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Memorial of Louis H. Ahrens 1918-1990

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Louis Ahrens was born in Pietermaritzburg, Natal, South Africa, on April 24, 1918, a descendant of Lutheran missionaries. He died in Cape Town on September 5, 1990. During his childhood, he traveled widely across South Africa and Southwest Africa (now Namibia) with his father, who was a district magistrate dealing with African affairs. Louis developed a lifelong love for the African landscape as a result of these early experiences, which included meeting, in 1931, on the 50th anniversary of Isandhlwana and Rorkes Drift, Zulus who had taken part in those battles.

He was educated at the University of Natal, receiving a B.Sc. degree in 1939. In 1940 he was made a senior analyst in the Government Metallurgical Laboratory (later the National Institute of Metallurgy) in Johannesburg, becoming an expert in spectrochemical analysis. In 1941 he married Evelyn Millicent McCulloch. During this time he continued graduate work at the University of Pretoria, receiving a D.Sc. degree in chemistry in 1944.

In 1946 he received the first postdoctoral research fellowship of the Council of Scientific and Industrial Research of South Africa, and he went to the Massachusetts Institute of Technology. His career there culminated in his appointment as director of the Cabot Spectrographic Laboratory. He and his students rapidly brought international recognition to the laboratory. Among his earliest scientific works were important papers on the geochemistry of Tl and Rb, a theme to which he frequently returned. He was especially pleased to have received a complimentary letter from V. M. Goldschmidt about this work.

In 1949 he published a landmark paper in the *Bulletin of the Geological Society of America* on the geochemical basis for Rb-Sr dating, a prescient paper that went far to establish that method as a viable technique for geochronology. The clarity and perception of this paper immediately established his international reputation. Most of his work in that period was carried out using optical emission spectrographs. Not content with applying established techniques, he pioneered many innovations, in particular, using selective distillation methods to obtain a marked improvement in detection limits for the alkali elements, Pb, and other volatile elements. In 1950 he published the definitive work on that difficult analytical art, casting a flood of light on the basic behavior of silicate powders in d.c. arcs. This work became and remains the standard text, showing how accurate data might be obtained from what had previously been a semiquantitative technique.

In 1954 he moved to Oxford as a reader in mineralogy to assist L. R. Wager in building up a geochemical and geochronological team. At both MIT and Oxford, he delved into the fundamentals of geochemistry, always seeking to understand the scientific basis behind the observations. This led him to develop a new table of ionic radii, which was widely used. He emphasized the importance of ionization potentials as a guide to the complex behavior of elements in mineral lattices, preferring to use a measurable scientific property rather than more empirically based notions such as electronegativity.

Among his wide-ranging interests were the systematics of isotopic abundances and the log-normal distribution of the chemical elements in rocks and minerals. He cared deeply about the quality of analytical data and was a leading proponent of the necessity for interlaboratory calibration, a precept still not universally heeded. Thus he was an early participant in the seminal work on the famous standards G-1 and W-1. He was an early editor of *Geochimica et Cosmochimica Acta,* was a founder of the review series *Physics and Chemistry of the Earth,* and was very active in international affairs, being, among many other things, the second President of the International Association of Geochemistry and Cosmochemistry, an organization that he had helped to found. He was one of the few western scientists invited to the U.S.S.R. during the 1950s.

In 1956 he was attracted to a chair in Chemistry at the University of Cape Town, where he proceeded to develop geochemistry as a discipline. Beginning as a subdepartment in geology, it became one of the earliest fully fledged departments of geochemistry by 1961, when he took over as professor of geochemistry. He continued in that capacity until increasing ill health caused him to retire in 1978. He continued to work for another five years as a special senior research fellow. The present flourishing state of the department in Cape Town is a great tribute to his foresight.

His scientific contributions were immense. It is fair to say that he was the leading geochemist of the 1950s. He published four books and more than 200 scientific papers. He had great influence over his colleagues and students, due both to his obvious love of the subject and to his extraordinarily generous nature and open personality. He was thoughtful; he cared for his junior colleagues, and he was very helpful and always accessible. He had such a delightful sense of humor that it was always a pleasure to be in his company. Like many scientists, he was fond of classical music and particularly enjoyed the symphonies of Haydn.

