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Volume 29, Number 2, 2006

URI: <https://id.erudit.org/iderudit/800521ar>

DOI: <https://doi.org/10.7202/800521ar>

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Publisher(s)

CSTHA/AHSTC

ISSN

0829-2507 (print)

1918-7750 (digital)

[Explore this journal](#)

Cite this article

Loydlangston, A. (2006). Women in Botany and the Canadian Federal Department of Agriculture, 1887-1919. *Scientia Canadensis*, 29(2), 99–130.
<https://doi.org/10.7202/800521ar>

Article abstract

This article explores the nature of women's involvement in the science of botany in the federal Department of Agriculture from 1887 to 1919. It argues that the professionalization and bureaucratization of science in the department created distinct opportunities for women but also confined them to specific jobs deemed appropriate for their sex. Because the botany that was first undertaken in the department emerged from the natural history tradition, women first contributed as unpaid "amateur" observers, collectors, and correspondents. As science professionalized and bureaucratized in the late nineteenth and early twentieth centuries, however, the contributions of unpaid "amateurs" were no longer desired or needed. At this juncture, women were employed as paid assistants and members of the support staff. As civil servants, women entered an organization that was undergoing a process of professionalization and bureaucratization. As a result, women were subjected to hierarchical and territorial segregation, undertaking 'women's work' in botany. They performed tasks which were undervalued, underpaid, and offered little or no opportunity for advancement, and were, therefore, rejected by men. Satisfying the demands generated by the professionalization and bureaucratization of science as well as of the federal civil service, women were a pivotal part of the botanical workforce of the Canadian federal Department of Agriculture from 1887 to 1919.

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Canadian War Museum / Musée canadien de la guerre

Abstract : This article explores the nature of women's involvement in the science of botany in the federal Department of Agriculture from 1887 to 1919. It argues that the professionalization and bureaucratization of science in the department created distinct opportunities for women but also confined them to specific jobs deemed appropriate for their sex. Because the botany that was first undertaken in the department emerged from the natural history tradition, women first contributed as unpaid "amateur" observers, collectors, and correspondents. As science professionalized and bureaucratized in the late nineteenth and early twentieth centuries, however, the contributions of unpaid "amateurs" were no longer desired or needed. At this juncture, women were employed as paid assistants and members of the support staff. As civil servants, women entered an organization that was undergoing a process of professionalization and bureaucratization. As a result, women were subjected to hierarchical and territorial segregation, undertaking 'women's work' in botany. They performed tasks which were undervalued, underpaid, and offered little or no opportunity for advancement, and were, therefore, rejected by men. Satisfying the demands generated by the professionalization and bureaucratization of science as well as of the federal civil service, women were a pivotal part of the botanical workforce of the Canadian federal Department of Agriculture from 1887 to 1919.

Résumé : Cet article explore la nature de du travail des femmes dans la science botanique au ministère fédéral de l'Agriculture de 1887 à 1919. Il suggère que la professionnalisation et la bureaucratisation de la science au sein du ministère pendant cette période ouvrent certes des occasions d'emploi aux femmes, mais cantonnées à certaines tâches spécifiques jugées appropriées à leur sexe. Le type de botanique pratiquée au ministère ayant d'abord émergé de la tradition de l'histoire naturelle, les premières femmes contribuent d'abord à titre d'observatrices, collectrices et correspondantes « amateures » et non rémunérées. A mesure que la science se professionnalise et se bureaucratise à la fin du 19^e et au commencement du 20^e siècle, les contributions « amateures » et bénévoles ne sont cependant plus requises ou nécessaires. À partir de ce moment, des femmes sont employées comme assistantes et membres rémunérées du personnel de

soutien. À titre de fonctionnaires, ces femmes intègrent alors une organisation engagée dans un processus de professionnalisation et de bureaucratisation. Dans ce cadre, elles sont sujettes à une ségrégation hiérarchique et territoriale balisant un « travail de femmes » en botanique, fait de tâches mésestimées, sous-payées, offrant peu d'occasions d'avancement et donc délaissées par les hommes. Répondant ainsi aux demandes de la professionnalisation et de la bureaucratisation de la science et de la fonction publique fédérale, ces femmes représentent une part cruciale de la main-d'oeuvre en botanique au ministère fédéral de l'Agriculture de 1887 à 1919.

During the late nineteenth and early twentieth centuries, the Canadian federal government increasingly expanded and developed its scientific role, evidence of the institutionalization and professionalization of science in Canada. Undertaking recuperative analyses of the records of a number of federal departments mandated to carry out scientific studies, several historians have begun to investigate how these processes impacted upon women's opportunities to participate in science at the federal level. In this vein, Marianne Ainley and Catherine Millar explored the records of the National Research Council to uncover women's presence and to determine those aspects of the government environment, particularly the civil service regulations, which shaped their experiences.¹ Approaching the subject from a disciplinary perspective, Ainley has also drawn attention to the presence of women chemists, geologists, and timber pathologists in the National Research Council, Geological Survey, and Forest Products Laboratory, respectively.² A recuperative project in its own right, this article adopts both a departmental and a disciplinary approach to explore the way in which the professionalization and bureaucratization of both the science of botany and the federal civil service intersected to shape women's opportunities in the Department of Agriculture between 1887 and 1919.³

1. Marianne Gosztonyi Ainley and Catherine Millar, "A Select Few: Women and the National Research Council of Canada, 1916-1991," in *Building Canadian Science: The Role of the National Research Council*, eds. Richard A. Jarrell and Yves Gingras, *Scientia Canadensis* 15, 2 (1991): 105-116.

2. Marianne G. Ainley, "Last in the Field? Canadian Women Natural Scientists, 1815-1965," in *Despite the Odds: Essays on Women in Science in Canada*, ed. Marianne G. Ainley (Montreal: Véhicule Press, 1990), 25-62. See also, Ainley, "Les femmes dans les sciences au Canada: y a-t-il une division sexuelle de travail ?," in *Femmes et sciences: Au cour des débats institutionnels et épistémologiques*, eds. Lucie Dumais and Véronique Boudreau (Ottawa: ACFAS-Outouais, 1996), 3-18.

3. This analysis builds upon Marianne Ainley's valuable study of Catharine Parr Traill, a self-taught botanist, as well as her survey of women scientists in the Department of Agriculture including, among others, assistant botanist Faith Fyles, horticulturist Isabella Preston, and mycologist Margaret Newton, appointed in 1912, 1920, and 1922

To ground my analysis, I have adopted the concept of professionalization as elaborated by sociologist Thomas Haskell and as further refined by sociologist Anne Witz. According to Haskell, professionalization is a process whereby experts differentiate themselves and form a community of intellectual peers based on shared assumptions about the problems to be solved and the methodology and knowledge to employ.⁴ Haskell identifies race, religion, and class as attributes that determine "insider" and "outsider" status. Employing the neo-Weberian theory of occupational formation, Witz argues that criteria that determine inclusion and exclusion are often based on gender which forms another critical attribute. According to her study of health care professions, men are included in certain occupations because they are men while women are excluded from the same occupations because they are women.⁵ And yet historians have found that women regarded the emergence of the professions as a historical moment of incomparable opportunity.⁶ Taking at face value the rhetoric that held that entrance to, and success within, the professions was based on merit alone, women acquired the credentials that they believed would allow them equal access.⁷ However, such equal access was not achieved. In fact, it is argued that professionalization was, in reality, a response to female incursions into what had been all-male preserves of paid employment.⁸

respectively. Marianne G. Ainley, "Science in Canada's Backwoods: Catharine Parr Traill," in *Natural Eloquence: Women Reinscribe Science*, eds. Barbara T. Gates and Ann B. Shteir (Madison, WI: University of Wisconsin Press, 1997), 79-97. On Preston, Newton, and the key factors that shaped women's employment in science in the Department of Agriculture, see also Edwinna von Baeyer, "Isabella Preston, 1881-1964: An Explorer of the Horticultural Frontier," in *Despite the Odds: Essays on Women in Science in Canada*, ed. Marianne G. Ainley (Montreal: Véhicule Press, 1990), 220; "The Horticultural Odyssey of Isabella Preston," *Canadian Horticultural History/ Histoire de l'horticulture au Canada* 1, 3 (1987), 125-75; Ralph Estey, "Margaret Newton: Distinguished Canadian Scientist," in *Despite the Odds*, 244-245.

4. Thomas L. Haskell, *The Emergence of Professional Social Science: The American Social Science Association and the Nineteenth Century Crisis of Authority* (Urbana: University of Illinois Press, 1977), 66.

5. Anne Witz, *Professions and Patriarchy* (London and New York: Routledge, 1992).

6. Penina Midgal Glazer and Miriam Slater, eds., *Unequal Colleagues: The Entrance of Women into the Professions, 1890-1940* (New Brunswick: Rutgers University Press, 1986), 4-5.

7. Mary Kinnear, *In Subordination: Professional Women, 1870-1970* (Montreal and Kingston: McGill-Queen's University Press, 1995), 8-9.

8. Elizabeth Smyth et al., "Introduction," in *Challenging Professions: Historical and Contemporary Perspectives on Women's Professional Work*, eds. Elizabeth Smyth, Alison Prentice, Sandra Acker, and Paula Bourne (Toronto: University of Toronto Press, 1999), 5; Margaret Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: Johns Hopkins University Press, 1982), 73-99; Ann Shteir, "Botany in the

In science, the process of professionalization was accompanied and supported by that of bureaucratization, which saw tasks become fragmented and routinized.⁹ The growth and restructuring of scientific work processes inherent to professionalization and bureaucratization resulted in the creation of "women's work," that is, of low paying, undervalued, routine jobs that were unattractive to men.¹⁰ As this definition highlights, "women's work" in science did not refer to any one particular task but rather to conditions of employment marked by hierarchical and territorial segregation. Women worked in sex-segregated areas of science and were confined to the lowest occupational ranks of the institutions in which they were employed.¹¹

The creation of such women's work in science in the Department of Agriculture was also the product of the rules of the Canadian federal civil service. This civil service has been the subject of a number of historical analyses, which have charted its professionalization and bureaucratization. The position of women has been considered to a greater or lesser degree in all of these analyses. While early histories argued that women and men are suited to different forms of employment,¹² more recent feminist analyses probe the reasons for such an opinion as well as its impact upon women's employment opportunities.¹³ Studying the contemporary and historical experiences of women in the public service, these authors discuss the structures and attitudes of a masculine organizational culture that ensured discrimination against women. They were employees of an institution that was uncomfortable with their presence.

