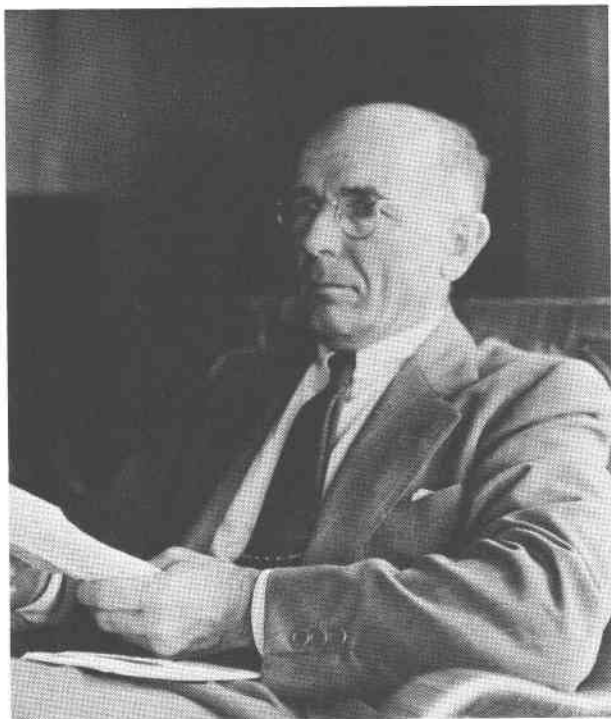


Memorial of Joseph Murdoch February 19, 1890–December 31, 1973

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Joseph Murdoch, past president of the Mineralogical Society of America and professor emeritus of geology at the University of California, Los Angeles, passed away on December 31, 1973. Since Joe's retirement from full time teaching in 1959, he had spent almost each weekday in his office on the U.C.L.A. campus; on the day of his death, he was working on the crystallography of some unusual sulfur. Having known Joe for nearly fifty years, both personally and professionally, I know he died as he had always wished—in the midst of his greatest loves, his family and his minerals. Would that we all might be so fortunate.

Joseph Murdoch was exposed to natural history at an early age. As one of twin sons of John and Abigail (Stuart) Murdoch, his parents reared him in a scientific and outdoor climate. His mother was a teacher, graduate of the University of Wisconsin

(Madison). His father, of Roxbury, Massachusetts, a Harvard graduate and naturalist, taught at Wisconsin, joined the Smithsonian Institution in the Bureau of Ethnology, was naturalist and observer for the International Polar Expedition to Point Barrow, Alaska, and from 1896 was on the staff of the Boston Public Library. With this scientific tradition, after graduation from Roxbury Latin School (1907) Joseph entered Harvard University, from which he received the baccalaureate degree in 1911, the M.S. in 1912, and the Ph.D. in 1915, all in geological science. His Ph.D. thesis was in mineralogy. He early came under the influence of Dr. L. C. Graton, eminent economic geologist; the friendship was life-long, and though Joe moved from New England in 1928, he made many trips "home" and commented many times on the influence that Graton had in shaping his career, and the friendship and concern that Graton showed Murdoch for more than 50 years.

While still a graduate student at Harvard, Murdoch served as an investigator with the Secondary Enrichment Investigation and was a co-author with Professor L. C. Graton of the first publication of the S.E.I., which was entitled "The Sulphide Ores of Copper—Some Results of Microscopic Study" (*Transactions of the American Institute of Mining Engineers*, New York Meeting, February, 1913). In 1916 Murdoch's book, entitled *Microscopical Determination of the Opaque Minerals—An Aid to the Study of Ores*, was published by John Wiley and Sons, Inc. This work provided the first method for the systematic identification of ore minerals in polished surfaces with tables giving the colors, hardnesses, and etch reactions of 186 minerals. Murdoch's treatise on the microscopy of polished minerals served as the definitive standard for many years.