He did not hesitate to question established wisdom, and his iconoclastic attitude influenced a generation of workers to look clearly at scientific problems and to write with clarity about them. It was an era much devoted to descriptive work and the production of interminable tables of elemental concentrations (of variable quality), as geochemists toiled to follow the Goldschmidtian precepts to discover the "abundance and distribution of the elements in nature." Louis, in contrast, always sought to understand the basic science behind this flood of analytical data, reminding his students of Darwin's precept: "six samples are enough for a scientist."

Throughout his life he was ably and loyally supported by his wife, Eve, and by his family, Yolanda, Wendy, and Ian. It was a great privilege to have been associated with this remarkable person, and it is both a personal and a scientific tragedy that in later years ill health prevented the fuller flowering of his work. His passing marks the end of an era.

Selected bibliography of Louis Herman Ahrens[1]

The unique association of thallium and rubidium in minerals. J. Geol., 56, 578–590 (1948).

Measuring geologic time by the strontium method. Geol. Soc. Amer. Bull., 60, 217–266 (1949).

Spectrochemical analysis, 269 p. Addison-Wesley, Cambridge, Massachusetts (1950).

The feasibilty of a calcium method for the determination of geological age. Geochim. Cosmochim. Acta, 1, 312–316 (1951).

The use of ionization potentials: I. Ionic radii of the elements. Geochim. Cosmochim. Acta, 2, 155–169 (1952).

(With W.H. Pinson, Jr., and M.M. Kearns) Association of rubidium and potassium and their abundance in common igneous rocks and meteorites. Geochim. Cosmochim. Acta, 2, 229–242 (1952).

The use of ionization protentials: II. Anion affinity and geochemistry. Geochim. Cosmochim. Acta, 3, 1–29 (1953).

The lognormal distribution of the elements: I. A fundamental law in geochemistry and its subsidiary. Geochim. Cosmochim. Acta, 5, 49–93 (1954).

The Sc abundance in chondrites and the neutron excess of principal isotopes. Geochim. Cosmochim. Acta, 9, 273–278 (1956).

Studies on the relative abundance of isotopes. Geochim. Cosmochim. Acta, 11, 1–27 (1957).

(With S.R. Taylor) Spectrochemical analysis: A treatise on the d-c arc analysis of geological and related materials (2nd edition), 454 p. Addison-Wesley, Cambridge, Massachusetts (1961).

The significance of the chemical bond for controlling the geochemical distribution of the elements. Phys. Chem. Earth, 5, 1–54 (1963).

Si-Mg fractionation in chondrites. Geochim. Cosmochim. Acta, 28, 411–423 (1964).

The distribution of the elements in our planet, 110 p. McGraw-Hill, New York (1965).

(With H. von Michaelis) The composition of the stony meteorites: V. Some aspects of the basaltic achondrites. Earth Planet Sci. Lett., 6, 304–308 (1969).

The composition of the stony meteorites: IX. Abundance trends of the refractory elements in chondrites, basaltic achondrites and Apollo 11 fines. Earth Planet. Sci. Lett., 10, 1–6 (1970).

(With J.P. Willis, A.J. Erlank, J.J. Gurney, and R.H. Thiel) Major, minor, and trace element data for some Apollo 11, 12, 14 and 15 samples. Proc. Third Lunar Sci. Conf., 1269–1273 (1972).

(With A.R. Duncan, A.J. Erlank, and J.P. Willis) Composition and interrelationships of some Apollo 16 samples. Proc. Fourth Lunar Sci. Conf., 1097–1113 (1973).

[1] For a copy of the complete bibliography of Louis Herman Ahrens, request Document AM-95-586 from the Business Office, 1130 Seventeenth Street NW, Suite 330, Washington, DC 20036, U.S.A. Please remit $5.00 in advance for the microfiche.