57–59, 1926), Lewis S. Ramsdell (1919–1961); and Chester B. Slawson (1920–1964) (*Am. Mineral.* **50,** 551–558, 1965).

Lewis Ramsdell is survived by his widow, Lois (nee Calkins), whom he married in 1920, and by two daughters, Mrs. Betty Mills of Missoula, Montana, and Mrs. Helen Reeve of San Jose, California, and by six grandchildren.

Publications of Lewis Stephen Ramsdell

1921 (with A A. Klein) Variation in heat treatment of a silica brick in the crown of a tunnel kiln. *J. Am. Ceram. Soc.* **4,** 805–811.

1922 An unusual diamond crystal. *Am. Mineral.* **7,** 158–159.

1924 Crystallographic and optical observations on strychnine sulphate (abstr.). *Am. Mineral.* **9,** 65.

1925 The crystal structure of some metallic sulfides. *Am. Mineral.* **10,** 281–304.

1927 The crystal structure of silver sulfide. *Am. Mineral.* **12,** 25–26.

X-ray data on some sulfide minerals. *Am. Mineral.* **12,** 79.

1928 The crystal structure of cuprous sulfide. *Am. Mineral.* **13,** 115.

1929 (with E. P. Partridge) The crystal forms of calcium sulphate. *Am. Mineral.* **14,** 59–73.

An X-ray study of the domeykite group. *Am. Mineral.* **14,** 188–196.

1930 The crystal structure of tetradymite. *Am. Mineral.* **15,** 119.

1932 An X-ray studies of the system K_2SO_4–$MgSO_4$–$CaSO_4$. *Am. Mineral.* **20,** 569–574.

1936 (with E. H. Kraus and W. F. Hunt) *Mineralogy,* 3rd ed.; McGraw-Hill Book Company, ix + 638 p.

1939 Composition, space group and unit cell of hanksite. *Am. Mineral.* **24,** 109–115.

1942 The unit cell of cryptomelane. *Am. Mineral.* **27,** 611–613.

The gnomonic projection in the hexagonal system. *Am. Mineral.* **27,** 819–823.

1943 The crystallography of acanthite, Ag_2S. *Am. Mineral.* **28,** 401–425.

1944 The crystal structure of α-SiC, type IV. *Am. Mineral.* **29,** 431–442.

1945 Crystal structure of α-SiC, type VI. *Am. Mineral.* **30,** 519–525.

1947 Studies on silicon carbide. *Am. Mineral.* **32,** 64–82.

1950 (with C. W. Wolfe) The unit cell of malachite. *Am. Mineral.* **35,** 119–121.

Crystallography. In, *Collier's Encyclopedia.* Vol. VI. P. F. Collier's and Sons, 146–149.

1951 (with E. H. Kraus and W. F. Hunt) *Mineralogy—An Introduction to the Study of Minerals and Crystals.* 4th ed.; McGraw-Hill Book Company, iv + 664 p.

(with J. A. Kohn) Three new polymorphs of silicon carbide, 8H, 75R, and 84R. *Acta Crystallogr.* **4,** 75.

(with J. A. Kohn) Disagreement between crystal symmetry and X-ray diffraction data as shown by a new type of silicon carbide, 10H. *Acta Crystallogr.* **4,** 111–113.

1952 (with J. A. Kohn) Developments in silicon carbide research. *Acta Crystallogr.* **5,** 215–224.

1953 (with R. S. Mitchell) A new hexagonal polymorph of silicon carbide, 19H. *Am. Mineral.* **38,** 56–59.

1954 Mineralogy (and several minor articles). In, *Encyclopedia Americana.*

1955 The crystallography of "coesite." *Am. Mineral.* **40,** 975–982.

1959 (with E. H. Kraus and W. F. Hunt) *Mineralogy—An Introduction to the Study of Minerals and Crystals,* 5th ed.; McGraw-Hill Book Company, ix + 686 p.

