

“The only girl in such a big class”: Women Students at the University of Toronto’s Faculty of Applied Science and Engineering during the 1920s and the 1930s

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Article abstract

This article draws the collective profile and examines the experiences of the handful of women who formed the first generation of female students enrolled at the University of Toronto's Faculty of Applied Science and Engineering (FASE) during the 1920s and 1930s. The student records shed light on their socio-economic background, which they shared to a large extent with their male counterparts and the other women attending university at the time. The available sources also provide information on the school's curriculum and pedagogical practices, and on the main features of student life at FASE. The institution cultivated and transmitted a deeply masculine culture: to train an engineer was to train a man and to construct a specific type of masculinity, symbolized by the "Schoolmen" and the "School Spirit." How did the pioneers adapt to this environment? How did FASE respond to their arrival? The article accounts for the diversity of views and experiences of the female students, and for the different reactions to their presence. Nevertheless, the entry of this pioneering group at FASE openly raised the question: can a woman be a woman *and* an engineer? Other studies are needed to better understand how female students answered this question in their own way, in different schools of engineering and in different historical settings. This work will help bring answers to this other question, which is still widely debated: why so few women engineers?

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Abstract : This article draws the collective profile and examines the experiences of the handful of women who formed the first generation of female students enrolled at the University of Toronto’s Faculty of Applied Science and Engineering (FASE) during the 1920s and 1930s. The student records shed light on their socio-economic background, which they shared to a large extent with their male counterparts and the other women attending university at the time. The available sources also provide information on the school’s curriculum and pedagogical practices, and on the main features of student life at FASE. The institution cultivated and transmitted a deeply masculine culture: to train an engineer was to train a man and to construct a specific type of masculinity, symbolized by the “Schoolmen” and the “School Spirit.” How did the pioneers adapt to this environment? How did FASE respond to their arrival? The article accounts for the diversity of views and experiences of the female students, and for the different reactions to their presence. Nevertheless, the entry of this pioneering group at FASE openly raised the question: can a woman be a woman *and* an engineer? Other studies are needed to better understand how female students answered this question in their own way, in different schools of engineering and in different historical settings. This work will help bring answers to this other question, which is still widely debated: why so few women engineers?

Résumé : Cet article trace un portrait collectif, puis examine les expériences de la poignée de jeunes filles qui constituent la première génération d’étudiantes inscrites en génie à la Faculty of Applied Science and Engineering (FASE) de la University of Toronto dans les années 1920 et 1930. Les dossiers étudiants jettent un éclairage sur leur profil socio-économique, qui s’aligne à la fois sur celui de leurs confrères masculins et sur celui des autres étudiantes qui fréquentent l’université à cette époque. Les sources disponibles nous renseignent aussi sur les programmes et les pratiques pédagogiques en vigueur, et sur la vie étudiante à la

FASE. Il s'agit d'une institution qui cultive et transmet une culture profondément masculine : former un ingénieur, c'est aussi former un homme, et construire un certain type de la masculinité, incarné dans les « Schoolmen » et dans le « School Spirit ». Comment les pionnières s'intègrent-elles dans cet environnement? Comment la Faculté réagit-elle à leur arrivée? L'article fait part de la diversité des points de vue et des expériences des étudiantes, et des réactions différentes que suscite leur présence. Il reste que l'arrivée de cette première cohorte féminine pose explicitement la question: peut-on être une femme *et* un ingénieur? D'autres études sont nécessaires pour comprendre comment les étudiantes en génie ont apporté leurs propres réponses à cette question, dans des différentes écoles de génie et dans différents contextes historiques. Ces travaux apporteront des éléments importants de réponse à cette autre question, qui est toujours d'actualité : pourquoi y -a-t-il encore si peu d'ingénieures?

In the 1927 edition of the *Torontonensis*, the University of Toronto's yearbook, the Faculty of Applied Science and Engineering (FASE) recalled how, four years ago, the "little students" of the Class of 2T7 had entered the "old School Building to imbibe such knowledge as would transform them into that man of mystery, the engineer." These students, the account went on, "were shy little boys," as "different from the lordly young men who have struggled through four years of study as the chrysalis is from the butterfly."¹ What FASE failed to mention was that two women figured amongst the 1927 graduating class, and that one of them, twenty-two year old Elsie Gregory MacGill, from Vancouver, had broken new ground as the first female student to receive a bachelor's of applied science in electrical engineering.² Not surprisingly, considering her impressive engineering career, MacGill has become an icon for Canadian women engineers.³ But the other women who, like Elsie MacGill, sought an engineering education at the time were also groundbreakers whose stories deserve to be told. Gaining access to the same formal training as their male peers was key to their entry in the profession. Who were these women and what factors help explain their decision to study engineering? How did schools or faculties of engineering adapt to their presence and how did they fare in these institutions? All these questions are critical to an historical study of Canadian women engineers.

The following article aims to provide some tentative answers to these questions by drawing a group portrait of the female engineering students

1. "History of the Class of 2T7 S.P.S." *Torontonensis* (1927): 86.

2. The other graduate was Elizabeth Mary Lalor who graduated in architecture.

3. See the article by Crystal Sissons in this issue.

who attended FASE in the early decades of the twentieth century, up until the outbreak of World War II.⁴ The history of women in engineering is still in its infancy in Canada and there are yet no specialized studies written on the subject. However, the evolution of their professional training is beginning to be addressed, mainly in larger studies devoted to the history of Canadian schools or faculties of engineering.⁵ The following discussion relies to a large extent on the rich body of scholarship which, over the last decades, has explored various aspects of women's experiences in Canadian universities. The social history of higher education has generated a large body of literature exploring its social, cultural and intellectual dimensions; a new focus on students as active players within these institutions has produced insightful work on their social origins and on the various dimensions of their sub-culture.⁶ For their part, feminist historians moved beyond the study of women's struggle for higher education and focused to a greater extent on the experiences of women as students and as teachers once they were admitted to university. Drawing largely on this work and on the growing body of research on women in the professions, recent studies have looked at the training of women in professional schools, including those who were attended mostly by men, such as law schools and medical schools.⁷

4. As discussed elsewhere, the war and immediate post-war period constitutes a specific chapter in the history of women engineering students at FASE. Ruby Heap and Ellen Scheinberg, "'Just One of the Gang': Women at the University of Toronto's Faculty of Applied Science and Engineering, 1939-1950," in *Learning to Practise: Professional Education in Historical and Contemporary Perspective*, eds. Ruby Heap, Wyn Millar and Elizabeth Smyth (Ottawa: University of Ottawa Press, 2005), 189-211.

5. For example, Heap and Scheinberg, 'Just One of the Gang'; Wyn Millar, Ruby Heap, and Bob Gidney, "Degrees of Difference. The Students in Three Professional Schools at the University of Toronto, 1910 to the 1950's," in *Learning to Practice*, 155-187; Richard White, *The Skule Story: The University of Toronto Faculty of Applied Science and Engineering, 1873-2000* (Toronto: University of Toronto Press, 2000) and Robert Gagnon, *Histoire de l'École Polytechnique de Montréal, 1873-1990. La montée des ingénieurs francophones* (Montreal: Boréal, 1991). On the entry of women in engineering at McGill University, see Margaret Gillett, *We Walked Very Warily. A History of Women at McGill* (Montreal: Eden Press Women's Publications, 1981), 317-328.

6. Some of the most significant studies include Paul Axelrod and John G. Reid, eds., *Youth University and Canadian Society: Essays in the Social History of Higher Education* (Kingston and Montreal: McGill-Queen's University Press, 1989); Paul Axelrod, *Making A Middle Class: Student Life in English Canada during the Thirties* (Montreal and Kingston: McGill-Queen's University Press, 1990), and A. B. McKillop, *Matters of Mind: The University in Ontario, 1791-1951* (Toronto: University of Toronto Press, 1994).

7. See, for example, R.D. Gidney and W.P.J. Millar, "Medical Students at the University of Toronto, 1910-40: A Profile," *Canadian Bulletin of Medical History* 13, 1 (1996): 29-52; "Quantity and Quality: The Problem of Admissions in Medicine at the University of Toronto, 1910-1951," *Historical Studies in Education* 9, 2 (Fall 1997): 165-89; W.P.J.

