps, isolate many of the factors that continue to work against women in science.

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Call for papers

The **GASAT** (Gender and Science and Technology) Association is seeking papers for its first Canadian conference July 31 to August 5, 1993. The conference is being organised by the Ontario Women's Directorate and will be held at the University of Waterloo in Waterloo, Ontario (near Toronto), Canada.

GASAT provides a forum for individuals and organizations concerned about the inclusion of girls and women in the world of science and technology, from early childhood to work environments.

This conference will focus on the following areas:
- Recruitment and retention of girls and women in science, engineering and technology
- Developing a feminist perspective on science that recognizes the diversity of experiences of women, girls and indigenous peoples.
- Creating a more inviting climate for work and study and developing strategies for change.
- Gender-sensitive science, engineering and technology curricula.

All attendees participate in the proceedings by making a contribution, whether it be a formal paper, leading or contributing to a symposium, conducting a workshop or convening a round-table discussion. Contributions resulting from international networking are encouraged.

For more information on this conference or membership in the GASAT Association, contact: Ann Holmes, Conference Chair
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