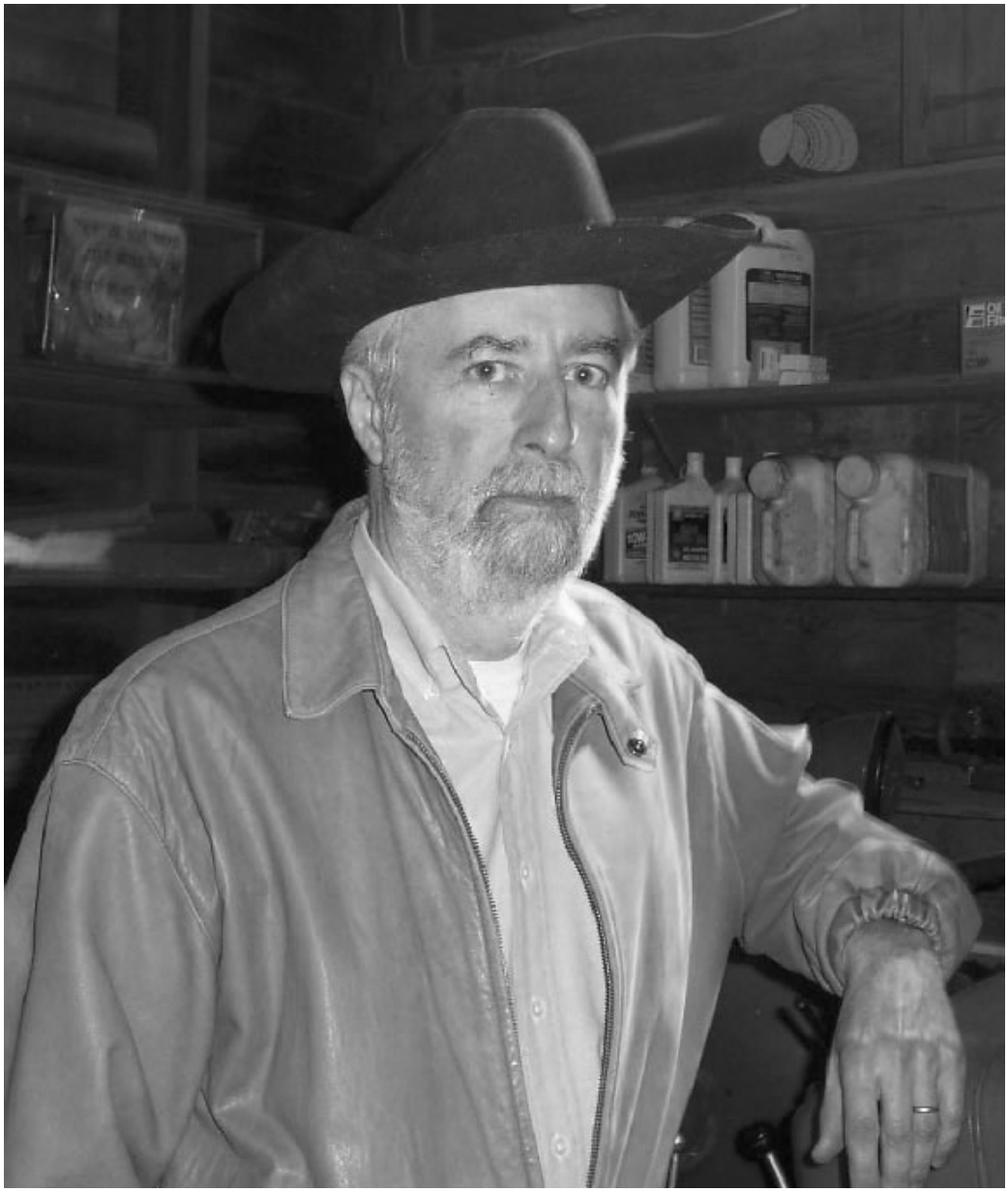

**Professor Thomas P. Fehlner**

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# Preface: In honor of Professor Thomas P. Fehlner

It is with great pleasure that we dedicate this issue of the journal *Applied Organometallic Chemistry* to our very good friend Professor Thomas P. Fehlner of the University of Notre Dame, on the occasion of his 65th birthday. He is universally respected and admired for his personal integrity, good humor, and the very high standards he sets for himself and his research program in a career that has produced, to date, 221 publications, 12 proceedings articles, and 17 book chapters and reviews.

