

## Biographical Memoir (Excerpts)

Anthony Klein

### Childhood memories of a scientist (Part One)

I have vivid memories of my maternal grandparents home: a freezing-cold bedroom with a cast-iron stove that was rarely lit, a large living-dining room with solid heavy furniture, a couch where I used to be put to sleep after family dinners, opposite a 'grandfather clock' whose pendulum I would watch and listen to while going to sleep.



*Tony with his Mother, Rose*

My earliest memories are, of course, like everyone else's, olfactory: I don't remember my pram, which I am told, was a fancy four-wheeler with a hood, but I do remember my stroller which was upholstered with oilcloth, in those pre-plastic days, with a not-unpleasant odour of linseed oil. The same material was used for covering the kitchen table, with edges tucked under and held in place with drawing pins. It was wiped down daily and replaced annually as part of a grand spring-clean and it then had the same, strong odour of linseed oil. My paediatrician's examination bench was covered with the same stuff - because I remember that it smelled

the same - but I also remember the peculiar smell of old Dr Wittenberg himself. Some sort of antiseptic stuff, I suppose - not unpleasant per se, but associated with less pleasant experiences such as his cold hands and worse, things like injections.

Dr Wittenberg's surgery was a fascinating and mysterious place that I still remember (obviously from later years): A large room with the examination bench on one side and a central work-bench - probably covered with oilcloth too - on which were to be seen (but not touched!) little bottles, test-tube racks, a funny-looking inclined brass tube (obviously a microscope) and various strange odds and ends. Clamped to the side of this bench was an interesting piece of equipment that resembled an eggbeater with a handle that turned two hinged brackets (into which test-tubes could be fitted). When the old boy allowed me to give it a twirl (as a reward for being brave!) the two brackets would fly out under the influence of the centrifugal force. Obviously a simple centrifuge for the sedimentation of blood - it, along with most of the other gear, was an example of the apparatus used in what nowadays is done by pathology labs but

was, in those days part of a doctor's job. Anyway, it all looked rather intriguing and may, at an early age, have aroused my curiosity in things scientific.

Speaking of Dr Wittenberg' perennially cold hands, I distinctly remember an aversion to being bathed in the huge cast-iron bathtub, which, even when supplied with hot water from the big, brown, wood-fired water-heater, still had a cold bottom. It probably gave me too a cold bottom, hence my reluctance. This was overcome when some very shrewd person suggested to my mother that little kids like nice-smelling soap. So she bought some (probably rather expensively luxurious) sandalwood soap - and I still remember sitting in the tub - cold bottom or not - happily sniffing the cake of soap - brand name: "Bob". To this day, Suzanne reminds me, I am rather fond of nicely scented soap!

Around the age of 5 I had a bout of pneumonia – accompanied by a high fever and an uncharacteristic lethargy. Dr Wittenberg's diagnosis gave my parents great cause for concern. Pneumonia was a lethal illness in those days: After all, my paternal grandparents had died of it many years earlier in Budapest, when in their 30's, leaving my father and his three brothers orphaned at an early age. Fortunately the great triumph of the German pharmaceutical companies was already available: sulpha drugs.

The form of sulpha drugs that Dr Wittenberg administered was called "Rubiazol", considered by my parents as a miracle drug because it was almost instantly effective: Next morning I was bright and chirpy, no fever, and absolutely fascinated by the bright red colour of my urine – caused by the drug which, after all, was a coal - tar dye derivative. Apart from a very few childhood diseases such as chicken pox, measles and recurrent sore throats eventually cured by a tonsillectomy when I was about 14 years old. A few things I remember about the tonsillectomy: walking to the surgeon's rooms about one block from home, holding a kidney dish under my chin while he scooped my tonsils out with what seemed like a sharpened spoon, and walking home again in bitter cold weather. When the local anaesthetic wore off unlimited supplies of ice-cream controlled the pain which seemed no worse than some of the sore throats that I used to suffer before. Oh, and another thing: a little girlfriend I had at the time sat by my bedside and comforted me by holding my hand. The instinctive solicitude of women has always been a great consolation to me whenever I felt unwell!