While putting women at the forefront of the historical narrative and acknowledging their invisible and undervalued activities remain central to their approach, historians of women's education have joined other scholars in incorporating gender in their analysis. The category of gender helps explain how being male or female is socially constructed and reconstituted. Gender formation is also relational, with femininity defined in relation to masculinity, and vice versa. Gender thus refers to a system of ordering social relationships based on perceived differences between men and women. This system operates at different levels: at the personal level, in the ways individuals define their identity as women and men; at the structural level, defining social barriers and boundaries in institutions, including schools and universities; and at the symbolic level, in images of womanhood and manhood, in gendered metaphors, and in the attribution

Millar, "‘We wanted our children should have it better’: Jewish Medical Students at the University of Toronto, 1910-51," *Journal of the Canadian Historical Association*, New Series, 11 (2000): 109-24; Nicole Neatby, "Preparing for the Working World: Women at Queen's during the 1920s," in *Gender and Education in Ontario: An Historical Reader*, eds. Ruby Heap and Alison Prentice (Toronto: Canadian Scholars' Press, 1991), 53-72. On the experiences of women in professional schools, see Mary Kinnear, *In Subordination: Professional Women, 1870-1970* (Montreal and Kingston: McGill-Queen's University Press, 1995); Nadia Fahmy-Eid et al., *Femmes, Santé et Professions. Histoire des Diététistes et des Physiothérapeutes au Québec et en Ontario, 1930-1980. L’Affirmation d’un Statut Professionnel* (Montreal: Fides, 1997); Elizabeth Smyth, Alison Prentice, Sandra Acker, and Paula Bourne, eds., *Challenging Professions: Historical and Contemporary Perspectives* (Toronto: University of Toronto Press, 1999); Ruby Heap, "Training Women for a New ‘Woman’s Profession’: Physiotherapy Education at the University of Toronto, 1917-1980," *History of Education Quarterly* 35, 2 (1995): 135-58; Kathryn McPherson, *Bedside Matters: The Transformation of Canadian Nursing, 1900-1990* (Toronto: Oxford University Press, 1996); Yolande Cohen, *Profession infirmière. une histoire des soins dans les hôpitaux du Québec* (Montreal: Les Presses de l’Université de Montreal, 2000); Deborah Gorham, "‘No Longer an Invisible Minority’: Women Physicians and Medical Practice in Late Twentieth-Century North America," in *Caring and Curing: Historical Perspectives on Women and Healing in Canada* (Ottawa: University of Ottawa Press, 1994); Jean Brockman, *Gender in the Legal Profession: Fitting or Breaking the Mould* (Toronto: University of British Columbia Press, 2001); Yolande Cohen et al., *Les sciences infirmières: Genèse d’une Discipline* (Montreal: Les Presses de l’Université de Montréal, 2002); Esther Lamontagne and Yolande Cohen, "Les Soeurs Grises à l’Université de Montréal, 1923-1947: de la Gestion Hospitalière à l’Enseignement Supérieur en Nursing," *Historical Studies in Education* 15, 2 (Fall 2003): 273-97; Rondalyn Kirkwood, "Blending Virtue and Vigorous Leadership: Edith Kathleen Russell at the University of Toronto, 1920-1952," *Canadian Bulletin of Medical History* 11, 1 (1994): 175-206; Julien Prud’homme, "La Formation Universitaire et l’Établissement d’une Nouvelle Profession: l’Orthophonie-Audiologie à l’Université de Montréal, 1956-1976," *Revue d’Histoire de l’Amérique Française* 56, 3 (2003): 329-56; Peter L. Twohig, "‘Local Girls’ and ‘Lab Boys’: Gender, Skill and Medical Laboratories in Nova Scotia in the 1920s and 1930s," *Acadiensis* 31, 1 (Autumn 2002): 55-75.

of feminine or masculine traits to activities and objects. Historians pay particular attention to the ways gender identities and gender relations vary and change according to time and place, as these are historically constituted, not static or fixed.⁸ Their investigations also unravel the complex interaction between gender, race, and class relations, in different periods and in different contexts. Feminist historians are especially concerned with examining the power relations that constitute, and are constituted by gender, reminding us of the hierarchies of power and of authority that have underpinned relations between men and women.⁹

This article is also informed by the emerging field of Gender and Technology Studies, which aims to demonstrate how the relationship between gender and technology is reciprocal and intertwined, with each socially shaping the other, in different times and locations. Engineering constitutes a key subject of inquiry, since engineers develop and deploy technology in a wide range of institutional contexts. Scholars have established that engineering and technology are culturally associated with masculinity, and that “engineering culture” can be viewed as a variety of masculinity. Sociologist Mary Frank Fox sums this up when she states: “Images, symbols, and systems of belief continue to link engineering with men and masculinity and separate it from women and femininity.”¹⁰ Researchers recognize that gender and technology are “about power”; clearly, the association of maleness and technology in societies that values technological change privileges men over women.¹¹ In the case of engineering, to explore how the masculinity-technology equation functions in educational and work settings is key to our understanding of the continuing under-representation of women in this profession.¹²

8. Joan Scott, *Gender and the Politics of History* (New York: Columbia University Press, 1988).

9. Joy Parr, “Introduction,” in *Gender and History in Canada*, ed. Joy Parr (Toronto: Copp Clark Ltd., 1996) 1; Kathryn McPherson, Cecilia Morgan, and Nancy M. Forestell, “Introduction: Conceptualizing Canada’s Gendered Pasts,” in *Gendered Pasts: Historical Essays in Femininity and Masculinity in Canada*, eds. Kathryn McPherson, Cecilia Morgan, and Nancy M. Forestell (Toronto: Oxford University Press, 1999), 11.

10. Mary Frank Fox, “Women, Men and Engineering,” in *Women, Gender and Technology*, eds. Mary Frank Fox, Deborah G. Johnson, and Sue V. Rosser (Urbana: Illinois University Press, 2006), 54.

11. For the most recent discussion on this field, see *Women, Gender and Technology* (see note 10); see also Jill M. Bystydzienski and Sharon R. Bird, eds., *Women in Academic Science, Technology, Engineering, and Mathematics: Removing Barriers* (Bloomington: Indiana University Press, 2006).

12. Wendy Faulkner, “The Power and the Pleasure? A Research Agenda for ‘Making Gender Stick’ to Engineers,” *Science, Technology and Gender Values* 25, 1 (2000): 89.

During the past decade, American and European feminist historians have begun to provide significant insights into these various issues, in addition to retrieving women from the history of engineering. Wondering if their small numbers accounts for the fact that women engineers have so far received much less attention from historians than other professional women, Ruth Schwartz Cowan reminds us that it is their scarcity that makes women engineers so interesting, both collectively and as individuals.¹³ Indeed, the work produced so far has illuminated the complexity of their stories, which is linked to the gendering of engineering as a male profession and to the impact this process had on the entry of women at various times and in various settings. Engineering schools played a key role in this scenario, by promoting the cultural association between masculinity and technology and by shaping the identity of the professionally trained (male) engineer.¹⁴ The following article builds on this literature, by considering the views expressed at FASE on manhood and on the ideal male engineer, and discussing how the homo-social culture which prevailed there contended with the arrival of women students.

To draw the collective profile of the women who studied engineering at FASE between 1916 and 1939, we used published and unpublished material located at the University of Toronto Archives. The Report of the Board of Governors, The President's Report and the University Calendars helped establish the number of female students. We also gained access to the applications of female students to first-year engineering, from which we generated a database containing information on their age, sex, religion, birthplace, and geographical origin, ethnicity and father's occupation, as well as on their high school education. The student transcripts shed light on their academic performance at FASE.¹⁵ This data was supplemented by

13. Ruth Schwartz Cowan, "Musings about the Woman Engineer as Muse," in *Crossing Boundaries, Building Bridges: Comparing The History of Women Engineers, 1870s-1990s*, eds. Annie Canel, Ruth Oldenziel and Karin Zachmann (Amsterdam: Harwood Academic Publishers, 2001), xiii.

