ist's alembic, the "magic" microprobe of Dr. J. V. Smith, we shall soon have a better idea of the phase relationships in natural igneous rock series.

I mentioned that I chose geology because I preferred field work to laboratory classes, but it turns out that I spend my time between laboratory and office. However, the Chicago department tries to keep its experimental, analytical, and theoretical approaches to problems in close touch with the realities of field occurrences. By using rocks whose field significance is thoroughly known, I hope to keep in contact with the field geology which must continue to be the source of inspiration for the design of experiments in experimental petrology. This inspiration, Mr. President, is second only to the MSA Award that I have just received. Thank you.

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MEMORIAL OF JOHN GIFFORD FAIRCHILD

JOSEPH J. FAHEY, *U. S. Geological Survey.*

John Gifford Fairchild, who for thirty-one years of his professional career was a geochemist of the U.S. Geological Survey, died on January 16, 1965, at his home in Alexandria, Virginia, after a long illness.

Fairchild was born May 28, 1882 in Monticello, Sullivan County, New York. He received the AB degree from Cornell in 1903. After serving as a chemist from 1906 to 1909 at the Nichols Copper Company he joined the staff of U. S. Geological Survey in July of 1909 and continued his chemical work until November, 1912. There was then a hiatus of about seven years in his Survey employment when he transferred to the Bureau of Mines, and then to the Department of Agriculture where from 1915 to 1917 he was on the Insecticides and Fungicides Board. He returned to the Survey in July, 1919 and continued as a productive chemist until his retirement in June, 1947.

John Fairchild was a kindly, quiet gentleman of a very retiring nature. He was always ready to help the younger analysts in their problems of rock and mineral analysis. He repeatedly stressed that spinels, staurolite, zircon, and other minerals difficult to dissolve, that occur in minor quantities in many rocks, should not be reported as insoluble material, but should be decomposed and the constituents reported as part of the analysis.

Fairchild was one of the first to recognize base exchange in minerals

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other than clay minerals. His paper "Base exchange in artificial autunites" published in *The American Mineralogist* in 1929, pointed the way for the vast amount of later work in this field.

In his analytical work he strove for perfection and his degree of attainment was exceptionally high. Over the years he contributed a large number of accurate analyses of rocks and minerals. The appended bibliography reflects only a small proportion of his contributions.

The mineral fairchildite, an anhydrous potassium calcium carbonate, was named in his honor by his colleagues, Charles Milton and Joseph Axelrod.

On July 2, 1948, John Fairchild was awarded the Bronze Medal of the Department of Interior for outstanding accomplishments in geochemistry. Fairchild was a member of the American Chemical Society, a fellow of the Mineralogical Society of America since 1936, and a member of the Geological Society of Washington. He is survived by one daughter, Helen. His wife predeceased him by about fifteen years.

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MEMORIAL OF JAMES EDWIN HAWLEY

J. M. HARRISON, *Geological Survey of Canada.*

Professor James Edwin Hawley died at Tucson, Arizona, on April 20, 1965, on the eve of his return to Kingston. He retired from teaching at Queen's in 1962 and had wintered thereafter in Arizona, but he looked forward each summer to returning to Kingston and Queen's University. In spite of the illness that taxed his strength severely, he continued his investigations until his death. As a matter of fact, his latest paper was published in Economic Geology in May of 1965, just about a month after he died.

Ed Hawley devoted more than 45 years to the study of geology and he provided the stimulus and example for those of us fortunate enough to have benefited from his wise counsel. The accompanying bibliography lists more than 60 papers and shows the breadth of his interests, and the scope of his contributions to them. He was, I think, exceptional in combining success as a practising consulting geologist with a flair for basic research. His experience in these two fields, combined with an appreciation of the problems of teaching, made him an outstanding and inspiring teacher. The world of geology was fortunate to have attracted such a man.

It was almost inevitable that he should attend Queen's University, for he was born, on September 27, 1897, in the city of Kingston, Ontario. He graduated with a B.A. in geology in 1918, and an M.A. in 1920, following which he spent 3 years in South America, Burma, and India, working on petroleum problems. When he returned to North America, he undertook studies for his Ph.D. at Wisconsin, then practically a finishing school for Canadian geologists, and was granted the degree in 1926.

On completion of his formal training, his research began in earnest and his activities covered such diverse fields as the development of oil by the application of shearing stress, evaluation of life in the Archaean, structural geology as related to ore deposits, and the detailed study of the Sudbury nickel ores. He spent many summers on field investigations in