Indeed, referring specifically to the Civil Service Commission, sociologist Kathleen Archibald stated that its objectives were to restrict the numbers of women in the civil service and the opportunities of those

Breakfast Room: Women and Early Nineteenth-Century British Plant Study," in *Uneasy Careers and Intimate Lives: Women in Science, 1789-1979*, eds. Pnina G. Abir-Am and Dorinda Outram (New Brunswick: Rutgers University Press, 1987), 41-43.

9. Graham Lowe, *Women in the Administrative Revolution: The Feminization of Clerical Work* (Toronto: University of Toronto Press, 1987), 2.

10. Rossiter, *Women Scientists in America*, 53.

11. *Ibid.*, 51.

12. See, for example, Robert MacGregor Dawson, *The Civil Service of Canada* (London: Oxford University Press, 1929); Stanislaw Judek, *Women in the Public Service* (Ottawa: Roger Duhamel, 1968).

13. Kathleen Archibald, *Sex and the Public Service* (Ottawa: Information Canada, 1973). See also, Library and Archives Canada (LAC), RG 32, v. 854, "Sex and the Public Service," the Archibald Report, 1965-1972; Carole Simard, *L'Administration contre les Femmes: La Reproduction des Différences Sexuelles dans la Fonction Publique Canadienne* (Montreal: Boréal Express, 1983); Nicole Morgan, *The Equality Game: Women in the Federal Public Service (1908-1987)* (Ottawa: Canadian Advisory Council on the Status of Women, 1988).

women who had been employed.¹⁴ The structure of the civil service, determined by its masculine organizational culture, served to constrain women's opportunities. They experienced occupational segregation and foreshortened career ladders in "female" fields. This article, after first exploring women's voluntary, unpaid contributions to botanical science, will illustrate the operation of this system in terms of women's paid employment in botany in the Department of Agriculture.

To reveal women's changing role over time in the Department of Agriculture, I divide this article into three overlapping sections. First, the paper will study the period 1887 to 1908, the years during which James Fletcher (1852-1908) was the Dominion Botanist. This section will investigate the nature of women's role in botany as unpaid, voluntary correspondents during the period in which the Department of Agriculture's botanical work was the responsibility of an expert amateur who became a professional by virtue of his appointment to a position in that department. The second section, spanning the years 1902 to 1919, will investigate the work of the first women to be paid employees in botany in the Department of Agriculture: the seed analysts. This section will demonstrate the way in which the professionalization and bureaucratization of botany and the federal civil service, evidenced by the importance placed upon educational credentials and the passage of new legislation, combined to create an entirely new area of paid employment for women. The third and last section of this article, encompassing the years 1910 to 1919, will study the experiences of one woman: Faith Fyles (1875-1961). Hired as a seed analyst in 1910, she became assistant botanist in 1912 and so transcended the barriers erected by the civil service to restrict women's opportunities. This section seeks to understand why Fyles was appointed to this post. Through this discussion, the article will uncover the main patterns of women's involvement in botany during the formative years of science in the Department of Agriculture.

James Fletcher, Natural History, and his Female Correspondents, 1887-1908

Although the federal Department of Agriculture did not have a scientific function when it was established in 1868, agricultural crises throughout Canada led farmers and politicians to encourage the adoption of such a role during the next decades. Plagued by epizootic diseases and growing incidences of insect pests, plant diseases, and soil exhaustion, farmers began to call for assistance and the provision of practical solutions to their problems. While farmers asked for assistance, this was not because they believed that they lacked the ability to find their own solutions but rather

14. Archibald, 14.

because they lacked the time to do so. Mistrusting speculative knowledge, farmers expected scientists to help them to unlock the productive potential of Canadian soil "by applying principles learned through observation and extrapolation from one set of circumstances to another set elsewhere."¹⁵ To resolve their crop problems, farmers thus advocated economic botany, an applied science that emerged from the natural history tradition.¹⁶

Undertaken in response to the perceived neglect of Canadian interests by the English and American naturalists for whom Canadian naturalists had collected extensively,¹⁷ economic botanists focused their attention on acquiring a greater and more practical knowledge of the flora of Canada,¹⁸ particularly those species of agricultural importance.¹⁹ While economic botany would eventually encompass plant pathology, this subject was initially included with economic entomology since it was so difficult to differentiate between damage inflicted by insects and that caused by disease.²⁰

One of the most eminent and well-known practitioners of economic botany and entomology in Canada in the late nineteenth century was James Fletcher. Born in 1852 in Ashe, Kent, England, Fletcher was a self-taught amateur naturalist. Upon his emigration to Canada in 1874, in the employ of the Bank of British North America, he transplanted his interests

15. Patricia Bowley, "Ontario Agriculture in the 1910s: The Move Toward Regional Specialization in Crop Production," *Scientia Canadensis* 20, 49 (1996): 101.

16. Ainley, "Les femmes dans les sciences au Canada," 11.

17. A number of historians discuss the relationship between the collectors on the periphery and those for whom they collected in the metropolitan centres. See, for example, Suzanne Zeller, *Inventing Canada: Early Victorian Science and the Idea of a Transcontinental Nation* (Toronto: University of Toronto Press, 1987), 183-268; Thomas R. Dunlap, *Nature and the English Diaspora: Environment and History in the United States, Canada, Australia, and New Zealand* (Cambridge: Cambridge University Press, 1999), 32; Sally Gregory Kohlstedt, "In from the Periphery: American Women in Science, 1830-1880," *Signs* 4, 1 (1978): 81-96.

18. Donald Fleming, "Science in Australia, Canada, and the United States: Some Comparative Remarks," *Actes du Dixième Congrès International d'Histoire des Sciences* (Paris: Herman, 1962), 183. See also, Zeller, *Inventing Canada*, 193-197, 206.

19. Zeller, *Inventing Canada*, 183-239. See also Margaret Rossiter, "The Organization of Agricultural Improvement in the United States, 1785-1865," in *The Pursuit of Knowledge in the Early American Republic: American Scientific and Learned Societies from Colonial Times to the Civil War*, eds. Alexandra Oleson and Sanborn C. Brown (Baltimore: Johns Hopkins University Press, 1976), 280.

20. Ralph Estey, "Entomologists and the Genesis of Plant Pathology in Canada," in *Essays on the Early History of Plant Pathology and Mycology in Canada* (Montreal and Kingston: McGill-Queen's Press, 1994), 6-20. As well, plant pathology, a discipline that emerged from physiology, was not introduced until the methodology of laboratory-based biology superseded that of natural history. See, Richard A. Overfield, "Charles E. Bessey: The Impact of the 'New' Botany on American Agriculture, 1880-1910," *Technology and Culture* 16, 2 (1975): 170-172.

to the Canadian environment. Having begun his studies of plants and insects out of scientific curiosity, Fletcher's membership and active participation in the Entomological Society of Ontario led him to concern himself with those species of plants and insects of agricultural importance.²¹ His proficiency widely recognized, Fletcher found ample opportunity to share his growing knowledge with those who sought his expertise. While employed as an accountant with the Library of Parliament, he offered, on a purely voluntary basis, advice to Ministers of Parliament about the best methods for combating the insect pests that plagued the farms of their constituents. This function was made official with his appointment as Honorary Entomologist in 1884. On July 1st, 1887, he achieved the paid position of Entomologist and Botanist of the Experimental Farms System.

Fletcher's was a fortuitous appointment because he was closely attuned to the attitudes and interests of the farming community. In 1886, he voiced approval at his own unpaid status: "At the beginning, at any rate, this kind of work should be carried on by a specialist—one who takes up, and labours at it, for its own sake, without thought of any reward, further than that the results arrived at may be of benefit to the world." Because he was unpaid, farmers, agriculturists, and orchardists throughout the country had "gone to considerable trouble to assist [him] in [his] studies, which might not have been the case, to such a large extent, had [his] been a remunerative political appointment."²² Moreover, he decried the fact that "(i)n all sciences there is a great deal too much theory." Fletcher maintained that what was required were practical results. Describing his own work in economic entomology, he averred that "(e)ver since I have concerned myself with the study of Injurious Insects I have always kept before my eyes a short motto, which is also a warning, and according as I can follow out its admonitions, by so much, I believe, will the work I have undertaken be successful. That motto is, 'Be Practical.'"²³

Motivated by this attitude, and lacking funds and staff to do otherwise, even after his permanent paid appointment to the Experimental Farms Branch in 1887, Fletcher continued to employ a tool developed in the

21. Canada. "Report of the Gigault Committee," *Appendices to the Journals of the House of Commons*, 1884, no. 6, 152-153.

22. James Fletcher, "Insects Injurious to Fruit Trees (An Address delivered before the Fruit Growers' Association of Nova Scotia at their Annual Meeting held at Kentville, Nova Scotia," in Canada. "Report of the Minister of Agriculture for the Calendar Year 1885," *Sessional Papers*, 1886, no. 10, 396. Notably, Fletcher was himself not without political connections in Ottawa. He was the son-in-law of Collingwood Schreiber, the man who succeeded Sanford Fleming as chief engineer of the CPR in 1880. See, Vittorio de Vecchi, "Science and Scientists in Government, 1878-1896—Part I," *Scientia Canadensis* 8, 2 (1984): 135.

23. Fletcher, "Insects Injurious to Fruit Trees," 396.

amateur natural history tradition. He gained much of his information from "practical men, actually engaged in the cultivation of the soil."²⁴ Also, he was in constant contact with an extensive group of amateur and professional collectors, observers, and correspondents from Canada and around the world. Indeed, he needed the assistance of this national and international network of individuals to actually perform the duties of a Dominion Entomologist and Botanist. Women, who had long been active and avid participants in Canadian natural history, constituted an important part of Fletcher's network.²⁵ His appointment to the position of Entomologist and Botanist in the Department of Agriculture provided them, in effect, with a new opportunity to extend their interests.