14. Recent contributions include *Crossing Boundaries* (see note 13), and Ruth Oldenziel, *Making Technology Masculine: Men, Women and Modern Machines in America, 1870-1945* (Amsterdam: Amsterdam University Press, 1999). See also Amy Sue Bix, "Feminism Where Men Predominate. The History of Women's Science and Engineering Education at MIT," *Women's Studies Quarterly* 28, 1-2 (Spring-Summer 2002), 24-45; and "From 'Engineeresses' to 'Girl Engineers' to 'Good Engineers': A History of Women's U.S. Engineering Education," in *Women in Academic Science* (see note 11), 46-65.

15. University of Toronto Archives (UTA), Office of Admissions, A69-0008; UTA, FASE, A1998-0003 (engineering transcripts).

interviews with two women who enrolled at FASE in 1939.¹⁶ To help capture the voices of students and administrators and to get information on student life, we relied on printed sources such as the Report of the Dean of FASE, the *FASE Transactions and Year Book*, the University of Toronto student newspaper, *The Varsity*, and the engineering student newspaper, *The Toike Oike*, launched in 1911. Finally, we consulted the local press, which published during the period under study some informative profiles on FASE female students.

Profile of the First Generation of Women Engineering Students at FASE

Thirteen women were admitted in engineering at FASE between 1916 and 1939. They joined the sixteen other female students who chose architecture, a program which FASE offered until 1948, when a separate School of Architecture was established. As historian Richard White observes, architecture had been for years “something of an undernourished black sheep,” and it only attracted a small number of male students in the early twentieth century.¹⁷ Women, for their part, were enrolling since the 1910s.¹⁸ Although architecture had evolved in the nineteenth century as a profession dominated by men, it was deemed more acceptable for women than engineering, in view of the field’s artistic dimension, which was better suited, it was argued, to their feminine abilities. These, along with the separation of the private and public spheres, could also be invoked to channel them into more feminine fields like housing and interior decoration.¹⁹ These views were shared by Mary Kentner, the first woman to enrol in architecture at FASE in 1916, following her graduation in modern languages at the University of Toronto. She believed there was “a great opening for women in the domestic branch of architecture,” declaring that she hoped to specialize in “Interior Decoration and Domestic Art.”²⁰

16. A semi-structured questionnaire was sent to these female alumnae, and follow-up telephone interviews were conducted with the two respondents who had enrolled in 1939. Both agreed to be identified. The interviews were conducted by Ellen Scheinberg.

17. White, 100-101.

18. According to our database, the first female student was admitted in 1916. The second, Esther Marjorie Hill, who was admitted in 1918, was the first woman to graduate in architecture in Canada and the first Canadian woman registered architect. On Hill, see Anne Marie Adams and Peta Tancred, “*Designing Women*”: *Gender and the Architectural Profession* (Toronto: University of Toronto Press, 2000), 16.

19. Adams and Tancred, 7.

20. *Toronto Star*, November 14, 1916; *The Varsity*, December 8, 1916.

Aspiring women engineers could not capitalize on this kind of association between women's prescribed roles and aptitudes and their chosen field of study. Significantly, the two major books of vocational guidance for women published in 1919 made no reference whatsoever to engineering as a possible career choice.²¹ Yet, FASE began to admit women in engineering during the 1910s.²² Two were admitted at the end of the decade, and another two, including Elsie Gregory MacGill, in the 1920s. The number of admissions increased to nine in the 1930s, five of whom were accepted in 1939 alone. In fact, 1939-40 was a record-breaking year with respect to female enrolments, with a total of seven women studying engineering at FASE. Compared to female enrolments elsewhere on campus in the early twentieth century, these were, of course, very tiny numbers. In 1924-25, for example, there were 1,751 women registered at the University of Toronto, with more than 1,189 studying at the Faculty of Arts. In 1939-40, the numbers had reached 2,763 and 1,563 respectively. Female engineering students were also outnumbered by their counterparts enrolled in other male-dominated professional schools and faculties. In 1939-40, for instance, 64 women were enrolled in the Faculty of Medicine, and 20 in the Faculty of Dentistry.²³

At the same time, the entry of the first generation of women students was more than offset by FASE's large male enrolments. These were close to 800 in 1911. World War I provoked a sharp drop, with enrolments falling to 194 in 1917. But the end of the war led to a great influx of students, with more than 815 men, many of whom were veterans, attending classes in 1919. The 1920s witnessed an overall decline, but there were always between 400 and 500 male students registered during this decade. The Depression did not turn male students away from engineering. On the contrary, there were more than 909 in 1932-1933, the worst year of the Depression. In 1939-1940, FASE boasted more than 949 male students. Engineering thus remained an attractive professional option

21. See Ellen M. Knox, *The Girl of the New Day* (Toronto: McClelland and Stewart, 1919); Marjory MacMurchy, *The Canadian Girl at Work: A Book of Vocational Guidance* (Toronto: Thomas Nelson and Sons, 1920). MacMurchy encouraged women to go into architecture, as "the advantages which should be possessed by women in designing houses are obvious," *The Canadian Girl at Work*, 91.

22. Hildergade Scott was the first woman to receive a BASc from FASE in 1912. She received her degree in Analytical and Applied Chemistry, which, according to Richard White, was a non-engineering course. White, 73.

23. University of Toronto, *Report of the Board of Governors, 1924-25*, 7; University of Toronto, *President's Report, 1939-40*, 146.

for young men, with job prospects remaining good throughout the decade.²⁴

These enrolment patterns confirm that during the first three decades of the twentieth century, FASE remained the preserve of students from the middle class, with an over-representation of fathers who belonged to the professional, business and supervisory categories.²⁵ Although we cannot draw any firm conclusions from our small sample of female students, our data indicates that most of those who were admitted between 1916 and 1939 had fathers who belonged to these occupational categories.²⁶ This suggests that the first generation of female engineering students shared the same social background as the majority of Canadian university women at the time.²⁷ They presumably entered FASE with the financial backing of their family, and they had a cultural background that could support their decision to study in an exclusively male domain, as Millar and Gidney point out in the case of the minority of women attending the University of Toronto's medical school at the time.²⁸

The FASE women were also a homogeneous group with respect to religion, nationality and age. They were all were Protestants who belonged mainly to the Anglican and United Churches, the two largest denominations represented at the University of Toronto during this period.²⁹ All had Canadian-born parents, except for one student whose parents were British. Except for one twenty-year old, their age ranged between seventeen and nineteen, with six eighteen year-olds. This can be attributed to the fact that most of these students enrolled in engineering directly from high school.³⁰ Their young age accounts also for the large percentage of local residents. Toronto was the home address of eight of the thirteen students, who were more than likely living with their parents. The remainders were from Ontario, except for Elsie MacGill who lived in Vancouver. This pattern reflected the general tendency of women

24. White, 124.

25. See Millar, Heap, and Gidney, "Degrees of Difference," 162.

26. We used the occupational categories designed by Paul Axelrod in *Making of the Middle Class*. We obtained the father's occupation for ten of the thirteen students who enrolled at FASE during the period under study. One of the fathers was an engineer. The others held positions in business, management, the legal and health professions, the clergy and the civil service.

27. See Fingard, "College, Career and Community," 47; Neatby, "Preparing for the Working World," 332; Millar and Gidney, "Medettes," 218; Axelrod, *Making a Middle Class*, 29.

