

Ludwig Gattermann (1860-1920)

About a year ago, the human rights lawyer Philippe Sands organised a remarkable event in the Royal Festival Hall in London: a complete reading of Primo Levi's *If this is a man* (*Se questo è un uomo*), a memoir of Levi's imprisonment at the Nazi extermination camp at Auschwitz. The readers included actors, playwrights, novelists and jurists as well as several survivors of genocide from Auschwitz to the Balkans. In the tenth chapter, "The Chemistry Exam" read that afternoon by the chemist Martyn Poliakoff, Levi is summoned to a clinically tidy office outside the fence of the camp to be quizzed about chemistry by the director of the Buna-rubber factory, Dr Pannwitz. Levi's sense of unreality is heightened when Pannwitz hands Levi a copy of Gattermann's *Die Praxis der organischen Chemikers* (*The Organic Chemist's Practicum*) identical to the one he himself had owned and worked from as a chemistry undergraduate in Turin before the war. Not surprisingly, given that Levi had graduated *summa cum laude*, he is chosen to be assistant in a lab where he comes into contact with German civilians from the nearby town. To them he is next to invisible; in turn he observes them with a mix of curiosity and horror.

After the performance I hurried home and pulled down my own copy from the bookshelf by my bedside. A maroon quarto with a textured, soft cover, it describes chemical techniques and procedures in simple, spare language that even my rudimentary German could cope with. As I flipped the pages, it occurred to me that against all the odds, Gattermann's book had perhaps helped save Levi's life. But who was this Gatterman?

Ludwig Gattermann was a baker's son born in the foothills of the Harz mountains in Lower Saxony in central Germany. As a child he delighted in collecting butterflies and minerals and was drawn to science from an early age. While still at school he started doing chemical experiments at home and discovered his vocation. He spent part of his military service at the University of Leipzig but then moved to Heidelberg where he spent a year with Robert Bunsen (CK2, Nov 2007). Wanting to focus on organic chemistry, Gattermann then went to Berlin to work with one of Bunsen's former students, the synthetic organic chemist Liebermann (discoverer of the dye alizarin). One of Liebermann's assistants remarked that Gattermann already had an exceptional laboratory instinct and superb synthetic skills.

After less than a semester, Gattermann left Berlin for somewhere closer to home, Göttingen, to work with another organic chemist Hans Hübner (who had worked not only with Bunsen but with Kekulé and Wöhler as well). Gattermann set to work in the lab and quickly developed a reputation as someone who could build kit and improve methods, from furnaces to nitrogen analysis. Within a few months Gattermann was Hübner's trusted lecture demonstrator; Gattermann gained exposure to a wide range of chemistry while also working towards his dissertation on aromatic chemistry. Hübner's sudden death in 1885 left Gattermann without a supervisor.

Viktor Meyer's (CK52, Feb 2012) arrival from Zürich was a turning point for both Gattermann and for Göttingen. Meyer's charisma attracted students in droves and the Department flourished.

Although Meyer had brought with him some of his assistants, Gattermann was in a different league of efficiency and skill. He was soon Meyer's right hand man, not only acting as his lecture assistant but also as project manager for the construction of a new wing of the labs. In return Meyer ensured that in spite of the substantial admin load, Gattermann had enough time and space to do his own research.

Although without an independent position, it was a very happy and productive time for Gattermann who was highly gregarious and the centre of a lunchtime club that included not only chemists but law and classics dons too. Gattermann's research was highly varied including syntheses of carboxylic acids using carbamoyl chloride, as well as developing the Friedel-Crafts alkylation, especially with Meyer's discovery, thiophene. But Gattermann really made his name by his attempt to purify and properly analyse the terrifyingly unstable chloride of nitrogen whose stoichiometry was still uncertain. In spite of numerous explosions, Gattermann succeeded in preparing exceptionally pure material and to analyse carefully weighed samples, confirming that "nitrogen

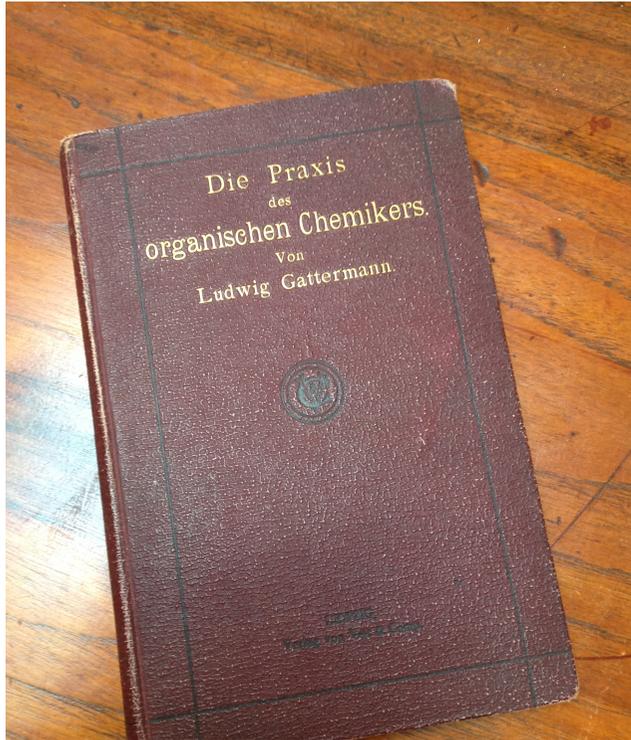
perchloride" had the formula NCl_3 . A British newspaper that picked up the story described him as a "hero of science", a phrase that led to endless ribbing by his colleagues.

In 1889 Bunsen in Heidelberg retired and Meyer was appointed to succeed him. Gattermann moved also. By this time he was also well known as an enthusiastic and cheerful teacher of students in the laboratory. He decided to commit what he knew to a book "to draw every single student's attention to the many little tricks which are required in organic synthesis". He was not a formal, showy writer but instead wrote a simple and direct account of the basic techniques – filtration, reflux, distillation etc. – that every student must master, and followed them with some sixty syntheses and analyses to put these methods in practice. Published in 1894, Gattermann's volume became known as his "Cookbook", a term used sniffily by some senior chemists who thought it intellectually inferior, but adopted cheerfully by the self-deprecating Gattermann himself who, forever the baker's son, had never felt comfortable around posh professors anyway. A 1907 paper gives an idea of his approach in the lab: he recommends that students smoke a cigar when working with hydrogen cyanide as even trace quantities give an "undefinable but very characteristic taste to the smoke". After Meyer's suicide in 1897, Gattermann was finally awarded a chair in Freiburg am Breisgau and after the first world war helped to support and retrain some of the endless number of wounded veterans returning from the front. And for all the sniffing, his cookbook was a spectacular success; it would be reprinted over and over, even long after his death in 1920. A couple of retired colleagues, trained in the 1940's and 50's, have told me that they too had used the book as students. If today it is hard to countenance any chemistry text saving anyone's life, Primo Levi's are books for our time, especially *The Periodic Table*. An extraordinary meditation on man's inhumanity to man and how it might be possible to rise above it, it has never seemed more relevant than today as memories of the horrors of the Second World War fade. Read it. Share it. And then read it again.

Acknowledgments: I am grateful to Philippe Sands, Alwyn Davies, Mike Porter, Thomas Morris and Peter Garratt

References

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Die Praxis
des
organischen Chemikers.
Von
Ludwig Gattermann.



VEIT & CO.
Verlag von 1842 bis 1904