

Early Shannon Mass Spectrometry

My recollections of the tremendous impact made by Jim Shannon in the early days of molecular mass spectrometry were jarred on re-examining these early publications to prepare this. His seminal 'Studies in Mass Spectrometry. I.' on the then-unusual rearrangement in benzyl alcohol and its derivatives was dated 1962! The author index to the 1963 'Mass Spectrometry of Organic Ions' lists approximately 1000 names, but with, understandably, no mention of Jim Shannon. However, he landed on his feet running, publishing over 40 papers on mass spectrometry and chemistry utilizing it by 1966. The first importance of these papers was to show the broad applicability of mass spectrometry for structural characterization of many types of compounds such as triterpenoids, aromatics, cyclic peptides, heterocyclic compounds, biologically active compounds such as sporidesmin and zeatin, and organometallics. Even more important, however, was his leadership in applying rigorous mechanistic principles, backed up by isotopic labeling and comparison of spectra of similar compounds, to establish structure/activity relationships. He not only pioneered the mass spectrometry of metal coordination compounds, but his 1965 *Chem. Commun.* paper (3 : 33) on the effects of metal valencies greatly clarified the reactivity differences due to odd- and even-electron ions. Probably his most-used single contribution is the Shannon 'fishhook and arrow' convention for distinguishing homolytic and heterolytic cleavages in mass spectral mechanisms. This was immediately adopted by most workers in the field, including the tremendously influential 'Mass Spectrometry of Organic Compounds' by Budzikiewicz, Djerassi and Williams. This was surely a key factor in mass spectrometrists' rapidly improved confidence in explaining mass spectral fragmentations with persuasive mechanisms. A major reason for the start of the journal *Organic Mass Spectrometry* was the flood of such mechanistic papers that appeared in this explosive period of molecular mass spectrometry.

Shannon's accomplishments are all the more amazing when the difficulties of communicating from 'down under' are considered. Approximately half of his papers during this period appeared in Australian journals, journals unfortunately not carefully read by many of us in the field. My real appreciation of his unusual basic understanding of mass spectral mechanisms came when he and his wife Vóis were on leave in 1966-67 at the University of Indiana, just down the road from Purdue where I was. He was tremendously helpful in making our mechanistic strugglings fit together into a much more cohesive overall picture. I especially appreciated his deep intuition about how such organic ions should behave; I suspected that he only had to ask the ions themselves.

Another outstanding Shannon trait is his ability to make mass spectrometry so enjoyable. I must mention a great week in Sydney in 1976 overwhelmed by the incomparable Shannon hospitality. I am fairly sure that we solved many key problems in mass spectrometry at that time, but my even stronger recollection is that the importance of such accomplishments was dwarfed by the fun, with the means justifying any possible end.

Such special issues are becoming more common, with the field sufficiently mature to command honoring those that have spent a highly productive lifetime in it. By these standards this issue for Jim Shannon is highly appropriate, and it is a pleasure to have this opportunity to salute his outstanding contributions, personal as well as scientific.

FRED W. McLAFFERTY
Baker Chemistry Laboratory
Cornell University
Ithaca, NY 14853-1301
USA