

A Select Few: Women and the National Research Council of Canada, 1916-1991

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Résumé de l'article

Cet article explore les liens entre les femmes et le Conseil national de recherches du Canada entre 1916 et 1991. Bien que les femmes aient reçu 14 % des bourses et subventions de cet organisme avant 1931, ce pourcentage déclina durant et après la Dépression. A partir de données provenant de sources primaires et secondaires ainsi que d'entrevues avec des employés masculins et féminins du CNR, l'article retrace l'évolution des emplois occupés au CNR par des femmes dans divers domaines de recherche, de même que leurs conditions de travail.

A SELECT FEW: WOMEN AND THE NATIONAL RESEARCH COUNCIL OF CANADA, 1916-1991

Marianne Gosztonyi Ainley and Catherine Millar¹

Abstract

This paper explores the interrelationship of women and the National Research Council of Canada during the 1916-1991 period. Although women received 14% of the NRC fellowships and bursaries before 1931, they fared less well during and after the Depression. Based on information obtained from primary and secondary written sources as well as from interviews with both women and men employed by the NRC, the paper traces changing trends in employment practices and improved research opportunities for women scientists at the NRC.

Résumé

Cet article explore les liens entre les femmes et le Conseil national de recherches du Canada entre 1916 et 1991. Bien que les femmes aient reçu 14% des bourses et subventions de cet organisme avant 1931, ce pourcentage déclina durant et après la Dépression. A partir de données provenant de sources primaires et secondaires ainsi que d'entrevues avec des employés masculins et féminins du CNR, l'article retrace l'évolution des emplois occupés au CNR par des femmes dans divers domaines de recherche, de même que leurs conditions de travail.

1 September 1991 marked the beginning of a new NRC 'training plan for women in science and engineering.' The announcement was made in late November 1990 with great fanfare, to a select few dignitaries, representatives of the federal government and Carleton and Ottawa Universities. Why has it taken the NRC seventy-five years to publicly promote women in science? Why is there now, in the 1990s, such a concern about women's under representation in most scientific and engineering disciplines? To the uninitiated it may seem that the NRC finally joined the rest of Canada in encouraging women to choose science as a career. The new training programme promises to 'provide both financial assistance and career-related training to outstanding women enrolled in undergraduate science and engineering at Canadian universities.'²

1 Simone de Beauvoir Institute, Concordia University, Montréal, Québec H3G 1M8.

2 'Backgrounder. The National Research Council Training Plan for Women in Science and Engineering,' November 1990, 2.

The applicants will be part of the programme for three years, with a minimum of twenty-five new students each year. They will be receiving a stipend of \$10,000 the first year, \$12,000 the second year, and \$15,000 the final year. This initiative was prompted in part by the prevailing social climate that recognizes women's under representation in many fields, and in part, perhaps by a larger part, the wide-spread concern that Canada faces a shortage of people in many areas.

The initiative seems like a novelty. Yet, an examination of the various documents published by the NRC indicates that during the last seventy-five years the NRC has both encouraged some women graduate students and employed a select few women scientists. Because of the lack of access to primary documentation, this story must remain uneven and incomplete.³ Important insights were gained, however, from Ainley's discussions, interviews and private correspondence with former NRC research officers; from these it is possible to construct a sketchy overview of women and the NRC. Putting it into the context of our ongoing research on Canadian women and science, it is evident that the saga of women in the National Research Council of Canada is representative of women's status in the scientific branches of the Canadian government and reflects national attitudes towards women professionals.⁴

Like many other innovations, the National Research Council was a result of war. During the First World War the British government discovered to its dismay that there were 'more trained scientists in a few of the great German industries than in the entire British Empire.'⁵ Science councils were thought to be able to remedy this situation. The Honorary Advisory Council for Scientific and Industrial Research (later referred to as the National Research Council) was established in 1916 to promote and utilize Canada's natural resources and improve the country's agricultural and industrial research record. 'One of the first activities of the council was to take, in 1917, a research inventory of Canada.' According

- 3 Unfortunately the NRC administration prohibited the senior author from consulting the relevant archival documents.
- 4 See, Nicole Morgan, *The Equality Game. Women in the Federal Public Service (1908-1987)* (Ottawa, 1988) and Stephen G. Peitchinis, *Women at Work: Discrimination and Response* (Toronto, 1989). See also Marianne G. Ainley, 'Last in the Field? Canadian Women Natural Scientists, 1815-1975.' in Marianne G. Ainley, ed., *Despite the Odds. Essays on Canadian Women and Science* (Montréal, 1990); Ainley, 'Women's Work' in Chemistry--the Canadian Experience' paper presented at CIC conference, Halifax, July 1990; Ainley, 'Women's Work' in Science--hierarchical and lateral segregation at the work place,' Invited paper, History Department, Queen's University, March 1991.
- 5 Quoted widely, see for instance Christine M. King, *E. W. R. Steacie and Science in Canada* (Toronto, 1989), 45-46.

