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“Engineering Education in British Columbia”

by William O. Richmond

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WORKING PAPER 8/1995

ENGINEERING EDUCATION IN BRITISH COLUMBIA

by

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Abstract

This paper covers the period from the beginning of university-level education in British Columbia in 1894 until 1950 when Professor Richmond became Head of the Department of Mechanical Engineering at UBC. Engineering education in this Province began in 1906 and was the responsibility of the McGill University College of British Columbia and the Royal Institution for the Advancement of Learning until 1915, when the University of British Columbia was founded. Thereafter, the story told is principally that of the Department of Mechanical Engineering at UBC and of faculty members who served in it. This paper was written by Professor Richmond in October 1990. It extends the scope and period covered by the article, also written by him, which appeared in the September 1991 issue of the CSME Bulletin. The Editor wishes to thank Professor Ian Gartshore of UBC for his help in getting this material into print.

About the Author

William O. Richmond was born in October 1907 in Rouleau, Saskatchewan. He attended the University of British Columbia and graduated in mechanical engineering in 1929. He went on to receive his MSc in 1930 after completing the Graduate Studies Course offered by the Westinghouse Electric Manufacturing Company at East Pittsburgh, Pennsylvania. He remained with Westinghouse until 1934, when he became, successively, a Research Associate at the Harvard Engineering School and at MIT, and an Instructor in Mechanics and Materials at the Case School of Applied Science in Cleveland. In 1937 he joined the Faculty of Engineering at UBC as an Assistant Professor of Mechanical Engineering. Promoted to Associate Professor and, in 1946, to Full Professor, he served as the first Head of the autonomous Department of Mechanical Engineering at UBC from 1950 to 1967. Bill Richmond was a member, and also served as President, of the Association of Professional Engineers of B.C.. In 1959 he was President of the Canadian Council of Professional Engineers. He was a member of the EIC, ASME and the American Society of Metals. He was also a member of the CSME's History Committee in the late 1970's. He died in April 1994 at the age of 86.

About the Working Paper Series

In June 1991 the Board of Directors of the 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 a limited initial distribution, but CSME Headquarters 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 Society.

University-level education in British Columbia was made possible by the passage of a Bill through the Provincial House in 1894 that extended permission to all high schools in the Province to affiliate with any university of recognized standing. High schools in Vancouver and Victoria became affiliated with McGill University in Montreal. Vancouver High School, becoming known as Vancouver College, offered the course of the first year in Arts in 1899, with the second year in Arts being added in 1902.

A discussion between Mr. Lemuel Robertson, a teacher at Vancouver High School then doing post-graduate work at McGill, and Dr. H.M. Tory of McGill University led to the introduction by the Government of British Columbia on 1 February 1906 of two Bills - one to permit McGill University to establish a College in British Columbia, and the other to incorporate the Royal Institution for the Advancement of Learning in British Columbia. Both of these Bills were passed early in 1906 - on 12 March - but not without considerable controversy and opposition on the part of graduates and supporters of other institutions of learning in Canada who thought McGill was being given an unfair advantage. McGill, however, was one of the few institutions that had the power to operate extra-provincially, since it was a private institution.

Very soon after the passage of this legislation, the first meeting of the Royal Institution was held in Vancouver - on 19 March 1906. At it, the establishment of McGill University College in British Columbia was initiated, to begin work in the fall of the year. In the report of this meeting by Dr. Tory, the establishment of courses in applied science was described as follows:

Article 9, Courses in Applied Science:

In addition to the (...Arts) courses, those for the first two years in Applied Science will be added. This will be possible because these courses are largely the same for all departments of engineering....

Two further years at McGill will give students a B.Sc. in Engineering degree....

The calendar for the 1906-07 of the Vancouver/McGill University College, included the following information:

Course for degree in Applied Science:

The Royal Institution offers the first two years of this course in connection with Vancouver College. The staff is being organized, and an announcement will be made within a short time.

The course prepares for specialization in the following branches: architecture; chemistry; metallurgy;

mechanical, electrical and mining engineering, civil engineering and surveying; and transportation.

