Memorial to Charles H. Behre, Jr.
1896–1986

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Charles Henry Behre, Jr., Professor Emeritus of Geology at Columbia University and retired consultant with Behre, Dolbear and Company, died February 18, 1986, a month before his ninetieth birthday, in a convalescent home at Emerson, New Jersey. Mrs. Behre preceded him in death by some seven years; as he had no immediate family, Mrs. Behre's nephew and niece saw to him during his last few years.

Dr. Behre's teaching career spanned fifty years, during which time he profoundly influenced geology and the other natural sciences. He will be remembered by many students and peers around the world as one of the last great generalists who focused his broad intellectual background and ability on the genesis of ore deposits and was a world authority on the economics of minable raw materials.

C.H.'s (his preferred designation) grandparents came from Germany; from this heritage came his teutonic thoroughness. His father was a native of Charleston, South Carolina; his mother was Emilie Schumann. Of his three sisters, one was a talented concert pianist, another a distinguished zoology professor at Louisiana State University. His only brother inherited their father's ice plant in New Orleans where the family moved from Atlanta during C.H.'s youth. During his early formative years in New Orleans, he developed a wide and enthusiastic interest in the natural sciences, especially biology—besides studying music and languages. He matriculated at the age of eighteen to the University of Wisconsin where he became an expert fencer, winning many collegiate awards, according to George Lang. After two years he moved to the University of Chicago, earning a B.S. in 1918. After graduating, C.H. enlisted in the medical corps, serving at a military hospital in the southwest where he studied the influenza virus during the widespread pandemic. In 1920 he returned to Chicago as a graduate student in geology. In the following year he married Helen Jeanette Allen, a distinguished and genteel biochemist whom he had met in graduate school and who, like him, came from an educated and productive family. They were an extremely close couple throughout the 58 years of their life together. C.H. earned his Ph.D. in 1925, with a doctoral thesis describing the slates of Northampton County, Pennsylvania; the thesis was published as "Pennsylvania State Bulletin M9" two years later. Much of the background research for his thesis was accomplished while he served as an instructor at Lehigh and as a cooperating geologist with the State Survey, an arrangement which allowed him to be near Jeanette, who was studying in New York. Then an accident lucky for the science occurred when most copies of the original report were destroyed in a warehouse fire. State Geologist Ashley asked C.H. to expand his detailed study to include the entire Eastern Pennsylvania slate belt. This incredibly detailed description of outcrops and quarries, mineralogy, tectonics, and economics was published as Pennsylvania Mineral Resource Bulletin M16. State Geologist Arthur Socolow calls it a classic, "still considered the most definitive exposition on the subject." As usual, C.H. gave credit to all his predecessors in the region, his teachers, and Jeanette, who manned the alidade when she could spare time from her own research.

During C.H.'s graduate student and instructor period, he reviewed the literature of petrological abstracts, including the then frontier concepts in thermodynamics and metamorphism of V. M.

Goldschmidt (from the German literature) and collaborated with his professor, E. S. Bastin, on a paper on the provenance of native antimony. At the same time he began his association with the U.S. Geological Survey as assistant geologist when his teaching and consulting duties did not interfere with extensive field work. Nevertheless, he kept a close relationship with Chief Geologist G. F. Loughlin; the two published the classification of ore deposits in the landmark Lindgren Volume on ore deposits of the western states.

After two years at Lehigh (1921–1923), C.H. transferred to an assistant professorship at the University of Cincinnati. There he could apply his background in biology to the paleontology and stratigraphy of the Cincinnati Arch, involving as it does the Paleozoic erathem he knew so well farther east. But perhaps more important was the stimulating environment of the geology department, which included Professors N. M. Fenneman, W. H. Bucher, and Otto C. von Schlichten, all friends with a common Germanic and broad natural science background. Having earlier studied Mississippi Valley lead-zinc deposits and petrology under Bastin and Johannsen at Chicago, he soon began summer field work out of Cincinnati for the USGS in the Leadville District of Colorado and in the upper Salmon River Valley in Idaho. Teaching at Cincinnati during the winter months gave C.H. the opportunity to hone his lecture presentations, work with graduate students, and carry on the office and laboratory work especially needed for the Leadville–Mosquito Range District. This was a fortuitous arrangement as the 100-year-old mining district had everything to excite his curiosity— Precambrian, plus almost the entire Paleozoic span of stratigraphy, with ores in an igneous and tectonic environment which had produced six different metals during seventy years: a three-dimensional vista in depth, physically and mentally. His continuing studies after the earlier work of Emmons, Irving, and Loughlin (including exploration with a candle in the stale air of dead-end abandoned stopes or chipping ice cover in adits at 12,000 feet altitude) developed a cant toward magmatic hydrothermalism. Yet he always explored other possible origins; as early as 1927 he had observed that consanguinity of igneous intrusives in the Mississippi Valley depended on inference. The origin of epithermal ores, especially of lead and zinc, fascinated him; the sources were obscure and allowed speculation on structural control, regional mineralogenic provinces, and mixture of geothermal, connate, and meteoric ore carriers; and after isotope ages became trustworthy, the geochronology—always the possibility of magmatic involvement. It was as though he sensed early that the prime motivator was heat from various sources (as is now widely believed) and that the vast majority of metalliferous deposits originated late in the geologic history of their environment; many depended on previous, often obscure, events as well as the actual emplacement process and subsequent, often dynamic, post-ore changes.