James Fletcher's female correspondents fell into three distinct groups: farmers, natural history enthusiasts, and self-taught botanists, some of whose knowledge may have been comparable to that of Fletcher. The group to which individual women belonged shaped Fletcher's approach to them. Thus, the women farmers who participated in cultivation experiments were enlisted as assistants, who aided in the conduct of larger experiments. The correspondence between Fletcher and the natural history enthusiasts suggests a relationship similar to the one he enjoyed with women farmers. Finally, the relationship with the self-taught amateurs was entirely collegial in that information was both sought and shared between them.

The first group of women, the farmers, were anxious to participate in experimental programs that Fletcher organized at the Central Experimental Farm. He arranged for the distribution of seed to correspondents who were responsible for growing it and recording their

24. *Ibid.*, 396.

25. Restricted to the periphery of the nineteenth century scientific community because of the constraints of Victorian femininity, Canadian women still formed an important part of this community. During the nineteenth century, identified as the "period of the great lady collectors," women constituted a crucial link in the chain of natural history exchanges and earned considerable praise from the men for whom they collected. In addition to this collecting work, women were also valued as natural history illustrators and popularizers. Despite the recognition that these women received from certain of their male correspondents, the historical record has neglected them. And while women like Anne Mary Perceval and Lady Dalhousie have been recognized for their inestimable role in the development of Canadian natural history, the contributions of less illustrious women have only just begun to be appreciated. See Lynn Barber, *The Heyday of Natural History, 1820-1870* (London: Jonathan Cape, 1980), 126; James S. Pringle, "Anne Mary Perceval (1790-1876), An Early Botanical Collector in Lower Canada," *Canadian Horticultural History* 1, 1 (1985): 7; Lorraine C. Smith, "Canadian Women Natural Scientists—Why Not?" *The Canadian Field-Naturalist* 90, 1 (1976): 1-4; Ralph Estey, "The Early Teaching of Plant Pathology in Canada," in *Essays in the Early History of Plant Pathology and Mycology in Canada* (see note 25), 175-245; J. T. H. Connor, "To Promote the Cause of Science: George Lawson and the Botanical Society of Canada, 1860-1863," *HSTC Bulletin* 10, 1 (1986): 3-33; Ainley, "Science in Canada's Backwoods," 79-97.

results. With this information at hand, Fletcher felt he would be able to inform farmers of the best varieties to sow.²⁶ These women undertook the fieldwork that Fletcher could not undertake himself. Fletcher, the scientist, then placed their observations within a scientific context. For example, to Mrs Pepplewell of Glen Robertson, Ontario, Fletcher wrote, "I have much pleasure in sending you herewith a sample of the new fodder grass *Bromus* (*illegible*), which has given splendid results and, I believe, will give you satisfaction. I shall be obliged if you will report to me your opinion of this grass at the end of the season."²⁷

Amateur female natural history enthusiasts, the second group of women, submitted specimens to James Fletcher.²⁸ Some sent specimens because they knew that the Department of Agriculture was seeking to build its collections. Other women collectors submitted specimens for identification and instructed Fletcher to keep material that he found interesting. Moreover, these women were also willing to search out extra specimens if Fletcher found a specimen of interest in a collection that he had been asked to return.²⁹ Even those collections that included specimens already fully represented in the Department contained important information. As a naturalist, Fletcher was interested also in biogeography. Those individuals who sent in properly labelled specimens, recording date and location of collection, were dispensing information which, through his scientific knowledge, became scientifically relevant. Working within the tradition of inventory sciences, he "recorded the occurrence of plant [...] specimens [...] and measured their distribution over a large territory."³⁰ Fletcher wrote in his annual report: "Through these collections valuable additional information is acquired as to the known distribution of our native insects and plants, lists of the names, localities and dates of all

26. *Ibid.*, 178.

27. LAC, RG 17, A II 7, v. 2337, "Letter from Fletcher to Mrs. Pepplewell, 25 May 1893."

28. For example, Miss Alice Williams of Victoria, British Columbia, donated a collection of seeds of wild flowers of Vancouver Island in 1888. Mrs. D.W. Stewart of Renfrew, Ontario, donated specimens of *Medicago falcata* in 1907 and 1909. Fletcher, "Report of the Entomologist and Botanist," in Canada. "Report of the Experimental Farms Branch for the calendar year 1888," *Sessional Papers*, 1889, no. 5b, 47; "Report of the Entomologist and Botanist," in Canada. "Report of the Experimental Farms Branch for the calendar year 1907," *Sessional Papers*, 1908, no. 16, 202; Hans Güssow, "Report of the Dominion Botanist," in Canada. "Report of the Experimental Farms Branch for the calendar year 1908," *Sessional Papers*, 1909, no. 16, 64.

29. LAC, RG 17, A II 7, v. 2343, "Letter from Fletcher to Mrs. A. S. Hurd, 27 March 1897"; v. 2349, "Letter from Fletcher to Mrs. S. A. Ridley," n.d.; v. 2345, "Letter from Fletcher to Miss B. Hargrave, 14 June 1898."

30. Stéphane Castonguay, "Naturalizing Federalism: Insect Outbreaks and the Centralization of Entomological Research in Canada, 1884-1914," *Canadian Historical Review* 85, 1 (2004): 6.

specimens received being carefully kept.”³¹ Writing of the correspondence received, Fletcher noted that the data contained in the letters, “although not used now are carefully preserved, and will be made use of, when the various subjects to which they refer, are treated of in full.”³²

This group of women enjoyed a distinct relationship with Fletcher, one in which he provided information solicited by them. Deferential in manner because of their socialization, they repeatedly assured Fletcher of their desire to assist him in any way that he might suggest. Fletcher explained to Miss Edythe Copp: “I hope you will make every possible use of my offer to name plants for you next spring remembering that the obligation is by no means one-sided. I keep records of the localities and dates of all plants sent and in this way get much information of value to me.”³³ In this statement, we see that Fletcher harnessed the efforts of these women to satisfy his own professional research needs.³⁴ At the same time, the tone of the letter implies that the female natural history enthusiasts may not have realized fully the benefit that Fletcher derived from their information.

Finally, Fletcher relied also on the assistance of female correspondents whose knowledge of particular areas of economic botany equalled or surpassed his own. Until 1890, at which point the work was transferred to the Horticultural Branch, Fletcher undertook investigations in plant pathology, a task that earned him the title of “father of plant pathology” in Canada.³⁵ Continuing after 1890 to serve as a broker of information about plant diseases and their remedies, Fletcher satisfied the needs of many growers by providing a plant disease answering service for the country.³⁶ Lacking the proper facilities, books and instruments, Fletcher relied upon the assistance of expert correspondents to provide him with the information that he subsequently circulated to the Canadian farming community. One such woman was Eleanor Ormerod, a well-known British botanist and entomologist.³⁷ Writing to Ormerod about the

31. Fletcher, “Report of the Entomologist and Botanist,” in Canada. “Report of the Experimental Farms Branch for the calendar year 1896,” *Sessional Papers*, 1897, no. 8c, 223.

32. *Ibid.*, 183.

33. LAC, RG 17, A II 7, v. 2342, “Letter from Fletcher to Copp, 22 October 1896.”

34. Mark Rothenberg, “Organization and Control: Professionals and Amateurs in American Astronomy, 1899-1918,” *Social Studies of Science* 11, 3 (1981): 316; Marianne Ainley, “The Contribution of the Amateur to North American Ornithology: A Historical Perspective,” *The Living Bird* 18 (1979-80): 162, 174.

35. Ralph Estey, “James Fletcher (1852-1908) and the Genesis of Plant Pathology in Canada,” *Canadian Journal of Plant Pathology* 5, 2 (1983): 121.

36. *Ibid.*, 123.

37. In her biography of Eleanor Ormerod, Suzanne Le-May Sheffield explores the pains that Ormerod took to operate within the bounds of Victorian femininity. This extended to

destruction of the onion crop by a fungal disease, Fletcher noted that he advised farmers to treat their land "with a liberal dose of Gas Lime."³⁸ Cautioning Fletcher about the possible ill effects of the product, Ormerod noted that nevertheless it had a favourable reputation with farmers.³⁹

To satisfactorily undertake the tasks of economic botanist, Fletcher realized the importance of creating an arboretum, a botanical garden, and a herbarium to illustrate the variety of native and acclimatized flora in Canada. Beginning the herbarium by donating his own collection of three thousand specimens, Fletcher began to collect locally and in the different regions of Canada as time and lecture tours permitted.⁴⁰ But to acquire a truly representative collection, Fletcher was also dependent upon the donations of his correspondents. Women played a significant role in this activity in a number of ways. In addition to sending specimens to Fletcher because they knew that the department was building its collections, women with expertise in particular areas or in particular species were sometimes specifically asked to locate and collect specimens. A particularly generous and regular donor of specimens was Catharine Parr Traill, a well-known Canadian botanist.⁴¹

The Fletcher-Traill correspondence reveals the shared attitudes that allowed their collegial relationship to flourish. Seeing in nature evidence of God's love, Fletcher deplored the "irreverent materialistic philosophy" of many modern naturalists. Praising *Studies in Plant Life*, a book by Traill which he had edited, Fletcher wrote: "It is very charming to me to see such love for our beneficent Creator and reverence for His perfect works." Her work corresponded with his own effort to "draw attention to the marvellous and beautiful adaptations of all objects presented to us in the study of nature, to their required ends and to show us how much we have in this lovely world to make us happy."⁴² Indeed, to Fletcher, Traill was an exemplary botanist:

her insistence that her appointment to the position of Consultant Entomologist to the Royal Agricultural Society should be an honorary one. Although offered payment, which would have elevated her to the position of professional, Ormerod rejected it. She thus maintained her Victorian femininity and respectability by continuing her work on a purely philanthropic basis. See, Suzanne Le-May Sheffield, *Revealing New Worlds: Three Victorian Women Naturalists* (London: Routledge, 2001), 152.