First year: descriptive geometry, English; freehand drawing; lettering; mathematics (1,2,3 and 4); physics; physical laboratory; shopwork (to be offered in 1907-08).

Second year: chemistry; chemical laboratory; mapping; mechanics of construction; mechanics of machines; physics; physical laboratory; surveying; shopwork (to be offered in 1907-08).

Howard K. Dutcher, M.Sc. (McGill), was appointed Professor of Civil Engineering, and James G. Davidson, B.A. (Toronto), Ph.D. (California), was appointed Professor of Physics. They were responsible for the first year courses offered in applied science.

At the first meeting of the Faculty of McGill University College in British Columbia, held on 15 November 1906, Professors Dutcher and Davidson were asked to prepare all matter having special reference to the Engineering Department in the preparation of the calendar of the College. The instruction given would cover the work of the first and second years of the Faculty of Applied Science at McGill and, being largely mathematics and pure science, was intended as the foundation for the specialization in the third and fourth years in the various branches of engineering.

The first calendar was issued for the 1907-08 session. It contained much the same information for prospective engineering students as has been given (above) for 1906-07, with the addition that the regular work of each session would end about the middle of April at the close of the sessional examinations. Summer work would begin as soon as practicable thereafter, and would continue for six weeks. This work would include: survey school; mechanical drawing; laboratory; and shopwork. A thesis would be required of students going on to the third year.

In the summer of 1907, George E. Piper, Assoc. R.C.S. (Dublin), was appointed Professor of Mechanical Engineering, and George R. Kendall, B.Sc. (McGill), was appointed Lecturer in Chemistry. At a meeting of the Faculty held on 30 August 1907, it was announced that the Board of Governors had appointed Professors Dutcher, Davidson and Piper as the Committee on Engineering Studies. Also, with the addition of Piper and Kendall, the second year of applied science could now be offered. The attendance record for November 1907 showed nine students in the first year and eleven in the second.

During the summer of 1908, Professor Piper went back to England to be married. On his return journey he contracted scarlet fever and was forced to leave the train in Calgary, where he died on 4 September. This tragic event affected the young College, and

Professors Davidson and Henry (English) were asked to draw up a suitable minute on the death of Professor Piper. This appeared in the minutes of the Faculty meeting of 23 September 1908...and noted that 'his energy in planning new lines of work based on a thorough understanding of practice in the old country was of the greatest value in the year he was with us.' Prompt action was taken to replace Professor Piper. His replacement, Professor D.W. Munn, was present at the meeting on 23 September.

David Walter Munn, M.A., B.Sc. (McGill), was exceptionally well qualified. He had first graduated in classics and had spent several years teaching high school before returning to McGill for his bachelor's degree in mechanical engineering. At the time of his appointment he was in the staff of the Mechanical Engineering Department as a Demonstrator at McGill. He taught at the College in Vancouver for four years, then took leave of absence in 1913 to go to MIT for graduate work. He did not return to British Columbia, but went on to teaching positions at Queen's, the Royal Military College, and Nova Scotia Technical College. He died in Halifax in 1929.

The Faculty members of the young College were very much concerned that proper standards be maintained. A procedure was developed in which examination papers in most of the engineering subjects were marked by local examiners, with the marks allotted for each question being plainly shown at the side. The papers were then forwarded to Montreal for such revisions as might be necessary to secure identity of standards. Term work was to be included in the final mark, with the work in drawing, laboratory and field work being evaluated by the local Instructors.

Considerable importance was attached to practical work. The 1912-13 calendar of the College listed the following Instructors: S. Northrup, in carpentry and wood turning; H. Taylor in machine shop work; and H. Edwards in smith work. (These three were also listed in the first University of British Columbia calendar in 1915. Taylor left the Department of Mechanical Engineering of the University in 1930.)

