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Memorial of Daniel E. Appleman 1931–1998

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Daniel Appleman, a long-time member and fellow of the MSA, passed away on Friday, January 2, 1998, after a courageous year-long fight with cancer. Thus ended an extraordinary life—a life devoted to the mineralogical sciences, museum directorship, public service, the arts, and most importantly to his beloved wife, Peggy, and his daughter, Rebecca. Dan became a fellow of the Mineralogical Society of America in 1955 and has served our society in many capacities for over forty years. His research, management, and curatorial skills were very influential in furthering the scientific and educational programs of three major institutions—the U.S. Geological Survey in Reston, Virginia, the National Museum of Natural History (NMNH) in Washington, D.C., and the Cranbrook Institute of Science in Bloomfield Hills, Michigan. For his contributions to public awareness of mineralogy and other physical and natural sciences through the design and supervision of numerous museum exhibitions and educational programs, Dan was posthumously awarded the Public Service Medal of the Mineralogical Society of America at the 1998 annual meeting in Toronto, Canada.

Dan was born on April 11, 1931, in Berkeley, California and he grew up in a stimulating environment; his father was a professor of botany at UCLA and his mother taught biology in a California high school for many years. Dan received the BS degree in geology from the California Institute of Technology in 1953 and then commenced graduate work within the Department of Geology at the Johns Hopkins University. Here he came under the tutelage of the noted professor of mineralogy and former MSA President, J.D.H. Donnay, who promoted Dan's life-long interest in the atomic structure of minerals. A crystal chemistry group, with which Donnay was associated, had recently been established at the U.S. Geological Survey in Washington, D.C., and it is this group that Dan elected to join to pursue his thesis research. This research, started in the summer of 1954, was on the nature of the crystal structure of two uranium-bearing minerals, liebigite and johannite. Determining the atomic positions within a crystal structure was a monumental task requiring many hours of tedious calculation, for in 1954 only mechanical computers were available to Survey scientists. In spite of these computation problems, Dan was able to determine the crystal structures of these minerals by the end of 1955 and they were subject of his thesis dissertation, his Ph.D. degree being awarded by the Johns Hopkins University in 1956.

Dan started the first phase of his scientific career when in May of 1956 he became a full-time Geological Survey employee and a member of the Crystal Chemistry Project. During his 18-year tenure at the Survey, Dan described a truly impressive number of mineral structures, including (in addition to liebigite and johannite) carnotite, clinoenstatite, pigeonite, spodumene, jadeite, ureyite, acmite, diopside, johannsenite, reedmergnerite, fairfieldite, meta-torbernite, bikitaite, sarcopside, väyrynenite, euclase, melanophlogite, ulexite, hulsite, lautarite, and brüggenite (while at the NMNH Dan studied crystal structures of low tridymite, gerstleyite, laffittite, becquerelite, billie-

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tite, protasite, and chalcophanite). During the Survey years Dan also became expert in the programming and use of the first of the big vacuum tube-driven mainframe computers. He spent many hours of his time working on the many problems involved with the purchase and administration of the newer mainframe computers that were coming on line in the 1960s. These were costly items and many at the U.S. Geological Survey were not convinced that big computers were really worth the expense. By demonstrating the scientific value of this new technology Dan helped bring the Survey scientists into modern times. Today there are thousands of desktop computers in the Survey far more powerful than the ''big'' mainframes of the 1960s. His colleagues fondly remember those halcyon days when Dan would help nurse to completion their computer runs throughout the night while the big mainframe cranked along for 10 to 15 hours to calculate one cycle of a crystal structure refinement, a calculation that can now be accomplished on a desktop computer in minutes. The crystallographers sometimes stood an all-night watch, for the computer might blow a vacuum tube during a cycle. The program had to be rescued immediately after the failure, otherwise hours of expensive computing time would be lost. With regard to computer programming, Dan is most noted for his creation (with Howard Evans) of the Appleman-Evans program for indexing the Bragg reflections and refinement of unit cell parameters using X-ray powder diffraction data, a program still in use by crystallographers all over the world.

The unselfish donation of his time to help his fellow scientists was one of the abiding characteristics of Daniel Appleman. This trait would contribute to his success in the second and third phases of his professional life—at the National Museum of Natural History and then at the Cranbrook Institute of Science. We might add that it was at the Survey that Dan met his future wife, Peggy Hall, who joined the Crystal Chemistry Project in the summer of 1965 after receiving her B.A. degree in geology. They were married two years later.