38. LAC, RG 17, A II 7, v. 2330, "Letter from Fletcher to Ormerod, 20 November 1885."

39. LAC, RG 17, A II 7, v. 2330, "Letter from Ormerod to Fletcher, 4 February 1886," 195-196.

40. T. H. Anstey, *One Hundred Harvests: Research Branch, Agriculture Canada, 1886-1986* (Ottawa: Agriculture Canada, 1986), 21.

41. Ainley, "Science in Canada's Backwoods: Catharine Parr Traill," 79-97.

42. LAC, MG 29 D 81, Traill Family Papers, v. 1, "Letter from Fletcher to Traill, 22 March 1883."

I wish that a fraction of one percent of the students of plants who call themselves botanists, could use their eyes half as well as you have done. I think indeed your work of describing all the wild plants in your book so accurately that each one could have the name applied to it without doubt, is one of the greatest botanical triumphs which anyone could achieve, and one which I have frequently spoken of to illustrate how one can develop their powers of observation.⁴³

Traill's possible reticence in accepting the designation of botanist and the tone of Fletcher's letter suggest that both were aware that the science of botany was changing. Certainly the process of professionalization, which was transforming botany into a laboratory science dependent upon experimentation rather than observation, was well underway.

Although the way in which Fletcher undertook his investigations was clearly rooted in the amateur natural history tradition, he also responded to the scientific demands of his discipline and to his own professional aspirations. Thus Fletcher maintained that scientific knowledge was advancing beyond the grasp of amateurs. Speaking of crop losses due to insect infestations, Fletcher stated: "Now the loss to crops is caused, not by large and conspicuous insects, but by insects so small that they are not noticed." Farmers who before had been able to identify their insect foes and apply appropriate remedies were now helpless in the face of insect depredations.⁴⁴ Only an expert entomologist, an authority in the subject, could provide these farmers with the necessary information. In this, we see the growing divide between professionals and amateurs.

The growth of this divide was furthered by the desire of the Department of Agriculture to be the locus of original scientific investigations, and by the process of professionalization underway within the federal civil service.⁴⁵ Following Fletcher's 1908 death, the Department replaced him with two university-trained professionals: Hans Güssow as Dominion Botanist and Dr. C. Gordon Hewitt as Dominion Entomologist.⁴⁶ As a university trained plant pathologist, Güssow paid special attention to investigations on diseases of plants due to micro-organisms such as bacteria and fungi. Indeed, he envisioned that the laboratory at the Central Experimental Farm would serve as "a centre for the investigation of the diseases of plants, which annually cause enormous losses to the growers

43. LAC, MG 29 D 81, Traill Family Papers, v. 1, "Letter from Fletcher to Traill, 29 July 1894."

44. Canada, "Report of the Gigault Committee," 152.

45. Castonguay, "Naturalizing Federalism," 15-16.

46. Stéphane Castonguay, "La Dynamique du Changement Scientifique en Contexte Gouvernemental : l'Entomologie Économique au Canada, 1909-1959," PhD Dissertation, Université de Québec à Montréal, 1999, 20, 56. See also, William Saunders, "Additions to the Staff of the Experimental Farms," in Canada. "Appendix to the Report of the Minister of Agriculture Experimental Farms Report," *Sessional Papers*, 1910, no. 16, 9-10.

of fruit and farm crops in Canada.”⁴⁷ Although women continued to correspond with these two men, the limited visibility they had enjoyed with Fletcher through departmental annual reports disappeared entirely. By this time, however, women had found a new role in the botany of the Department of Agriculture as paid seed analysts.

George Clark and Seed Analysis, 1899-1919: Female Botanists as Laboratory Technicians

Because crop returns are determined, in part, by the purity and vitality of agricultural seed, seed analysis, encompassing tests to ascertain both, was an important activity within the Department of Agriculture. As it grew in importance, it created unique work opportunities for women. First officially performed by the staff of the Central Experimental Farm from 1886⁴⁸, seed analysis was conducted as part of crop experiments and was offered as a service to farmers.⁴⁹ In the late 1890s, however, the activity began to attract greater attention through the efforts of the department’s agriculturist, James Robertson. In this incarnation, seed analysis constituted a transitional activity shaped both by the amateur naturalist tradition, by the professionalization of botany, and by the new professional rules that began to be implemented in the federal Department of Agriculture after 1908.

First appointed to the Experimental Farms Branch in 1891, James Robertson was an avid supporter of the Nature Study Movement, which encouraged the study of all aspects of nature through observation. For him, this movement prepared farm boys and girls for complete living on the farm by teaching them better production methods that, in turn, fostered a better appreciation of the value of their work. Ultimately, it would prevent their enticement away from the farms to the cities and, by extension, foster improved social life.⁵⁰ Nature Study courses, including

47. Hans Güssow, “Report of the Dominion Botanist,” in Canada; “Appendix to the Report of the Minister of Agriculture Experimental Farms Reports for the year ending March 31, 1910,” *Sessional Papers*, 1910, no. 16, 251.

48. William Saunders, *Testing the Vitality of Seeds*, *Bulletin No. 2*, Central Experimental Farm, Department of Agriculture, Ottawa, December 15, 1887, 1-11; “Appendix 54—A, Report on Agricultural Colleges and Experimental Stations, with Suggestions Relating to Experimental Agriculture in Canada,” in Canada, “Report of the Minister of Agriculture for the Calendar Year 1885,” *Sessional Papers*, 1885, no. 10, 289-90.

49. William Saunders, “Progress of Agriculture in Canada,” in Canada, “Select Standing Committee on Agriculture and Colonization,” *Appendices to the Journals of the House of Commons*, 1906-07, no. 4, 157-158.

50. O. J. Stevenson and Sidney Silcox, *Modern Nature Study* (Toronto: Morang Educational Company, Ltd., 1908), 5; Ontario Teachers’ Manuals, *Nature Study* (Toronto: Ryerson Press, 1915), 13; James Mills, “Nature Study,” in *Nature Study or Stories in Agriculture*, Bulletin 124, Ontario Agricultural College (Toronto: L. K. Cameron, King’s Printer, 1902),

investigations of birds, trees, and soils, also incorporated studies of seeds. In these courses, children were taught to recognize the main crop and weed seeds and they were instructed in the methods of conducting both purity and germination tests.⁵¹

To demonstrate the importance of this training, James Robertson launched, in 1899, a seed competition, the Robertson Seed Grain Competition. It began as a small affair with prizes mounting to one hundred dollars. Favourably impressed, William MacDonald, a wealthy Montreal businessman, offered ten thousand dollars to continue the competition for another three years.⁵² Busy with his duties as Commissioner of Dairying, Robertson hired George H. Clark as an assistant to help him with the administration of the renamed MacDonald-Robertson Seed Grain Competition.⁵³ Among the first university graduates employed in the Department of Agriculture, Clark graduated with a B.S.A. from the University of Toronto in 1898. Employed for two years in the Field Husbandry Division of the Ontario Agricultural College, he was then appointed as Robertson's assistant in 1900. He brought with him decided views about the problems facing Canadian farmers and the best way to solve them.

The most serious problem that Clark perceived was that of weeds, particularly the contamination of agricultural seed with the seeds of these pests.⁵⁴ Not only did weed seeds reduce immediate crop returns, but because they destroyed soil fertility, they also reduced long-term productivity. Historian Clint Evans argues that the recognition of the problem of weeds coincided with the specialization and professionalization of disciplines in science in general, and in botany, in particular, leading to the development of a new breed of agricultural specialist, of

3-4; W. H. Muldrew and S. B. McCready, *Hints on Making Nature Collections in Public and High Schools*, Bulletin 134 (Guelph: Macdonald Institute, Ontario Agricultural College, 1906); Wilbur S. Jackman, "Nature-Study and Morals," Chapter IV in *Nature Study*, The Third Yearbook of the National Society for the Scientific Study of Education, Part II (Chicago: University of Chicago Press, 1904), 73-81.

51. Elizabeth Keeney, *The Botanizers: Amateur Scientists in Nineteenth-Century America* (Chapel Hill: University of North Carolina Press, 1992), 139.

52. Canada, "Report of the Select Standing Committee on Agriculture and Colonization," James W. Robertson's testimony, "The MacDonald Movement for Rural Education," *Appendices to the Journals of the House of Commons*, 1907, no. 4, 191-192.

53. Robertson had resigned his position as Agriculturalist with the Central Experimental Farm in 1896.

54. LAC, RG 17, Acc. 83/64, file 5-5-A-1, "Geo. H. Clark-Outline of his Services to Agriculture While Dominion Seed Commissioner," *History of Seed Branch Work*, 1935; RG 17, Acc. 83/64, file 5-5-A-2, "A Short History of Seed Testing in Canada," *History of Seed Laboratories by W. H. Wright and A. Hope, 1900-1939*, 1.

which G. H. Clark was one.⁵⁵

Upon his appointment to the Department of Agriculture, Clark began to investigate the state of the Canadian seed trade to determine the most prevalent noxious weed contaminants that were destroying farms and reducing crop yields. He surmised that because legislation in other countries controlled the quality of their seed imports, Canadian traders exported their best quality seed to these countries. To compound the problem, foreign exporters used Canada as a dumping ground for poor quality seed. Lacking legislative protection, Canadian farmers were left with the worst. In 1902, Clark convinced the Minister of Agriculture, Sydney Fisher, of the need to substantiate this claim. A Seed Division was then formed, with Clark as its Chief. The magnitude of the problem revealed by his investigations prompted the federal government to pass regulatory legislation controlling both the quality of seed imports and exports and all seed offered for sale in Canada. In 1905, the *Seed Control Act* was passed; the Seed Division then became a Branch in its own right, under the direction of George H. Clark, who became Seed Commissioner.

