With the death of Gordon Gross on 14 March 2011, Canada lost one of her pre-eminent earth scientists and his colleagues, a valued mentor and friend. Gordon devoted most of his professional life—more than 50 years—to the study of iron in all aspects of its natural setting and left us a rich legacy of his findings in a body of work comprising more than one hundred titles. But beyond his written work, through personal contacts (consulting, lecturing, and meetings), scientists in many parts of the world were able to benefit directly from his knowledge. As a research scientist with the Geological Survey of Canada, Gordon had the opportunity to collect data systematically from all regions of Canada unbounded by dictates, other than the science itself, and the logical evolution of his work reflects this. He was fortunate to begin his project at a time when exploitation of iron in Canada was in its initial phase and knowledge and understanding of iron occurrences was at a fairly elementary level. Accordingly, his work provided an ongoing and expanding base of knowledge to the industry and to the science of iron in the natural environment; the latter a subject of increasing current interest in its possible revelations of past environments. His last great contribution was a summation and analysis of his life’s work—replete with the data of 50 years of collecting—in a monumental paper issued scarcely 2 years before his death (Gross, 2009). How like Gordon to have felt so keenly his responsibility to his organization and to his science as to have wrapped up all his work in a package so readily accessible to his successors.

Gordon Gross was born on 11 October 1923 near Goderich, Ontario, Canada, where he received his early education. Just prior to the war, the family moved to Golden Lake, Renfrew County in the Ottawa Valley of eastern Ontario, and here Gordon completed high school by means of a daily 10-mile commute by bicycle to nearby Eganville. Following graduation he worked in a munitions factory in Hamilton, Ontario, for two years. Then, in 1942, he enlisted in the Royal Canadian Air Force and, as an air gunner in England, completed a tour of operations with 433 Squadron, 6th Bomber Command and subsequently, undertook instructing duties until returning to Canada at the end of World War II. Like so many other veterans he took advantage of the Canadian Government’s programs for war veterans to embark on a university education. From Queen’s University in Kingston, Ontario, he earned a B.A. (1950) and an M.A. (1951) in geology, then, following a period of mine and exploration work in Sudbury, completed a Ph.D. program at the University of Wisconsin.

The hiatus in his education in 1951 was initiated by a most fortunate event—his marriage to a fellow Queen’s University student, Elizabeth (Betty) Stewart, who, like Gordon, was from the Ottawa Valley (Winchester). Nothing could have contributed so fully to Gordon’s happiness and career as the lifelong support and companionship that resulted from his marriage to Betty. Two
children (a boy and a girl) came into their lives and subsequently grandchildren and ultimately a great grandchild followed. One might, perhaps, conclude that education is best pursued on a schedule that can accommodate such a marvellous diversion.

Gordon's interest in iron developed at an early stage of his professional career. In the summer months of 1949 and 1950 he worked with the Iron Ore Company of Canada in the developing iron ore region of Quebec-Labrador and utilized material collected there for his master's thesis at Queen's University. His subject was the Ruth Shales, believed to have been harbingers to the overlying Sokoman Iron Formation, the principal ore-bearing iron formation in Canada. Prophetically, the thesis itself proved to be a harbinger to Gordon's own career development in the study of iron.

Following graduation from the University of Wisconsin, Gordon spent three semesters as an assistant professor at University of Cincinnati, Ohio. Then, in 1956, he joined the Geological Survey of Canada in Ottawa. Almost immediately he was assigned a new project: “The Geology of Iron and Manganese Deposits in Canada.” This was a project with enormous potential as very little systematic work had been done at this stage on iron in Canada and Gordon was uniquely suited by background and temperament to undertake it. He could not have realized at that time that this project would be his life’s work.