The third of five boys, Tom was born in 1937 in Dolgeville, NY, a town of 3100 inhabitants in the foothills of the Adirondacks just north of the Mohawk valley. In high school, his interest in science was fostered by Mr Buck, who gave him full access to the science room (which also served as a homeroom for the juniors) after hours. He graduated from the Dolgeville Central School in 1955 in a class of about 30.

Tom's summers were spent in the Adirondacks in a camp on the shores of a small lake. Lusting after the two-sail boats on the lake, and being the budding experimentalist that he was, led him to convert an old row boat into a sailing vessel. It sailed backwards, with an oar in the bow eye for steering and a half a pup tent on a freshly cut hemlock pole for a sail. It moved beautifully—downwind! One of the sailors took pity on him, explaining the idea of a side board and how the force of the wind could be harnessed. With a jury-rigged side board, not only could he get out on the lake but also back again. With no TV while he lived at home, he expects that there are many things he would never have learned to do if the family had had one.

On a New York State scholarship and a tuition scholarship, he enrolled in Siena College in the fall of 1955 to prepare for chemical engineering. However, engineering never had a chance, as he discovered he liked chemistry too much. His mentor in college was Roland Allen, a physics teacher, who taught Tom's section of first-year chemistry. There was no formal undergraduate research program, but with Mr Allen's encouragement he explored a number of areas outside the rather classical curricula; for example, the deposition of aluminum films constituted his first exposure to the generation of clean high-vacuum conditions.

Acting upon the advice and counsel of Mr Allen, Tom enrolled in the graduate program at Johns Hopkins in the fall of 1959. Upon enrolling in 'Advanced Organic Chemistry from White' and 'Electricity and Magnetism from Pevsner' he soon had cause to question Mr Allen's wisdom, since these courses were at a level Tom could not have imagined a couple of months earlier. But 'it was like champagne after beer': once he was able to handle the headaches, it was very enjoyable. A plus was that his ten fellow graduate students were both friends and competitors. Several of them ended up in academia as well.

Tom joined the research group of Walter Koski, the head of the department. His project was an investigation of the pyrolysis of boranes using a single-pulse shock tube. The tube had to be constructed, as none was available. Indeed, no one around the department had worked with them, although, at the time, the technique was popular in the world of physical chemistry. Tom supposes that it was the engineering aspects that made this project attractive—since the chemistry that came out of it certainly didn't.

The department took delivery of its first mass spectrometer shortly after Tom arrived, and, as he worked for 'the boss', he had total access to it. This learning experience stood him in good stead later on.

In his second year, his future wife Nancy joined the department as a graduate student in organic chemistry. They married in 1962, and their son Thom was born on the day Tom's PhD was officially received. As Nancy had not yet finished, Tom talked Walter Koski into letting him stay for a year as a postdoc, convincing him that he could design and construct a mass spectrometer for the purposes of identifying free $BH_3$ in the gas phase within 12 months. Fortunately, there was an excellent departmental shop, and with the assistance of Joe Walter the project was successful, resulting in a communication in the July 1964 issue of the *Journal of the American Chemical Society* that reported the first direct detection of the monoborane molecule.

Mass spectrometry had become his love, in addition to Nancy, and when Ernest Eliel extended an offer of a faculty position at Notre Dame in March of 1964, Tom was determined to pursue this line of research. There were only organic and physical chemists at Johns Hopkins, so here he was venturing off into inorganic chemistry without ever having been in a course labeled 'Inorganic Chemistry'. He taught inorganic mechanisms the first semester, staying ten pages ahead of the students in Basolo and Pearson's book.

With NSF support arriving in early 1965, over the next eight years two new spectrometers, each better than the one before, were built to investigate the reactions of phosphorus hydrides ($P_2H_4$ is even more exciting than $B_2H_6$, as Tom's first student Bob Callen can attest!) and then boranes. Using modulated molecular

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beam sampling and high sensitivities, he was able to measure the absolute rate constants for the reactions of monoborane with a number of typical substrates. Gary Mappes, his second student, was the one who made this go. Earl Muetterties spent a week at Notre Dame in the late 1960s and was sufficiently taken with the results to create in the book he was editing a chapter for Tom called 'Boron Hydrides'. This, along with Stan Heřmánek's visit in the department at about the same time, turned Tom even more towards main group chemistry.