After a successful, non-geological, business career, Joe returned to geology (partly by the urging of Professor Graton) when he joined the faculty in 1928 of the emerging department of

geology at the University of California, Los Angeles, rising progressively to the professorship from which he became emeritus in 1959. In his years at U.C.L.A. he taught geology and mineralogy, specializing in crystallography and crystal chemistry as the U.C.L.A. geology faculty, after World War II, became heavily involved in advanced graduate study. Joe required mastery of subject matter, rigorous scholarship, and a dedication to scientific ideals, qualities that won him the respect of many generations of U.C.L.A. graduates. His stamina on field trips, where the lighter side of his somewhat austere New England personality became apparent, won for him from his students the affectionate nickname "Little Joe," a description of esteem for the man and his worth as well as an apt description of his short physical stature. U.C.L.A. geo-legend is filled with stories of Joe's field escapades, with his undergraduates trying to beat him to the top of the mountain. To do so usually meant near-exhaustion for the lad or lass, only to be left behind as Little Joe kept right on to the next summit.

After extensive field collecting of minerals in California, Professor Murdoch published a number of papers on the crystal chemistry of several rare minerals. Murdoch described the occurrence and crystallography of a number of borate minerals from California deposits, including veatchite, ulexite, probertite and howlite. He became expert on minerals of the world-famous Crestmore quarries of Riverside County, California. In 1960, he summarized his Crestmore research before the Mineralogical Society of America in his address as retiring president of the Society. In this address (published in *The American Mineralogist*, 46, 245-257, 1961) Murdoch related the history of the Crestmore quarries and described the geological and mineralogical relations there which had been observed by previous investigators and by Murdoch himself. The remarkable deposits of unusual and some new minerals at Crestmore were produced by contact metamorphic and hydrothermal alteration of the Sky Blue limestone bed adjacent to an intrusion of quartz monzonite porphyry. One of the ten new minerals found at Crestmore was discovered and described by Murdoch and given the name wightmanite by him in honor of Mr. R. H. Wightman, Director of Exploration and Mining of the Riverside Cement Company.

Murdoch's work on Crestmore, and the suites of minerals that he collected, will be featured in a display in the department of geological sciences at U.C.L.A. as a Murdoch Memorial. The department is also the recipient of a memorial fund established by the Murdoch family to which U.C.L.A. alumni have contributed, and a memorial prize in recognition of scholastic excellence in earth science will be made periodically.

In 1948, Professor Murdoch visited a number of beryl-tantalite pegmatite deposits in northeastern Brazil, deposits which contain many phosphate minerals. He brought back to California many specimens of these pegmatite minerals which he investigated in the mineralogical laboratories at U.C.L.A. As a result of these studies, he published two papers entitled "Phosphate Minerals of the Borborema Pegmatites: I - Patrimônio" (*Am. Mineral.* 40, 50-63, 1955) and "Phosphate Minerals of the Borborema Pegmatites: II - Boqueirão" (*Am. Mineral.* 43, 1148-1156, 1958). In these papers he described the phosphate minerals and other minerals associated with them and elucidated the paragenetic relations. In the second of these papers he also described a new mineral to which he gave the name chavesite in honor of Dr. Onofre Chavez, an engineer of the Brazilian Department Nacional de Produção Mineral.

In 1948, 1956, and 1966 he authored (with Robert W. Webb) *Minerals of California*, annotated catalogs of California mineral occurrences, appearing at scheduled intervals during the decades of rapid growth in development of mineral products of the state in the expansion following World War II. Published by the California State Division of Mines and Geology, these bulletins are widely used by laymen and professionals interested in minerals and mineral resources.

A signal honor that comes to few mineralogists was the naming of a newly found mineral, murdochite, in recognition of his attainments. Murdochite is a copper-lead oxide from the Mammoth Mine in Pinal County, Arizona. The mineral was described by mineralogists of the United States Geological Survey and named "in recognition of Professor Murdoch's contributions to the science of mineralogy."

