



Preface

“Lasciate Ogni Speranza O’voi Che Entrate Senza Risultati”

Csaba Horváth’s modification of the original line of Dante Alighieri

This special volume of *Journal of Chromatography A*, entitled *Separation Science: Past, Present and Future* is dedicated to the memory of Professor Csaba Horváth who passed away on 13 April 2004 in New Haven, CT, USA. He is widely known as one of the pioneers of modern bioseparation science, often referred to as “the father of high-performance liquid chromatography, HPLC”. During his life, Csaba has been involved in practically all fields of separation science, including gas chromatography (GC), liquid chromatography (LC), capillary electrophoresis (CE) and capillary electrochromatography (CEC). Professor Horváth greatly advanced the progress of separation science in continuously seeking novel approaches in high performance bioseparations and analysis.

Csaba Horváth was born on 25 January 1930 in Szolnok, Hungary. He possibly developed his interest toward sciences from his father, who was a math and physics teacher in the local high school. Csaba graduated as a chemical engineer from the Technical University in Budapest. He immediately became a faculty member in the Institute of Organic Chemical Technology of his Alma Mater. When the Soviet tanks rolled in to crash the Hungarian revolution in November 1956, he immigrated to West Germany. First he obtained an industrial position at Farbwerke Hoechst and started working on scale-up processes. After working two years in a pilot plant, he turned to research and development on the surface chemistry of organic pigment colors. His success in this field prompted him to find an opportunity to continue his studies for a Ph.D. Fortunately, Dr. István Halász, the famous separation scientist with whom he served together on the faculty of the Technical University in Budapest, became a Privatdozent (Associate Professor) in the Institute of Physical Chemistry at the University of Frankfurt, and offered him the possibility to do doctoral research on gas chromatography in his re-

search group. In his thesis, entitled *Trennsäulen mit dünnen porösen Schichten für die Gaschromatographie*, Csaba Horváth introduced novel column types in order to enhance the performance of open-tubular columns by increasing the chromatographic surface of capillary columns or columns packed with glass beads, by coating them with a porous support or an adsorbent layer. This expertise gained in his doctoral work later came in very handy in making novel types of columns and stationary phases for HPLC and CEC. Some of these developments led to the introduction of pellicular, i.e., non-porous column packings a few years later at the dawn of HPLC.

After receiving his Ph.D. in physical chemistry in 1963 he got married and immigrated to the USA. He became a research fellow in the Physics Research Laboratory at the Massachusetts General Hospital in Boston that was associated with the Harvard Medical School. During his work there with biochemists and biologists, he realized the opportunity to establish a new discipline “biochemical engineering”. Towards this new goal, he proposed to build a liquid chromatograph, but the opportunity did not come until he moved to Yale University in New Haven to join the laboratory of Professor S.R. Lipsky at the School of Medicine. His new project was to get ready for the analysis of the moon rocks brought back to Earth by the Apollo program. The almost two-year waiting time for the moon samples gave him the time to design and build the first high-pressure liquid chromatograph to separate biological substances, the technique known today as high-performance liquid chromatography.

In the 1970s Dr. Horváth devoted most of his research efforts to a better understanding of the fundamentals of HPLC. His landmark contributions included the development of the theory and practice of reversed-phase chromatography and by adapting the solvophobic theory for the treatment of this most widely used branch of HPLC. In the field of biochemical engineering, first he conducted basic research on enzyme technology and bioreactors; later he shifted back the focus of his research to bioseparations. He was also an acknowledged

leader in the area of preparative and process chromatography of large biomolecules. In the past decade his attention turned to the understanding of the fundamental issues encountered in capillary electrophoresis, and his research interest was focused on the applications and theory of CEC, which he considered a promising combination of electric-field-mediated separations and chromatography. Dr. Horváth established a vigorous and highly successful research program in biochemical engineering at Yale, where he chaired the Department of Chemical Engineering from 1987 to 1993. He was named the Llewelyn West Jones Jr. Professor of Chemical Engineering in 1993 and the Roberto C. Goizueta Professor of Chemical Engineering since 1998.

Professor Horváth was the author or co-author of close to 300 scientific papers, and the holder of nine patents. One of his major contributions to the field was the book *An Introduction to Separation Science* which he co-authored with B.L. Karger and L.R. Snyder. This book has been the standard text on separation science for decades. Furthermore, he has edited five volumes of the series *High Performance Liquid Chromatography—Advances and Perspectives*, which is considered to be the most comprehensive scientific treatment of the widely ranging aspects of HPLC. In addition, in 1993 he edited the book *Chromatography in Biotechnology* with L.S. Ettre which was the first book in biochromatography. He was serving on the editorial boards of nine scientific journals, including the *Journal of Chromatography* since 1977. He received numerous awards and other honors, here we just list the most important ones:

1978	Dal Nogare Award from the Chromatography Forum of Delaware Valley
1978	Commemorative Tswett Medal (USSR)
1980	M.S. Tswett Award in Chromatography
1982	German Humboldt Award for Senior US Scientists
1983	American Chemical Society National Chromatography Award
1986	Chromatography Award of the Eastern Analytical Symposium
1994	A.J.P. Martin Gold Medal of the European Chromatography Society
1997	Halász Medal Award of the Hungarian Separations Science Society
2000	Michael Widmer Award of the New Swiss Chemical Society
2001	American Chemical Society National Award in Separation Science
2002	Cross of Honor for Arts and Sciences of the Austrian Republic
2003	Torbern Bergman Medal of the Swedish Chemical Society
2003	Heureka Price of the Hungarian Chemical Society

Professor Horváth was elected member of the Hungarian Academy of Sciences (1990), the American Institute of Chemical Engineers (1994) and the US National Academy of Engineering (2004).

He was a frequently invited speaker on topics dealing with chromatography and electrophoresis at international symposia and other events. His lectures were always among the highlights of the meetings not only for the novelty and importance of the results and ideas presented but also for their humor, entertainment and beautifully designed slides.

The term separations scientist has been increasingly used recently to refer to those researchers who dedicate themselves to the science and art of differential migration processes. Csaba was one of the greatest separation scientists and his contribution to the field was gigantic. But besides being an excellent scientist, Professor Horváth was also a real *renaissance man*. He favored reading about history, mainly the history of science with particular interest in the philology of words that were related to separations. His knowledge in the latter predestined him to enrich the language of separation science with new and appropriate names and terminologies, such as pellicular packings, isocratic elution, multimodal separation and least but not last high-performance liquid chromatography. In his private life cooking was his favorite pastime and he was an excellent cook. He considered cooking the highest level of chemistry and chemical engineering. We, who knew him closely, were fortunate to have stimulating discussions with him and to receive encouragement from his vast experience. We have learned that behind the great scientist, there is a kind human being with sympathy, empathy, caring and sharing. We will miss Csaba very much and his memory will live forever in all of us.

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