

Gerard Viner Middleton FRSC (1931-2021): A Tribute



It is with sadness that we report the recent passing of Gerard V. Middleton, one of the leading pioneers of sedimentology. Gerry, as he was known to his many friends and colleagues, was born in South Africa of English parents, and was educated in England, obtaining his Ph.D. in geology from Imperial College in 1954. For his thesis research, he mapped an area of Devonian rocks in Devon, and one of his earliest papers (1959) is a taxonomic documentation of the tetracorals contained in those rocks. Immediately upon graduation, he emigrated to Canada where he worked first for California Standard Oil Company in Calgary for one year, after which he joined McMaster University, Hamilton, Ontario, in 1955, starting as a Lecturer in Geology, where he remained for the remainder of his professional career. Interestingly, this appointment came on his second application; his first as a paleontologist had been unsuccessful! Perhaps because much of his Ph.D. research involved carbonate rocks, he undertook research on the facies and diagenesis of limestones in both Alberta and Ontario, spending summers working for Shell Oil where he met many of the leading carbonate researchers of the day. However, he found the local limestones “boring”, and switched his attention to sandstones. His first work on them was petrographic and geochemical in focus, and involved some of the earliest work in sedimentary geology to use advanced statistical techniques, an interest that continued to the end of his career.

Because he appreciated that a deeper understanding of the origin of sandstones would require knowledge of the physical processes responsible for transporting and depositing sediment, Gerry educated himself in fluid mechanics through reading the civil engineering literature. In 1964, he

organized a research symposium at the AAPG meeting in Toronto, the papers from which were published as SEPM Special Publication 12 "*Primary Sedimentary Structures and Their Hydrodynamic Interpretation*", which he edited. This presented the now classic flow-regime concept to geologists, and popularized the series of bedforms that develop as current speed increases. This volume can be credited with introducing fluid mechanics into sedimentology, something that has become central to an enormous body of subsequent research.

One of the particularly hot topics of the time (late 1950s and 1960s) was the "greywacke/flysch problem", namely the origin of the ubiquitous graded beds that occurred in what were widely thought to be deep-water deposits. Early work by Keunen and others had raised the possibility that they were emplaced by turbidity currents, a process that was then poorly understood. Using his extensive network of connections, Gerry arranged to undertake a series of experiments on density currents at Caltech that formed the basis of the classic series of papers published in 1966-1967, that, together with a 1965 paper on antidune structures and a follow-up paper on "flysch sedimentation" in 1970, represents the foundation of nearly all modern work on turbidity currents! In 1973 and again in 1976, together with Monty Hampton, he expanded on this earlier work and published a more comprehensive process-based classification of sediment gravity flows that remains the basis for most interpretations of the origin of deep-water deposits. Various additional studies with students, commonly but not exclusively based in the Gaspésie region of Quebec, added soundly-based outcrop interpretations to the repertoire of examples that have been extensively used by workers over the years. Gerry published his final synthesis paper on deposition from turbidity currents in 1993. In addition to this primary focus of his research, Gerry also contributed to important papers on such diverse topics as the origin of upper-flow-regime parallel lamination, the interpretation of grain-size distributions in sand, and tidal sedimentation in the Bay of Fundy. Later in life, he turned his attention to topics in the history of geology, and to the origin of the various building stones used in construction in and around Hamilton in the 19th century.

Education in various forms was central to Gerry's character and contribution to the sedimentological community. As he himself said, he was always "... *trying to put in order (in my mind) an area of scientific knowledge ...*": he had a passion for synthesizing information and passing that knowledge to others, something that may have arisen because most of his own knowledge in clastic sedimentology was self-taught. Most notable was the general textbook "*Origin of Sedimentary Rocks*", coauthored with Harvey Blatt and Raymond Murray, which appeared in 1972, with a second edition in 1980. This was the first comprehensive textbook to take a rigorous process-based approach to sedimentary geology, rather than the descriptive, petrographic approach that prevailed in previous textbooks. Gerry was also the lead author, with John Southard, of the highly influential SEPM Short Course Notes "*Mechanics of Sediment Movement*" (1977, 1984) that introduced many clastic sedimentologists to the intricacies of fluid mechanics. This was preceded by the first-ever SEPM Short Course that he organized with Arnold Bouma "*Turbidites and Deep Water Sedimentation*", followed by short courses on the application of fluid and solid mechanics in the whole of geology, the notes from which became the textbook "*Mechanics in the Earth and Environmental Sciences*" (1994), cowritten with Peter Wilcock. Middleton also returned to his love of statistical methods near the end of his career, organizing short courses on "*Nonlinear Dynamics, Chaos and Fractals with Applications to Geological Sciences*" (GAC, 1991), and "*Nonlinear Dynamics and Fractals: New Numerical Techniques for Sedimentary Data*" (SEPM, 1995), given with Roy Plotnick and David Rubin, and writing the book "*Data Analysis in the Earth Sciences Using MATLAB*" (2000). Indeed, he was fearless in his choice of research

topics, taking risks on novel subjects and tackling a wider range of topics than most other workers then or now, making him an ideal person to edit the comprehensive *Encyclopedia of Sediments and Sedimentary Rocks* (2003). In addition to all of this, Gerry was also the behind-the-scenes instigator of the widely popular text "*Facies Models*" edited by his long-time colleague and foil, Roger Walker, commissioning the initial series of articles for the Geological Association of Canada's journal *Geoscience Canada*, which he founded, serving as the inaugural editor. Furthermore, he had a knack for passing his love of education and scholarship to his graduate students, of whom 6 of 13 Ph.D. students went on to university academic careers themselves, expanding Gerry's legacy enormously.