The passage of the 1905 legislation, an example of the bureaucratization of both science and the federal civil service, generated an enormous volume of work in seed analysis. Seed growers and salesmen were obliged to send seed in for analysis and grading. To ensure compliance with the regulations drafted to implement the legislation, the seed inspectors, all men, took random samples of seeds offered for sale, which were then sent to the laboratory. As well, farmers were still invited to send samples to the laboratory. The increasing amount of work to be performed necessitated first the employment of more personnel at the Ottawa laboratory and then, the opening of the Calgary laboratory in 1907 and of another one in Winnipeg in 1918. A laboratory-based activity, seed analysis was to be conducted by a coterie of female laboratory technicians under the direction of a male laboratory head. But why did seed analysis come to be viewed as “women’s work?” Because the concept of “women’s work” encompasses two distinct workplace experiences, that is, territorial and hierarchical segregation, this question has a two-fold answer: 1) the nature of the work; and 2) the rewards in terms of pay and opportunity for advancement, which it was deemed to merit. Women performed routine, tedious work for which they were considered to be particularly suited, and, regarded as assistants, received low pay and few promotions.

55. Clint Evans, “The 1865 *Canada Thistle Act* of Upper Canada as an Expression of a Common Culture of Weeds in Canada and the Northern United States,” in *Canadian Papers in Rural History* 10, ed. Donald H. Akenson (Gananoque, Ont.: Langdale Press, 1996), 142-143.

Summarizing the nature of the work, G.H. Clark justified the employment of women as opposed to returned soldiers in the following way: "Men do not take to the detail work of seed testing. It is very fine and close work, very trying on the patience. It is essentially women's work."⁵⁶ The method employed to conduct purity and germination tests provides ample evidence of why the technical work of seed analysis quickly became identified as "women's work." The repetitive and exact nature of the work required women's "natural" skills and abilities. In "Technical Work in the Seed Laboratory," Clark wrote:

for a purity test a definite quantity is weighed out from a mixed sample—the weight of the sample varies with different kinds of seed...The weighed sample is then separated with the use of brass sieves and by hand into three component parts,
1st, Pure seed, seed of the kind being examined.

2nd, Inert matter, broken seeds, dirt, sand, sticks and chaff.

3rd, Foreign seed,— (a) Seeds of useful or harmless plants; (b) Weed seeds.

The percentage by weight of pure seeds, inert matter and foreign seeds is then calculated. Finally the kinds and proportion by number or by weight of foreign seeds are then determined.⁵⁷

Clark also stressed the exactness of purity analyses:

The average purity examination involves looking through from 18,000 to 40,000 seeds twice to find impurities. The seeds are from 1/16 to 1/24 of an inch in diameter, and some of the impurities are so similar to the cultivated seeds that very close scrutiny is necessary to distinguish them.⁵⁸

Moreover, to perform a thorough purity analysis it was often necessary to go through the sample several times.⁵⁹ As repetitive, routine, and fine work, purity tests necessitated the patience, tolerance of boredom, docility, and manual dexterity supposedly "natural" to women.

Germination tests involved, for their part, a "determination of (the) percentage of seeds capable of germinating under favourable conditions, and the vital energy of the seed that germinates."⁶⁰ Two general methods could be employed in the conduct of germination tests, although different types of seed required particular variations. In the first method, a sample of one hundred seeds was planted in soil. The number and strength of the seedlings determined the vitality. In the second method, a similar sized

56. LAC, RG 17, v. 2796, file 251115, "Letter from G. H. Clark, Seed Commissioner, to J. H. Grisdale, Deputy Minister of Agriculture, 28 April 1919."

57. George H. Clark, Branch of the Commissioner of Agriculture and Dairying, *Report of the Chief of the Seed Division, 1904* (Ottawa, December 31, 1904), 17.

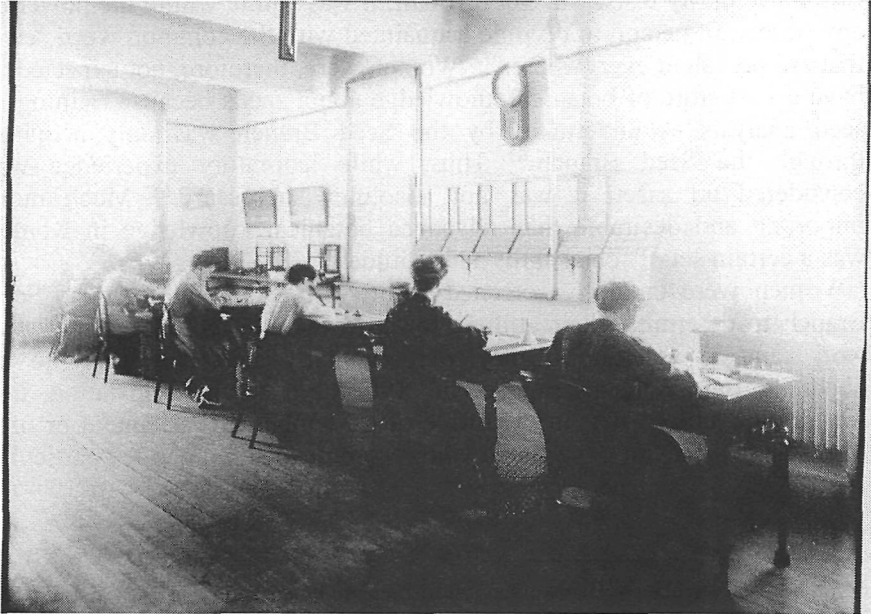
58. LAC, RG 17, v. 2887, file 14-19, "Letter from G. H. Clark, Seed Commissioner, to J.H. Grisdale, Deputy Minister of Agriculture, 7 April 1920."

59. Clark, *Report of the Seed Commissioner for the period from March 1911, to August 31, 1913* (Ottawa, December 31, 1913), 18.

60. *Ibid.*, 15.

sample was employed but it was placed between blotters in a standard germinator where the temperature and moisture was maintained at the optimal level for the variety being tested. As with soil tests, the number and strength of the seedlings determined the vitality of the seed. These two methods were used together so soil tests could confirm the results of tests in germinators.⁶¹

The purity laboratory of the Seed Branch, 1907.



Source: Library and Archives of Canada, PA-042588

While the men responsible for the seed laboratories had to be conversant in the method of conducting seed analyses to train women in the work and to verify test results, they were largely involved in duties that kept them away from the technical work of seed analysis. Indeed, had they conducted seed analyses, it would have been considered a misuse of their talents and ability for these men were university graduates.⁶² Because of their real and perceived greater knowledge and skill in comparison to women, men controlled the seed laboratories. Appointed to positions such as Assistant Botanist, Official Seed Analyst, or Chief Seed Analyst, men were responsible for the management of the work of seed analysis. Moreover, the men served as a reference for the women analysts in cases

61. *Ibid.*, 19.

62. LAC, RG 17, v. 2786, file 239409, "Letter from G. H. Clark, Seed Commissioner, to G.F. O'Halloran, Deputy Minister of Agriculture, 28 May 1915."

of hard to identify seeds.⁶³ One can argue that women attained a similar level of knowledge and skill after spending years at the work of seed analysis.⁶⁴ However, the knowledge and skill accumulated by women through experience was not accorded the same recognition because, with a high school education, they did not have the same academic credentials as the men had.⁶⁵

Seed analysts were required to have little formal training. In his discussions of seed analysis, G.H. Clark maintained that this kind of work, especially purity tests, was not difficult: it was "quite within the power of any observant person to become acquainted with the common weed seeds that are prevalent everywhere."⁶⁶ Women were, therefore, not expected to have a vast store of botanical knowledge about seeds because training in seed analysis as undertaken by the Seed Branch was only acquired through the Seed Branch.⁶⁷ Thus, while laboratory experience was considered an asset, it was not absolutely necessary.⁶⁸ Much more important and desirable than advanced botanical knowledge in women was a certain set of social skills and attitudes.

Women were carefully screened before being appointed to the Seed Branch to determine their attitude toward exacting, tedious, and routine work, and to ascertain if they were mentally alert and likely to be obedient. Before the passage of the 1908 civil service legislation, this screening occurred first in the office of a Member of Parliament or of a Minister of a federal department who recommended women for particular

63. "The Seed Branch: A Hardworking and Efficient Organization and How it Helps the Public," *The Civilian* 4, 13 (October 20, 1911): 344.

64. Jane Gaskell notes that "lots of different kinds of training will do to prepare people for their jobs. No single version is 'necessary'." See Gaskell, "What Counts as Skill? Reflections on Pay Equity," in *Just Wages: A Feminist Assessment of Pay Equity*, eds. Judy Fudge and Patricia McDermott (Toronto: University of Toronto Press, 1991), 149.

65. Discussing the different value assigned to "knowledge" and "experience," philosopher Lorraine Code argues that the latter, attributed to women, lacks credibility whereas the former, attributed to men, is authoritative. See, Code, *What Can She Know? Feminist Theory and the Construction of Knowledge* (Ithaca: Cornell University Press, 1991), 222-223. At least one woman with a university education did apply for the position of Supervising Seed Analyst. Annie Gray's application was rejected because a lady could neither undertake field work nor assume responsibility for a laboratory and its staff of both men and women. LAC, RG 17, v. 2771, file 220794, "Letter from G. H. Clark, Seed Commissioner, to W. Foran, Secretary, Civil Service Commission, 10 July 1912."

66. George H. Clark, Branch of the Commissioner of Agriculture and Dairying, *Report of the Chief of the Seed Division, 1904*, Ottawa, December 31, 1904, 22.

67. LAC, RG 17, v. 2799, file 257897, "Letter from J. H. Grisdale, Deputy Minister of Agriculture, to W. Foran, Secretary, Civil Service Commission, 15 November 1919."

68. LAC, RG 17, v. 2781, file 232176, "Memo from G. F. O'Halloran, Deputy Minister of Agriculture, to Martin Burrell, Minister of Agriculture, 3 March 1914."

appointments.⁶⁹ Upon recommendation, the screening continued with an interview in the Seed Branch. With the passage of the *Civil Service Amendment Act, 1908*, the Civil Service Commission determined academic qualifications. But the Seed Branch continued to ascertain if women candidates had the desired mind-set.