Professor Munn was replaced in 1913 by Lawrence Killam, B.A. (Mt. Allison), B.Sc. (McGill), as Lecturer in Mechanical Engineering. Killam came from Mt. Allison University where he was Dean of Applied Science. Mr. Killam was in charge of the mechanical work of the College, which included considerable vocational training in the first year of World War I.

McGill College operated until 1915. That year, the University of British Columbia was formed with its campus in Fairview, on the site of the present Vancouver General Hospital. The McGill College ceased to exist, and the Royal Institution was disbanded.

In 1915 Mr. Killam became Assistant Professor of Mechanical

Engineering and acted as Head of the Department at the new University. Mechanical engineering courses in the first two years were offered, but none yet for the third and fourth years. However, during the 1918-19 session, fourth-year mechanical engineering courses - including lectures and laboratory work - were given for the benefit of just one returned soldier. This is believed to have been H.F.G. Letson, who was the first graduate in mechanical engineering from the University, obtaining his degree in 1919.

Beginning in 1917, returned soldiers were taken into the machine shop as partial students and given courses similar to apprentice training. In the year 1918, courses in machine shop, garage and gas engine work, and motion picture machine operation were established in cooperation with the Department of Soldiers' Civil Re-establishment.

Mr. Killam - in charge of mechanical engineering during this time - was undoubtedly extremely busy. Yet he found time to do work in the hospital power plant to make it available for students' use as a laboratory, as well as to make savings in fuel consumption that amounted in six months to about \$14,000. In 1920 he was granted leave of absence, and resigned as Associate Professor of Mechanical Engineering in October 1921. He returned to Nova Scotia to become General Manager of the Inverness Railway and Coal Company, and later became President and Managing Director of the Nova Scotia Tramways and Power Company of Halifax. In 1926 he returned to British Columbia to become President and Managing Director of the B.C. Pulp and Paper Company, a position he retained until 1950 when the Company was taken over by Rayonier. Mr. Killam died in 1976.

Professor C.C. Ryan became Head of the Department of Mechanical Engineering for the 1920-21 session. Mr. H.P. Archibald, B.Sc. (McGill), was appointed Instructor and taught the course in engineering drawing.

The appointment of Professor L.W. Gill as Head of the Department of Mechanical Engineering was approved by the University's Board of Governors in July 1921. Professor Gill was a graduate of McGill and had done research work there and at Harvard University on magnetism and magnetic hysteresis. He was at Queen's University from 1900 to 1915, where he organized the Departments of Civil, Mechanical and Electrical Engineering, finally becoming Professor of Electrical Engineering. He served in World War I and, at the end of it, organized engineering training at the Khaki College for Soldiers. He was Director of Technical Education at this College when he accepted the UBC appointment.

At a meeting of the Faculty of Applied Science on 19 December 1921, Professor Gill moved:

That a course in Electrical Engineering be offered by the Faculty of Applied Science and that the same be placed in

the calendar for the next session. First and second years are to be the same as other engineering courses. The third year is to be the same as that for mechanical engineering. The fourth year is to consist of 15 lecture hours and 18 laboratory hours.

This was approved and the 1922-23 calendar listed L.W. Gill as Professor and Head of the Department of Mechanical and Electrical Engineering. It announced that a B.A.Sc. degree was being offered in electrical engineering, with the qualification that third and fourth year courses would not be offered in 1922-23.

Professor Gill did not remain to oversee the development of the new offering, but resigned effectively on 30 September 1922. He left to become Principal of the new Technical School in Hamilton, Ontario. His reason for leaving UBC was that he believed that engineers should be trained in technical schools and that universities were very unsatisfactory for developing engineering talent. Professor Ryan again became acting Head of the Department for the two years before a Head was appointed. He was granted supplementary stipends for his additional supervisory duties in 1922 and 1923. Ryan resigned on 30 September 1924 and entered the service of the B.C. Pulp and Paper Company where he was a mechanical engineer at the Port Alice Mill for some time.

In late 1922 negotiations were started with Dr. H. Vickers of the University of Liverpool in Great Britain. Dr. Vickers was finally appointed Professor of Electrical Engineering and acting Head of the Mechanical and Electrical Engineering Department. He arrived in Vancouver in the middle of March 1924, by which time the course in electrical engineering was fully operational.

