

ROBERT FERGUSON LEGGET
CC, BEng, MEng(L'pool), DEng, DGSc, LLD, DSc, FRSC, FICE

Robert Legget, distinguished civil engineer, geologist, author and historian, died on 17th April 1994 in Ottawa, Canada at the age of 89.

He was born in Liverpool, on 29th September 1904, the son of Scottish parents, was educated at the Merchant Taylor's School, Great Crosby, and graduated from the University of Liverpool in 1925 with a First Class Honours BEng degree in Civil Engineering followed by a Master of Engineering degree in 1927.

From 1925 to 1929 he was an Assistant Engineer with consulting civil engineers, Meik and Buchanan, later Sir William Halcrow and Partners and was engaged on the design of hydro power plants in Scotland, Greece, Italy and Finland, his principal involvement being with the Lochaber hydro power scheme which included what was then the longest tunnel in the world.

In order to widen his experience, he moved to Canada in 1929 to take up an appointment as an Engineer with the Power Corporation of Canada. He maintained his interest in power generation as Resident Engineer on the construction of the Upper Notch Hydro Plant, the largest automatic plant in Canada. In 1932 he joined the Canadian Sheet Piling Co Ltd, and as their Engineer was responsible for the design and construction of sheet piling on many major construction projects across Canada.

During his eleven years in engineering practice he had been actively developing his interests in geology and soils, and in particular with the growing new subject of soil mechanics dealing with the load bearing characteristics of soils and rocks. He was concerned with the need for education and research in this new field, and in 1936 made a deliberate change in career, by taking up a Lectureship at Queen's University, Kingston and then a professorial appointment at the University of Toronto. At both these institutions he established undergraduate lecture and laboratory courses in soil mechanics and foundation engineering, amongst the first in Canada. At Toronto, he initiated short courses and evening lectures on soil mechanics for engineers in practice. His former students remember him as a superb teacher, his lectures always being well prepared and sprinkled with his experience from case histories, and eloquently delivered.

In the second world war, an edict kept engineering and science University staff at their posts because of the need to train engineers and scientists but Legget's vacation time was spent participating in wartime projects, such as the Mackenzie River Transport, the Shipshaw Power Project and the Sarnia Polymer Plant. He also advised on the design and planning of the Toronto Subway System, construction of which commenced after the war.

In 1945 Dr C J MacKenzie, President of the National Research Council of Canada, asked Legget to chair a wartime committee to oversee research on tracked vehicles, a committee which evolved into the Associate Committee on Soil and Snow Mechanics (ACSSM). Both Legget and MacKenzie felt strongly that snow and ice were materials the properties of which should be better known, and therefore important subjects for research. As part of the work on tracked vehicles, Legget made a visit to Europe in 1946 specifically to learn of snow and ice research in Switzerland. This visit later led to the ACSSM playing a major role in encouraging research on soils, ice, snow, peat and permafrost through publications, the sponsoring of conferences, workshops, and other technical meetings and participation in programmes such as the International Geophysical Year and the International Hydrological Decade.

In 1947, the National Research Council of Canada formed a Division of Building Research (DBR) and MacKenzie invited Legget to direct it. Under his guidance DBR developed facilities for research on building materials, building services, structures, acoustics, vibrations, soils, housing and construction in cold climates. By the time he retired in 1969, the Division had a skilled staff of 250, major facilities for research and testing for the construction industry and a highly respected and greatly used information service. DBR had also been charged with the preparation of a Model Building Code, which under Legget's direction became the National Building Code now adopted by every province and territory, a remarkable achievement for a country as large and diverse as Canada.

Throughout his life, Legget was an avid reader, keen observer, and an accomplished writer. He contributed regularly to technical and other publications on topics of interest to the engineer and others. Many of his books are familiar to geoscientists world-wide. They include: *Geology and Engineering* (1939) now in its third edition with A E Hathaway; *Soils in Canada* (1970); *Cities and Geology* (1973); *Glacial Till* (1976); and the *Handbook of Geology in Civil Engineering* with P F Karrow in 1983. He was a fastidious student of old records and journals and his books on Canadian canals and railways reflect his interest and knowledge of the historical development of transportation routes in Canada. Of particular merit is his book on the Rideau Waterway, a 200 km long canal joining Ottawa and Kingston, on Lake Ontario, built by the Royal Engineers of Great Britain between 1826 and 1832. He maintained his writing up to his death, and shortly before he died he had just submitted for publication his manuscript on the development of the MacKenzie River.