to this inventory, 'industrial research was practically non-existent' and there were few 'research men.'⁶ Because the Council was interested in promoting industrial research, its inventory may have overlooked the existence of a number of eminent researchers. Scientists who pursued pure rather than applied research would not have been considered. Women scientists, including Dr Clara Benson, Professor of Food Chemistry, University of Toronto, were also excluded.⁷

Because of the perceived shortage of 'Canadian researchers' the Council attempted to help train both men and women and, as part of its mandate, sought to promote deserving graduate students. Beginning in 1917, an appendix of the Annual Report listed bursaries, studentships and fellowships and the regulations for awarding them. The grants were open 'on equal terms to men and women ... awarded to the applicants ... deemed best qualified by the evidence submitted.' They were 'given only to men (or women) who have already graduated from a university....'⁸ Clearly, members of the Council knew, that by 1917 dozens of Canadian women had obtained undergraduate and graduate science degrees. Several, including Dr Annie McLeod (a chemist) and Dr Maud Menten (a biochemist) left Canada for the US and better professional opportunities.⁹

The association of the NRC and women scientists falls into several periods:

- 1) From 1916 to 1940 a) some women were given NRC grants to help their training as researchers and, b) a few women were employed in selected divisions the Council.
- 2) Canada's entry into the Second World War opened the door to women's increased employment in all areas, and there were more employment opportunities for women scientists at the NRC.
- 3) After the war, when generally speaking women were expected to return to their homes, Dr Luise Herzberg and Mrs Magda Jones, worked with their husbands as volunteers. Women, also among the new post-doctorate fellows,

6 'Report of the President,' *Annual Report*, National Research Council, 1926-27, 8.

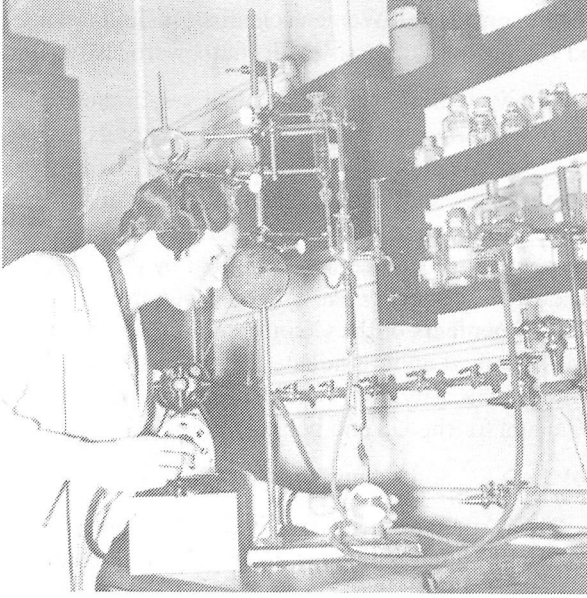
7 The NRC was promoting applied rather than pure research; in 1919, Benson became founding member of the Canadian Institute of Chemistry. Although her research had important implications for the food industry, she never served on any associate committee.

8 Appendix 'G,' *Annual Report* 1927-28.

9 McLeod obtained the first McGill PhD in chemistry in 1910. She had a good career at Vassar College and the University of Syracuse. Menten was a student of A. B. Macallum (MD, University of Toronto, 1911; PhD, University of Chicago, 1916). She had a good career at the University of Pittsburgh.

Illustration 1.

Top: Miss Tweedie Using a Van Slyke Amino-Nitrogen Apparatus; Bottom: Dr Roxanne Deslauriers (centre).



were employed in larger numbers, and were members of the Scientists' Wives' Association founded by Magda Jones in 1949.¹⁰

During the first period, female students received financial assistance. A careful perusal of the lists of fellowships and bursaries provides useful information on the people and topics encouraged by the NRC. During 1920-21, the six women graduate students in botany, bacteriology, chemistry and biochemistry constituted 18% of the total of 36 grant holders. Of the six Margaret Newton, Clara Fritz, Irene Mounce, Eleanor Hill (Venning) had exceptionally good careers – though not at the NRC. In 1930-31 the number of scholarships rose to 52, but only 5, or 10% of these went to women. Graduating during the Depression, the promising careers of the geneticist Marie Hearne and the chemist Margaret Greig never materialized.