28. Millar and Gidney, "Medettes," 218.

29. Axelrod, *Making a Middle Class*, 29.

30. Only Elsie MacGill and another student had attended university before entering FASE, the former, the University of British Columbia, the latter, the University of Toronto.

university students in Canada to reside in the immediate vicinity of their university.³¹ At the same time, female students at FASE were no different from their male counterparts, who tended largely to be Toronto residents.³²

This pioneering group of women entered FASE at a time when the presence of women in Canadian higher education had become acceptable overall, and when women were making some inroads in other professional schools. Advances were much slower in engineering education, however. Indeed, the University of Toronto welcomed women into engineering much earlier than the other major universities in central Canada. McGill opened its doors only in the late 1930s, while women had to wait until the late 1940s to be admitted at Queen's.³³ In this respect, the University of Toronto stood up to its claim of being the *provincial* university, at the top of Ontario's educational system, and open to all qualified Ontario citizens.³⁴ Enrolling at FASE became more difficult in the early 1920s, however. Entrance requirements were raised to allow for the introduction of a more comprehensive curriculum in 1922-1923. Applicants now needed senior, rather than junior, matriculation from the Ontario Department of Education, as they were now expected to have a stronger preparation in science and in mathematics.³⁵ Far from expressing concern, the President of the University of Toronto, Robert Falconer, rejoiced that FASE was now attracting "a quality of student who shows much better grasp of his work."³⁶ Again because of their very small numbers, we cannot make any firm statements on the academic standing of the women who entered FASE during our period of study. However, an examination of the high school marks included in the application forms of male and female engineering students admitted in the 1930s suggests that the women came well prepared to engineering studies.³⁷ This was certainly the case of Eugenia Claire Jones, who was admitted at FASE in 1939. Jones was a gold medallist, having graduated first in her class at Toronto's Humber College, one of Canada's largest high schools.³⁸

31. Millar and Gidney, "Medettes," 218.

32. Millar, Heap and Gidney, "Degrees of Difference," 167-168. In 1932, almost 60% of FASE students were from Toronto.

33. Heap and Scheinberg, "Just One of the Gang," 196.

34. On this issue, see Millar, Heap, and Gidney, "Degrees of Difference," 155-156.

35. White, 105.

36. University of Toronto, *Report of the Board of Governors, 1921-1922*, 12.

37. Millar, Heap, and Gidney, "Degrees of Difference," 176-178. The women's high school matriculation scores for all papers and for science and math papers were examined then compared with the men's. The latter tended to have slightly higher scores.

38. Interview by Ellen Scheinberg with Claire Jones, 4 May 2001.

Training “Suitably Educated Young Men”: Engineering Education at FASE

What happened to the women students once they were admitted at FASE? What were the main features of this homo-social environment? What prevailing educational principles and practices did the women students encounter during their engineering studies?

To begin with, these young women had chosen a field of study which required a large degree of commitment. Indeed, everyone agreed that the four- year program was very demanding. In 1921, the Chairman of the Civil Engineering Club reminded his members that in no Faculty in the University “is the course more strenuous than Engineering. It demands the utmost ability of all of us...”³⁹ The changes introduced in the 1922-1923 curriculum, following the increase in admission standards, made it even more rigorous. The common first year was eliminated and second-year courses were moved to first year; this allowed for some specialization during year one and for more advanced courses in the last year. The addition of new non-technical subjects, such as accounting, economics and commercial law, overloaded an already heavy curriculum.⁴⁰ Further changes brought to the curriculum during the 1920s and 1930s put extra pressure on both the students and their professors. In 1939, the Dean of FASE, C. H. Mitchell, reported that the requirements for training “suitably educated young men” for the engineering profession had changed considerably over the last decade: “the technical requirements of today impose many new subjects which ten or twenty years ago were not in the applied science picture: nowadays engineering education has come to be a mosaic of a complicated and multi-coloured pattern.” As a result, the calendar for the 1939-1940 academic year included more than 458 courses, of which 269 were lecture courses and 189 were laboratory courses. This total was over 50% more than that contained in the calendar ten years ago, a clear measure, concluded the Dean, of the “extent by which the work and load of this Faculty has expanded.”⁴¹ In its continuing quest for higher standards, FASE also introduced higher examination requirements in 1934, which made it more difficult for weaker students to move on to the next year.⁴²

39. *Transactions and Year Book of the University of Toronto Engineering Society* 34 (1920-21): 118.

40. White, 105.

41. “Report of the Dean of FASE,” University of Toronto, *President’s Report*, 1939, 29.

42. *Ibid.*, 1934, 29. Students needed an average of 50% for written examinations and they had to pass all of the examinations of one year before proceeding with the rest.

Another of the program's distinguishing feature was its rigidity. Electives were rare, and there was no opportunity to take courses in the humanities and social sciences elsewhere on campus. Students completed their whole studies within the walls of FASE. As can be expected, engineering students were subjected to a gruelling schedule. One male graduate of the Class of 1935 recalled: "The school days were long—at least from 9am to 5pm five days a week, and from 9am to 12 noon on Saturdays, with usually three lab reports to write each week."⁴³ No wonder, then, that studying engineering was perceived by many as an endurance test reserved only for the fittest. Indeed, in view of increasing standards, of the expanding program of study and of the heavy workload, a lot of student failed their annual examinations, especially during the first and second years. The situation worsened in the 1930s; between 1932 and 1937, the percentage of failures in the first year climbed from 21% to more than 32%, while it stood at 29% on the eve of World War II.⁴⁴ The dropout rates were, for their part, consistently high during the first decades of the twentieth century, with over a quarter of students failing to graduate. Finally, a large percentage of students did not complete their program in four years, as many had to take make-up exams in various subjects, mainly in the first years.⁴⁵

In this context, how did the first-generation of women fare? Our data reveals that ten out of the thirteen enrolled graduated.⁴⁶ The three others quit during the first two years of the program. One had enrolled in Electrical Engineering, and another, in Chemical Engineering. The third had chosen Engineering Physics, a very demanding course introduced in 1934.⁴⁷ As for time of completion, half of the ten women who graduated received their degree after four years, with the other half taking between five and six years.⁴⁸ Ailsa MacCorquodale, who enrolled in 1939 in chemical engineering with three other women, belonged to this group. She failed her first year, along with another of her classmates, Gertrude

43. R. S. Segsworth, "The Thirties," in *Cold Iron and Lady Godiva: Engineering Education at Toronto, 1920-1972*, eds. Robin S. Harris and Ian Montagnes (Toronto: University of Toronto Press), 1973, 69-70.

44. "Report of the Dean of FASE," University of Toronto, *President's Report*, 1939, 28.

45. Millar, Heap, and Gidney, 178-180.

46. Although our sample is very small, it suggests that these women performed better than their counterparts in the University of Toronto's medical school, a large proportion of whom failed to graduate in the first half of the 20th century. See Millar and Gidney, "Medettes," 221-222.

47. White, 130; "Report of the Dean of FASE," 1938, 37.

48. We do not know the reasons behind the longer time to completion, except for one student, whose record mentions that she had to rewrite exams due to illness during her second year.

Wagar. MacCorquodale repeated her year and graduated in 1944. For her part, Wagar transferred to McGill University and became the first woman to graduate in electrical engineering at that institution.

In what field of engineering did these women graduate? As noted above, Elsie Gregory MacGill was the first woman to graduate in electrical engineering in 1927. Two years earlier, in an interview with the *Toronto Star*, MacGill explained that her interest in electricity had developed through her enthusiasm for radio, and that she intended to specialize in designing electrical apparatus.⁴⁹ Another female student completed in 1945 the new and challenging Engineering Physics course. As for the eight remaining female students, they all graduated in Chemical Engineering; one received her degree in the 1920s, three others in the 1930s and the remainder in the 1940s. This concentration of female students in chemical engineering was occurring at the time in other engineering schools in Europe and the United States.⁵⁰ Several viable explanations can be put forward to account for this trend. Certainly, chemistry was a field which attracted a large number of female university students in the early twentieth century. Many ended up working as high school teachers or university part-time lecturers, while others found employment as lab assistants in the government, in universities or in the private sector.⁵¹ Other graduates could find “women’s work” in the exclusively female field of household science, with some able to pursue successful careers, inside or outside of the educational system.⁵²

A potential alternative to this segregated “women’s work” was employment in the chemical industry, a fast growing sector since the turn of the twentieth century. In her best-selling 1919 vocational guidance book, *The Canadian Girl at Work*, Marjorie MacMurchy reported that “young women graduating in science from universities are finding openings for chemical work in a number of industries.”⁵³ Meanwhile, the

49. *Toronto Star*, April 13, 1925.

50. See the contributions in *Crossing Boundaries* (see note 13).

51. Margaret W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: Johns Hopkins University Press, 1982), 249-253; Suzanne Le-May Sheffield, *Women and Science. Social Impact and Interaction* (New Brunswick: Rutgers University Press, 2006) 146; 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*, New Series, 2 (1991): 239-240.

52. Dr. Clara Benson, a University of Toronto graduate who was the first Canadian woman to obtain a doctorate in chemistry in 1903, is a case in point: despite her superior qualifications and the wide respect she achieved as a researcher, Benson spent her whole professional life at the University of Toronto’s Faculty of Household Science. See Heap, “From the Science of Housekeeping,” 152-157.