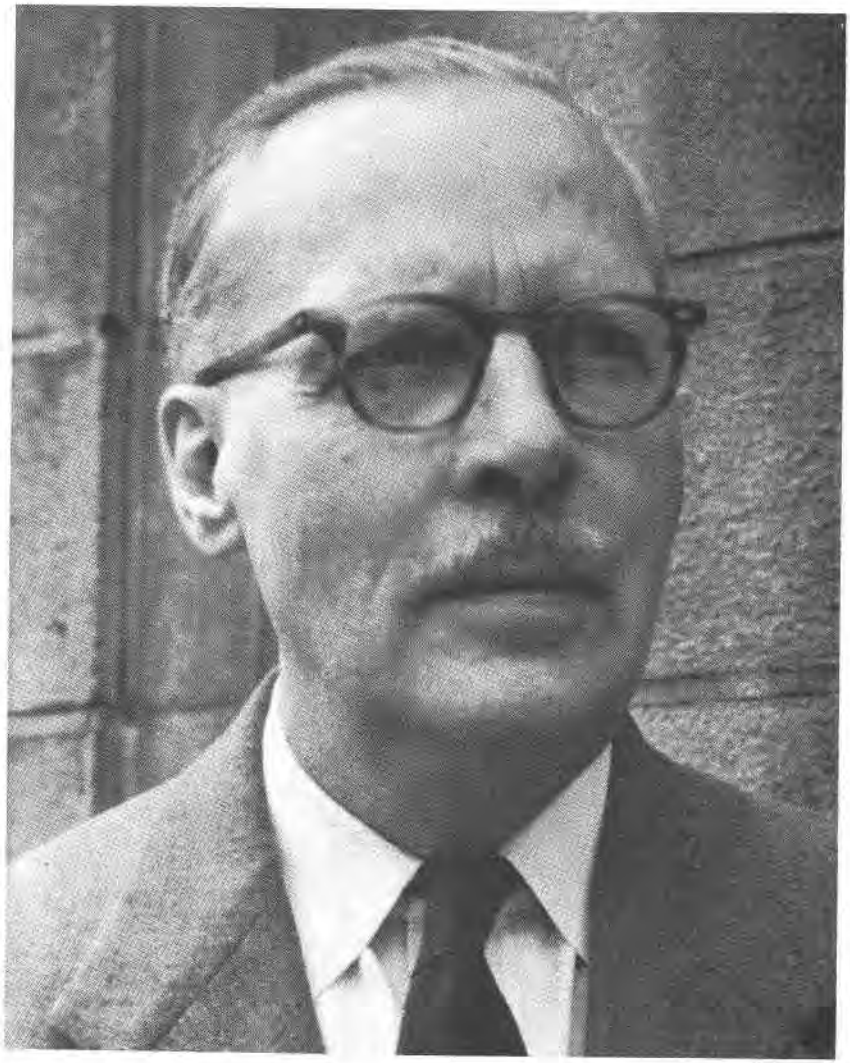
the Canadian north and thereby not only contributed to our knowledge of particular problems in that region, but acquired the background of field experience that all geologists need if they are to interpret laboratory data. To all these studies, he brought an incisive and inquiring mind solidly based in chemistry and physics. As a result, his scientific papers are marked by fresh and original ideas that are soundly fashioned.

His scientific work is a major contribution to Canadian geology but perhaps even more impressive has been his contribution as a teacher and a stimulator of geological research. Following short terms of teaching at Wisconsin and at Stanford, he became Professor of Mineralogy at Queen's in 1929. In 1950, he became Miller Research Professor, a position he held until early 1962 when the ill health that dogged him to the end made it too difficult to carry out the duties the position demanded.

Hawley was an inspiring teacher, a blessing rare among gifted men. He was a prodigious and critical reader whose lectures were notable for concise presentation of the whole scope of his subject and for inclusion of the latest concepts stemming from his knowledge of current research. Dogma had no place in his teaching. He had a talent for unbiased and well-documented presentation of conflicting hypotheses and insisted that the student form his own conclusions. He had great patience with simple questions but could be devastating if the student were trying to bluff his way through an assignment. His continued interest in all his graduates made return to Queen's a warm and stimulating experience.

His consulting experience made him acutely aware of the need for increased basic research in geology and particularly of the need to stimulate studies bearing on Canadian problems. It was largely as a result of his efforts that the National Advisory Committee on Research in the Geological Sciences was formed in 1949, charged with coordinating and stimulating geological research in Canada. He was an active charter member of this committee and served in similar capacities with the Ontario Research Foundation, the Royal Society of Canada, and the Canadian Institute of Mining and Metallurgy.

Hawley's eminence in geology was recognized in his election to Fellowship in many scientific societies, but it was his interest and vigour that led to his service as an officer of most of them. He was awarded the Barlow Medal of the Canadian Institute of Mining and Metallurgy and the Willet G. Miller Medal of the Royal Society of Canada. His particular interest in mineralogy was recognized when the mineral hawleyite was named for him, and as a fitting tribute in a broader field, he was the first to be honoured by a special issue of the Canadian Mineralogist, appropriately entitled "Studies in Geochemistry, Mineralogy and Petrology" which was dedicated to him in 1963. Finally in 1964, his outstanding con-



JAMES EDWIN HAWLEY

tribution to the whole science was recognized by the Geological Association of Canada in awarding him the first Logan Memorial Medal.

He did not permit the demands imposed by official duties to interfere with his family life and many years ago curtailed his consulting activities so that he could spend part of each summer with them. Both children graduated from Queen's. Nancy married a geologist, Dr. M. C. Robinson, and Donald is now practising law. Mrs. Hawley predeceased him in 1960.

Ed Hawley will be sorely missed by his family, his many friends, and by the geological fraternity as a whole, but he has left his own enduring memorial—his contributions to the advancement of science.

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