During the 1930s, grants given to women became smaller and fewer for several reasons, first because funds given to all researchers were cut, second, because funds were directed into the building and operation of the new NRC laboratories at Sussex Drive, and third because of the social climate which assumed that a woman had a partner to provide for her, and did not have or want to work.¹¹

Despite the prevailing view that women's place was in the home, women have been employed at the NRC since the 1920s. Their names can be found in published papers, lists of employees and some in-house histories, including articles in *Science Dimension* and the *Sphere*. Details are scarce on most careers, however. Interviews with retired women scientists are not always feasible and the short-sighted archival policies of the NRC and other government institutions made a detailed study of women's experiences at the NRC practically impossible.

10 Magda Jones, interview, October 1990.

11 See Margaret Rossiter, *Women Scientists in America. Struggles and Strategies till 1940* (Baltimore, 1982); G. M. Ainley, ed. *Despite the Odds. Essays on Canadian Women and Science* (Montréal, 1990); numerous articles and works on women in North America. On Canadian attitudes see also Pat Armstrong and Hugh Armstrong, *Theorizing Women's Work* (Toronto, 1990), 14-15; Peitchinis, *Women at Work*, 37, 76.

Illustration 2.

Dr Barbara Judek (Photograph by Harry Turner, NRC)



To the best of our knowledge, in 1927, Muriel Whalley (1892- ?) was the first woman employed in a science related occupation, as a technical abstractor and translator. The NRC libraries continued to employ relatively large numbers of women; by 1946, there were seven women qualified librarians, with good science backgrounds, under a male director, who was not a qualified librarian but an engineer! Evidently, being a director was 'men's work,' while library work has traditionally been considered 'women's work in science.'¹²

Although women chemists in Canada rarely found appropriate employment, the Chemistry Division of the NRC was unusually hospitable to women. Possibly, some farsighted men welcomed and promoted women chemists. The first to be employed, as a scientist, in 1930, was Dr Helen Chathaway, a graduate of McGill University. In 1937 she returned to England.¹³ Several other women chemists had long and productive careers. Audrey Tweedie, a graduate in physics (MSc, University of Manitoba), applied for a junior position in physical chemistry in 1930 but, for reasons that are unclear, was hired for a similar post in wool research. Her job involved breeding experiments under Canadian winter conditions and laboratory work to study the fiber results. Tweedie enjoyed working for the NRC— the atmosphere was informal, the scientific staff mixed socially and her starting salary was \$1,800 per annum, or about the same as that of a male lecturer. She left in 1939, for reasons she would not disclose, 'to try something else' but returned the following year.¹⁴ Like other women in government employment (in the 1930s, and 40s), Tweedie remained single.¹⁵

Initially, Audrey Tweedie collaborated with Paul Larose on wool. Later, during the war, she worked with Colin H. Bayley on cotton, linen and rayon, testing materials for 'commissions purchasing for the armed forces.' Her long-term collaborations were highly productive. By the time of her retirement, in 1972, she had become one of the NRC's respected research scientists.¹⁶ In a 1990 interview, Tweedie recalled that she was pleased with her career. She admitted, however, that maybe her expectations were not 'as high.' Tweedie knew that some women were bitter about their experiences but, like others of her generation, she appre-

12 M. G. Ainley, 'Women's Work in Chemistry.'

13 Donald Phillipson, personal communication.

14 Interview, Nov. 1990; apparently Tweedie entered nursing at the beginning of the war, Donald Phillipson, personal communication.

15 Ainley, *Despite the Odds*; Morgan, *The Equality Game*.

16 [Anonymous] 'Forty Years of Support to the Textile Industry,' *Science Dimension* 1972:6, 12-17.

ciated having an interesting position and, after 1940, 'never thought of leaving the NRC.' She had found her niche.¹⁷

From 1940 to 1945 the NRC was dealing with important war-time projects, and employment opportunities improved for women scientists. Although the atmosphere had changed, becoming more hectic and more formal, women scientists took up the challenge. Mary Chisholm, a graduate of Queen's University (BA, 1926) and a former school-teacher, was hired in 1941. Until her retirement in 1967, she collaborated and published with Dr C. Y. Hopkins in the division of pure chemistry, on fat and oil research, and was senior author of 18 of their 50 co-authored papers.¹⁸