In 1930, C.H. accepted an associate professorship at Northwestern University, leading to full professorship and departmental chairmanship five years later. During the next eleven years there, he produced a number of fundamental papers and trained geologists, many of whom have been or are pioneers in the current geological revolution. Mrs. Behre was able to transfer her research and teaching from New York to Evanston, and for the first time they were able to make a permanent home in a small apartment near the campus. There C.H. occasionally relaxed, playing Mozart and Chopin piano music or carrying orchestral scripts to the Chicago Concert Hall and following the symphonic score from the third balcony. His productive field work flourished, even though he devoted much time to administration and teaching. His lectures represented long preparation and generally were updated the night before; he never spurned undergraduate teaching.

C.H.'s interests spread beyond the slate and lead-zinc deposits into the geomorphology of central Colorado, the origins of bauxite, and rock genesis, such as the origin of chert. His presidential address at the Illinois Academy of Science concerned the diverse origins of mineral veins.

During the Evanston period, C.H. persuaded the Geological Society of America to finance a study by the Northwestern University geology department of the South Park, Colorado area. For two years he led field parties there in conjunction with J. T. Stark, J. H. Johnson, W. E. Powers, A. L. Howland, and D. B. Gould. Several next-generation geologists served as student assistants. The

project culminated in publication of GSA Memoir 33 in 1949, several years after the field work. During the interim, C.H. travelled in Europe as a Guggenheim Memorial Fellow, visiting ore deposits in Silesia, Sardinia, Yugoslavia, and Greece. He made many friends among European earth scientists, especially in Poland, Germany, France, and Czechoslovakia. Earlier he had actively participated in the meetings and field trips of the 16th International Geological Congress held in Washington, D.C.

In 1941, Mrs. Behre accepted a professorship at the Columbia College of Physicians and Surgeons in New York. The desire to keep their home intact and his deep attachment to Jeanette—who had accompanied him on most of his field trips, living in all kinds of remote places under difficult conditions—doubtless led C.H. to accept concurrently a professorship in the Columbia Department of Geological Sciences, even though at that time he was offered the presidency of Northwestern.

At Columbia, both C.H. and Jeanette led full and active lives; during World War II, he focused on raw materials for war. At a time when vast enmities swept the globe, C.H.'s kindness and understanding crossed language, ethnic, and national boundaries. He talked of "meritocracy," meaning that the powers of decision should be based on education, imagination, and dedication—abilities he believed transcended race and cultural background. Although claiming to be agnostic, he practiced the moral and ethical principles of the great religions. His war charities were private, but occasionally the tip of the iceberg was exposed. Recently, Professor Walther Petrascheck wrote that C.H. "sent CARE parcels of precious food to my parents for hungry Austria during 1945–46." Many of his students were refugees from war-torn Europe and the Far East; the geology department at Columbia served as a pier in the gateway harbor of the democracy. During the war years, C.H. expounded the part economic geologists could play in the Western Alliance and the relationship between mineral resources and the Atlantic Charter. He was disturbed by the militaristic attitudes that dominated world affairs and thought much about ways of developing a more peaceful society. His professional activities increased during the reconstruction of the war-torn nations. He founded the consulting firm of Behre, Dolbear and Company where he served as President, Senior Geologist, and Consultant, primarily to the governments of Algeria, Burma, and Haiti. His professional travels, with Jeanette when her professorship permitted, included Western Europe, Russia, North Africa, and Mexico, and his interests broadened to include world-wide water supplies, raw materials for atomic energy, and non-metallics of economic importance, such as sulfur in the Galapagos Islands (with A. F. Banfield), and the ore deposits and geomorphology of central Mexico. Yet he continued to play an important part in the research of base metals within the United States.

Besides teaching activities, which included chairmanship of the Columbia Department of Geology from 1956 to 1959, he took an active part in many professional societies, serving as Councilor, Secretary, Vice-President, and President of the Society of Economic Geologists, and as Distinguished Lecturer for the American Association of Petroleum Geologists, the American Geological Institute, the Earth Science Panel, and the National Science Foundation. He was a founding member of the International Association on Genesis of Ore Deposits; Vice-President of the New York Academy of Science, and Chairman of the Committee on Geological Exploration, New York Joint Resource and Development Board. He was a Fellow of the Geological Society of America, the American Geographical Society, the American Association for the Advancement of Science, the Mineralogical Society of America, and the Guggenheim Foundation. Internationally he was an honorary member of the Deutsche Akademie der Naturforscher Leopoldina and the Association Ingenieur de Leige. Among his awards were the Posepny medal of the Czechoslovak Academy of Sciences, the Neil Miner Award of the American Association of Geology Teachers, and an honorary doctorate from the College of Franklin and Marshall.

Dr. Behre has left memories worldwide of a kind and gentlemanly teacher who inspired many leaders in earth sciences. Robert Houston, President of the University of Wyoming, describes him "as an individual whose human traits were so exceptional that they exceeded his many scientific achievements." Lacking children, he developed a strong paternal attitude toward his students, often

putting their good above his own needs. Thus, his selected bibliography does not do him justice—his general practice was to designate a student as senior author to a joint paper; undoubtedly many of his ideas were incorporated in reports without his authorship. Arthur Socolow, Director of the Pennsylvania Geological Survey, wrote, "All who came in contact with Charles Behre were awed by this dear, gentle soul who in his own quiet and polite manner provided creative inspiration. He also demonstrated the importance of relating the cold facts of science to the needs and concerns of humanity. Truly, Charles H. Behre, Jr. was a great teacher and an outstanding scientist. Never was the phrase 'a gentleman and a scholar' more apt." By perpetuating and amplifying pioneering concepts of ore deposits in many terrains, he was, like Posepny, truly a Renaissance scientist. His ashes were interred in Spring Grove Cemetery, Cincinnati, in Jeanette's family lot near Johnny Appleseed, among the trees and flowers he loved.

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