53. MacMurchy, 96-97.

field of chemical engineering had emerged as a response to the expansion of this industry, with FASE establishing its own Department of Chemical Engineering in 1905.⁵⁴ The new course attracted a rapidly increasing number of students, a situation which caused serious overcrowding and accommodation problems, and became a source of continuing concern at FASE.⁵⁵ By enrolling in chemical engineering, the first generation of female students was therefore entering a field that was also very attractive to men. Like their male counterparts, they were presumably lured by the good job prospects.

This was the case for Melba Greer and Adela Prescott, who enrolled in chemical engineering directly from high school in 1929 and 1932 respectively. Both told the *Toronto Star* that they expected to find work after graduation. Prescott was quite optimistic about her professional future: "We'll have just as good a chance as the men. Our course leads to jobs in factories or companies for dyes, rubber, synthetic perfume, paints, oils companies and celluloid goods, such as combs, mirrors, etc." Asked why they had chosen to enrol in engineering, both laughed and answered, almost in unison: "Lots of people ask us that and we never know what to say...Probably because we just have a flair for it." Melba Greer added that "most girls would take anything else but science and mathematics, but we like them both more than anything..." Interestingly, Greer believed that there wasn't "so much difference between chemistry and chemical engineering...Only we take everything in engineering, as well as chemistry."⁵⁶ It could be, then, that in the minds of some female students, the boundaries between chemistry and chemical engineering were not clearly defined, which can help explain their decision to enrol in the latter.

Some other female students chose chemical engineering simply because they were interested in the field. This is what first-year student Graburn Nichols and third-year student Ellen Sheppard reported in 1936 to the *Toronto Telegraph*. None had a definite job in view following graduation.⁵⁷ Finally, chemical engineering was a second choice for Ailsa MacCorquodale and Claire Jones, both admitted in 1939. MacCorquodale failed to enrol in ceramics engineering, introduced in 1924 as an option in Metallurgical Engineering, before she turned to chemical engineering. Jones had first considered medical school, but since she needed to earn a

54. White, 64.

55. See, for example, "Report of the Dean of FASE," University of Toronto, *President's Report*, 1921, 22; 1935, 35; 1938, 37.

56. *Toronto Star*, October 11, 1932.

57. *Toronto Telegraph*, March 19, 1936.

living, she turned to engineering, which could be completed in a shorter amount of time.⁵⁸

Whatever reason the first-generation of female students had for choosing chemical engineering, this field appeared to be less gender-coded as masculine, thus making it more welcoming to women. Chemical engineering was, in fact, said to attract a type of men different from those who enrolled in the older branches like Civil, Mining and Mechanical Engineering. As one male graduate of the Class of 1923 put it: “the Miners and the Civils were more the outdoor type and the Electricals and Chemicals more the indoor type, with the Mechanicals falling in between.”⁵⁹ At the metaphorical level, this “inside-outside dichotomy” thus opposed two types of maleness, with the more inactive and tamed chemical and electrical engineers facing the strong, adventurous and fearless civil and mining engineers who were trained to conquer nature hands-on.⁶⁰ The importance of the laboratory in chemical engineering fuelled such a dichotomy, since it constituted a safer, cleaner and more private workplace than the shop floor, building site or survey camp. As a result, it became acceptable to employ women in this site, where they could work as laboratory assistants, under the supervision of male engineers.⁶¹ Women’s attraction to chemical engineering at FASE and elsewhere suggests that they could take advantage of these ideological constructs to enter a field with favourable job prospects.

“... the only girl in such a big class”: Male Student Culture at FASE

The first women to enrol in engineering at FASE were duly reported and commented on by the local press. According to the *Toronto Star*, the first generation of women at FASE were “invading” this male technical threshold.⁶² In fact, most ended up being “the only girl in such a big class,” as Adela Prescott discovered when she began her studies in 1932. Prescott confessed to the *Toronto Star* that she had “qualms of

58. Interview by Ellen Scheinberg with Ailsa MacCorquodale, 9 May 2001, and with Claire Jones, 4 May 2001.

59. A. M. Reid, “The Twenties,” in *Cold Iron and Lady Godiva* (see note 43), 54.

60. On the development of this image, see Ruth Oldenziel, *Making Technology Masculine*. The absence of any compulsory field work or shop work in Engineering Physics could therefore have attracted the two female students who enrolled in this program during our period of study. Conversely, the introduction, in 1921, of a six-week surveying course at Gull Lake Survey Camp, for all third-year students in Civil and Mining Engineering, may have deterred women from this field. On both, see White, 104 and 131.

61. This key development is reported in several contributions included in *Crossing Boundaries* (see note 13).

62. *Toronto Star*, October 11, 1932.

nervousness at her own temerity when she registered,” but that she “braved it out” when she found out that Melba Greer was also enrolled in chemical engineering.⁶³ Ailsa MacCorquodale, who, in 1939, enrolled in chemical engineering with three other women, was herself quite shocked to find out that there were so few women at FASE; her first week of class constituted, in her own words, a “rude awakening.”⁶⁴

Once the initial phase of shock was passed, the first generation of women students had to adapt to the cultural and pedagogical make-up of an institution aimed at training members of what Dean Mitchell called a “proud profession.” There was no doubt that its members were expected to be men.⁶⁵ During the 1920s and 1930s, the Dean of FASE, the Engineering Society, the various social and cultural clubs, as well as *The Toike Oike*, consistently referred to the “Schoolmen.” The male character of professional engineering clearly transpired from Dean Mitchell’s various depictions of the ideal engineer he wished to train at FASE. “This famous ‘School,’ as we love to call it, prides itself in making men, real men, who lead, who do things,” he told graduates.⁶⁶ Engineers were, indeed, “men of action.” The profession, he insisted, had no room for “visionaries, dreamers or sit-downers.”⁶⁷ Young engineers, he added, were imbued with a “spirit of adventure” which “combines energy with useful performance.” According to Dean Mitchell, “men seek adventure in this sense because sometimes life which is unsalted by strenuous joyous enterprise ‘has lost its savour’.”⁶⁸ But successful engineers were also good managers of men: they could “handle difficult business negotiations” and “solve problems where both men and materials are involved.” Finally, Dean Mitchell frequently presented his list of those qualities that characterized “real men,” qualities which, in his view, symbolized also the Canadian character. These included courage, activity, necessity, adaptability, decision and assurance.⁶⁹

FASE also had a clear set of expectations for its students, while it was training them to become “real men.” These were linked to the cultivation of what was commonly called the “School Spirit.” According to the *Toike Oike*, the “Spirit” meant “team work and the self reliant feeling that a School man can do anything he sets out to do, not because he is any better than the rest, but because he is trained to organize and to learn—to know

63. *Ibid.*

64. Interview by Ellen Scheinberg with Ailsa MacCorquodale, 9 May 2001.

65. *Torontonensis* (1935): 110.

66. *Torontonensis* (1940): 114.

67. *Torontonensis* (1939): 116.

68. *Torontonensis* (1938): 110.

69. *Torontonensis* (1936): 116; (1937): 118.

what he is doing and why.”⁷⁰ The Engineering Society, which aimed to represent the interests of the student body, described the “Spirit” in the following way: “That School has an influence which appeals to the highest and noblest in men, no one will deny. Fair play and justice to everyone is the very essence of the manner in which all activities are carried out, whether they be tactics on the gridiron or arrangements for a “Stunt” Night.” “Team play” was another essential feature of the “Spirit.” In the business world, reported the Engineering Society, “it is men with team play experience, with an analytical type of mind, who are being sought to solve them.”⁷¹ But students needed also to acquire leadership skills, as the Society’s President reminded them: “Industrial executives will tell you that it is not technical knowledge alone that they value in a man, it is his personality, his conduct, and most important, his ‘ability to handle men’.”⁷²

Ultimately, the “School Spirit” translated into an “esprit de corps” and a sense of brotherhood enabling students to act responsibly and to work together as an organized body.⁷³ How did students cultivate the “Spirit”? Joining the Engineering Society was a course strongly encouraged, as well as participating in its various social events, including the School Dinner, the School-at-Home Dance and the Stunt Nights. There were also the specialty clubs, the Debating Club, the Toike-Oikestra and the Athletic Association. Finally, there were the colourful chariot races and the famous roar of the canon, which students began to fire at school events in the 1920s. Altogether, these various activities, organizations and rituals contributed to the creation of a distinct male student culture at FASE.⁷⁴

At the same time, “Schoolmen” were expected also to behave as “Gentlemen” like their counterparts across campus. The Dean was particularly eager to promote academic gentility amongst his students. The *Toike Oike* dutifully exhorted its readers: “Do not forget that while you are a Schoolman you are also a “Varsity” man. Keep your Faculty spirit by all means, but do the same by your University. [...] People who do not know your University judge it by your actions. They expect a University man to be a gentleman and as sportsman at all times.”⁷⁵ In fact, these statements were clear reminders that the Schoolmen were, in many

70. *Toike Oike* 11 (November 13, 1920): 4.