For a variety of reasons, women physicists fared worse than did the chemists. In the early 20th century there were more than a dozen women nuclear physicists¹⁹ including the Canadian Harriet Brooks. While generally speaking, there were fewer physics than chemistry students at British and Canadian universities, there was a certain pool of women physics graduates. In the 1930s, the University of Toronto trained and employed several competent women physicists,²⁰ but the Atomic Energy Project, although it had thirty physicists, did not employ them.²¹ As far as we know the only women at Chalk River worked in the biology/health radiation, and chemistry branches. In 1950, 31.25% or 5 out of 16 biologists and 35.48 %, or 11 out of 31 chemists, were women.²² In fact the only woman in physics we were able to identify was Charlotte Covington who, during the early years of the Second World War, was employed as a technician at the NRC laboratories, 100 Sussex Drive, at \$1,100 per year.²³

17 Interview with Audrey Tweedie.

18 C. Y. Hopkins to M. G. Ainley, 11 August 1990.

19 Marlene F. and Geoffrey W. Rayner-Canham, 'Pioneer Women in Nuclear Science,' *American Journal of Physics* 58 (1990), 1036-43.

20 Alison Prentice, 'Bluestockings, Feminists or Women Workers? A Preliminary Look at Women's Early Employment at the University of Toronto,' *Journal of the Canadian Historical Association* 2 (1991), 231-61.

21 Yves Gingras, *Physics in Canada* (Montreal, 1991), 127, mentions that thirty physicists were employed at Chalk River; however, to date there is no evidence of any woman physicist having worked there. In a 1986 interview with Ainley, the biochemist Dr Elinor Huntsman Mawson, wife of physicist Colin Mawson recollected that there were no women physicists at Chalk River during the war.

22 A. M. Marke, G. C. Butler and D. K. Myers, 'Biochemistry at Chalk River,' *Bulletin of the Canadian Biochemical Society* 23 (June 1986), 13-19.

23 Personal communication, October 1991.

Although women have been earning advanced science degrees in Europe as well as in North America from at least the early years of the 20th century, there were relatively few women among the new, international NRC 'postdoctorate' fellows, after the Second World War. Of the 1898 post docs between 1948 and 1975, 27 or 1.4% were women. Even in the Chemical Division, where the 'most important new developments related to the postdoctorate fellowships' occurred (see A.W. Tickner's article in this volume), there were only 16 women²⁴; this constituted 1.7% of the 900 postdoctorate fellows. Most of these, as Dr Norman Jones recalled, came to Ottawa in the earlier period.²⁵

Postdoctorate fellows were expected to leave the NRC after two years. Many returned to their respective countries and institutions (e.g. Marelene Friedlander, biology, 1952-54). Others found suitable employment in Canada, such as Dr Margaret Back (1959-61) who became one of the first women scientists at the University of Ottawa where, currently, she is professor of chemistry. Only a few, such as Dr Marie Przybylska (1950-52) in crystallography and Dr Margaret Wilson-Bell (1959-61) in space science, remained at the NRC and have had relatively good careers. Dr Przybylska recently retired as Senior Research Officer, Dr Wilson-Bell is still active in the Herzberg Institute of Astrophysics. She is data manager at the Associate Research Officer level for the Canadian CAN-OPUS project, a network of ground based experiments measuring aurora phenomena and associated magnetic perturbation. By contrast, Gemma Kerr's career at the NRC stagnated. She is currently employed as 'air quality detective' at Public Works Canada.²⁶

During the 1950s and 60s, most women at the NRC were employed as technicians, and assistants. Helen Wong worked in biology, Helen Brown, Mary T. Clement in microbiology, Elinor Zuckerman in biometrics and Ruth Peterson in food chemistry. Details of their careers are unknown.²⁷ A long-time biology technician, Barbara Sinott, still at 100 Sussex Drive in late 1990, refused to discuss her experiences.

During this time, there was lingering resistance towards employing married women, and anti-nepotism regulations were still in effect. Nevertheless, an increasing number of married women scientists were hired. The much respected

24 King, E. W. R. Steacie, 102.

25 R. Norman Jones, personal communication; M. MacKenzie, personal communication.

26 Kerr, personal communication.

27 Again, Ainley was prohibited from consulting the personal files of these people.

Marjorie MacKenzie, as senior technician, worked with Dr Norman Jones in chemical spectroscopy for a quarter of a century.²⁸

Dr Pearl Weinberger was an assistant in plant physiology in the 1960s. She had a productive career as professor of biology at the University of Ottawa where, until her death in early 1991, she conducted pioneering research on plant growth acceleration using ultrasonics. The NRC had its share of 'male chauvinists' and some women 'had difficulties.' A glaring case is that of Barbara Hamilton, a dietician. When both she and her fiancée applied for a marriage leave, he got his, but hers was refused! An even more serious problem was the alleged scooping of a female scientists' research results by a male colleague.²⁹

Although a select few women eventually reached high scientific positions, for women hired in the 1950s and 60s the path was far from smooth, however. The biggest problem was marginalization and neglect as seen from the experiences of Dr Barbara Judek, a physics graduate of the University of Edinburgh. Although Judek had several publications before coming to the NRC in 1953, she was hired as a research assistant. In a 1990 interview she recalled that the job in the nuclear emulsion section was a research position, but was defined as that of an assistant, and she was paid less than a postdoctoral fellow. And while the fellowships were tax-free, the assistantship was not.