Within the next decade much of Gordon's work would be focused on visiting, observing, assessing, recording, and interpreting iron formation occurrences throughout much of Canada but most particularly in the eastern Canadian Shield and Maritimes. Although much was inventory work, the varied occurrences that were presented to him by these studies provided a basis for developing methods of classifying, analyzing, and formulating theories of genesis of iron formations and the conditions for ore formation within them. The resulting science was mostly laid out in the first of three massive volumes that Gordon published in the Geological Survey’s Economic Geology Series in 1965, 1967, and 1968. The latter two volumes focused on iron deposits of the Appalachians and Grenville Province—i.e., the St. Lawrence and Maritime regions—and the Labrador Geosyncline respectively. The Labrador Geosyncline or Trough, as it is commonly called, is an elongate belt of sedimentary and volcanic rocks of Mid-Proterozoic age that extends southward from Ungava Bay to within a few hundred kilometers of the St. Lawrence River. It contains iron formation over much of its extent and is our greatest source and potential source of commercial iron ore. It represented Gordon’s initiation into iron studies and remained an enduring attraction for him throughout his career. These three volumes continue to be the bibles of iron exploration and studies in Canada and abroad.

Following the summation stage represented by the publishing of these works, the focus of the project tended to broaden its base to cover the rest of Canada—the Arctic, and Western and Central Canada—and beyond our borders to include studies of iron and related deposits elsewhere in the world, notably, for extended periods, Ukraine and China, and after 1983 increasingly the seabed. All such studies returned us dividends in terms of the better understanding they provided of our own deposits. The nature of the studies also tended to shift in later years, from analyses of physical form and setting to analyses of compositional shifts from site to site and its significance in terms of origin and tectonic setting. The concept of iron formation itself broadened to include strataform massive sulphide deposits and such other strataform deposits as could be attributed in part or whole to a hydrothermal origin, all encompassed by Gordon's inclusive term, “stratafer deposits.” Thus, was born the concept of stratafer horizons, marking periods of intense submarine volcanic and hydrothermal activity which, in their entirety, could be targets for mineral exploration. Some of his latest work involving the role of bacterial action in the fixation of iron in iron formation nicely rounded out a career of study that progressed from basic mapping of iron occurrences in Canada to the highly sophisticated study of the many aspects of their genesis. It was a lifetime well spent.
In the course of these latter studies the project was interrupted for two years (1972–1974) while Gordon undertook to manage the Commonwealth Geological Liaison Office in London. In this position he travelled widely throughout the Commonwealth, especially the underdeveloped parts of it, consulting and advising on mostly economic geology concerns. For this period he must have, at least partly, suspended his core interest in iron and drew much more on his earlier experience as an economic geology generalist.

Gordon was at base an economic geologist so it is not surprising that at all stages of his scientific studies he had an eye on the economic potential of the iron formation under study and took care to keep industry informed of his work through the mining journals and mining conferences.

Gordon’s value to society received recognition at many points in his career: the earliest from Queen’s University with a medal for top geology student in his graduating year; later a public service award of merit from the Public Service of Canada, the Leonard Medal from the Engineering Institute of Canada, the Canadian Institute of Mining Proficiency Medal, and the Queen’s Golden Jubilee Medal. But, in addition, the numerous invitations he received from scientific organizations around the world to speak or consult and from the United Nations (UN) for participation on their committees and missions was, itself, a very cogent form of recognition of his achievements. Notable among the latter was his participation in an expert panel on “United Nations World Survey of Iron Ore Resources” in 1966–1967, and in his assignments as UN advisor on iron ore resources to the governments of British Guiana (1962—3 months), Ceylon (Sri Lanka) (1964—3 months), and Congo (1968—6 weeks).

After Gordon retired in 1989 he continued to work on the iron project and in the intervening 21 years, 18 as an emeritus scientist, published a number of significant, additional papers and ended with the comprehensive analysis and overview of the project that was noted earlier. This was issued by the Survey as an open file disk in 2009, just two years ago.

Gordon’s professional life was very much underlain and supported by a rich family life that included a cottage on Pike Lake, near Perth, Ontario, designed by Gordon himself and appropriately named “Ironwood.” The “cottage” (actually a two-story structure more like a family home) was a center around which a great deal of the Gross’s family and social life coalesced and a place where friends were so often welcomed. That it was located in the heart of the Canadian Shield did nothing but enhance its value in Gordon’s mind, at least. The church was also an important element in Gordon’s life as befits one from a clergy family and his faith a force that undoubtedly shaped much of his life. Gordon’s was truly a life of service and continuing contribution to society and his departure removes a momentum that will be sorely missed.

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