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"Contributions of Women to Science & Engineering in Canada - Elsie Gregory MacGill"

by Manon Dumas

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WORKING PAPER 4/1994

CONTRIBUTIONS OF WOMEN TO SCIENCE AND ENGINEERING IN CANADA: ELSIE GREGORY MacGILL

by

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Abstract

This paper was prepared for - and presented by the author at - the Second Seminar of the CSME History Committee, held during the CSME FORUM at Concordia University, Montreal, on 1 June 1992.

The paper describes briefly the career of one of Canada's distinguished engineers - and feminists - whose activities included a number of 'firsts' for women in the profession. A 1927 graduate in the electrical discipline, and in spite of being disabled by polio when in her twenties, she went on to become one of Canada's pioneers in aeronautical engineering.

About the Author

Manon Dumas has completed a B.A. degree in Women's Studies (with distinction) at the Simone de Beauvoir Institute of Concordia University and is presently enrolled in a graduate program in Management at McGill University. She is also presently coordinating women's training programs in electrotechnology at the Montreal YWCA. Under the supervision of Dr Marianne Ainley, the Director of the Simone de Beauvoir Institute, she has researched the history of women geologists in Canada and, in 1992, attended the Conference on Women in the Geosciences at St Lawrence University.

About the Working Paper Series

In June 1991 the Board of Directors of CSME agreed that its History Committee should be responsible for the production of a series of Working Papers on topics related to the history of engineering generally and to the mechanical discipline in particular. These papers may or may not be authored by members of the Committee or the Society. They will have limited initial distribution, but CSME Headquarters (now located in Ottawa) will maintain a small supply of copies for distribution on request. These Working Papers may subsequently be published, in whole or in part, in other vehicles. But this CANNOT be done WITHOUT the WRITTEN PERMISSION of the CANADIAN SOCIETY for MECHANICAL ENGINEERING.

Elizabeth Muriel Gregory - Elsie - MacGill was a remarkable engineer, famous for designing and test-flying her own planes.

She was born in Vancouver on 27 March 1905. As a child she studied art and music, but her real interest was in building radio sets. The MacGills were a privileged family. Her father, James Henry MacGill, was a corporation and estate lawyer. Her mother, Helen Gregory MacGill, was British Columbia's first female jurist, and was a dominant influence on her daughter's life. Formerly a newspaperwoman, Judge MacGill firmly believed that everyone - male or female - should be free to chose their own life's work. She had also been the first woman to attend Trinity College at the University of Toronto, and had completed three degrees there - the Bachelor of Music (again the first woman in the British Empire to graduate with this degree), and B.A. and M.A. degrees in Moral and Mental Philosophy. With this kind of role model, it is easier to understand the origin of Elsie's own pioneering spirit.

As her mother had done, Elsie came east to Trinity College and - in 1927 - became the first woman in Canada to graduate with a degree in Electrical Engineering. She was also the first woman in the Province of Ontario to register as a Professional Engineer. She began her career with the Austin Automobile Company in Michigan. When this company turned its attention to aviation, she adapted her skills by taking an aeronautical course at the University of Michigan. After winning a scholarship at this University, she resigned from her position at Austin Automobile and enrolled as a full-time student for a Master's degree on Aeronautics.

However, in the spring of 1929, while in the midst of completing her studies for this degree, Elsie MacGill was stricken with polio, and both of her legs were paralysed. Her family was told she would never walk again. But she insisted on writing her final examinations in hospital. While anxiously awaiting the results, and confined to a wheelchair, she returned home to Vancouver. Determined to continue in her profession, she worked out a rigorous schedule of physiotherapy treatments and spent long hours doing aeronautical designs and writing articles on aviation. Her work helped pay the heavy medical expenses as well as allowing her to continue her professional work. The news that she had passed the examinations made her more determined than ever to become the first woman aeronautical engineer in the world.