71. *Transactions and Year Book of the University of Toronto Engineering Society* 37 (1924): 95.

72. *Toike Oike* 31 (September 1939): 3.

73. *Transactions and Year Book of the University of Toronto Engineering Society* 34 (1921): 114.

74. On student life at FASE, see White, 73-80; 112-120.

75. *Toike Oike* 14 (October 1, 1923): 3.

respects, different from the Varsity Men, although both groups came from the middle-class. This difference was fed above all by a variety of activities, rituals, pranks, songs and poems that built the Schoolmen's reputation as a rowdy, tough and untamed male community, which freely engaged in wry humour, excessive beer-drinking and loud parties. In fact, while it urged its readers to deport themselves responsibly, the *Toike Oike* had become over the years a major player in the shaping of this distinctive culture. The newspaper did not hesitate to print the notorious songs and rhymes, and it reported approvingly or tacitly the physical and social excesses of engineering students.

During the 1920s and 1930s, the Schoolmen's unruly behaviour during initiation, a ceremony aimed at integrating "freshmen" into campus life, came increasingly under fire. As Paul Axelrod reminds us, initiations were performed across Canadian universities with the specific aim of teaching the newcomers the importance of fraternity, hierarchy and conformity, values that were promoted by the emerging culture of professionalism. At the same time, the gruesome competition, physical tests and indignations involved in these rituals served also to celebrate "manly" virtues.⁷⁶ However, the crude and frequently violent behaviour that hallmarked the initiations at FASE drew more and more criticism from the Dean, the university authorities, the students' associations, the *Varsity* and a significant portion of the student body. But their repeated admonitions did not tame the engineering students, whose worsening reputation as a group of "hard-living, beer-slugging slide rule men" distanced them from the rest of the campus.⁷⁷

The "Enginettes" Enter the World of the "Schoolmen"

How did the "School Spirit" react to, and contend with the arrival of female students? During the period under study, faculty administrators did not openly discuss, or intervene on the matter. The presence of a handful of women apparently did not generate interest or concern within their ranks. However, male students did take notice; as one graduate of the Class of 35 later recalled, they could not escape the fact that "girls were taking and succeeding in Engineering."⁷⁸ To examine their views on their female classmates, and on women students generally, provides further insights into the community of men that made up FASE when the first generation of female students enrolled.

76. Paul Axelrod, *Making a Middle Class*, 17-18.

77. *Toike Oike* 46 (September 17, 1953); White, 116-120.

78. R. S. Segsworth, "The Thirties," 67.

Overall, the Schoolmen's response was mixed. Student culture at FASE included, most certainly, elements of misogyny. These were consistently channelled in the *Toike Oike* throughout the 1920s and 1930s. A large number of stories, jokes, cartoons and poems were devoted to women, who were objects of ridicule and the victims of demeaning remarks. Women were commonly portrayed as sexualized beings whose intellectual abilities were mocked. A cartoon entitled "A Peep into the Future," published in 1921 in the *Toike Oike*, showed a girl looking through the transit, an instrument used by civil engineers. She was wearing a very short skirt; it flew in the back, revealing her undergarments.⁷⁹ As the cartoon suggested, women were sought above all for their physical attributes, especially those whose charms were easily accessible. A "woman is man's chief amusement in his lighter moments" summed up a *Toike Oike* article entitled "Fundamental Properties of Women." But women had a dark side, which Schoolmen had to be aware of. The author of "Words of Wisdom" warned his readers that many women used men for their money and expected gifts from them; they were also obsessed with their figures, as well as with fashion and scandal.⁸⁰ Unflattering representations of women were also included in plays staged by FASE students. Set in the university of the future, "Insomnia" presented female students as "gold diggers" who were mainly interested in attracting members of the opposite sex. They thus devoted their whole time to the study of cosmetics, attitudes and other ways of "attracting the male."⁸¹

These negative stereotypes reflect the mixed sentiments of insecurity, nervousness and hostility which, as Paul Axelrod demonstrates, were generated by the increasing presence of women on Canadian campuses.⁸² At FASE, however, there was also a noticeable fear that female students would sap the Schoolman's unique maleness. In 1927, the Civil Club staged a play portraying the impact of co-education on male students over time. Unfortunately, co-eds had impaired the virility of student life. Along with the playwright, one reviewer regretted "the good old days when men were men..."⁸³ The *Toike Oike* was particularly eager to celebrate the engineer's distinctive brand of manhood, which his university studies helped shape, and which clearly set him apart from other male students. An article entitled "The Chemical Analysis of a Schoolman" summed up

79. *Toike Oike* 11 (January 6, 1921): 3.

80. *Toike Oike* 25 (September 25, 1933): 3; 22 (October 1, 1930): 4.

81. *Transactions and Year Book of the University of Toronto Engineering Society* 37 (1924): 100.

82. See Axelrod, 90-91; 116-118.

83. *Toike Oike* 40 (1927): 80.

this rhetoric. The Schoolman's training, it contended, made him ready for any emergency "requiring muscle, brawn or courage." His energy was "boundless," and this made him "dangerous to Meds." The engineer's identity was, of course, closely tied to his notorious fondness for alcohol; the Schoolman, the article readily acknowledged, "conducts himself fairly well when sober but when in a liquorified state is very dangerous..."⁸⁴ Another article claimed that the Schoolmen's rugged maleness and "bad-boy" reputation appealed to women who were more than willing to "Love'em."⁸⁵ In the same vein, one contributor advised against marriage to an engineer, the main reason being, not his particular brand of manhood, but, rather, his propensity to focus more on his work than on his mate's charms.⁸⁶

These views did not represent the whole picture, however. Within the student body, there were conflicting attitudes about male students and about women. In the 1927 edition of the Engineering Society's *Transactions and Yearbook*, one student concurred with the statement, quoted at the beginning of this article, to the effect that most Schoolmen "are inclined to be shy," including in their relationships with women; comparing the engineer with the physician, he explained that contrary to the latter, the engineer had less developed social skills since he "deals with machines and instruments."⁸⁷ Other students contended that the present generation of "Schoolmen" were ready to welcome women in their ranks. For example, the president of the Class of 1930 believed that despite the Schoolmen's claim of being the type known as the "Big Men of the North," the "masculine members of this generation" were more "broadminded" and had realized that they could no longer neglect "their opposites of the feminine sex."⁸⁸

84. J. H. Cairns, "The Chemical Analysis of a Schoolman," *Toike Oike* 22 (December 18, 1930): 4.

85. *Toike Oike* 25 (March 14, 1934): 3.

86. *Toike Oike* 25 (January 19, 1934): 4.

87. *Transactions and Year Book of the University of Toronto Engineering Society* 40: 1927, 71, 73.

88. *Transactions and Year Book of the University of Toronto Engineering Society* 41 (1928): 198.

Women Students of the FASE in 1940.

GIRLS OF S.P.S.



G. M. WAGAR, A. E. RUSHBROOK, A. M. R. MACCORQUODALE, S. M. L. MACDONNELL, M. J. SEWART, A. A. AYER, J. D. TAYLOR,
E. C. JONES,
Absent: M. SYNGE, M. L. INKEL, S. B. MACDONALD.

