

## IN MEMORIAM

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By M.H.B.H. & E.C.C.

### Ronald L. Malcolm

On July 24, 1998, Ronald L. Malcolm, 60, lost his brave battle against cancer at his home in Morrison, Colorado. His condition was diagnosed four years previously, shortly after he had made his usual high quality academic contribution in St. Augustine, Trinidad, to the Proceedings of the 7<sup>th</sup> International Conference of the International Humic Substances Society (IHSS).

Ron Malcolm was born on October 6, 1937, and raised on the family farm in Kenova, West Virginia. He maintained an excellent Junior and High School record in academics and in football (as a linesman) while making also a major contribution to completing the usual daily chores that still are essential to the running of a dairy farm. He was the outstanding Senior in Agriculture when he graduated from West Virginia University in 1959, and he went on to earn a Master of Science Degree in Agronomy and Biochemistry in 1961. He was then awarded a NSF Research Assistantship at North Carolina State University and worked under the direction of Dr. R.J. McCracken, and was awarded a Doctor of Philosophy Degree in 1964. A part of his dissertation focused on



'Canopy Drip: A Source of Mobile Soil Organic Matter for Mobilization of Iron and Aluminum', and that study may well have kindled his interest in humic substances which became his academic passion for the last 20 years of his research involvements. Immediately after finishing the requirements for the Ph.D. degree Ron joined the U.S. Geological Survey, and initially worked on stream sediments and discharge measurements under the direction of Howard Reeder in Raleigh. Later, under the direction of Vance C. Kennedy, and under the administrative direction of E.A. Jenne, he was involved in studies in Northern California of the rate of cation exchange of reference clays and stream sediments, and in the inorganic geochemistry of the Mattole River. His successes soon won him the title and position of Project Leader for an Organic Geochemistry Project designed to determine the amount and distribution of the organic matter transported by major streams in the United States. This project was later redirected to studies of various methods for fractionating and purifying stream organic constituents, and also a study of organic aspects of deep-waste storage was initiated. Inevitably he was led, at Wilmington, North Carolina, to the intensive study of waste disposal, and in the 1973-1974 period his research was confined to a waste disposal project. During that period (1974) he won the 'Best Paper of the Year' Award of the Ground Water Journal. His predicted reactivity and study approaches for organic waste disposal are still widely used in waste studies.

For some years after 1974, Ron's research efforts focused on the development of techniques for the systematic isolation and identification of unknown organic solutes in water. Such studies had an urgency because Rook had shown in Holland that waters containing humic substances give rise on chlorination to trihalomethanes, many of which are mutagenic, and some were later shown to be carcinogenic. His work led to the development of the XAD-8 and XAD-4 resin-in-tandem technique for the isolation of humic fractions from waters, and even from waters, such as some ground waters, with very low levels of dissolved organic carbon (DOC, a term introduced by Ron which is now in common usage). Development of techniques which allowed large volumes of water

to be processed allowed studies of the variations of dissolved aquatic humic substances with season, climate, vegetation and stream discharge. During the mid-eighties he led his team to processing more than 30 000 liters of ocean waters from the Mid-Pacific deep ocean using the XAD resin technology. He showed that essentially all of these substances could be classified as fulvic acids with only a trace that are in the humic acid category. The analytical data indicated that these were of marine and stream origins and with radiocarbon dates of 3500 B.P. Another milestone from his mid-eighties work was his  $^{13}\text{C}$  characterization study of the humic substances from the 10 soil orders.

At the 11th International Conference of the International Society of Soil Science (ISSS) in Edmonton (1978), Ron, with Pat MacCarthy from the Colorado School of Mines, introduced those in soils with interests in humic materials and soil organic matter to the techniques of resin separations. Their efforts were enthusiastically received, and it was agreed that in order to make progress in the field it was important to establish a set of well-characterized humic standards from soils, peats, lignite, and waters. Such standards would make it possible for scientists from different laboratories to apply their techniques to the standards and to their own isolates and in that way have confidence in their characterization procedures. Ron, with the enthusiastic support and backing of Bob Averett, secured funding from USGS to set up a Standard and Reference collection and then called a meeting of humic scientists from around the world to discuss the source soils and waters from which the Standard and Reference materials would be isolated. After agreement had been reached on technical matters it was decided to found the International Humic Substances Society (IHSS). Thus this Society, with the motto 'To Advance the Knowledge, Research and Applications of Humic Substances' was founded in Denver on September 11, 1981, and Ron Malcolm was unanimously elected as its first President, and made an Honorary Member in 1992.

As a part of the Department of the Interior, scientists in the U.S. Geological Survey normally confine their activities to the USA. Strangely, Ron had not been outside North America before he attended the 12th International Conference of the International Society of Soil Science in New Delhi in 1982. Since then he was invited extensively to bring his science to several parts of the world, and he visited and conducted collaborative projects with scientists in Australia, Canada, China, England, France, Germany, Ireland, Italy, Norway, Russia, Spain, and Portugal. His techniques have been shown to be applicable to the isolation of humic substances from soils as well as from waters, and his efforts are germane to the striking progress that has been made in the humic sciences during the past decade. There has been huge international recognition for his work and talents, and the Honorary Doctorate awarded to him by the University of Linköping in Sweden was the first of what would have been many.

Those who knew Ron well are aware of his immense energies, of his dedication to his subject, of his unquestionable academic talents, and of his eagerness to see that the fundamental environmental importance of humic substances are appreciated widely. He maintained that zeal to the end. Even after his disease had been diagnosed as fatal he engaged in strenuous work in England, France, and Norway in order to encourage the completion of projects that he considered to be important. In these, as in earlier visits, he trained young scientists in the advances in his techniques. He was quick to appreciate interest and involvement, and he had no time for those who invested minimum effort and hoped for career rewards. He was a man of extraordinary generosity, and those who knew him well, appreciated his unique wit.

Ron had total support from his wife Mollie Jane who was his High School sweetheart, and whom he married in 1958. It was plain to all that they had retained the sparkle for each other and for life, and they were the closest of friends. They were blest with four talented children Gregory, Susan, Jeffrey, and Janet. He is also survived by his sister Gwenlyn and her family of Kenova.

Ron was a man of deep Christian faith and his knowledge of the gospels could match his awareness of the humic sciences. He would discuss both with equal fervor. He was laid to rest in the Hillcrest Cemetary, in his much loved Kenova.

Those wishing to make memorial contributions might be reminded of Ron Malcolm's zeal in promoting interest in the humic sciences among the young, and especially students. Thus, contributions will be welcomed to the Dr. Ronald Malcolm Scholarship Fund (for students to travel to IHSS meetings). c/o Dr. J.J. Alberts, President of IHSS, Marine Institute, University of Georgia, Sapelo Island, Georgia 31227.