After three years of intensive physiotherapy, Elsie MacGill was able to walk again with the help of a cane. She borrowed enough money to take a refresher course at the Massachusetts Institute of Technology. During her stay in Boston she was offered - and accepted - a position as Assistant Aeronautical Engineer at Fairchild Aircraft Limited at Longueuil, Quebec. Her work consisted of stress analysis on the prototype of the first all-metal aircraft to be built in Canada. Owing to her slight residual disability, she

was prevented from piloting but, when prototypes were undergoing flight tests, she still flew in the aircraft.

In May 1936 she applied for membership in the Institute of Aeronautical Sciences in New York, but was denied admission because the Institute was uncomfortable with the fact that she was a woman. In March 1938, however, she was elected the first woman corporate member of the Engineering Institute of Canada.

In 1938 Elsie MacGill accepted a position with the Canadian Car and Foundry Company. As Chief Aeronautical Engineer of the company at Fort William (Thunder Bay), Ontario, she designed the 'Maple Leaf' trainer, the first to be designed by a woman. This aircraft received its Certificate of Airworthiness within eight months. During World War II - at Fort William - she was handed over 3,600 blueprints and told to start building a winterized version of the 'Hurricane' fighter aircraft for the British Government. In this project, she demonstrated her creativity, flexibility and ability to organize. She used a factory that had formerly been used to build railway boxcars. As well as having to supervise the design and fabrication of the machine tools necessary to make the 25,000 parts of the aircraft, she had to train a skeleton staff of 120 unskilled people in how to use them. By January 1940 her staff had increased to 4,500, and they were turning out more than 100 'Hurricanes' every month. During this same period her team also built Curtiss-Wright 'Helldiver' fighters for the United States Navy.

Towards the end of the War Elsie MacGill married E.J. Soulsby, but refused to change her name, which was not a popular thing to do in her time. She said, "I never go under the name of Soulsby. Even my husband calls me Miss MacGill. Actresses and writers have that privilege, so should engineers." In 1943 they moved to Toronto where Elsie established her own consulting firm, specializing in flight and performance computations, airframe design, stress analysis and certification.

Owing to her love for her work, Elsie MacGill had very little time for hobbies. She took a great interest in the engineering profession itself. She also made time for many different women's organizations. Her mother had been an ardent suffragette. In 1948, when one of her friends remarked that women had not made use of their new status as true citizens, she decided to write the story of her mother's life to show what one woman could accomplish. So in 1953, when she was in hospital with a broken leg, she wrote "My Mother, The Judge." This book became so popular that buying it or borrowing it from libraries was, for a time, practically impossible. She was also chair of a committee which set out the needs of women prisoners and, with her committee colleagues, vigorously protested the proposed reduction in the number of women

probation officers. She was elected President of the Canadian Federation of Business and Professional Women's Clubs. At the Clubs' convention in Edmonton she advocated more political power for women to ensure employment safeguards, increased educational opportunities, and a more realistic plan for peace. The Toronto Club established an educational grant in her honour. In 1967 she was named a member of the Royal Commission on the Status of Women, and signed its report in 1970, and was a founding member of the National Action Committee on the Status of Women.

In 1941 Elsie MacGill was awarded the Gzowski Medal by the Engineering Institute of Canada for her paper, "Factors Affecting Mass Production of Aeroplanes." In 1946 she became the first woman to serve as a technical advisor to the International Civil Aviation Organization. She helped draft the International Airworthiness Regulations for the design and production of commercial aircraft. In 1953 she became the firat woman to have her photograph included in the Gevaert Gallery as a tribute to her contributions to Canadian industrial development. She was admitted to the Order of Canada in 1971, received the Engineering Institute's Julian C. Smith Medal in 1973, the Gold Medal of the Association of Professional Engineers of Ontario in 1979, as well as several honorary degrees.

Elsie MacGill was a Canadian engineer and feminist who overcame physical disabilities to add distiction to both. She died in Cambridge, Massachusetts in November 1980 at the age of 75.

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