Memorial to Robert Ferguson Legget  
1904–1994

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Robert Ferguson Legget, a 20th century civil engineer *extraordinaire*, changed the face of applied geology. His legacy shows that civil engineers must embrace the application of geology to their projects; and to do less is to neglect the standard of practice. Robert is remembered by the many who both knew him and knew of him as an engineering geologist, so influential in tenaciously collecting, examining, lecturing, and writing of a world of examples, and so graciously stating all of this for the record.

Robert Legget was the epitome of the practicing professional person, both engineer and geologist. Gracious in all manner of contact with others, he was a 19th century gentleman comfortably engaging 20th century technologies and devoting his career to promoting the application of geology to all aspects of human endeavor. Robert was even a little desperate about preparing us to employ the best geologic knowledge to meet the challenges of the 21st century. On the basis of his ruddy-cheeked health, ease of movement, and strong voice, we all took for granted that he would be here with us to greet the year 2000.

Robert was born in Liverpool of Scottish parents, Donald and Mary Thompson Legget, on September 29, 1904. On graduation from Liverpool University (first class honors in civil engineering) in 1925, he worked for four years with C. S. Meik and Buchanan, Consulting Engineers, of Westminster, completing a master's degree in engineering in 1927. In April 1929 he emigrated to Canada and worked as resident engineer for the Power Corporation of Canada to initiate and complete the Upper Notch hydroelectric project in northern Ontario. From following project work around Montreal, he joined Canadian Steel Sheet Piling Company in that city and designed and oversaw project work into 1936.

Robert and Mary Free, a coworker, were married in 1931. Mary was a fine and understanding companion and supporter of Robert's indulgences in trying to codify the sense of geology in engineering.

By the early 1930s, as a trivially paying outlet for his geological hobby, Robert had become a Canadian correspondent to *Engineering News Record*, then an in-depth weekly journal employing engineers as staff and correspondents to produce all that was fit to print about civil engineering. Perhaps it was the challenge of identifying and describing emerging engineering works and their geologic situations that matured Robert the chronicler. Over the years Robert built a massive file of literature, clippings, and notes at his home in Ottawa. Robert came to see so much geology influencing the first truly big projects around Canada's larger cities and up and down the St. Lawrence Seaway and Welland Canal, yet not being properly addressed at professional society meetings.

After 11 years of practical engineering, Robert joined Queen's University as a lecturer in civil engineering in 1936. Now his desire to identify geologic problems in construction was met with a need to set down rules and answers and to teach them to those entering the profession. In 1938, Robert joined the University of Toronto as an assistant professor of civil engineering, from which he was promoted to associate professor in 1943.
By 1939 Robert had become an unabashed champion of engineering geology. He had just completed *Geology and Engineering*, the very first technical book in which geology preceded engineering in its title and in which a brief description and advice were found for dealing with the most common of recurring geologic conditions.

With the Canadian restriction against university faculty serving in the war effort on active duty, Robert volunteered to relinquish six years' vacations to work on such military projects as the Mackenzie River Transport, Shipshaw Project, the Polymer Project and initiation of the Toronto Subway.

World War II productivity was so acclaimed that he was asked to serve as the first director and to initiate operations of the Canadian Building Research Establishment at Ottawa in 1947. By this time, Robert was recognized as one of the leading practitioners and teachers of engineering geology and had worked with GSA Executive Director Charles Peter Berkey, the leading American engineering geologist, as one of the founders of the Engineering Geology Division, the Society's first technical division. Robert's frequent and thoughtful participation in GSA activities placed him in natural line for the once-in-a-decade selection for a Canadian president in 1966. His presidential address, "Soil, Its Geology and Use," will remain a timeless piece of applied geology.

In his public and professional addresses, Robert not only wove geology with the principles of engineering, but addressed the importance of the works and the demands made by their functionality on the resulting behavior of earth materials. He integrated a sense of history, people, and places in his talks, stimulating the imagination of all. A Legget hallmark was his impeccable (at least to North American ears) and delightfully authoritative Queen's English speech. When Robert spoke, people stopped to listen. Robert's handwriting, on the other hand, was not only one of his best secrets (he had early mastered speed writing as a means of collecting and recording information) but also a real challenge to read. In contrast, his precise calligraphy graced his Christmas greetings, which marked visits to important and historic civil engineering works. His goal in correspondence was to read and respond to letters in one or two days. According to David Legget, his only child, the joy became a greater and greater challenge and eventually, over the last few years, began to take nearly all of his father's time, with the accumulating literature and news of technical discoveries and geological advances beginning to pile up around the home in orderly stacks marked "to be reviewed."