In 1967, Tom heard David Turner speak on photoelectron spectroscopy at the mass spectrometry meeting in Denver, and he was determined to add this technique to his laboratory. In 1972 he had an opportunity to spend a year in Turner's laboratory in Oxford, where, with the generous advice of Peter Timms, he was able to generate the spectra of HBS and $SiF_2$, so-called high-temperature molecules. Back at Notre Dame, Tom built his version of a Turner-type spectrometer (cheap and versatile) and began to apply it to boranes and metalloboranes, as all the easy inorganic molecules had been done. It was clear that, in order to succeed, he would have to make his own molecules. Furthermore, his interests continued to become more chemical in nature. So, after an NSF proposal to make clusters containing AlH fragments was funded, he spent some time during the summer of 1975 in the laboratory of Sheldon Shore, learning, as Tom himself states, 'the arcane secrets of synthesis not requiring a Bunsen burner or shock tube'. It was the beginning of a beautiful friendship that has endured for close to 30 years. A publication resulted from that brief sabbatical. In his attempts to repeat a synthesis of $B_4H_8Fe(CO)_3$ that was in the literature, Tom calculated the amount of $H_2$ that could be generated in a closed system containing $Fe(CO)_5$ and $B_5H_9$ at 200 °C, and, in order to avoid excessive pressure, he frequently pumped off the $H_2$ generated. This changed the reactor characteristics sufficiently to allow the isolation of an intermediate, $B_5H_9Fe(CO)_3$, of the compound being sought. Tom says, 'A little fear plus some physical chemistry can be helpful'.

Back at Notre Dame, Jeff Ulman was Tom's first synthetic postdoc. Fresh from Don Gaines' lab, he both made compounds and gathered photoelectron spectra. Jose Vites was Tom's first student in synthesis. Shared with Jay Labinger until Jay moved on, Jose's thesis gave promise of ultimate kinetic control of metalloborane synthesis. But it was nearly a decade later when Katie Deck and Yasushi Nishihara found the key to the generation of metalloboranes of many of the transition metals lying between Groups 5 and 9. Their work and the efforts of many more excellent coworkers have appeared in 58 publications that describe this chemistry. This chemistry ranges from metalloboranes of the earlier metals, which march to a different drum than Wade and Mingos, to those of later transition metals with reactivities that reflect their origins in borane cages and metal clusters, but in unexpected ways. The more Tom does, the more, it is apparent to him, has to be done. The potential, relative to organometallic chemistry, so confidently described in the book *Inorganometallic Chemistry* that he edited in the early 1990s, is truly there. It just needs the time and effort to be developed.

The engineering bug is still with Tom. In addition to undertaking short-lived projects in the synthesis of amorphous alloy thin films from metalloborane precursors and developing transition metal clusters of clusters into unusual heterogeneous catalysts, he recently submitted three papers describing the evaluation of surface-bound, oriented mixed-valence complexes for realization of the novel new paradigm of molecular electronics called Quantum Cellular Automata. He states, 'Electrochemistry is great and I actually had to look up the notes from the course I took in Electricity and Magnetism from Pevsner, at Johns Hopkins, to figure out what my collaborator from electrical engineering was talking about. Never throw anything away!'

In 1990 the Fehlners moved to a 17-acre country place about 12 miles from Notre Dame. Now Tom is able to indulge in more of his 'building' interests: ship model building in the winter and green woodworking in the summer competing for time with 'nervous breakdowns' of his '71 MGB. There is a barn for his tractors, pickup and workshop, shared with various and sundry critters and bugs. (The yellow jackets had to go once he got stung a few times.) He feels that it is fun to putter around while not, consciously at least, thinking about chemistry. No animals, but he does have a garden. It is probably a good thing that he did not go into botany, as his gardening experimental results are mixed at best.

Sailing is still fun for Tom. Every two years or so, he and Don Gaines crew for John Morris and sail the nooks and crannies of the Western Isles, off Scotland. Don has recently gotten Tom restarted with photography—medium format, black and white—by the simple expedient of giving him a Graflex 4 × 5 that he had rejuvenated. A photography that is a bit out of date but real chemistry!

Tom, you have had a remarkably fruitful career, which we all hope will continue for many years to come. You have rightfully earned the respect and admiration of your colleagues in science throughout the world. We salute you, wish the very best for you and Nancy, and dedicate this special issue to you on the occasion of your 65th birthday, in recognition of your outstanding contributions to organometallic and inorganic chemistry.

**Sheldon G. Shore and Narayan S. Hosmane**
Organizers of the Symposium 'Recent Advances in Inorganometallic Chemistry'