American Mineralogist, Volume 61, pages 534–536, 1976

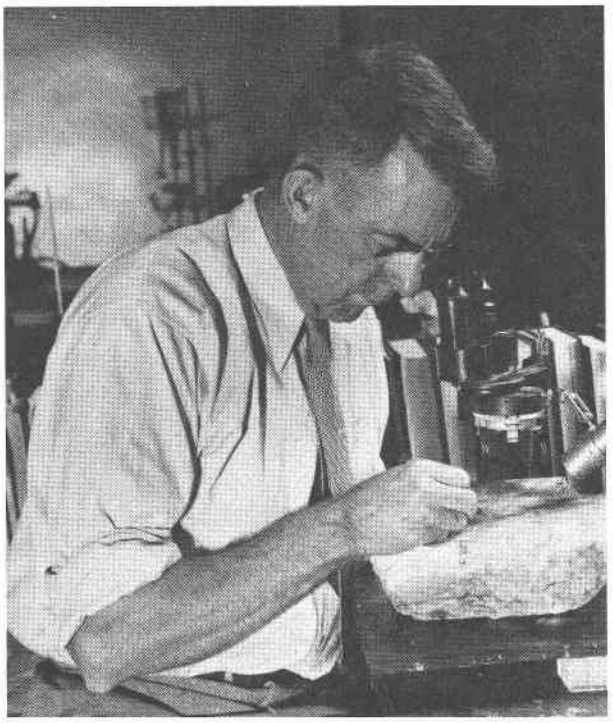
Memorial of Clarence S. Ross
September 20, 1880–April 19, 1975

GEORGE T. FAUST

U.S. Geological Survey, Reston, Virginia

Clarence Samuel Ross died in his sleep at the Potomac Valley Nursing Home in Rockville, Maryland, on Saturday, April 19, 1975. This took from us the last member of the celebrated triumvirate Larsen–Schaller–Ross, whose contributions to mineralogy and petrology were so important. The halls of the former Chemistry–Physics–Petrology wings at the Old Interior Building were not infrequently subject to loud and sometimes heated discussions on pegmatites, dunites, basalts, rhyolites, hydrothermal processes, and Bowen's theory of fractional crystallization. These sessions were frequently continued later at lunch in some nearby cafeteria, and any member of the triumvirate reserved the right to change sides at the drop of a hat.

Ross' investigation of the clay minerals was a benchmark in mineralogy, petrology, and economic geology. In mineralogy, his careful studies laid the basis for the description and characterization of the clay minerals; in petrology, they opened the path to the study of rock alterations involving clay minerals; and in economic geology, they made possible the clarification of the relations of ore deposits in zones of hydrothermal alteration and surficial weathering. Dr. Ross was not merely interested in the descriptive mineralogy of the clay minerals; he strove un-



ceasingly to unravel their complex paragenetic relations. This is clearly evident in his many papers on the clay minerals.

As a member and later Chief of the Petrology Branch of the U. S. Geological Survey, Ross had a long and a diversified experience with igneous, metamorphic, and sedimentary rocks, but his principal interest centered in the igneous rocks. His early studies with Hugh D. Miser were made on the diamond-bearing peridotite in Pike County, Arkansas, and are models of description and interpretation. Subsequently, he published papers on rhyolite and lamprophyric dike rocks. His interest in volcanic pyroclastic rocks began at least as early as 1925, when he published with Earl V. Shannon of the U. S. National Museum a series of papers on bentonites, and culminated in his paper with Robert L. Smith on ash-flow tuffs. He attacked with vigor the problems of identification and the processes of alteration of pyroclastic materials, and these studies dovetailed with his researches on the clay minerals. The examination of pyroclastic rocks occupied much of his time throughout his career. Ross' paper on "Microlites in glassy volcanic rocks" published in *The American Mineralogist* in 1962 is a superb contribution to descriptive petrography. His paper on "Provenience of pyroclastic minerals" published in the *Geological Society of America Bulletin* in 1951 is an excellent summary of many of his observations.

