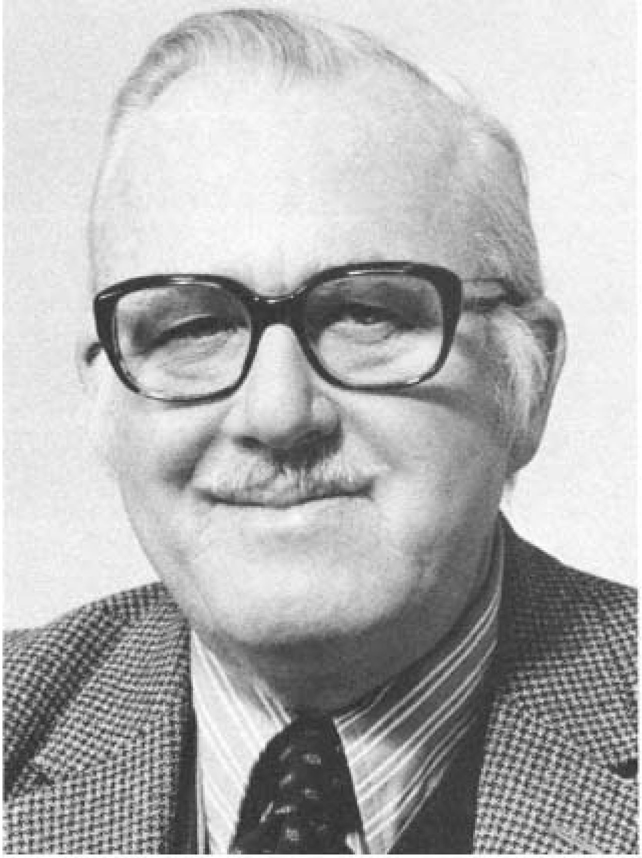

Stanley G. Mason

1914-1987

By Howard Brenner

Stanley George Mason, a prominent Canadian colloid scientist and one of the founders of the science of microrheology, died unexpectedly on April 21, 1987, in Grand Mere, Canada, in the Province of Quebec. From 1946 until his retirement in 1979, he was director of the Applied Chemistry Division of the Pulp and Paper Research Institute of Canada (Paprican), housed on the McGill University campus in Montreal, while simultaneously holding an appointment on the McGill Chemistry Faculty. From 1979 to 1985, he was Otto Maass Professor of Chemistry at McGill, achieving the status of professor emeritus in 1985. This last position was endowed with special meaning as Otto Maass was Mason's Ph.D. thesis supervisor.

Stan (as his friends and colleagues called him) was born in Montreal on March 20, 1914, and earned a B.Eng. in chemical engineering from McGill University in 1936, followed in 1939 by a Ph.D. in physical chemistry from this same institution under the supervision of the well-known Canadian physical chemist Otto Maass with whom he conducted research on critical-state phenomena, especially critical opalescence. Following a two-year academic appointment as lecturer in physical chemistry at Trinity College in Hartford, Connecticut, he spent the war years 1941-45 at the Suffield Experimental Station in Ralston, Alberta, Canada, in the role of research engineer and head of the Munitions Division in the Department of National Defence. During 1945-46 he served as associate research chemist with the newly created (Canadian) Atomic Energy Division of the National Research Council in Montreal. He returned to the McGill campus in 1946 to begin an affiliation that continued uninterrupted for the next forty years, ending only with his death.

Stan Mason and his students revolutionized the way in which we think about flowing suspensions and dispersions. These heterogeneous substances, composed of particles dispersed in a fluid, are encountered in fields as diverse as cellulose-fiber suspension in paper-making machines and in the red and white blood cell suspensions coursing through our bodies. Accumulated knowledge regarding the dynamics of such systems constitutes the science of microrheology —a term that Mason coined, and a subject that he and his collaborators pioneered.

Prior to Mason's researches in the field of microrheology, begun in the early 1950s, we were taught that there existed in Nature only four states of matter, namely solids, liquids, gases, and plasmas. It would be only a mild exaggeration to say that Mason and his students taught us of the existence of yet a fifth state of matter—namely suspensions or dispersions, especially those in a state of flow. Together he and his coworkers showed us how the complex, macroscopic, engineering, continuum-level properties of flowing suspensions of colloidal and larger particles dispersed in a liquid could be understood at a much simpler, microscopic, scientific, particulate-scale level of description. Furthermore, they demonstrated how such knowledge could be manipulated so as to serve the needs of *both* engineering and science.

