

Memorial to J. Harlan Johnson

1892-1974

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J. Harlan Johnson, professor emeritus of geology, Colorado School of Mines, died at his home in Crowley, Texas, on October 31, 1974, at the age of 82. He was known worldwide as an eminent authority on fossil algae, yet his geological interests were diverse and he contributed significantly to the growth and the development of many facets of the science.

Harlan Johnson was born on March 21, 1892, in Philadelphia, Pennsylvania, to William H. Johnson and Mary Harlan Johnson. He attended public schools in Philadelphia between 1898 and 1910. Harlan left the Quaker City to enroll in the South Dakota School of Mines, but his higher education was interrupted by World War I. As a noncombatant in the Army Medical Corps in France, he was wounded and gassed. He recuperated in France and in 1919 earned a certificate in geology and language at the University of Montpellier. He returned to the South Dakota School of Mines where he completed his undergraduate studies and received an Engineer of Mines degree in 1920. Later that same year he accepted an appointment as instructor in geology at the Colorado School of Mines in Golden, where he was to begin an unusually productive career in teaching and research that lasted for nearly half a century.

Harlan received his Master of Science degree from Colorado School of Mines in 1923, and in 1925 he became an associate professor of geology. He earned his Ph.D. in geology and biology from the University of Colorado in 1936. Johnson became a full professor of geology at Mines in 1947 and retired from the faculty in 1957. He was curator of the Geological Museum, considered one of the largest collections of mineral specimens in the West. During his tenure at Colorado School of Mines, he was instrumental in shaping the geological and geophysical engineering curriculum.

Harlan was married to Merle (Molly) Knights of El Centro, California, in Denver on September 12, 1924. Molly shared Harlan's enthusiasm for his work and took great pleasure in accompanying him on his many travels around the world. Although they had no children, their family, as Richard Rezak said, "included the many students who studied with Harlan over the years."

Harlan Johnson's career began with a wide range of geological interests, in addition to archeology and natural history in general. To illustrate, in the 1920s he published on mineral deposits, Pleistocene man, evolution, invertebrate paleontology, and the geology of the Golden, Colorado, area; compiled bibliographies on geophysical principles; and reviewed and commented on one of Wegener's articles on continental drift. Regarding his early years at Mines, Harlan said, "I had no specialty then. The School expected every faculty member to be able to teach all the courses in his department. Mine was geology."

Shortly after this period, field studies of Paleozoic and Mesozoic sediments in Colorado focused his attention on soft rocks and paleontology, and ultimately led to his

interest in fossil algae, which was to dominate his research for forty years. During the summer of 1930, while engaged in field mapping of the upper Paleozoic in central Colorado for the U.S. Geological Survey, Harlan noted, "I ran into considerable deposits of algal limestone. At that time I was unable to find any specialist who could assist me in their study or to advise me as to their meaning with regards to conditions of deposition and other geologic aspects. Consequently, I became interested in their study." This, then, was the beginning of Harlan's lifetime of research on fossil algae and algal limestones.

Field studies and basic geology continued to occupy much of Johnson's research time during the 1930s and early 1940s, primarily Paleozoic stratigraphy of Colorado, especially in the Mosquito and Sawatch Ranges and the Sangre de Cristo Mountains. He collaborated with others in studies of the geology of South Park, Colorado, which was published as Geological Society of America Memoir 33. He devoted particular attention to Tertiary sediments of South Park, especially Oligocene algal limestones, and these rocks served as the subject for his Ph.D. dissertation. Although his earlier studies of algae were confined mainly to formations in Colorado, soon he began to expand his research into other regions, including the Permian "lime-secreting" algae of West Texas and New Mexico.

For a few years during the early 1940's, he diverted his interests to mercury deposits, their geological occurrences, mineralogy, and mining. During these war years he was employed part time as a geologist for Brown and Root and American Smelting and Refining Company, among others.

Starting in 1947 and continuing into the mid-1950s, Johnson was engaged by the Military Geology Branch of the U.S. Geological Survey to study modern and fossil calcareous algae of the Pacific reefs. This program, in which K. O. Emery, J. I. Tracey, and H. S. Ladd, among many others, were involved, was a part of a comprehensive USGS examination of modern reefs. The investigations began at the site of the Bikini Atoll 1946 nuclear test, and subsequently covered intensive studies of nearby islands, including Saipan, Eniwetok, and Guam. This research enhanced his knowledge of the petrography of organic limestones and Cenozoic algae and served as a base to expand his studies of algae into other regions of the Pacific.