While the questions asked of potential seed analysts from 1908 to 1921 have not been preserved, it seems likely that the list given to Supervising Analysts in 1936 parallels the ones distributed to their predecessors. In this list, only one question considered the candidate's knowledge of weed seeds. It conceded that "while the candidate is not expected to be very familiar with weed seeds," she should be shown "a collection of a few common ones to test her powers of observation."⁷⁰ Significantly, all of the other questions focused upon securing a young woman with the appropriate attitude and temperament for seed analysis (see box 1).

Oral Examination for Junior Analysts.

The "Simple" Question (e.g. how to wash glassware). Note the manner of reply. What is the candidate's attitude towards a simple subject? Is she likely to be careful of small details?

Attitude to Work. What are her interests and hobbies? What reaction to skills requiring close attention to detail—painting, embroidery, etc., etc., to nature studies, gardening, and so on.

Mental Alertness. The so-called "catch" question may be useful here. Questions which may involve simple mental arithmetic, power of following a line of reasoning, general powers of observation, and so forth.

General Knowledge. A good deal of information as to a candidate's attitude to life and to her work can be derived from questions relating to general knowledge. Her knowledge of names, historical and contemporary, famous in any fields of endeavour; of present trends in national and international affairs; of the government of the country; of sport, art, science, etc., may be gauged and much more learned as to her attitude from replies and the manner in which she makes them.⁷¹

Source : LAC, RG 17, v. 2385, file 64-6, *Minutes of the Supervising Analysts' Conference*, November 1936, 3-4.

69. LAC, RG 17, v. 1018, file 176444, "Letters from J. M. Kilburn, to Sydney Fisher, Minister of Agriculture, and from G. H. O'Halloran, Deputy Minister of Agriculture, and Jennie M. Kilburn, 28 November, and 4, 6, 11 December 1905."

70. LAC, RG 17, v. 2385, file 64-6, *Minutes of the Supervising Analysts' Conference*, November 1936.

71. Ibid., 3-4. In her discussion of the work of women in the making of watches and clocks, Joan Sangster notes that the "explicit comparisons with knitting and embroidery, which were female hobbies, were often made, thus belittling the proficiency needed for the job." See, Sangster, *Earning Respect: The Lives of Working Women in "Small-Town Ontario, 1920-1950* (Toronto: University of Toronto Press, 1995), 58.

Thus the nature of the work undertaken by women in seed analysis, the qualifications that they brought to the work, and its organization under the impetus of the bureaucratization and professionalization of science and the civil service determined that the technical work of seed analysis would be performed by women. Experiencing territorial segregation, women were, in effect, employed as laboratory technicians to assist male scientists. This territorial segregation resulted in hierarchical segregation. The recognition in terms of pay and opportunity for advancement reflected women's status as laboratory technicians.

The Germination Laboratory of the Seed Branch, 1907.



Source: Library and Archives of Canada, PA-042586

As the Seed Branch grew, a sexually segregated occupational hierarchy developed. As the Seed Commissioner, George H. Clark answered to the

Deputy Minister of Agriculture, and was the head of the Branch that had both a field inspection and laboratory division. E.D. Eddy was the assistant Commissioner who answered to Clark. Beneath these two men were district supervisors responsible for directing both seed inspection in the field and seed analysis in the laboratories. These men were ranked in the first and second divisions. At this point, the field and laboratory divisions were separated. Assistant botanists, sometimes called Official Seed Analysts or Chief Seed Analysts, answering to district supervisors, directed the work of seed analysis in the laboratories. Upon their first appointment, these men were ranked in the Second Division. Women appointed to the position of seed analyst performed the detail work of seed analysis in these laboratories. At the bottom of the hierarchy were a final group of men, the labourers and messengers.

Within this larger hierarchy, there existed another, exclusively feminine hierarchy, the complexity of which masked the fact that women's career ladder in the Seed Branch was short. Upon their first appointment, women were employed in a seasonal capacity for six months between October and April, the peak season for seed testing.⁷² In the first year, seasonal seed analysts received a monthly salary of \$60.00. After one season's experience women were titled senior seasonal seed analysts and paid a monthly salary of \$75. If a seasonal analyst returned for a third season, she might receive \$87.50 per month. This salary increase was not guaranteed, but was granted upon the recommendation of the Seed Commissioner. After having served efficiently and reliably for several years in a seasonal capacity, and having shown themselves to be highly skilled, with a facility in conducting research work, under the direction of the chief analyst or supervising analyst, women might be appointed permanently.⁷³ A whole new work hierarchy, located entirely within the third division, the lowest of the civil service, and also composed entirely of women, then came into play.

Seed analysts were ranked in the third division but length of experience in a temporary or seasonal capacity determined the sub-division, A or B, with B as the lower of the two, into which they were placed (see table 1). The ramifications of their placement in the third division are important.

72. Seasonal appointments were differentiated from temporary appointments by the fact that those holding seasonal appointments were immediately reappointed the following season without having to go through the application process.

73. LAC, RG 17, file 77, "Letter from G. H. Clark, Seed Commissioner, to Dr. J. H. Grisdale, Deputy Minister of Agriculture, 5 March 1921."

Table 1. *Canadian Civil Service Hierarchy and Salary Ranges, 1908.*

Position Title	Status	Division and Sub-Division	Yearly Salary
Seed Commissioner	Permanent	First Division, Sub-Division A—1-A	\$2,800 - \$4,000
Assistant Seed Commissioner	Permanent	First Division, Sub-Division B—1-B	\$2,100 - \$2,800
Assistant Botanist / Official Seed Analyst / Chief Seed Analyst	Permanent	Second Division, Sub-Division A—2-A	\$1,600 - \$2,100
Assistant Botanist / Official Seed Analyst / Chief Seed Analyst	Permanent	Second Division, Sub-Division B—2-B	\$800 - \$1,600
Seed Analyst	Permanent	Third Division, Sub-Division A—3-A	\$900 - \$1,200
Seed Analyst	Permanent	Third Division, Sub-Division B—3-B	\$500 - \$800
Seasonal Seed Analyst	Temporary Oct. to April	N/A	N/A

Source: "Appendix B," Canada. "First Annual Report of the Civil Service Commission of Canada for the period from September 1, 1908 to August 31, 1909," *Sessional Papers*, 1909, no. 31, 57.

According to the 1908 instructions provided by the Civil Service Commission to guide the implementation of the new civil service legislation, which established three divisions into which staff were to be divided, the third division was intended for "clerkships, the duties of which are routine work under direct supervision, not ordinarily calculated to render the clerk performing them competent to perform the duties of a clerkship in the second division."⁷⁴ Once in the third division, there was little likelihood that women would be promoted out of it. Indeed, for a woman in 3B, even promotion to subdivision A was sometimes difficult to achieve. It took many years of service before it was granted. Moreover, while women were eligible under the civil service regulations to take the second division promotion exam, success did not translate into a promotion. A second division promotion did not figure in the seed analyst career ladder because men held positions in the second division almost exclusively. The Civil Service Commission implemented this rigid hierarchy as a means of advancing the professional status of work in the federal civil service. By definition, only that work undertaken by men merited the designation "professional."

74. LAC, RG 17, v. 2761, file 199279, *Memorandum for the Guidance of Deputy Heads in the Organization of Departments under Section 8 of the Civil Service Amendment Act, 1908*, n.d.

The career trajectory of Mary Florence Hartley is typical of that experienced by women who stayed with the Seed Branch for any length of time. Employed temporarily beginning in 1902 at a salary of \$500 per annum, Hartley received a permanent appointment in 1908 under the new civil service legislation, when the Seed Branch became part of the Inside Service. She was placed in the lowest grade, in sub-division B of the third division, although she earned \$900 per annum, a salary considerably higher than the \$500 minimum of that grade.⁷⁵ By 1918, Hartley was in sub-division A of the third division and she was earning an annual salary of \$1300, one hundred dollars above the maximum of that grade. Although Hartley was receiving the salary of a clerk in the Second Division, she was not promoted to that grade.⁷⁶

And yet, in 1909, Hartley was the first woman to assume any degree of responsibility for the control of laboratory work in the Seed Branch. As difficulties in securing male personnel in the Seed Branch began to jeopardize the efficient operation of the laboratories, Clark was willing to experiment:

Miss M. F. Hartley, of our seed laboratory staff, has had seven years training and is quite competent in the details of both purity and germination work. I believe that under Mr. McKillican's direction our Calgary seed laboratory would be able to continue to render the usual efficient and prompt service to the farmers of Alberta, British Columbia and part of Saskatchewan with Miss Hartley in direct charge of the detail work.⁷⁷

Miss Hartley's seven years "training" under the Seed Commissioner is key. Not only was Clark personally aware of her knowledge and skill but even more significant, he was cognisant of her correct attitudes toward her work and her superiors. In this position, Hartley supervised the work of other women seed analysts and served as an assistant and a helpmate to the male head of the laboratory, Mr. McKillican. Hartley's increased responsibility involved neither a promotion nor a corresponding increase in salary.⁷⁸ Mary Hartley's career was atypical in that she stayed with the

75. Seed analysts were always paid two hundred dollars above the minimum of the 3B in recognition of the special nature of the work.

76. LAC, RG 17, v. 1034, file 185909, *Estimates, Session 1906-07, Memorandum to the Seed Commissioner, 26 April 1907*; v. 2761, file 199279, *Drafts, Copies, re organization of the Department of Agriculture under the Civil Service Amendment Act of 1908*, n.d.; v. 2803, file 262618, *Seed Branch Employees, July 1918*.

77. LAC, RG 17, v. 2754, file 166496, "Letter from G. H. Clark, Seed Commissioner, to the Deputy Minister of Agriculture, 20 October 1909."

78. Hartley received, in addition to her transportation and meals on the train, a living allowance of \$15.00 a month. LAC, RG 17, v. 2754, file 166496, *Memorandum for the Accountant, 10 November 1909*.

Seed Branch for many years, finally retiring after forty-three years of service. Her career was typical, however, in that she did not advance beyond the third division. Indeed, only one woman, Faith Fyles, secured a position in the second division during the period explored in this paper.