Legget's contributions to professional societies were many and varied. He was Vice President (North America) of the International Society of Soil Mechanics and Foundation Engineering from 1961 to 1965; President of the American Society for Testing Materials (1965 to 1966); President of the Geological Society of America (1966); President le Conseil International du Batiment (Netherlands) from 1966 to 1969, and the Founding President of the Canadian Academy of Engineering (1987-1989). In turn he has been recognised by the award of Honorary Fellowships of the Royal Architectural Institute of Canada in 1953, of the Royal Society of Canada in 1959, the Institution of Civil Engineers in 1980, and the Royal Society of Edinburgh in 1983. He was also made a Foreign Associate of the National Academy of Engineering of the USA in 1988.

Academic recognition came from many parts of Canada, the United States and Europe, in the form of honorary doctorates. He has been awarded DSc degrees from the Universities of Waterloo (1963), Western Ontario (1969) and in 1972 from Clarkston College (New York State) and Sir George William University (Montreal). He has LL.Ds from: Macmaster University 1961, Queen's University Kingston (1966), University of New Brunswick (1969), the University of Toronto (1969) and the University of Glasgow (1971). DEng degrees were awarded to him by the University of Liverpool (1971), the Technical University of Nova Scotia (1972) and Carlton University Ottawa (1974). He also has a DGSc from Charles University, Prague, awarded in 1969.

Recognition of his talents came from many directions over a long period of time. As a young graduate engineer, he was awarded in 1928 the James Forrest Medal, the James Prescott Joule Medal and the Miller Prize of the Institution of Civil Engineers followed in 1931 by a Telford Premium Award of that Institution. Gold Medal awards abound. The first of these came from the Association of Professional Engineers in Ontario in 1970; in 1972 he received the Logan Gold Medal of the Geological Association of Canada and in the same year the Medaille d'Or from the Canadian Council of Professional Engineers followed in 1974 by the Leo B Moore Gold Medal of the Standards Engineers Society, and in 1976 the Dumont Gold Medal of the Geological Society of Belgium.

He was the first recipient of the William Smith Medal of the Geological Society of London in 1977 and he also received the Sir John Kennedy Medal of the Engineering Institute of Canada in 1978. Canadian government recognition of his many talents was through his appointment as an Officer of the Order of Canada in 1967 and his subsequent elevation to a Commander of that Order in 1989. The Royal Bank of Canada Award was established in 1967 to 'honour a Canadian citizen or person domiciled in Canada whose outstanding accomplishment makes an important contribution to human welfare and the common good'. He was given that Award in 1989, which comprised a Gold Medal and a cash prize of \$100,000.

Robert Legget was a courteous, generous and charming person who believed in the positive qualities of his fellow human beings. He had an uncanny ability to bring people together to a common purpose and to get things done. He always displayed a close personal interest in young people and encouraged them in their efforts. He was a self effacing man of genuine modesty, always generous in applauding the work of others. He had no well-defined hobbies. Writing was his principal recreation, and even in his busiest periods he continued to contribute articles and comments on a wide variety of subjects beyond his immediate fields of interest. His writing was not confined to professional matters. He maintained an extensive correspondence with his many overseas friends and even found time to correspond with the present writer's daughter in Australia and son in Hong Kong.

I first met Robert Legget in Canada in 1946 when he was a Professor at the University of Toronto, and subsequently worked for him in 1948 and 1949 after he became Director of DBR. Our association continued on a professional and personal basis until his death. The Legget Award and Annual Dinner were initiated in 1970. I was invited to participate in the 1994 Dinner which was also to be a celebration of his 90th birthday. Unfortunately he died before the Dinner which then became a commemorative rather than a celebratory meeting of his professional colleagues and friends.

He was very proud of his Scottish background and regularly visited his relatives in Edinburgh. He took a great interest in Scots who had helped in the development of Canada, and in particular Sir Alexander MacKenzie. He participated in the planning of the celebrations of the 200th anniversary of MacKenzie's discovery of the MacKenzie River. As a representative of the Canadian Government, Legget visited MacKenzie's birthplace in the Black Isle to unveil a Memorial to the great explorer. In his 90th year he visited Orkney to see the Memorial to Dr John Rae, another prominent Arctic explorer. It has been reported in Canada that among the awards he cherished most was his appointment to Companion in the Order of Canada, his election as an Honorary Fellow of the Institution of Civil Engineers (UK), and as an Honorary Fellow of the Royal Society of Edinburgh.

A man of such outstanding ability requires close family support and this he received in full measure from his wife Mary. They first met as colleagues in Meik and Buchanan in the late 1920s and married in 1931. She travelled with him on many of his overseas trips and they were an extraordinary couple. Her death in 1984 was a great loss to him. He is survived by his son David.

HUGH B SUTHERLAND