Canadian engineers and builders remember Robert also as the driving force behind the first national building codes for Canada. His code-developing work naturally brought him membership in the American Society of Standards & Materials (ASTM), which had been founded in 1898 but which embraced *soil* and *rock* and engineered materials only in 1937 (Committee D-18). Robert was ASTM president in 1965.

*Geology and Engineering* went into a second edition in 1962. Robert's overflow of 35 years of diligent collection of examples and comment then went into *Geology Beneath Cities*, released in 1973. Here the record of the rewards for observing and penalties for neglecting geology in the urban setting was cemented for all time. He sought the most poignant of examples relating to the safety and welfare of citizens, the most disastrous related to neglect of geology, and cited the most successful of examples of its application. In this book he cited the examples of Boston and Johannesburg, along with Czechoslovakia in collecting the geologic details discovered in urban development. At the suggestion of Richard W. Galster in 1977, Robert organized a "Geology Under Cities" symposium for the 1978 GSA annual meeting in Toronto. Robert accepted the challenge and produced not only the symposium but GSA Reviews in Engineering Geology Volume V (1982). Also in 1982, in appropriate recognition, the Association of Engineering Geologists (AEG) dedicated its *Bulletin* series "Cities of the World" to Robert as the world's leading urban engineering geologist.
Robert took retirement in 1969, from the Canadian National Research Council. Robert’s retirement gave even more reason, time, and access to the prodigious outflow of his observations, experiences, and files.

AEG accorded him honorary member status in 1971 and its Holdredge Award in 1974 (for *Cities and Geology*). In 1989 Robert received the Can-Am Award of the American Society of Civil Engineers, in recognition of his achievements in combining the art and technologies of Canadian and American practice.

Next (1982) came the *Handbook of Geology in Civil Engineering*, a superb expansion of *Geology and Engineering*.

Robert’s last geological book was the 1988 third edition of *Geology and Engineering*, fashioned as an abstracted (80%) and expanded (20%) version of the *Handbook*. In the throes of reducing the *Handbook* to textbook size, the burgeoning field of environmental geology had not gotten the treatment deserved for the 1990s. One of Robert’s last and most frustrating challenges was dealing with the new McGraw-Hill Book Company, so vastly changed from the 1939 firm of which Robert was then (1994) the most senior living technical author. At his death, he was attempting to arrange for a fourth edition, carrying an expanded environmental geological message.

Robert wrote his books, papers, and correspondence on a 1925 Underwood typewriter. His books were personally indexed. He knew and corresponded regularly with literally hundreds of people worldwide with whom he had crossed paths. His last work, a biography of Canadian engineer and statesman Alexander MacKenzie, is at the University of Toronto Press, and a bronze plaque, engineered by Robert, was in place at MacKenzie’s birthplace at Edinburgh, the subject of his 1993 Christmas card.

Even more than for his eight professional society medals and six honorary memberships, Robert was most thankful for having been appointed an Officer in the Order of Canada (O.C., 1967), with subsequent (1989) promotion to Companion in the Order. Truly of note was his election as founding president of the Canadian Academy of Engineering (1987).

Robert viewed life from a pleasantly tinted eyepiece—expecting the best, but cognizant of the worst, searching always for a way to improve the human situation through the application of geology. His was a life that delighted in discovery of a “happily” occurred event, a favorite Legget phraseology. He missed little and he passed along most of what he learned. We all knew Robert as “Dr. Legget”; yet it was he who would rightly introduce himself to others not of his closer circle as “Mr. Legget,” which indeed he was, the 13 doctorates all being honorus causa and all rightfully granted for the strongest of reasons.

He died on Sunday, April 17, 1994, of complications of an embolism. Even the Legget funeral at the Anglican Christ Church Cathedral, Ottawa, was pre-planned by Robert right down to a bagpiped Scottish lament.

Today, facing the 21st century, we would have but a poor record of our past geological lessons learned if it were not for Robert Ferguson Legget. We would, today and tomorrow, be routinely making the same unfortunate and costly mistakes in the siting, design, construction, operation, and maintenance of the many engineered works that sit directly on or in the ground, rather than thinking geologically first and making site selection and design fit the soil, weak rock, ground water, surface water, and other geologic constraints that so profoundly and ultimately control the performance and success of works made by humans to suit life on planet Earth, and which equitably and fairly respect our environment. Robert constructed and paved a roadway of knowledge and awareness for thinking professionals—scientists, engineers, architects, planners and public officials—to embrace geology gainfully and profitably or to ignore geology at the peril of grave consequences. In the words of Richard Galster, “Surely no one person has done as much to further the cooperation between civil engineers and engineering
geologists and has kept the need for cooperation in our minds in his thoughtful and unassuming way. We shall not see his like again."

SELECTED BIBLIOGRAPHY OF R. F. LEGGET

In addition to nine other books dealing with the historic aspects of engineered construction in Canada