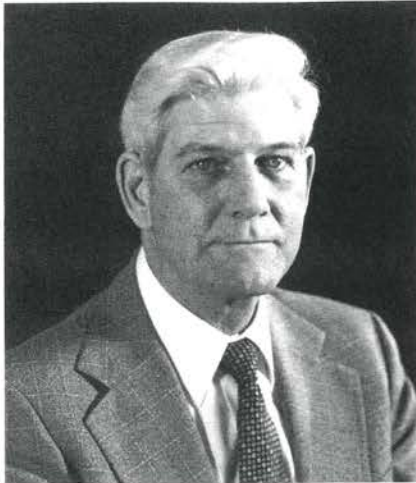


George Henry Johnston 1927 - 1999

George Henry (Hank) Johnston graduated in Civil Engineering from the University of Manitoba in 1953 and that spring went directly to Norman Wells to work with two individuals who became his close friends and colleagues, John Pihlainen and Roger Brown. These three were pioneers in permafrost research and engineering in Canada. In a few short years they laid a firm and remarkable foundation of knowledge and experience for construction in the North. Hank's particular research interests, which continued until his retirement in 1986, were concerned with the construction and performance of foundations for engineered works on permanently frozen ground.

In 1954, the Government of Canada decided to relocate the town of Aklavik, which was located on low lying, high ice content ground on an island at the beginning of the Mackenzie Delta. It was subject to flooding and there was little room for expansion of the town site. Hank was a member of the survey team that, in 1955, found a more satisfactory site on the East Channel of the Mackenzie River. Construction of the new town, to be called Inuvik, began in 1956.

The town became a field laboratory for Hank. During its construction he had ground temperature measuring cables placed under the buildings and to depths of 200 feet at other sites. Permanent benchmarks were installed for surveys and reference points were placed on structures for measuring settlements. An extensive survey was carried out to accurately locate these structures, which included the powerhouse, wharf, storage tanks, buildings and the utilidor system. Instrumentation was installed, also, to determine the effects of roads and the new airstrip on the underlying permafrost. He made a study of steaming in piles and measured the rate at which the ground re-froze about them. Careful observations were made on the dependence of the ground temperature on surface conditions and the effects of



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surface disturbance on the permafrost. Observations on ground temperatures and settlement of structures were made from the date of installation of the instruments to the early 1980's.

A similar program of ground temperatures and performance of building foundations was carried out at Norman Wells. By 1960, however, DBR work in the north had moved away from Norman Wells and the laboratory there was closed. In addition to the work at Inuvik, Hank's research program had grown to include a study of the use of insulation for preserving permafrost under the Dempster Highway, an investigation of the foundations for the Eagle River bridge, a study of the Whitehorse embankment and investigations at Dawson City and Churchill.

The construction of the Kelsey hydro-electric plant on the Nelson River in Northern Manitoba provided an opportunity to study the construction and performance of dykes on the sporadic permafrost zone.

Hank began, in 1958, a detailed study of the distribution, characteristics and effects of permafrost in Thompson, Manitoba, the site of a new mine and smelter for the International Nickel Company of Canada. This included in-

vestigations of structures that had suffered damage and measurement of settlements and ground temperatures. In 1967, he initiated a four year detailed study of anchors in permafrost at Thompson and Gillam, Manitoba, in cooperation with Manitoba Hydro. By 1966, his work at Thompson, Kelsey and Gillam had increased to a level to justify a small laboratory with permanent staff at Thompson. As at Inuvik, his research program at these sites continued until the early 1980's.

Hank kept meticulous records of all his work. His notes and sketches are outstanding examples of clearness and completeness. He took several hundred photographs, all well documented. Much of this material is in the archives of the NRC and is being used by the Geological Survey of Canada for a study of global change.

In 1968, there was a great increase in interest and activity in the North and the knowledge and experience that Hank had gained over the previous fifteen years became in great demand. This demand came to a peak during the period of exploration for petroleum in the Beaufort Sea. By the end of the 70's, much of the knowledge obtained by DBR on engineering in permafrost had been transferred to the private and public sectors and was a major contribution to the development of the considerable capability that now exists in Canada.

A major participant in the growth of knowledge on permafrost and permafrost engineering was the Permafrost Subcommittee of the NRC Associate Committee on Geotechnical Research. Hank was its Research Advisor from 1981 to 1985 and its Chair from 1985 to 1987. He was closely involved with the Canadian Permafrost Conferences and a founding member of the International Permafrost Association. The knowledge and experience that had accumulated in Canada on construction in the North was compiled by the Associate Committee on Geotechnical Research, through

the efforts of several individuals, and published in 1981 in "Permafrost Engineering Design and Construction". Hank was the editor and a major contributor to this very significant and excellent book.

Hank had many direct contacts with the international permafrost community. Through a program of scientific exchange, he and his close colleague, Roger Brown, were able to visit the USSR for two months in 1966. They observed research work, foundation designs and construction methods in Siberia at Yakutsk, Bratsk, Aldan, and Mirneyy. In the following year, they were hosts for two months for two of the top experts in permafrost of the USSR, P.I. Mel'nikov and S.S. Vyalov. The Russian experts were taken to permafrost research sites that included Inuvik, Yellowknife, Hay River, Frobisher Bay (Iqaluit), Thompson, Churchill, and Schefferville. In 1979, Hank led a Canadian group that was invited to look at conditions along the Bam Railway in the USSR. He was the contact and senior member of a group invited to visit China in 1987 to discuss joint studies on permafrost. This visit included a trip through Tibet.

Hank was made a Fellow of the Engineering Institute of Canada in 1989 and a Fellow of the Arctic Institute of North America in 1995, in recognition of his research contributions, technical activities and long interest in the North.

Hank's research and technical activities, however, were only one aspect of his busy life. He was an enthusiastic curler, serving as President of the Granite Curling Club in Ottawa in the early 1970's. He was warmly welcomed into the large family circle of his wife, Teresa, when they were married in 1965.

Hank enjoyed people and could talk easily and comfortably with everyone he met, whether in the communities of the Arctic, at technical meetings or with curlers, friends or members of Terry's extended family. He truly enriched the lives of all he met and his work is an enduring contribution to the development of the Canadian North.

Prepared by Lorne Gold