Gerry's involvement in geological and sedimentological societies was a life-long passion. He drew inspiration from the colleagues that he interacted with at meetings, and he instilled this passion in his students as well. He was Vice-President and President of the Geological Association of Canada (1986-1988); a Council Member of the International Association of Sedimentologists for many years and Vice-President from 1978-1982, and he held positions on many SEPM committees. He once boasted that he was the only person to ever run for office in SEPM three times, and to be defeated each time. All of these societies and others have recognized his immense contributions: he was inducted into the Royal Society of Canada in 1970; he is one of only five people to be named an Honorary Member of both the International Association of Sedimentologists (IAS) and SEPM, as well as of the Canadian Society of Petroleum Geologists (CSPG); he has received the highest award given by both the Geological Association of Canada (GAC)—the Logan Medal (1980) and SEPM, which awarded him both the Pettijohn Medal (1994) and Twenhofel Medal (2003). The Geological Society of London also awarded him the Major John A'Deane Coke Medal in 1995. In many ways, given all of the books and sets of notes that he coauthored, the most relevant honour was the Grover E. Murray Memorial Distinguished Educator Award that he received from the American Association of Petroleum Geologists (AAPG; 1998). The Canadian Sedimentology Research Group (CSPG) also named its sole award in Gerry's name.

Gerry, the person, was gregarious and thoroughly enjoyed his interactions with colleagues. As he himself said, "*I was always interested in acting, from early highschool days, and elecution (sic), debating, etc. I take after my father too, in liking to talk!*". He had a "presence" that caused people to pay attention to what he was saying, no matter what other conversations might have been going on. His critical ability and insight were second to none. Harold Reading, another giant pioneer in the field, once said that Gerry's greatest qualities were "*... your wisdom and your ability to see to the heart of a question, to analyse it and come up with an answer. You express your thoughts truthfully and sometimes with bluntness. ... You once said to me I am only rude to my friends and to those whom I respect.*" Gerry was, despite his great accomplishments, a humble man, saying that "*... contacts with my contemporaries (e.g., John Ramsay, who was a fellow student at Imperial) had convinced me that my abilities in geological research were modest*". He thought of himself as a scholar rather than a researcher. He also had a dry, self-deprecating humour, as is indicated by some of the comments quoted above, and he liked good food and wine. An anecdote that we remember from our early days as graduate students, involved Middleton telling his students, in all seriousness, while driving between outcrops after a particularly terrible meal at a nameless restaurant, about his "Roloids Scale" for restaurants, Roloids © being a popular antacid tablet. He argued that all measurement scales required a standardized benchmark and for this he chose Howard Johnson's Restaurants ©, at that time a widespread hotel/restaurant chain (now with only one remaining location) that served adequate, if unremarkable, food. Gerry considered it to represent zero on his Roloids Scale. He was proud that it was

an inverse scale, like the then popular phi size scale, with meals that were better than the benchmark receiving a negative Rolaid score, and worse meals a progressively higher numbers of Rolaid.

In summary, Gerard V. Middleton was an innovative researcher, sometimes well ahead of the field, with a deep interest in understanding how sediments were created. He was a profound and deeply critical thinker, a trait that he, together with Roger Walker, instilled in their students by means of their facies-models course and home seminar series, a trait that became feared when, in later years, these former students reviewed manuscripts for publication. He was passionate about passing on knowledge to others, and about his involvement with scientific societies. He was justly decorated for his many services to sedimentary geology, and his many publications continue to be widely cited because of they helped to establish the foundations for our present-day understanding, especially of gravity-flow processes. Beneath all of this external evidence, he was a deeply human individual, who loved his wife of 62 years, Muriel. He is survived by Muriel and their three children, Laurence, Teresa and Margaret, their spouses and Gerry's grandchildren. We thank Teresa and Laurence for their assistance in preparing this tribute. For those who would like to give a donation in honour of Gerry's legacy, contributions can be made to the Middleton/Walker Prize in Sedimentary Geology or the Walker/Middleton Fieldwork Scholarship, both at McMaster University, at:

<http://alumni.mcmaster.ca/s/1439/17/giving/landing.aspx?sid=1439&gid=1&pgid=6111>

Information about these scholarship awards can be found at:

<https://www.science.mcmaster.ca/ees/undergraduate/undergrad-scholarships-awards.html#application-required>.

Or you can contact: giving@mcmaster.ca

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