The Professional Female Botanist: The Career Trajectory of Faith Fyles, 1910-1919

On the same day that Clark appointed Mary Hartley to the control of the technical work of seed analysis at the Calgary laboratory, that is 20 October 1909, he submitted this request for personnel to the Minister of Agriculture:

(I)t seems clear to me that we shall need to add an additional clerk to our staff for seed laboratory work. What we need at this time is a competent person who has had a university training in science and has a good general knowledge of biology and who would take and continue with the work in our germination laboratory. I need hardly say that I would prefer a man to a lady clerk, although our experience has been that there is, and is likely to be, so much demand for young men with good training, such as our work affords, that we can scarcely hope to retain them even at the salaries we have been paying. If therefore the Civil Service Commission can furnish the Seed Branch with a lady clerk of exceptional qualifications, including a complete university science course, who would be well worthy of commencing in grade 3 sub-division 2, your Seed Commissioner will be content to give her the three months trial, as provided under the new Civil Service Act. That grade would allow her to begin at \$900 and to go \$1200.⁷⁹

Under the duress generated by the inability to keep men on staff, he reluctantly accepted to grant a woman some measure of control and authority. But she was only to take charge of one aspect of seed analysis: the work in the germination room. She was not intended to be responsible for all aspects of seed laboratory work.

The only individual hired in the Seed Branch after the appearance of this announcement and who fitted its parameters was Faith Fyles, B.A. She was hired in March 1910 as an assistant seed analyst and placed in B of the third division at a starting salary of \$800 a year. There is no indication, however, that Fyles assumed any responsibility for the supervision of the work of seed analysis in the germination room or in the purity room. In fact, Fyles only stayed with the Seed Branch for just over a year. She transferred to the Central Experimental Farm to fill the

79. LAC, RG 17, v. 2754, file 166496, "Letter from George H. Clark, to Deputy Minister of Agriculture, 20 October 1909."

position of Assistant Botanist in B of the second division at a salary of \$1200 per annum on August 1st, 1911.⁸⁰

Faith Fyles, 1912.



Source: Library and Archives of Canada, PA-204727

Born on 30 September 1875 in Cowansville, Québec, Fyles was the seventh of ten children and the third of four daughters born to the Reverend Thomas Fyles and his wife, Mary.⁸¹ Part of a large and loving family, her parents were deeply involved in their children's emotional and

80. LAC, RG 17, v. 2768, file 212092, "Letter from G. H. Clark, Seed Commissioner, to Colonel A. L. Jarvis, Acting Deputy Minister of Agriculture, 24 July 1911."

81. Hoyes Lloyd, "Faith Fyles, Artist-Naturalist, 1875-1961," *The Canadian Field Naturalist* 75, 4 (October-December 1961): 220; LAC, C-13204, 1881 census records for Cowansville, Township of Dunham.

intellectual development.⁸² Writing of his relationship with his own young daughter, Connie, James Fletcher, Dominion Entomologist and Botanist, stated in 1891 that she was “old enough now to help [him] considerably in [his] collecting” and that she was his “constant companion.”⁸³ It is not difficult to imagine the Reverend Fyles, an amateur entomologist and botanist and a colleague of Fletcher’s, expressing similar sentiments about his own children, especially the young Faith who seems early on to have shared her father’s interests. The Reverend, who was an artist, no doubt encouraged also the early artistic endeavours of Faith, who later became a gifted artist, encouraging her to depict botanical and entomological subjects.⁸⁴

Fyles’ education and work history provided her with the qualifications necessary to undertake the position of Assistant Botanist. She began her schooling at King’s Hall, in Compton, from which she graduated with honours, obtaining the medal and special prizes in botany and other subjects. Fyles entered college with a first class scholarship and graduated, in 1900, from McGill with a Bachelor of Arts degree.⁸⁵ During her time at McGill, Fyles studied botany with Professor Carrie Derick, a woman who assuredly inspired Fyles with the idea that it was possible for a woman to gain satisfying employment in the science of botany.⁸⁶ Upon her graduation, Fyles returned home to Cowansville to pursue a yearlong study of the flora of that region with her father. At the same time, she took a drawing course from artists Robert Wickenden and Walter Griffin, then

82. The caring and fun personality of Reverend Fyles is revealed in his short history of the mission of Iron Hill and West Brome. He describes his young wife, the Sunday School teacher, in the most positive terms: “She was then 21 years of age, bright and active, and she had a particularly winning way with young people.” See, Rev. T. W. Fyles, “An Account of the Early Days of the Mission of Iron Hill and West Brome in the Diocese of Montreal,” 1907, 8.

83. LAC, MG 29, D 81, Traill Family Papers, v. 1, “Letter from James Fletcher to Catharine Parr Traill, 25 March 1891.”

84. We have only been able to find a small sample of letters from the Reverend Fyles and they do not mention any contributions from Faith. However, other histories of women in science have noted how daughters and wives joined the ‘family firm’ through their collecting activities and their illustrations of the work of fathers and husbands. See, for example, Shteir, *Cultivating Women, Cultivating Science*; Marcia Myers Bonta, *Women in the Field: America’s Pioneering Women Naturalists* (College Station: Texas A & M University Press, 1992).

85. Canada. “Additions and Changes in Staff,” in “Appendix to the Report of the Minister of Agriculture, for the year ending March 31, 1912,” *Sessional Papers*, 1913, no. 16, 46; *McGill University Montreal, Directory of Graduates, Corrected to July 1913* (Montreal: Dodd-Simpson Press, 1913), 43, 235.

86. Margaret Gillett, “Carrie Derrick (1862-1941) and the Chair of Botany at McGill,” in *Despite the Odds* (see note 3), 86.

holding classes at the Quebec Studio Club, of which Fyles was a member. Entering the job market, she taught school for six years, first at Dunham Ladies College, Dunham, and then at Bishop Strachan School, Toronto. Giving up teaching, Fyles completed her education with a year of travel and study in Europe in 1909.⁸⁷

While Fyles was, in terms of her education, eminently qualified for the position of Assistant Botanist, her application was also likely considered favourably because of her age and marital status. At the time of her appointment she was a single, mature woman of thirty-six. The likelihood of her leaving the position in favour of marriage and a family was not high. It seemed probable that Fyles, who had shown academic inclinations, would choose a career over a family of her own. The extant evidence indicates that she was the main support of her parents as they aged.⁸⁸ But while her education, age, and family status helps to explain why Fyles was able to earn the position of Assistant Botanist, they do not tell the complete story. To understand the reasons for her appointment, we must consider her employment history with the federal Department of Agriculture and her connections with potentially influential individuals.

Fyles' received her first permanent appointment to the Department in 1910 as a seed analyst; a position she acquired despite her poor typing skills!⁸⁹ In this position, Fyles was placed in B of the third division at an annual salary of \$800, \$300 above the minimum of the grade. Had she remained with the Seed Branch, Fyles might have been promoted, after many years service, to 3A and received a salary equal to that paid in 2B. She would have remained primarily involved in the technical work of the Seed Branch with limited supervisory responsibility for women her junior in terms of length of service, but who earned the same salary and were placed in the same rank. Women could not be appointed to the position of Assistant Botanist in the Seed Branch because it involved supervising

87. Canada. "Additions and Changes in Staff," 46.

88. It has been suggested that families selected certain daughters for professional careers and it is possible that this was the experience of Fyles. See, Patricia A. Palmieri, "Patterns of Achievement of Single Academic Women at Wellesley College, 1880-1920," *Frontiers* 5 (1980): 63-7.

89. LAC, RG 17, v. 1773, "Letter from G. F. O'Halloran, Deputy Minister of Agriculture, to William Foran, Secretary, Civil Service Commission, 15 April 1910." In this letter O'Halloran asked Foran if Fyles could be made permanent despite her low score on the typing test. In 1910, the Civil Service Commission instituted rules that dictated that women applying for temporary positions must pass typing and stenography tests. This was part of an effort on the part of the CSC to segregate the sexes because typing and stenography were skills rare among men. See, Lowe, *Women in the Administrative Revolution*, 73.

men, undertaking field work, and taking charge of a Seed Laboratory.⁹⁰

Thus the choice of a job in seed analysis does not seem to conform to a woman of Fyles' education and background. Did family responsibilities necessitate this move? Why abandon teaching for seed analysis? Was she made aware of greater opportunities in the Department of Agriculture? I cannot answer these questions with complete assurance, but I suggest that Fyles' appointment in the Seed Branch was probably a stepping stone to a better-ranked and more lucrative position. Two connections possibly facilitated the transfer.

The first was between the Fyles family and that of the Deputy Minister of Agriculture, G. F. O'Halloran, as suggested by the 1891 census returns for Cowansville.⁹¹ While we can only speculate upon the existence of this connection, if it did exist, efforts might have been made to obtain information about possible posts in the Department and the procedures to follow to obtain them. A more concrete connection is evident with Carrie M. Derick, who was one of the civil service examiners responsible for testing individuals who applied for positions in botany. As one of Fyles' former professors, it seems possible, and indeed likely, that Derick would have alerted a former pupil of the availability of positions in the Department of Agriculture.⁹²

We must still ask why a woman was appointed to the position instead of a man. Other women equally qualified for other sorts of positions applied but did not get them because they were considered unsuited to a "lady."⁹³ This naturally suggests two questions: What was it about the work of Assistant Botanist that made it suitable for a lady? To what extent did the

90. LAC, RG 17, v. 2771, file 220794, "Letter from G. H. Clark, Seed Commissioner, to W. Foran, Secretary, Civil Service Commission, 10 July 1912."

91. The Reverend Thomas Fyles was the Anglican minister in Cowansville at that time. Amongst the Anglicans in town were the O'Hallorans, one of whom would later become the Deputy Minister of Agriculture.

92. Carrie M. Derick, McGill University, and Prof. Ramsay Wright, University of Toronto, were listed as examiners in biology. See, Canada. "Fourth Annual Report of the Civil Service Commission of Canada for the period from September 1, 1911 to August 31, 1912," *Sessional Papers*, 1912, no. 31, 158.