Source : *Transactions and Year Book of the University of Toronto Engineering Society.*

Indeed, during the 1920s and 1930s, the Engineering Society reported on the increasing presence of women at FASE, and the photograph of a lone female graduate appeared more frequently in the *Transactions and Yearbook*. The 1940 edition was a memorable one as it included a group photograph of the eleven "Girls of S.P.S." enrolled in architecture and engineering. The five chemical "freshettes" of 1939, Claire Jones, Ailsa MacCorquodale, Gertrude Wagar and Audrey Rushbrook, all appear in the picture, along with Sally MacDonald, who had enrolled in Engineering Physics.⁸⁹ The women are photographed in a collegial and relaxed atmosphere; some are smiling while others strike a more serious pose, thus projecting different personalities. They are wearing dressy sweaters, shirts and skirts, a far cry from the World War II iconography of Rosie-the-Riveter, which projects the image of a working-class woman dressed in overalls.

89. *Transactions and Year Book of the University of Toronto Engineering Society* 53 (1940): 79.

Yet, even in 1940, the Engineering Society and the contributors to the *Transactions* continued to perceive female engineering students as objects of curiosity and as strange creatures, with whom they now shared their all-male environment and masculine culture. Overall, their interventions tended to be polite and supportive, with paternalistic overtones. A case in point is the following account of Elsie McGill's student days at FASE, under the title "Our Ladies of 2T7":

Astonished were the men of 2T7 when, as freshmen, they realized that the sanctum of the First Year Drafting Room had been invaded by a bold, ambitious co-ed... a lady in that den of iniquity?... What new, polite exclamation of disgust were the poor freshmen to invent, for use when the ink spilled over their paper, in order not to shock the ears of so tender and unspoiled a creature? Would our "Elsie" outlive the freshman year and finally blossom forth as the only female electrical engineer of S.P.S.?

MacGill is then commended for the way she managed to "look after herself in so masterful a fashion that, by the time this is published, she will be as good an engineeress has ever worn overalls –if not better." The account ends in a poetic note, a clear reminder that Elsie MacGill belonged, after all, to the "weaker sex" and that, fortunately, she had not lost her femininity during her studies: "With clever hand she steered her ship around the cliffs of annual examinations. With true womanly grace she kept in check those fellow students who dared disregard the respect due to so frail a creature."⁹⁰

The tone and language of this text are telling, indeed. Even if she had the required abilities to succeed (as Elsie MacGill obviously did), a woman remained an outsider. Labelled as an "engineeress," she could not fully belong to the fraternity of the Schoolmen. A similar linguistic stroke was used in the 1940 *Transactions* article devoted to the "Girls of S.P.S." (note that they were no longer called "Ladies"). While the "Enginettes" were reported as working "manfully" to get their degree, the article extolled the "Feminine Pulchritude... which relieves the monotony of labs and lectures at the Little Red Schoolhouse." On the other hand, the contributors admitted having difficulty at first securing information from the female students, claiming that "the easiest way to obtain any information regarding phone numbers is to buy a directory." This was yet another reminder of the conflicting images the first generation was subjected to; if behaving like men appeared to be a condition for academic success and social integration, there were, at the same time, persisting

90. *Transactions and Year Book of the University of Toronto Engineering Society* 40 (1927): 110. The other female student profiled in the article was Betty Lalor, who graduated in architecture.

references to the femaleness of the “Enginettes,” a recurring pattern which revealed a concern for the impact of engineering training on their femininity.⁹¹

How did the female students react to these various representations? The available evidence reveals a wide variation in individual women’s views and experiences. Some were not afraid to expose in the press the various ways professors and students made them feel like they did not belong. Melba Greer thus reported that a professor of chemical engineering thought she was in the wrong building when she came to register; he then tried to discourage her by predicting that she would quit before the end of her studies. She also reported that “you get lots of teasing before you are through.”⁹² Asked to comment on her student days at FASE, Ailsa MacCorquodale will recall that she did not find it “welcoming” to women. She was offended when the Dean addressed the new class of 1939 as “Gentlemen.” She and other female students also resented those professors and teaching assistants who told dirty jokes in the classroom.⁹³ More positive was Aleda Prescott’s account of her experience as a first-year chemical engineering student, which appeared in the *Toronto Star*. Prescott expected “a lot of kidding, being the only girl in such a big class.” But she enjoyed her life as a student so far: “...the men are very nice and, probably because I am the only one, they have spared me. So I didn’t mind being the only girl now at all. In fact, I hardly ever think of it.”⁹⁴ A few years later, Prescott expressed the same views in the local press, along with her schoolmates Graburn Nichols and Ellen Sheppard. All three agreed that their male colleagues were “a swell bunch to work with,” and were pleased to be treated “just like one of the gang.” Sheppard had one misgiving, however. She explained that female students had become popular by advising their male colleagues on matters of the heart: “Considerate though the men are, old-time chivalry is dead. The men help the girls with the heavy work and, in return, the girls serve as an information bureau on perplexing feminine matters.”⁹⁵ There was no consensus, either, on the vital issue of labwork. Ailsa MacCorquodale reported that she was not pleased when, in her first-year year labs, she and other female classmates were grouped together, isolated from the male students.⁹⁶ Claire Jones felt, for her part, that the men were “perhaps too

91. *Transactions and Year Book of the University of Toronto Engineering Society* 53 (1940): 80.

92. *Toronto Star*, October 11, 1932.

93. Interview by Ellen Scheinberg with Ailsa MacCorquodale, 9 May 2001.

94. *Toronto Star*, October 11, 1932.

95. *Toronto Telegraph*, March 19, 1936.

96. Interview by Ellen Scheinberg with Ailsa MacCorquodale, 9 May 2001.

helpful” in the more physically demanding labs, such as those in hydraulics. She claimed that she and her female classmates just wanted to be treated as equals and be allowed to complete their lab work on their own, without interference.⁹⁷

What about life outside the laboratory and the classroom? Some were probably focusing entirely on their studies, like Elsie MacGill whose entry for the Class of 1927 reports no participation in organized extra-curricular activities. Others, on the other hand, were actively involved in campus life. Melba Greer was secretary of the chemical engineering club during her first year, belonged to the Writer’s Club and played in the Meds-S.P.S. Baseball Team during her last year. Aleda Prescott also took time to play baseball and to act in plays as a member of the University Drama Committee.⁹⁸ Claire Jones and Ailsa MacCorquordale both reported attending plays, dances and other social events with male students, although Jones recalled avoiding the many engineering parties involving heavy drinking.⁹⁹

This does not mean that women of the first-generation were treated equally with men in all aspects of campus life. A blatant discriminatory practice was the banning of all women students from Hart House, the main social centre on campus. As a result, female engineering students were unable to attend those regular engineering events held at Hart House, such as lectures, class dinners and Engineering Society Dinners. They were also unable to eat with male students at the Hart House cafeteria, having to use the facilities of the Women’s Union instead. Wartime and the larger presence of women at FASE would lead to a relaxing of some of these exclusionary practices.¹⁰⁰

Women engineering students also had specific issues to deal with. For instance, they were not allowed to take physical education with the men. Ailsa MacCoquordale, who was determined to get some kind of physical training, had to report to someone who then organized walks for women students on campus.¹⁰¹ Student government was another contested area; as Claire Jones later recalled, she and other women students were refused admission to the Engineering Society when they expressed their desire to join. They protested against this decision by rejecting a proposal to form a separate women’s group.¹⁰² We can assume that the first-generation of

97. Interview by Ellen Scheinberg with Claire Jones, 4 May 2001.

98. *Toronto Telegraph*, March 7, 1936; *Toronto Star*, December 14, 1938.

99. Interview with Claire Jones, 4 May 2001, and with Ailsa MacCorquodale, 9 May 2001.

100. Heap and Scheinberg, 199-202.

101. Interview with Ailsa MacCorquodale, 9 May 2001.

102. Interview with Claire Jones, 4 May 2001.

women students were just too few to follow the example of other female students by establishing separate formal networks and associations.¹⁰³ Or it may be that they did not favour this “separatist” option, preferring to deal with matters on their own, as self-reliant and determined individuals.

To Marry or to Pursue a Career ?