In the early 1970s, Judek shifted into accelerator work, using a new technique she adapted from her research on photo emulsion. With time, her research group gradually dwindled, becoming the high energy group, but Judek, quietly and tenaciously, continued working with nuclear emulsion.

For Judek there was no conflict between family life and science. Married to an economist, she is the mother of six children, five of whom were born while she was working for the NRC. Since at the time maternity leave was unheard of, wearing oversized lab-coats and working on her own had their advantages. With scientific precision, and a bit of luck, Dr Judek had her babies on weekends and returned to work before her colleagues heard of the new family member.³⁰

Barbara Judek had spent fourteen years toiling with little personal or moral support. When the NRC wanted to scrap her work, in the late 1970s, she fought for and won a two-year extension. Her research was largely ignored by her col-

28 MacKenzie recently recalled her difficulties of finding employment as a divorced woman, and the general difficulties of married women; personal communication.

29 Discussions with various retired NRC scientists, September-November 1990.

30 Interview, October 1990.

leagues because it was not considered mainstream science. But after she began to collaborate with Erwin Friedlander and his group at the Lawrence Scientific Laboratory at Berkeley, Judek became well known. Her controversial 1968 discovery of nucleus-nucleus collisions, now referred to as the 'Judek Effect,' became famous through their joint publications.³¹

As so often in the past, it took the recognition of the international scientific community for Canadian scientists to wake up and take notice. In 1980, Peter Watson, Carleton University, considered Judek's discovery 'the most exciting work in physics in 30 years.'³²

When Judek retired in 1989, it was with Senior Research Scientist status and pay; on the surface she did have a good 'career.' Judek's marginalization is typical, however, of what happened to many women scientists.³³

During the last twenty-five years, things have improved at the NRC, as in other scientific institutions, for women scientists. Since the late 1970s, there have been several women Associate Research Officers, such as Gladys Harvey in the radio branch, Dr E. A. Colburn in spectroscopy, Dr S. J. Basinski in metal physics, Dr Marianna Sikorska in biochemistry, and Dr Roxanne Deslauriers in molecular biophysics. Terry Stock had a good career in the systems design and Dr Margaret Czuba in ecotoxicology, doing research on the modulating effects of systematic interactions of stress induced molecules. Dr Joanne Zwinkels is a respected researcher for the National Measurement Standards.³⁴

There are still too few women at the top. The select few include Dr Mary Williams, group leader for the Institute of Marine Dynamics in Newfoundland, Dr Gabrielle Adams, Director, Industrial Affairs and Dr Roxanne Deslauriers, now group leader and section head in the Biomedical NMR section. But women are

31 Estelle Dorais, 'Canadian's physics find finally accepted,' Montreal, *The Gazette*, 17 December 1980, 88; David Peat, 'A Belligerent Atomic Nucleus. The Judek Effect,' *Science Dimensions* 1981:5, 4-8.

32 'New Nuclear Discovery Puts Barbara on Map,' Victoria, *The Times-Colonist*, 16 December 1980, 37.

33 There is considerable literature on American and Canadian women scientists. On British women in physics and chemistry see, Kathleen Lonsdale, 'Women in science: Reminiscences and Reflections,' *Impact of Science on Society* 20 (1970), 45-59; the article also includes a number of useful tables on women science students in Britain. On women in physics in the 1950s and 60s see Lise Meitner, 'The Status of Women in the Professions,' *Physics Today* 13:8 (August 1960), 17-21; Dorothy W. Weeks, 'Women in Physics Today,' *Physics Today* 13:8 (August 1960), 22-23.

34 We thank Estelle Dorais for providing information on the careers of recent women scientists.

still under represented on the Honorary Advisory Council. To date only three have been elected, Thérèse Gouin-Décarie (1970-79), Berthe Lambert (1986), and Marthe Salcudean (1991).

From the above it is clear that, during its first seventy-five years, the NRC had both encouraged women science graduates and have employed women in a variety of scientific posts. The full extent of women's contributions to the scientific work of the NRC cannot be assessed, however, until free access to its archives will be made available to researchers. More research will lead to a better understanding of the factors that encouraged or hindered women's careers at the National Research Council of Canada and will contribute to a better, more integrated history of Canadian science.

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