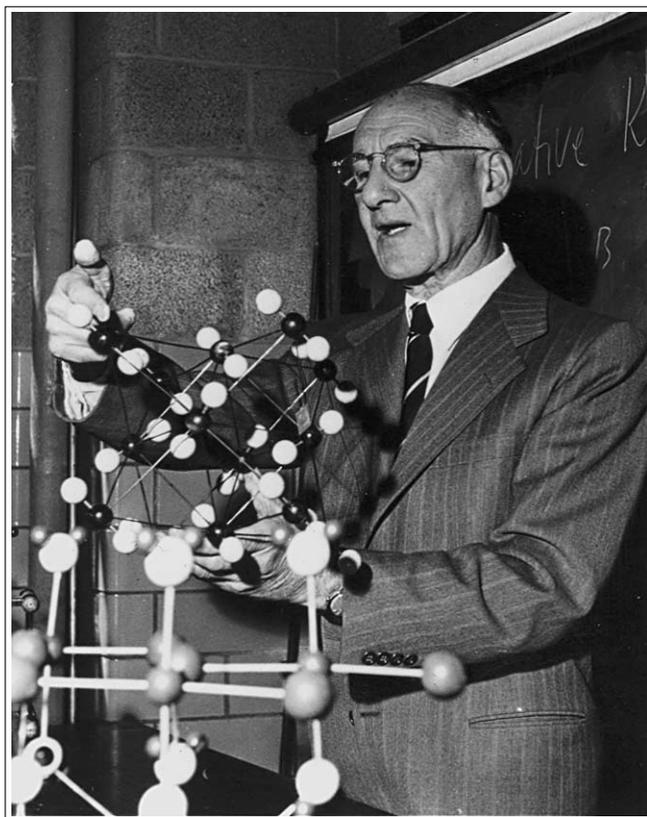


## RECOLLECTIONS

### Kasimir Fajans

Fajans was a gift to the University of Michigan from Hitler's Nazi Germany. A brilliant but flawed man who was his own worst enemy, he, almost simultaneously with Rutherford and Soddy, formulated the laws of radioactive transformations. Rutherford, and later Soddy, were recognized by being awarded the Nobel Prize. Fajans never was, possibly because of the enemies he acquired. One illustration of Fajans' self-inflicted trouble: he argued in print with the famous Linus Pauling again and again, not always using good judgment about the wording of his arguments. Pauling was my "scientific grandfather," and it was clear to me that Pauling, despite certain intemperate actions in his later years, was a truly great man. Editors, of course, also recognized his stature and began to reject papers written by Fajans. Yet it struck me that in his arguments with Pauling, Fajans had been correct perhaps more than half the time. He simply didn't understand how to argue in a civil manner.



As far as Nobel prizes are concerned, there is another story besides that involving Rutherford and Soddy. One day Fajans told me about what happened when he had a young assistant investigate some aspects of the precipitation of silver halides. This assistant came to him and showed him a remarkable color change when a certain dye was present as the endpoint was passed in a titration of a halide solution into a silver solution. Fajans told me that the assistant wasn't very bright and had no idea of what happened; but Fajans remarked that

he, himself, understood immediately. The dye later came into general use in analytical determinations of silver, and was known as the Fajans' indicator. After Fajans told me the name of this not very bright assistant, namely Odd Hassel, I realized that Fajans had had another brush with the Nobel Prize—inasmuch as Hassel later went on to win it in 1969!

I had been lucky enough to have had two courses from Fajans, one in the first semester of physical chemistry as an undergraduate, and one on thermodynamics as a graduate student. Fajans spoke English with such a thick accent that it took awhile to learn to understand him. Furthermore, his lectures tended to be very disorganized. Even so, Fajans had the knack of getting to the heart of subjects. I developed a love of thermodynamics from Fajans. It wasn't always clear even to Fajans how some subtle aspects of thermodynamics worked, but Fajans never tried to bluff his way out of the problem as some professors do. For example, in the graduate course, Fajans told us about various electrochemical cells that operated with gravity providing the driving force. One of these cells seemed very strange to me, so I asked him to explain how it worked. He was at a loss, so, after class, he asked me to follow him. We went to his office, which was piled high with all manner of journals and apparatus. He went to a particular stack of yellowing journals, reached up high into the pile and quickly removed one. It contained the original article on that very cell! How Fajans knew exactly where to look when it was obvious that those journals hadn't been touched for years, defied my imagination. He asked me whether I read German (the language of the journal). When I responded, "not really," he told me to read the article and report on it during the next class!

When I was invited to join the Michigan faculty, I was surprised and disappointed by the absence of discussions at the end of seminars in physical chemistry. At Iowa State University where I had been, such discussions were spirited, and useful to students. What had happened was that when Fajans was an active member of the faculty, he made such outrageous and often nasty statements after seminars that the rest of the faculty thought it best to keep quiet. Well, I felt that keeping quiet after seminars was quite the wrong way to behave. So I always raised questions at seminars and, bit by bit, the other faculty members began to, as well. What a dampening influence Fajans had been. He had so very much to offer, yet the way he expressed his ideas was almost totally counterproductive.

Fajans was always interested in new structural results because they enabled him to sharpen his already

very keen ideas about structure and bonding. One day I put into his mailbox a reprint reporting a rather strange structure I had determined. Fajans walked in before I left, took a quick look at the reprint, then came over to me and bellowed "How could *you*, a student of mine, publish a resonance structure in your paper? I once thought about resonance theory for five minutes, and realized it was nonsense!" First of all, while it was true that I had taken two courses from Fajans, I had never been a research student of his. Second, this outburst revealed how little Fajans understood quantum mechanics because the formulation of resonance theory by Pauling had a firm basis and provided useful insights into many molecular properties. Actually, Fajans considered that theoretical chemistry, particularly quantum chemistry, had no place in chemistry. Chemists were supposed to study and understand molecules from the standpoint of their observed behavior

In parties at his home, Fajans was the very model of a gracious European host. One could ask for no finer a gentleman in such situations. But in his professional dealings with others, he suffered terrible lapses of judgment in his uncivil behavior. For example, A. D. Walsh had published some brilliant work showing how qualitative aspects of molecular orbital theory could help one quickly predict structural trends in molecules. He formulated what became known as the Walsh Rules. One day Michigan was fortunate enough to get Walsh to present a seminar. Fajans was present, and so was I. Walsh began by pointing out how prescient Fajans had been in formulating his "Quanticule Theory" of molecular binding and how closely related it was to molecular orbital theory. He went into some detail to show examples. One would have thought that Fajans would be extremely pleased by this gracious acknowledgment of his creativity. But no, Fajans became enraged and angrily argued that Walsh didn't interpret his quanticule theory quite exactly as he meant it to be interpreted. Fajans had so very much to offer the world that it is a tragedy he made it difficult for the world to appreciate him.

—Lawrence S. Bartell, *Philip J. Elving Collegiate Professor of Chemistry, Emeritus, University of Michigan.*