93. Most informative is the case of an unnamed young woman who applied and was rejected for a position as Bacteriologist and Chemist in the Health of Animals Branch in November, 1908. Writing to reject her application, Deputy Minister of Agriculture G. F. O'Halloran stated that not only would the men be unwilling to work with a lady assistant but that the work of the Department would be "very disagreeable to a young lady." See, LAC, RG 17, v. 1763, "Letter from G. F. O'Halloran, Deputy Minister of Agriculture, to W. S. Fielding, Minister of Finance, 7 November 1908." Similarly, Rossiter found that women in the United States Department of Agriculture, while permitted to work in plant pathology, were not employed to study animal diseases. See, Rossiter, *Women Scientists in America*, 221.

factors that made the position appropriate for a lady in turn make it equally inappropriate for a man?

Although undertaking work of considerable value to the country, the salaries paid to the science staff of the Experimental Farms Branch were low in comparison to those paid in the private sector. Retention of staff was a perpetual concern of the heads of the various divisions, because employees, with training and experience acquired through working in the Department, were desirable to employers in the private sector as teachers and researchers. These employers were able to offer considerably higher salaries than those offered by the government. Equally significant, not all the work to be done in the Department was on the cutting edge of science. While laboratory research in plant pathology and mycology was becoming increasingly important, long-standing responsibilities continued to exist. For example, the herbarium continued to be an important tool for the staff and the Canadian public, while the botanical garden also needed to be maintained. Finally, the science staff of the Department of Agriculture was relatively small and there was little chance of advancing within the hierarchy to a position of greater salary or prestige.

In this context, opportunities in the Department of Agriculture held little attraction to well-trained young men. This led to the trial of a new experiment: the employment of a woman in an indisputably scientific position. Thus, in 1911, "(t)he vacancy created by the resignation of Mr. Herbert Groh was filled by Miss Faith Fyles, B.A., who (had) charge of all the work connected with the Botanic Gardens, Herbarium, identification and collection of plants and such experiments as (came) within the scope of systematic botany."⁹⁴

It can be argued that the work Fyles was undertaking was service oriented in that it supported the work of male professionals and individuals outside of the Department. Moreover, it was work that necessitated the stereotypically feminine skills of patience and attention to detail. Dominion Botanist Hans Güssow explained that as part of her responsibilities for the Botanical Garden, she began "labelling the plants with plainly printed large labels of a permanent character. This work entail(ed) considerable painstaking and careful research owing to the difficulty of the everchanging nomenclature of plants."⁹⁵ Fyles was also in charge of co-ordinating the exchange of seed and plant specimens for the

94. Canada. "Report of the Dominion Botanist, Appendix to the Report of the Minister of Agriculture, for the year ending March 31, 1912," *Sessional Papers*, 1912, no. 16, 191-2.

95. Canada. "Botanic Gardens, Appendix to the Report of the Minister of Agriculture, for the year ending March 31, 1912," *Sessional Papers*, 1912, no. 16, 214.

herbarium.⁹⁶ While Güssow was involved in experimental science as well as legislative and administrative work, his Assistant, Fyles, continued to undertake the long-standing botanical tasks of the Department, established during the years when James Fletcher was Dominion Botanist.

In addition to her regular work, and suggestive of her willingness to assist the men to the best of her abilities, Fyles freely offered her services as an artist. Her pen and ink drawings and watercolour paintings significantly improved the utility of divisional reports because farmers were provided with a tool that helped them to identify plants and plant diseases. In praise of her work, Hans Güssow wrote that she had "shown herself to be an expert artist, and her skill in this connection has been much in requisition and has been found very useful in all phases of work of this division [...] The division is exceedingly fortunate in having a member on its staff whose skill in the work is so exceptional."⁹⁷

Although Fyles was doing the equivalent of professional "women's work" in science, the position offered her opportunities for scientific employment that she would not have found elsewhere. As Assistant Botanist she was expected to publish the results of her investigations. Further, her responsibilities occasionally necessitated fieldwork:

On July 11, 1914, Miss Fyles left for a tour through the West in order to collect flowering specimens of the Western weeds as they are found in their natural surroundings. Treesbank, Brandon, Indian Head, Medicine Hat, Lethbridge, Agassiz, Victoria, Lacombe and Rosthern were visited as collecting centres, from which trips were made through the neighbouring districts. Upwards of 800 perfect specimens of weeds representing 44 different species were collected, pressed, dried and shipped to Ottawa, during July and August. Many hundreds of botanical specimens other than weeds were also collected, as opportunity occurred, to be included in the herbarium.⁹⁸

While women were often barred from scientific employment and advancement because of fieldwork, Fyles was required to do it because of staff shortages.

On the other hand, despite her responsibilities and the recognition granted her, Fyles' superior had to fight in order for her to maintain her

96. Canada. "Systematic Botany, Appendix to the Report of the Minister of Agriculture, Experimental Farms, for the year ending March 31, 1913," *Sessional Papers*, 1913, no. 16, 493-496.

97. Canada. "Report of the Botanist, Appendix to the Report of the Minister of Agriculture, for the year ending March 31, 1912," *Sessional Papers*, 1912, no. 16, 191-192, 215.

98. Canada. "Report of the Botanist, Appendix to the Report of the Minister of Agriculture, for the year ending March 31, 1915," *Sessional Papers*, 1915, no. 16, 964-965.

rank in B of the second division. Under the 1919 reclassification, and coinciding with her transfer to the Horticultural Division in 1920, Fyles suffered a demotion and significant pay cut. Assuming that she was "simply an artist" and no longer a botanist, the Civil Service Commission classed her as "Artist, Botany" with a salary range of \$1320 to \$1620. E. S. Archibald, the Director of the Experimental Farms System, hastened to correct this misapprehension. Writing to the Deputy Minister of Agriculture, J. H. Grisdale, he noted

As a matter of fact in the Horticultural Division it is proposed to avail ourselves just as fully and perhaps more fully of her training as a Botanist and in addition thereto utilize her marked ability as an Artist which were not nearly as fully used in the Division of Botany except on one or two special things which she did, such as the Bulletin on Poisonous Plants. In the Horticultural Division, however, we expected to have constant use of her work as an Artist in addition to using her botanical knowledge in the fullest extent.⁹⁹

Significantly, Archibald's initial recommendation for her classification did not adequately reflect her tasks and responsibilities. He recommended that, from her current position as Assistant Botanist, she be reclassified as a "Junior Technical Assistant."¹⁰⁰ In 1919, Fyles was in receipt of an annual salary of \$1600. Although the ideal salary range suggested by Archibald for the new position went from \$1600 to \$2400, he consented to more realistic alternative of \$1440 to \$1800.¹⁰¹ While Fyles' position was adjusted to match Archibald's recommendations, she still did not receive the recognition she deserved.¹⁰² There is no evidence, however, that Fyles complained.¹⁰³ She stayed with the Department, retiring in 1931, after more than twenty years of service.¹⁰⁴

99. LAC, RG 17, v. 2819, file 1-1-1, part 1, "Letter from E. S. Archibald, Director, Experimental Farms, to J. H. Grisdale, Deputy Minister of Agriculture, 1 October 1920,"

100. The difference of opinion over classification between Dr. Alice Wilson of the Geological Survey and her superiors is illuminating. She wished to be classed as an associate invertebrate paleontologist but her superiors planned to class her as an associate curator of paleontology. Wilson "recognized this stratagem for what it was, a grotesque attempt to keep her out of the higher echelons of the Survey, and to bar her from the field work that she so passionately enjoyed." See Barbara Meadowcroft, "Alice Wilson, 1881-1964, Explorer of the Earth Beneath Her Feet," in *Despite the Odds* (see note 3), 215-216.

101. LAC, RG 17, v. 2886, file 14-17, part 1, July 1919, "Experimental Farms, Classification 1919-1951."

102. Fyles was thus classed as a "Junior Technical Assistant" and continued to receive \$1600 a year.

103. In this, Fyles is the opposite of Geologist Alice Wilson who fought long and hard to win advancement and recognition in the Canadian Geological Survey. See, Meadowcroft.

104. PC 14/2756, F. Fyles, Artist, Botany Department, Superannuation, 6 November 1931.

Conclusion

In this recuperative project, I have traced the patterns of women's involvement in botany within the federal Department of Agriculture from 1887 to 1919. Arguing that the professionalization and bureaucratization of both the science of botany and the Canadian federal civil service shaped the nature of this involvement, I identified three overlapping trends. When James Fletcher, a self-taught amateur naturalist, held the position of Dominion Botanist, the contributions of a range of fellow amateurs, including women, were actively employed, sought, and recognized. As botany and the civil service professionalized, however, the role of amateurs decreased. The appointment of George Clark, BSA, in 1900 is evidence of the professionalizing trend. An agricultural specialist concerned with the poor quality agricultural seed available to Canadian farmers, Clark conducted studies, which led to the passage of seed control legislation. The resulting bureaucratization of science necessitated the appointment of women laboratory technicians as seed analysts. Performing repetitive, routine, and detailed work considered suitable to women's "natural" abilities and receiving low pay and little opportunity for advancement, these women undertook "women's work" in science. In effect, they experienced territorial and hierarchical segregation. Only one woman, Assistant Botanist Faith Fyles, apparently overcame the restrictions imposed by territorial and hierarchical segregation. However, I argue that while Fyles did enjoy professional success, she nonetheless performed what can be categorized as "professional women's work" in science. She, too, experienced both territorial and hierarchical segregation within the federal Department of Agriculture.

Was the federal Department of Agriculture unique among federal departments and agencies in its employment of women in science in both an unpaid and paid capacity? Was the science of botany, in its turn, unusual in providing a significant number of women with opportunities for work in science at the federal level? To what degree did the territorial and hierarchical segregation imposed by the professionalization and bureaucratization of science and the Canadian federal civil service shape women's employment in science within the federal government as a whole? With such questions as these awaiting exploration the federal government remains an area ripe for investigation by historians interested in the history of women in science in Canada.