

- (1963) Antarctic minerals. *Bull. U. S. Antarctic Proj. Officer* 5, 12-14.
- (1963) Petrography of some dredgings collected by Operation Deep Freeze IV. *Proc. Amer. Phil. Soc.* 107, 431-442.
- (1963) (AND W. C. PEARNS, AND E. E. ANGINO) New isotopic age measurements from the McMurdo Sound Area, Antarctica. *Nature* 199, 685.
- (1965) Antarctic mineralogy. In R. J. Adie (ed.) *Antarctic Geology Proceedings*, Amsterdam, North-Holland Publishing Company, 395-401.

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MEMORIAL OF GEORGE FORBES WALKER

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The death of George F. Walker at the age of 53 during a cardiac operation shocked and saddened his many friends; he appeared to have many years ahead of him to continue the clay mineral studies for which he was well known and highly respected. He is survived by his wife Anne, and two sons, Keith and Neil, both in their early twenties.

George Walker was born in Scotland and took a B.Sc. degree, with First Class Honours, in 1939; Ph.D., 1948; and D.Sc., 1959; all in the University of Aberdeen, Scotland. He was a fellow of the Mineralogical Society of America since 1962, a fellow of the Royal Australian Chemical Institute, a member of the Mineralogical Society (London) since 1947, and of the Clay Minerals Group since its inception, a member of the Clay Minerals Society, a councillor and foundation president of the Australian Clay Minerals Society, and Vice President of A.I.P.E.A. (International Association for Clay Mineral Studies).

His earlier professional life was in Great Britain where he held positions with the British Ceramic Research Association (1941-45) and the Macaulay Institute for Soil Research (1945-51). He took a prominent part in the development of the Clay Minerals Group from 1947-51. He moved to Australia in 1951 where he held various positions with the C.S.I.R.O. in Melbourne; at the time of his death he was Chief Research Scientist in the Division of Applied Mineralogy where he headed a team working particularly on clay-water and clay-organic systems, and the development of composite materials utilizing silicates. From correspondence with Dr. D. H. Solomon, an intimate colleague of George Walker in the

C.S.I.R.O., I learn that his attitude to research was greatly appreciated by those around him. He faced problems in a typical forthright manner and encouraged younger scientists in developing new lines of research. His helpfulness was by no means confined to members of his own laboratory and there are many who can testify to his helpful advice.

George Walker was well known to clay mineralogists in this country and elsewhere. He was an invited speaker at North American Clay Minerals Conferences in 1955, 1960, and 1963, and many people in this country were looking forward to seeing him again during a nine-month visit to the Soil Science Department of Michigan State University which was due to begin in September 1970. He played a prominent part in the international clay mineral conferences in Stockholm (1963), Jerusalem (1966) and Tokyo (1969).

He is probably most widely known for his chapters on vermiculite in "X-Ray Identification and Crystal Structures of Clay Minerals" (1951, 1961) and (with W. F. Cole) in "The Differential Thermal Investigation of Clays" (1957). His earlier work included several papers on Scottish soil clays, but his major work dealt with the crystal structure of vermiculite in various hydration states, vermiculite-organic complexes, and the hydration properties of halloysites. Several recent papers indicated new areas of interest, particularly those on organic complexes of nickel cyanide and on the application of NMR to the study of interlayer water in layer silicates.

The passing of George Walker leaves a gap in the ranks of clay mineralogists which will not easily be filled. His cheerful presence and his earnest drive to get things done will be greatly missed in those scientific circles where he played a prominent part. I can write feelingly about this especially in relation to the A.I.P.E.A. of which he was vice-president and to which he was contributing a very welcome drive towards new endeavours.

His outside interests were many and varied. He was a keen golf player. I am told that he was a very competent chess player and bridge player and used to carry out chess games by correspondence. Gem cutting was one of his main hobbies, particularly of Australian opals from the rough "potch." He was also very much interested in philosophical subjects.

BIBLIOGRAPHY OF GEORGE F. WALKER

- (1947) Mineralogy of some Aberdeenshire soil-clays. *Clay Mineral. Bull.* 1, 5.
- (1949) Decomposition of biotite in the soil. *Mineral. Mag.* 28, 693.
- (1949) (WITH R. C. MACKENZIE AND R. HART) Illite occurring in decomposed granite at Ballater, Aberdeenshire. *Mineral. Mag.* 28, 704.
- (1949) Water layers in vermiculite. *Nature* 163, 726.