In February of 1974 Dan joined the Department of Mineral Sciences at the National Museum of Natural History, part of the Smithsonian Institution museum complex. Shortly after his arrival at the Smithsonian, Dan's first major effort was to initiate planning for the post-Apollo era Moon Hall (Dan had previously been engaged in a number of studies of lunar minerals). He participated in three-way negotiations with the National Aeronautics and Space Administration and the National Air and Space Museum for Lunar rock exhibit specimens. From the exhibit's opening in 1976 until its closing for renovation in 1995, millions of museum visitors were able to view the lunar rocks and thrill to this legacy of the Apollo missions to the moon. This first experience with the technical and intellectual problems of museum exhibitions dramatically changed Dan's career goals, and although he still kept his hand in mineralogical research, he devoted more and more time to his new found love—bringing science to the public's attention. After being appointed to the Museum Exhibits Committee in 1976, Dan became involved with developing the Paleobiology Exhibit Complex and then the Dinosaur Hall, which opened in 1980 and 1981, respectively. In January of 1978 Dan was elected chairman of the Department of Mineral Sciences, taking on the additional administrative duties of this office as well as continuing to help initiate new displays of scientific discovery. Dan was one of the several curators engaged in developing the traveling exhibit, ''Magnificent Voyagers,'' which told the story of the U.S. Exploring Expedition of 1838–1842 under the leadership of Lieutenant Charles Wilkes. This exhibit opened at the NMNH in 1985, commemorating the 75th anniversary of the U.S. National Museum, and subsequently was exhibited at six other U.S. museums. ''Magnificent Voyagers'' is considered one of the most important exhibits in the history of the Smithsonian Institution. As part of the ''Voyagers'' exhibit, Dan had a challenging task—to research the monumental accomplishments of the Wilkes Expedition's geologist-mineralogist, James Dwight Dana, and bring them to a wide audience through the ''Magnificent Voyagers'' exhibit and a Smithsonian book of the same title. Dan emphasized the importance of geology and mineralogy to understanding the world around us through the ''Dana lectures'' he gave as he accompanied the ''Voyagers'' exhibit across the Nation. It is said of Dan by the members of the Smithsonian Exhibits Department that he was the ''intellectual giant'' among the scholars who worked on the ''Magnificent Voyagers'' project, a compliment that truly describes this exceptional man.

In 1989 Dan was appointed Associate Director for Science at the NMNH, supervising all of the scientific research and collections programs. Dan's last major exhibit project, before leaving the National Museum for the third phase of his distinguished career, was to help in the complete renovation of the gem and mineral halls. By September of 1989, largely through Dan's efforts, this initial project was expanded into the renovation of the entire Earth Sciences Complex. Without his behind the scenes eloquence, this grand project might have expired—instead, the Janet Annenberg Hooker Hall of Geology, Gems, and Minerals, containing over 20,000 square feet of exhibit space, opened in September of 1997. Dan, although very ill, was able to attend the opening ceremonies.

Dan's abilities in working with others and his very broad interests over the whole range of science, as well as his extensive knowledge of history, literature, and music, were keys to his success in his administrative and exhibit development activities at the NMNH, and prepared him for the final phase of his professional life, the Directorship at Cranbrook Institute of Science, located in the town of Bloomfield Hills, a suburb of Detroit, Michigan. This Institute is part of the renowned Cranbrook Schools and Academy of Art. Dan saw the opportunity at Cranbrook to take a small gem of a museum and make it into the finest science center in Michigan. He was able to obtain a $1.2 million grant from the National Science

Foundation for an exhibit that will offer a full tableau of the Earth's evolution. To house this exhibit the Cranbrook overseers raised $27 million to build an addition to the existing Cranbrook Science Institute museum complex. The addition was designed by the noted architect, Steven Holl, who worked in close collaboration with Dan to bring a truly unique way of viewing the exhibit displays. Dan's life abounds with wonderful anecdotes (such as the one involving dry martinis and the trolley track expedition), but one we most appreciate recently occurred in New York City. Steven Holl and Dan wanted the new addition to the museum to be designed so that the visitor would follow a continuous inclined and corkscrew path through the entire exhibit area—without room-to-room breaks as seen in conventional museums. So an architect and a mineralogist, to obtain an insight to such a design, were found one day on their hands and knees on the inclined floor of the Guggenheim Museum of modern art, measuring floor gradients and wall angles. What mineralogist, other than Dan Appleman, would stoop to such shenanigans in the pursuit of the perfect science hall?

Although very ill throughout 1997, Dan never gave up on his final mission—to make the Cranbook Science Institute one of the finest in the country. And before he died Dan was able to see from his office window this grand project, into which he put so much effort, nearing completion. In appreciation of Dan's many contributions to the Cranbook Institute of Science, a memorial service was held at the Institute on January 24, 1998.

Dan had a very significant life outside science: he was an accomplished violist who for many years played with a string quartet; knowledgeable in the arts and literature and onetime chairman of the Cosmos Club music committee; a connoisseur of good food, wines, and dry martinis; a raconteur on almost any subject imaginable; an enthusiastic runner and hiker (Dan accompanied Supreme Court Justice William O. Douglas on the famous 1954 hike to save the Chesapeake and Ohio Canal); a devoted family man who went with Peggy and their daughter Rebecca on backpacking trips in the mountains of the western United States nearly every summer—and such a good friend to so many. We miss him very much.

In addition to Peggy and Rebecca, Dan is survived by his two brothers, Gerald and Michael.

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