As for field projects, he became interested in the peridotitic and dunitic rocks of North Carolina; the rutile deposits of Amherst and Nelson Counties, Virginia; the origin of the copper deposits of the Ducktown type; and the Valles Caldera in New Mexico, first with Esper S. Laren and later with Robert L. Smith.

The field examinations of the rutile deposits of Virginia and the Ducktown-type ore deposits resulted in significant research problems; results of these investigations were later published as U. S. Geological Survey Professional Papers. The study of the minerals in dunites and in olivine-rich inclusions in basaltic rocks with Margaret D. Foster, Chemist, and A. Tennyson Myers, Spectroscopist, has proved to be a contribution of major importance in petrology and geochemistry and is a standard reference in the current literature of these disciplines.

In the dedication of the Ross–Schaller volume of the Mineralogical Society of America published in 1953, I gave an account of his early life; to this should be added the following:

Geologist—United States Geological Survey—1917–1968

Society Affiliations

Fellow of the Mineralogical Society of America
Fellow of the Geological Society of America
Fellow of the American Geophysical Union
Member of the Mineralogical Society of Great Britain and Ireland
Member of the Society of Economic Geologists
Member of the Geological Society of Washington
Member of the Petrologists Club of Washington

Academic Degrees

The degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy (1920) were conferred on him by the University of Illinois. In 1963, his Alma Mater awarded him the honorary degree of Doctor of Science.

Honors

President, Mineralogical Society of America—1935
Edward Orton, Jr., Fellow Lecturer of the American Ceramic Society—1945
Roebling Medalist of the Mineralogical Society of America—1946
Distinguished Service Award, U. S. Department of the Interior—1950

Distinguished Member Award, Clay Minerals Society—1969

The minerals rossite and metarossite were named in his honor.

Publications

A list of publications by Dr. Ross covering the period 1916 through 1954 was prepared by Marjorie Hooker and published in the Ross–Schaller volume of *The American Mineralogist,* Vol. 38, p. 1272–1275, 1953. A 10- year supplement to this list appeared in Vol. 48, p. 1410–1412, 1963.

To these lists should be added the following references:

Volatiles in volcanic glasses and their stability relations. *Am. Mineral* **49,** 258–271, illus., 1964.

Paul F. Kerr's role in the development of clay mineralogy. *Am. Mineral.* **50,** 1548–1551, 1965.

(And Harlan R. Bergquist, Watson H. Monroe, Joseph J. Fahey and Malcolm Ross) Natroalunite in Upper Cretaceous sedimentary rocks, north-central Texas, *J. Sediment. Petrol.,* **38,** 1155–1165, illus., 1968.

(With Robert L. Smith and Roy A. Bailey) Geologic map of the Jemez Mountains, New Mexico: *U. S. Geol. Surv. Misc. Geol. Invent. Map* **I-571,** 1970.

Clarence Ross married Helen Hall Frederick of Paxton, Illinois, in 1917. She predeceased him in 1968. They had two children—Betsy Ross Jones of Bethesda, Maryland, and Malcolm Ross of the District of Columbia, who is a geochemist for the U. S. Geological Survey.

In addition to his scientific interests, Dr. Ross had several hobbies which he pursued with equal enthusiasm and vigor. He was a gardener with a green thumb, and his garden at the side and rear of his home was a show place in Takoma Park in the spring and summer of each year. He specialized in azalea, iris, rose, and camellia horticulture. He was also an ardent botanist. He dug up wildflowers in the fields and woods and transplanted them in his garden. He knew the woodlands and fields of Maryland, Virginia, and North Carolina, and he loved to traverse them.

Dr. Ross was also a highly skilled lapidist. He made necklaces and other pieces of jewelry for his friends. He had collected some very fine specimens of the williamsite variety of antigorite from the State Line Serpentine belt in Maryland and Pennsylvania, which he formed into very beautiful necklaces and ring stones.

He was interested in history and philosophy, and he read extensively in these fields, particularly after he retired.