As a consultant for the St. Joseph Lead Company in Missouri in 1953, Johnson demonstrated a preferred relationship of mineralization and algal carbonates, specifically the localization of ore deposits in "roll" structures, which he interpreted as stromatolitic algal bioherms. He liked to cite this as the beginning of his applied use of calcareous algae in exploration geology. Soon he was to be in great demand to help the petroleum industry with the interpretation of sedimentary carbonate rocks in oil exploration.

Many petroleum companies in the fifties substantially increased the emphasis on understanding carbonate rocks in their research programs. The discoveries and development of enormous reserves of oil in limestone and dolomite in the Middle East and Libya, in the Devonian of Canada, and in the late Paleozoic of West Texas contributed to this new interest. Harlan was well prepared because he had pioneered in the modern approach to organic limestones and, in fact, had already written his now classic "Introduction to the study of organic limestones." In addition, he was the only fossil algae specialist in North America, and calcareous algae were becoming appreciated as very significant elements in the realm of carbonate sedimentology. Consequently, Harlan's expertise was much sought after, and he was retained as a research consultant for several major oil companies in the 1950s and 1960s.

Following his retirement from the faculty at Mines in 1957 at age 65, Harlan worked diligently on fossil algae for twelve more productive years. Now freed of teaching respon-

sibilities, he was able to devote full time to his research and consulting. At a time in one's career when many men would be content to reflect on their accomplishments and pursue more leisurely activities, Harlan was busy compiling, synthesizing, and exploring in his chosen field. His consulting work did not diminish his basic research on algae. On the contrary, it gave him a vast reservoir of new algae and carbonate rocks to investigate. In 1958 he began a long-term project to compile the existing knowledge on fossil algae by geologic periods. He managed to complete the Paleozoic and most of the Mesozoic, and, in addition, he reviewed in detail various groups of fossil calcareous algae.

Lecturing and consulting projects carried him to every continent except Australia, and his crossings of the Atlantic and Pacific are too numerous to recall. He and Molly made two around-the-world trips following his retirement from teaching. He spoke to scores of far-flung societies and industry groups and held visiting lectureships at the universities of Tokyo, Paris (Sorbonne), and London, in addition to many in the United States.

Johnson's scientific publications number approximately 175, of which several are book-length contributions. His bibliography is proof of the extent and depth of his research; many of his articles on fossil algae will remain the most definitive, if not the only, statements on these aspects of paleontology for generations to come.

In addition to his scientific contributions, Harlan was conscious of a larger responsibility to the scientific community and thus devoted much time to the affairs of geological societies in the United States and abroad. He was a Fellow of the Geological Society of America and was a member of the American Association of Petroleum Geologists; the American Institute of Mining, Metallurgical and Petroleum Engineers; and the Paleontological Society. He was President of the Society of Economic Paleontologists and Mineralogists in 1943 and was elected to honorary membership in 1969. An early member of the Rocky Mountain Association of Geologists, he served as vice president in 1929, president in 1930 and 1931, and later was elected an honorary member. He was vice president of the Société Géologique de France in 1934.

Through the years, but especially in later years, Harlan Johnson received many deserved honors. In 1958 he was awarded an honorary Doctor of Science degree from the South Dakota School of Mines. In 1969 he received the twelfth Gold Medal Award of the Colorado Engineering Council, and in 1970 he was selected as a Distinguished Achievement Medalist by the Colorado School of Mines Board of Trustees.

Early-acquired attitudes of a Quaker and pacifist characterized Harlan Johnson. To my knowledge, he never raised his voice in anger or spoke disparagingly of anyone. This gentleness toward mankind and nature was evidenced in his daily life, yet he was as disciplined and orderly in his work schedule as a drill sergeant. He would establish rigorous project goals for himself, meet the deadline with a completed product, and then go onto the next, always in a relaxed manner. Within this schedule he allowed time for his devoted wife and friends in addition to his garden, with its visiting fauna. In many ways he was a quiet man, but he had much to say to those who would listen.

Harlan Johnson was a highly regarded geologist and a respected teacher. Because of his dedicated hard work and pioneering insight, his published works on fossil algae and organic limestones will remain fundamental references for geologists concerned with broader aspects of interpreting Earth history.

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