It was my joy and privilege to be a faculty colleague of Joe Murdoch for 16 years at U.C.L.A., where we shared teaching responsibilities in undergraduate mineralogy. I first met Joe in 1928,

and piloted him on his first field trip in the California west. Our friendship was permanent, and our families shared Sierran hiking and fishing holidays up to two years before his death. Though our teaching fellowship severed in 1948, our professional and personal lives were joined, and with his passing I lost my dearest faculty friend. He is remembered by his students for his thoroughness and patience in and out of the classroom, and for his compassion and warmth to those friends who had succeeded in parting the curtain that separated taciturn Joe from those around him. Our profession has lost a noble man, closing a career of teaching, research, and service to mineralogy that spanned nearly 60 years.

Joe is survived by his widow, Maude Russell Murdoch, one daughter, Barbara (Mrs. Horace P. Phillips) of Whittier, California, and three grandchildren.

Publications of Joseph Murdoch

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- 1916 *Microscopical Determination of the Opaque Minerals*. John Wiley & Sons, New York, pp. i-vii, 1-165.
- 1934 Amber in California. *J. Geol.*, 42, 309-310.
- 1936 Silica-fluorite pseudomorphs. *Am. Mineral.* 21, 16-32.
Andalusite in pegmatite. *Am. Mineral.* 21, 63-69.
(AND R. W. WEBB) Bustamite from Inyo Co., California. *Am. Mineral.* 21, 69-70.
Adamite from Chloride Cliff, California. *Am. Mineral.* 21, 811-813.
- 1938 (AND R. W. WEBB) Notes on some minerals from Southern California. *Am. Mineral.* 23, 349-355.
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- 1939 Crystallography of veatchite. *Am. Mineral.*, 24, 130-135.
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- 1940 Notes on some minerals from Southern California, II. *Am. Mineral.* 25, 549-555.
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- 1942 (AND D. GARDNER) Lollingite from the Philippine Islands. *Econ. Geol.* 37, 69-75.
- (AND R. W. WEBB) Notes on some minerals from Southern California, III. *Am. Mineral.* 27, 323-330.
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- 1943 Crystallography of hureaulite. *Am. Mineral.* 28, 19-24.
- 1945 Probertite from Los Angeles County, California. *Am. Mineral.* 30, 719-721.
- 1951 Notes on California Minerals: Nuevite, trona, hanksite, gaylussite. *Am. Mineral.* 36, 358-363.
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(AND L. G. BERRY) X-ray measurement on argentopyrite. *Am. Mineral.* 39, 475-485.
(AND R. W. WEBB) Minerals in southern California. *Calif. Div. Mines Bull.* 170, Chap. VII, Article 1, 5-12.
- 1955 Phosphate minerals of the Borborema pegmatites, I - Patrimonio. *Am. Mineral.* 40, 50-63.
Scawtite from Crestmore, California. *Am. Mineral.* 40, 505-509.
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- 1957 (AND G. TUNELL) *Laboratory Manual of Crystallography*. Wm. C. Brown Co.
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- 1958 (AND D. McCONNELL) Crystal chemistry of scawtite. *Am. Mineral.* 43, 498-502.
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- 1960 (AND R. A. CHALMERS) Ettringite ("woodfordite") from Crestmore, California. *Am. Mineral.* 45, 1275-1278.
- 1961 Crestmore, past and present. *Am. Mineral.* 46, 245-257.
- 1962 Wightmanite, a new borate mineral from Crestmore, California. *Am. Mineral.* 47, 718-722.
Bakerite crystals. *Am. Mineral.* 47, 919-923.
(AND D. McCONNELL) Crystal chemistry of ettringite. *Mineral. Mag.* 33, 59-64.
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- 1967 (AND T. A. GEISSMAN) Pendletonite, a new hydrocarbon mineral from California. *Am. Mineral.* 52, 611-616.
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In addition, the record includes ten published abstracts and several book reviews.