

Memorial to Herbert E. Hawkes, Jr. 1912–1996

ARTHUR W. ROSE
University Park, Pennsylvania

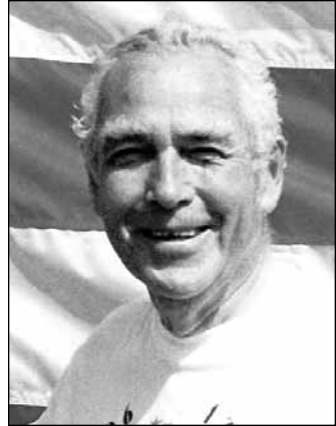
When Herbert E. Hawkes Jr. died on December 4, 1996, in Hanover, New Hampshire, exploration geochemistry and economic geology lost a pioneer of the field. He was the “founding father” of geochemical exploration in North America, and he spent most of his career developing new techniques and communicating exploration technology. He was active in all aspects of geochemical exploration including field prospecting and ore discovery, teaching, research, consulting, writing books, and compiling bibliographies.

Herb was born on December 11, 1912, in New York City, the son of Herbert Edwin and Annette Mary Coit Hawkes. His father was the dean of Columbia College. His primary education was in New York City, followed by secondary education at Deerfield Academy in Massachusetts. After graduating with a degree in geology from Dartmouth College in 1934, he entered the Massachusetts Institute of Technology, where he received a Ph.D. in geology and physics in 1940, with a thesis on structural geology of an area in Vermont. During this period, the three summers he spent as a field assistant in the Canadian bush led to a lifelong infection with the prospecting bug.

He joined the U.S. Geological Survey in 1940, and initially worked mainly on exploration and evaluation of chromite deposits. Later, he was part of the group in the USGS that developed and applied the first airborne magnetometer in the Western world.

In 1944, anticipating the end of the war, the USGS invited proposals for postwar research. Herb submitted a proposal for using trace elements in soil to detect ores. His interest in this topic had been spurred by the research of Hans Lundberg of Sweden on trace elements as guides to ore. Herb knew Lundberg from having been a field assistant for him in Newfoundland. Herb’s proposal overlapped with proposals by Lyman Huff for prospecting using trace elements in water, and by Helen Cannon for using trace elements in vegetation. A budget of \$125,000 was offered for their combined proposal, and to the surprise of all, was granted in full in 1946. In a few months, Herb, Lyman, and Helen made detailed plans, gathered a team of several geologists and chemists, and set to work on a variety of projects, with the incentive that their next year’s funding depended on results in the first six months. With Herb as the leader, they were highly successful and initiated the USGS Geochemical Exploration Group, which continued to the 1990s.

In perhaps the most important discovery of the program, Herb and Bert Lakin showed that analyses of soil for heavy metals, using newly developed sensitive calorimetric lab techniques, could detect the zinc ores of eastern Tennessee. The few previous investigations had concentrated on trace elements in plants; the Tennessee results initiated an explosion of geochemical soil sampling that continues to the present. At the same time, research on water sampling by Lyman Huff and vegetation sampling by Helen Cannon showed the potential of these methods.



Also, sensitive colorimetric methods for a range of elements were developed to improve on spectrographic methods.

In 1952, a few tests in collaboration with Harold Bloom suggested to Herb the potential of stream sediments as a geochemical medium for mineral exploration. To test this method, he resigned from the USGS in early 1953 and spent the field season, accompanied by Bloom, John Riddell, and John Webb, conducting sediment sampling and analysis in the Gaspé Peninsula of New Brunswick. The work discovered a previously unknown mineralized district at Nash Creek, showing the potential of the method. The following year, the Mt. Pleasant tin deposit and the Restigouche mineralized area were discovered. Stream sediments have continued to be a mainstay of geochemical exploration.

After a brief period teaching at the Massachusetts Institute of Technology, Herb moved to the University of California (Berkeley) from 1957 to 1965. While there he collaborated with Samuel Williston and Gunter Friedrich in investigating Hg vapor in soil gas as a guide to ore. This was probably the first serious attempt to use vapor geochemistry.

Another major product of his stay at Berkeley was the book *Geochemistry in Mineral Exploration* by Hawkes and John Webb of the Imperial College in London. This book was the first synthesis of the principles and methodology of geochemical exploration and remains a classic, slightly revised in 1979.

Throughout his career, Herb was a dedicated reader and organizer of the literature of geochemical exploration and related topics. While at the USGS, he organized preparation of bibliographies, and in the 1960s and 1970s he was the editor and guiding spirit for bibliographies of geochemical exploration published by the Association of Exploration Geochemists. Throughout his career, Herb read the foreign literature, translating papers from Russian and compiling bibliographies, both for his own use and the profession. In 1965–1966 he was briefly an editor for the Geological Society of America.

Herb spent the years after 1965 as a consultant, working for mining companies and for the United Nations, organizing and conducting geochemical exploration programs all over the world. He continued to publish new ideas, such as a quantitative approach to the interpretation of stream sediment geochemistry. In 1980 he received the Jackling Award of the Society of Mining Engineers for his outstanding contributions to mineral exploration.

Just as in his profession, Herb approached life as a curious and enthusiastic prospector. Each day brought him another opportunity to discover something new and exciting. Everyone who knew him was touched by his delightful sense of humor and optimistic attitude toward life. He was an avid chess player and loved to travel. But Herb was perhaps happiest when he was outdoors on a hike, climbing a mountain or blazing a new trail. For example, while in his 70s, he and his wife Evelyn spent a week hiking in the Himalayas near Mt. Everest. He was an outstanding person to know—friendly, always helpful and forward-looking, and a rare combination of scientist and successful mineral explorationist.

Herb is survived by a large extended family who were devoted to him. He had four children from his first marriage to Frances Maxwell, and when he died he had eight grandchildren and two great grandsons. Herb's second wife of many years, Evelyn Emmons, died in 1992. He is survived by his third wife, Janine Coolidge, who resides in their home in Hanover, New Hampshire.

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