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Memorial of Duncan McConnell 1909-1991

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Duncan McConnell, a fellow of the Mineralogical Society of America, died on November 8, 1991.

He was born in Chicago on January 30, 1909. He received a B.S. in chemistry from Washington and Lee University in 1931 and an M.S. from Cornell University in 1932, did postgraduate studies at the University of Chicago from 1932 to 1933 and Stanford from 1934 to 1935, and received his Ph.D. from the University of Minnesota in 1937. He was an instructor at the University of Texas from 1937 to 1940, worked as a mineral economist at the U.S. Bureau of Mines in Washington in 1941 and as a chemist-petrographer at the U.S. Bureau of Reclamation in Denver from 1941 to 1947, and was an acting assistant division director at Gulf Research and Development Co. in Pittsburgh from 1947 to 1950. He joined the faculty of the Ohio State University as a professor of mineralogy in 1950 and was chairman of the department from 1952 to 1956. He served as an assistant dean of the graduate school in 1954–1955 and was a research professor in the College of Dentistry from 1957 until his retirement in 1976.

He was a member of many professional societies, including the American Crystallographic Association, Geochemical Society, American Chemical Society, Society of Economic Geologists, Electron Microscopy Society of America, and the Mineralogical Societies of Canada, Great Britain, and France.

Dr. McConnell was respected internationally for his expertise in the field of crystal chemistry, a subject he initiated at the Ohio State University and which continues to be taught to this time. He was a man of principle and championed several concepts long before they became recognized as truths in the scientific community. A noteworthy contribution to science was his formulation and study of the tetrahedral hydroxyl group and its significance in garnetoids and carbonate hydroxyl apatite. He published extensively, including a widely respected book on phosphates, chapters in books and encyclopedias, and articles in scientific journals. He discovered the mineral ellestadite (redefined by Rouse and Dunn, *American Mineralogist,* 1982, 90–96) and contributed to the knowledge of minerals in bone, the crystal chemistry of clay minerals, the physical chemistry of the deterioration of concrete, and the nature of biological precipitates.

Dr. McConnell was active in community affairs, and he shared his views through frequent letters to local newspapers. He championed many causes and stood fast with cogent arguments. He is remembered by his colleagues for having filed suit in court in the 1950s on behalf of the faculty of The Ohio State University to decide whether or not employees of the state of Ohio who do not live in Columbus should be exempt from paying tax to the city of Columbus. The case was decided in favor of the city of Columbus on the grounds that in times of need, the university is served by the Columbus Fire and Police Departments. **(R.T.)**

Duncan McConnell was a creative, highly individualistic scientist. He was a very independent-minded person, and he was a pioneer in several aspects of mineralogical science. When he was convinced of the validity of an explanation, he championed the hypothesis forcefully irrespective of protocol, fashion, and the popular tide. In

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interpersonal relations, Duncan was blunt and direct. For his friends he had boundless loyalty, but for those whom he perceived as trespassing on the accomplishments of others by not giving proper credit in citations to the scientific literature, he had nothing but scorn and contempt. The latter trait, coupled with a very short fuse and a hot temper, inevitably led to difficulties with other scientists and especially with administrators. Although Duncan was usually right in his arguments, he still tended to suffer Pyrrhic victories. His sudden departure from the Department of Mineralogy at the Ohio State University, of which he was the Chairman from 1952 to 1956, and his subsequent affiliation as a research professor with the College of Dentistry at Ohio State illustrates one of those incidents. In that case, Duncan championed a salary increase for one of his deserving younger faculty members, which the dean denied. Duncan then threatened to resign over the matter unless the dean capitulated, at which point the dean cooly accepted Duncan's resignation. But that was characteristic of the man. He let his passion for a perceived just cause cloud his practical vision. He put principle before politics and diplomacy. It is difficult to decide whether this was just self-destructive or an admirable trait, but many of his professional battles were of a similar nature.

Duncan McConnell made many contributions to mineralogy as illustrated by his bibliography, but his salient contributions were as follows:

1. He was an earlier supporter of and contributed evidence for the tetrahedral OH theory in mineralogy, in which cationic deficiencies were charge balanced by H ions associated with vacant cationic sites. The evidence for this was largely chemical, with quantitative chemical analyses showing cation deficiencies and excess H_2O, the latter being numerically equal to four H^+ ions per vacant cation. The archetypal example of this was the grossular-hydrogrossular series. A considerable advance in our understanding of the tetrahedral OH concept was made in 1968 by D. Foreman, one of McConnell's students, in his neutron and X-ray diffraction study of deuterated hydrogrossular. It was typical of McConnell that his name did not appear on that paper. McConnell did publish a pioneering paper in 1964 on the refringence of garnets and hydrogarnets, in which he related the unit-cell parameter and refractive index of garnets to composition through the Lorentz-Lorentz relationship. For that paper, McConnell spent endless hours arduously making his calculations with a mechanical calculator. Today, with computers, the calculations would be completed in 1/10 to 1/100 of the time he invested.

2. McConnell had a long-time interest in the mineral apatite and members of the apatite group and in applications of this knowledge to the elucidation of the crystal chemistry of teeth and bones. He was a pioneer in our understanding of the relationship of structure to composition in this diverse group of minerals, and his research on the apatite group had its roots in his graduate research in the 1930s, with Professor John Gruner at the University of Minnesota. His work on apatite culminated in a book that presented his personal view of the apatite problem as it evolved over some 40 years.

3. Duncan McConnell was a very effective teacher of mineralogy. He always emphasized the relationship of crystal structure to chemistry. One of his publications on crystal chemical calculations proved useful to a generation of students before what we now consider routine procedures to derive a mineral formula from a complex chemical analysis were introduced into the standard textbooks on mineralogy. **(C.B.S.)**

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