In the summer of 1925 the University moved from Fairview to West Point Grey and the Department of Mechanical and Electrical Engineering moved into two framed buildings next to the Power House. The mechanical building comprised a large laboratory, three lecture rooms, a drafting room, a calorimeter room, a storage room, and a machine shop. In the first plans for the complex, no office space was provided for the staff of the Department. Dr. Vickers objected strongly to this arrangement and the plans were altered to provide three staff offices in the electrical building and one in the mechanical building.

The mechanical laboratory was equipped with a 3-ton CO₂ refrigerating plant, a Corliss steam engine, a two-stage steam driven air compressor, a 50 hp Mirlees diesel engine, a de Laval steam turbine with condenser, a Crossley two-stroke oil engine and a National gas engine. Most of these machines have been scrapped, but the National gas engine and the de Laval turbine were installed in the present mechanical engineering laboratory. The National gas engine may serve as a memorial to the late Professor Murray McIlroy, who treated it with loving care from 1937 until he retired

in 1972.

After the move to Point Grey, the staff of the mechanical engineering side was increased by the appointment of G. Sinclair Smith and John F. Bell as Instructors, and later as Professors. Captain Bell, who had been an engineer officer in the Royal Navy and the Royal Canadian Navy could always be depended upon for a good story!

The first UBC graduate in mechanical engineering, H.F.G. Letson, was appointed Assistant Professor of Mechanical Engineering in 1923, after he had obtained a Ph.D. from the University of London. Dr. Letson resigned in 1935 to take over the management of the well known engineering firm of Letson and Burpee.

Francis W. Vernon, with extensive experience in the aircraft industry in Great Britain, was appointed Associate Professor of Mechanical Engineering in 1926. Professor Vernon was a superb blackboard artist. His mechanism drawings executed with half a dozen coloured chalks were beautiful to behold, but quite difficult to clean off the board for the next lecture. His nickname was 'PUSH' - derived from 'You PUSH this link' when explaining the motion of a mechanism. Professor Vernon was given the additional title of Lecturer in Aeronautical Engineering in 1946 to satisfy the requirement of a bequest to establish instruction in aeronautics at the University.

In 1930 Joe Kinlock was appointed Instructor in the machine shop. He was trained in Scotland, had served in merchant ships, and was a very competent machinist. Many graduates felt he was the best engineer in the Department, as he was very clever in designing machine shop projects. In 1935 his nephew, Joe Millar, began his long service as Assistant in the mechanical laboratory.

Dr. Vickers resigned as Head of the Department in 1935 because of poor health. He was replaced by Dr. H.L. McLeod, who came from the University of Alberta where he had been Head of the Electrical Engineering Department.

In 1937 H.M. McIlroy and W.O. Richmond joined the Department as Assistant Professors. Professor McIlroy came specifically to take over instruction in drafting, though he also took courses in thermodynamics. Professor Richmond took the place of Dr. Letson, working mostly in the field of applied mechanics.

During this period, D.W. Thomson was Instructor in the Department, and later Assistant Professor. He developed courses in heating, ventilation and air conditioning. He later resigned to found an engineering firm that is, today, prominent in this field.

In the late 1940's the number of students attending the University increased enormously with the end of World War II and the return of

those who had been serving in the Armed Forces. The mechanical class of 1950 had 132 members, and was the largest class ever. Additional space for classrooms and drafting rooms was provided in huts salvaged from army camps. The laboratories and machine shops were in almost constant use during the University day.

In 1950 Dr. McLeod was appointed Dean of the Faculty of Applied Science to replace Dean Finlayson on his retirement. The (M & EE) Department was split in two, with Dr. Frank Noakes being appointed to head the Department of Electrical Engineering and Professor Richmond to head the Department of Mechanical Engineering. A year after the split, the second floor lecture room and the drafting room in the mechanical building were remodelled to provide office space for the staff of the Department.