To pursue a career was a goal shared by many of the pioneering group of women attending FASE in the 1920s and 1930s. They were attending, after all, a professional school that put a great emphasis on preparing its students for employment. But these women’s plans for the future were contested at various levels. To openly acknowledge the desire to pursue a career in engineering raised immediate concerns about the female students’ matrimonial plans. Those who were interviewed by the local press could not escape questions on this matter. Having stated her goal to become a chemical engineer, Melba Greer was asked by the *Toronto Star* in 1932 if she would “prefer the dangers of chemistry to the less exciting joys and housework.” “Quite sure,” responded Greer with conviction, although she claimed that she was not “completely hopeless when it comes to the domestic arts.”¹⁰⁴ A few years later, Aleda Prescott and Ellen Sheppard discussed their professional aspirations with the *Toronto Telegraph*. They did not worry about the potential conflict between marriage and career, as the question had “not as yet arisen.” However, both felt the need to reassure the reporter; they agreed that marriage was a “career in itself” and that they had “no ambition to become old maids.” Significantly, the *Telegraph* article was entitled: “Invade Men’s Domain but Don’t Wish to Be Maids.”¹⁰⁵

Ellen Sheppard’s marriage a few years after receiving her degree seem to have curtailed her career plans. But Aleda Prescott and some other first-generation women found employment following graduation. Elsie MacGill moved to the United States to complete a master’s degree in aeronautics, a decision which opened the door to a successful career in this area. Three graduates in chemical engineering, Ailsa MacCorquodale, Aleda Prescott and Audrey Rushbrook, found jobs in various settings. MacCorquodale worked as a chemist in companies such as Imperial Varnish, Dominion Rubber and Orange Crush, while Prescott became an

103. For a discussion of the extra-curricular life of female students on Canadian campuses during the interwar years, see Axelrod, 98-127; and McKillop, 420-437.

104. *Toronto Star*, October 11, 1932.

105. *Toronto Telegraph*, March 19, 1936.

employee of the National Research Council.¹⁰⁶ Rushbrook's career path was rather erratic. She first worked at Dominion Magnesium Ltd., and then organized the chemistry courses at the Canadian Memorial Chiropractic College in Toronto. Afterwards, she taught briefly in the United States, before joining the staff of the Aluminium Laboratories Ltd. as a technical writer. She finally established her own firm, Engineering Writing Consultants Ltd.¹⁰⁷ For her part, Claire Jones pursued a career in teaching, first at the University of Toronto and at Queen's where she lectured in science and math, and then at the high school level after completing a bachelor's in education.¹⁰⁸

The professional experiences of this first cohort of female engineering graduates correspond to the work patterns depicted by Ruth Oldenziel in her study of American women engineers. Those who stood a better chance of finding employment had graduated in newer fields like chemical engineering and aeronautical engineering, where the gender codes were not yet fixed. In the case of chemical engineers, however, most ended up employed as chemists in laboratories, with low salaries and difficult working conditions. Other graduates worked as lecturers and lab demonstrators in colleges and universities, with others teaching in high schools.¹⁰⁹ Our study thus suggests that the entry of women graduates in the engineering workforce led to a gendered division of labour in Canada as well, with most being channelled in a narrow range of jobs which paid less and offered little chance of advancement. One way to escape this segmented labour market was to become self-employed, a move which Elsie MacGill and Audrey Rushbrook made after working for different employers. Self-employment offered important benefits: women engineers could gain autonomy and assume management roles, from which they were generally excluded. It allowed women like Elsie McGill, who eventually married, to reconcile their professional and family obligations, a challenge which most female professionals faced with great difficulty.

Conclusion

The persisting under-representation of women in engineering continues to be an issue which attracts considerable attention, in Canada as well as

106. Interview by Richard White with Ailsa MacCorquodale, February 5, 1999. We thank Dr. White for providing access to this source. On Aleda Prescott, see the *Toronto Star*, May 29, 1948.

107. *The Edmonton Journal*, May 30, 1962.

108. Interview with Claire Jones, 4 May 2001.

109. Ruth Oldenziel, "Multiple-Entry Visas: Gender and Engineering in the US, 1870-1945," in *Crossing Boundaries* (see note 13), 22-29.

in other industrialized countries. Why still so few? Almost a century ago, the University of Toronto opened its door to its first female engineering students. They were only a handful, but their arrival at FASE constitutes an essential chapter in the history of Canadian women engineers.

The main challenge that the historian faces with respect to this pioneering group is to provide answers to the key question: what was it like to be the first women to study engineering? We might expect that a high level of self-motivation and determination inhabited these “gender-benders,” as Ruth Schwartz Cowan defines them.¹¹⁰ Their willingness to speak to the press and to make headlines as FASE’s “firsts” is telling of their level of confidence. That these pioneers came from middle-class backgrounds and probably benefited from their family’s emotional support and material resources was certainly an important factor that led to their decision to enter such a male preserve. Their academic abilities, above all their math and science skills, was another key element, which put them on par with their male classmates. They also shared with the latter a gruelling schedule and a heavy workload; like the male students, some quit down the way, while others took a longer time to complete their program. Overall, the women pioneers had professional aspirations, and they seemed fairly optimistic with respect to employment opportunities. This was especially the case of those enrolled in chemical engineering, a program which attracted both women and men during the period under study. That several women of the first generation found employment after graduation testifies to their determination to pursue a career in engineering. In sum, then, this group’s academic profile resembled, in many respects, that of their male counterparts.

Because they were women, however, they also lived different experiences. These pioneers were entering a professional program which was designed and managed exclusively by men, and which aimed to train exclusively men. Furthermore, the close association of technology with masculinity, which underpinned the gendering of engineering practice and culture, and the professional identities of engineers, points to the basic issue linked to the entry of women in engineering schools: how could they fit in? Our examination of their situation at FASE sheds some light on this matter. It is more than likely that the first women who were admitted did not have the same freedom with respect to the choice of a specialty. The older branches, such as civil, mechanical and mining engineering, remained closed to them, while they did find a niche in the newer fields of electrical engineering, chemical engineering and engineering physics, where they received their practical training in the “indoor” environment of

110. Cowan, xiv.

the lab. We can also assume that some, like Melba Greer, were discouraged from enrolling in engineering, even in those areas that seemed more welcoming to women.

Once they were enrolled in their program, the female students had to contend with FASE's male culture. This culture was not homogeneous; the "School Spirit" promoted by the authorities and the leaders of the Engineering Society, which expected students to behave like "Gentlemen," clashed with the image of the tough, uncultured and beer-drinking engineering student, projected increasingly by the *Toike Oike*. We cannot measure the impact of these conflicting discourses on the general male student body. However, the views expressed by the female students with respect to the attitudes of their classmates confirm the co-existence of these two models of behaviour at FASE in the early decades of the twentieth century, which may have made things easier for women. What we know is that the women students reacted in different ways to the homo-social culture prevailing at FASE. The teasing invoked by Melba Greer could have been tolerated by one female student, while considered unacceptable by another. More fundamentally, the women of the first generation had to cope with their status as "outsiders inside," as Boel Berner puts it.¹¹¹ Their labelling as "Enginettes," their absence from the more established engineering specialties, and their exclusion from various extra-curricular activities were obvious indicators of this status. Our sources suggest that the female students preferred to deal with this situation by trying to be accepted as "one of the boys."

This strategy did not resolve the major dilemma which the technology-masculinity nexus had generated, once women had begun to enter engineering: how could a woman be an engineer and still remain a woman? For generations to come, women in engineering, to a much greater extent than women in other professions, will face this symbolic dichotomy. To know how they managed to do so in Canadian schools and faculties of engineering constitutes a key area of investigation for historians.

Indeed, education is integral to the creation of a professional engineering identity. In this article, I aimed to illustrate the gendered dimensions of engineering education and how this impacted on the first women who enrolled at FASE. Gender, we have seen, operated at the structural, symbolic and individual levels. At the same time, individual women had their own reasons for choosing engineering and their own views on their experiences as engineering students.

111. Boel Berner, "Educating Men: Women and the Swedish Royal Institute of Technology, 1880-1930," *Crossing Boundaries* (see note 13), 97.

Each in their own way, they accommodated themselves to the faculty's masculine structures and practices. This is why their stories are complex, despite their scarcity. What is needed are additional studies on the situation of Canadian women engineering students in other engineering schools during the twentieth century; historians will then be able to establish firm comparisons that promise to yield fresh insights into why there are still so few women in engineering in the 21st century.