This research was done within the context of attempting to furnish answers to important technological questions, particularly those posed initially by technical day-to-day problems existing within the pulp and paper industry. In his hands, this essentially pragmatically oriented research program spawned activities that were intellectually stimulating, aesthetically pleasing, and posed a constant challenge to experimentalists working at the instrumental frontiers of microrheology, as well as theoreticians working at the corresponding physicomathematical frontiers.

His remarkable success at resolving the dichotomous tensions often existing between proponents of pure versus applied science is reflected in the diverse sources of the awards and honors that came to him during his lifetime. Last, but not least, among these was the prestigious Prix Marie-Victorin (1986)—the highest scientific distinction of the Province of Quebec. Moreover, he was elected a foreign associate of the National Academy of Engineering in 1980, as well as achieving fellowship status in a variety of professional societies including the Chemical Institute of Canada (1950), the Technical Association of the Pulp and Paper Industry (1968), and the Franklin Institute (1980) in addition to being named a distinguished member of the International Society of Biorheology (1984). The American Chemical Society gave him its Kendall Award in Colloid Chemistry (1967) and its Anselme Payen Award in Cellulose Chemistry (1969). The Society of Rheology awarded him the Bingham Medal (1969) and the Franklin Institute the Howard N. Potts Medal (1980). Within Canada, the Chemical Institute of Canada recognized his work with the presentation of the CIC Medal (1973) and the Dunlop Award (1975).

The scientific legacy of any academic researcher is embodied in his research publications—those refereed and invited papers published in scientific journals. Stan was prolific in this sense. Over a 43-year period, beginning in 1940 with his first publication on critical phenomena with Otto Maass, and ending with his last publication in 1983 on the droll subject of the surface tension of solids, he published no less than 271 scientific and technical papers totalling 3,282 printed pages of text and coauthored with approximately 60 Ph.D. students, 20 postdoctoral fellows, and 18 assorted colleagues and visitors. Simple division reveals that this accomplishment averages out to 6 papers (of roughly 12 pages each) published year in and year out for 43 years! And some years were better than others, his "personal best" occurred in 1977 with 18 published papers, at which time Mason was 63 years of age; the year 1981, two years after Stan Mason's so-called "retirement," ran this earlier record a close second with 17 publications.

In addition to their novelty, these 271 publications display a remarkable intellectual tenacity. Themes (embodied in the form of serial publications) were zealously pursued over long periods of time as advances in scientific instrumentation occurred to make possible experiments formerly deemed impossible; new and more detailed mathematical formulations were built upon the foundations laid down by more approximate predecessors in the series. For example, embedded in the overall list of 271 publications is a subsequence of 31 papers spanning a 30-year period. Each bears the same generic title, "Particle Motions in Sheared Suspensions," followed by an appropriate subtitle. The first of this series, coauthored with B. J. Trevelyan and dated 1951, bears the Roman numeral I and is subtitled simply "Rotations." The last in this series, dated 1981 and bearing the Roman numeral XXXI, is accompanied by the much richer subtitle "Rotations of Rigid and Flexible Dumbbells (Experimental)," along with a list of coauthors as lengthy as its title (namely K. Takamura, P. M. Adler, and H. L. Goldsmith). This single 30-year-long serial thrust involved no less than 33 different coauthors, whose names spanned the alphabet from A for Adler to Z for Zia. Equally did their nationalities span the globe.

Further and more detailed summaries of facets of Stanley G. Mason's professional life can be found elsewhere, including his own personal commentary "How I Became Interested in Colloid Science" *(Journal of Colloid and Interface Science,* Vol. 71, pp. 8-10, 1979), which appeared in the Festschrift volume accompanying his McGill retirement. Summaries and commentaries by his former students include an "Appreciation" written by Harry L. Goldsmith and David A. I. Goring in this same Festschrift volume (pp. 1-7). A more recent "Appreciation", penned by his intellectual heir, Theo G. M. van de Ven, appears as an introduction to the S. G. Mason Memorial Issue of the *International Journal of Multiphase Flow,* scheduled for publication in mid-1990.

With his passing, Stanley Mason leaves his wife, Renata, and two daughters, Cheryl and Andrea, as well as a whole host of former students, colleagues, and others whose lives he enriched. We will always remember him with great affection, admiration, and respect.