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- (1949) Distinction of vermiculite, chlorite and montmorillonite in clays. *Nature* **164**, 577.
- (1950) (WITH A. A. MILNE) Hydration of vermiculite saturated with various cations. *Trans. Fourth Int. Congr. Soil Sci. (Amsterdam)* **2**, 62.
- (1950) Trioctahedral minerals in Scottish soil-clays. *Mineral. Mag.* **29**, 72.
- (1950) Vermiculite-organic complexes. *Nature* **166**, 695.
- (1951) Unidirectional Fourier synthesis of vermiculite. *Clay Mineral. Bull.* **1**, 171.
- (1951) Vermiculites and some related mixed-layer minerals. In G. W. Brindley, ed. *X-ray Identification and Crystal Structures of Clay Minerals*, Mineralogical Society, London, p. 199-223, Ch. VII.
- (1952) (WITH A. McL. MATHIESON) Structure of vermiculite. *Clay Mineral. Bull.* **1**, 272.
- (1954) (WITH A. McL. MATHIESON) Crystal structure of magnesium vermiculite. *Amer. Mineral.* **39**, 231.
- (1956) (WITH A. J. GASKIN) Clay mineral research in Australia. *Clays Clay Minerals.* **4**, 196.
- (1956) Diffusion of interlayer water in vermiculite. *Nature* **177**, 239.
- (1956) Mechanism of dehydration of Mg-vermiculite. *Clays Clay Minerals* **4**, 101.
- (1957) Differentiation of vermiculites and smectites in clays. *Clay Mineral. Bull.* **3**, 154.
- (1957) (WITH W. F. COLE) The vermiculite minerals. In R. C. Mackenzie, ed. *Differential Thermal Investigation of Clays*, Mineralogical Society, London, p. 191-206.
- (1958) Reactions of expanding-lattice clay minerals with glycerol and ethylene glycol. *Clay Mineral. Bull.* **3**, 302.
- (1959) Diffusion of exchangeable cations in vermiculite. *Nature* **184**, 1392.
- (1959) (WITH W. G. GARRETT) Cation-exchange capacity of hydrated halloysite and the formation of halloysite-salt complexes. *Clay Mineral. Bull.* **4**, 75.
- (1959) (WITH A. McL. MATHIESON AND E. W. RADOSLOVICH) Accuracy in structure analysis of layer silicates. *Acta Crystallogr.* **12**, 937.
- (1960) Macroscopic swelling of vermiculite crystals in water. *Nature* **187**, 312.
- (1961) (WITH W. G. GARRETT) Complexes of vermiculite with amino-acids. *Nature* **191**, 1389.
- (1961) Vermiculite Minerals. In G. Brown, Ed. *X-Ray Identification and Crystal Structures of Clay Minerals, Second Edition*, Mineralogical Society, London, p. 297-324, Ch VII.
- (1962) (WITH W. G. GARRETT) Swelling of some vermiculite-organic complexes in water. *Clays Clay Mineral.* **9**, 557.
- (1963) The cation-exchange reaction in vermiculite. *Int. Clay Conf. Stockholm*, **1**, 117.
- (1963) Ion exchange on clay minerals, Introductory speech, *Int. Clay Conf. Stockholm*, **2**, 259.
- (1964) (WITH J. GRAHAM AND G. W. WEST) Nuclear magnetic resonance study of interlayer water in hydrated layer silicates. *J. Chem. Phys.* **40**, 540.
- (1967) Catalytic decomposition of glycerol by layer silicates. *Clay Mineral.* **7**, 111.
- (1967) Interactions of n-alkylammonium ions with mica-type layer lattices. *Clay Mineral.* **7**, 129.
- (1967) (WITH W. G. GARRETT) Chemical exfoliation of vermiculite and the production of colloidal dispersions. *Science* **156**, 385.
- (1967) (WITH D. G. HAWTHORNE), Complexes between n-alkylamines and nickel cyanide. *Trans. Faraday Soc.* **63**, 166.
- (1968) (WITH D. G. HAWTHORNE), Complexes of nickel cyanide with organic monomers. *Polymer Lett.* **6**, 593.
- (1970) (WITH B. K. G. THENG) Interactions of clay minerals with organic monomers. *Israel J. Chem.* **8**, 417.