This was the only surgery that I have ever undergone, apart, of course, from my circumcision, performed ritually when I was 7 days old and which I don't remember at all, but which must have been quite traumatic because I am told that I couldn't walk for over a year. Otherwise, I have escaped serious illness and had never even had a broken bone.

Like my father, who was a remarkably healthy man, until he had his first heart attack at the age of 63 (from which he recovered with the aid of a bedside electronic marvel called a pacemaker), I was a completely healthy specimen, too – until my first heart attack at the age of 65.

Back in Europe, I remember that my father, although himself a businessman and entrepreneur, with no technical training, was, nevertheless, fascinated by things chemical.

Together with a Vienna-trained chemical engineer as partner he slowly built up a little factory in Timisoara, for making chemical products - mostly ersatz materials such as detergents and tanning materials for the local textile and leather industries hit by wartime and early post-war shortages. Taught by Dr Vadasz, his partner, and by the 8-volume German "Ullmann's Enzyklopädie der Technischen Chemie" he was, to my childish eyes, a great expert. He prided himself of having a good nose for recognising smells - an important prerequisite for a chemist in those days - as he used to show me on my frequent visits to his smelly factory and its primitive laboratory. I got to like the game and learned to recognise quite an array of organic compounds. To this day, I can recognise and distinguish things such as benzene toluene and xylene (the solvents in contact adhesives); acetone, amyl acetate and methyl ethyl ketone (nail-polish removers); methyl salicylate (liniment) and several others – all of which, to me, smell quite nice, as well as a number of less pleasant-smelling compounds such as phenol, formaldehyde, and various sulphur-containing ones, starting with hydrogen sulphide and carbon disulphide, which positively stink!

More about my father's chemical and industrial activities elsewhere, but suffice it to say, I was quite determined to follow in his footsteps (and those of his rather foreboding partner - a rather morose bachelor from what I remember) and become an industrial chemist. I had a sort of a home laboratory in a corner of my room with an impressive collection of different chemicals - include some hair-raisingly dangerous ones such as concentrated sulphuric and nitric acids and other, less corrosive but highly toxic compounds. I wasn't alone in this - comparing notes many years later with other scientists, it was quite a common hobby - not discouraged by teachers and parents and, on the whole, adequately protected by common-sense safety warnings. I suppose there were occasional accidents but we all seem to have survived some pretty dangerous activities. For example - it was well known that nitro-glycerine was far too dangerous and unstable so I remember not attempting to titrate nitric acid into glycerine (though I possessed both) but using phenol instead - to produce picric acid (nitro-phenol) - a far less unstable explosive. I did this together with a boyhood friend, with whom I reminisced at a reunion 55 years later, recalling the yellow-stained hands that we sported for days. Eventually we produced a small quantity of yellow crystals but we never tried to actually explode them. One of my favourite experiments was to bubble acetylene - produced by dripping water on calcium carbide, bought in a hardware store, through a solution of silver nitrate. A white precipitate of silver carbide is produced and is collected on filter paper. It eventually turns black under sunlight – along with one's fingers, which were inadvertently stained with the silver nitrate too. When dried, the small flakes of silver carbide explode with quite a loud bang when tossed onto a hot stove - great fun indeed but we never dared to use it as primer to detonate the picric acid. Perhaps just as well too! Various fireworks produced with mixtures of potassium chlorate, sulphur and starch, and given colour by sodium (yellow) potassium (purple) and strontium (spectacular red), were also great fun to make, better than commercial fireworks which couldn't be bought by minors - unlike the prime ingredients that I mentioned. I must have been about 12 years old when I incurred severe parental wrath because holes appeared in my clothes and, worse, a Persian carpet, caused by sulphuric acid that somehow escaped from a glass-stoppered bottle. How could that have happened?

I also incurred a deep cut when attempting to force a piece of glass tubing through a rubber stopper with a clearly under-sized hole. I still have a slight scar in my left palm to show for it but - mercifully, nothing more untoward happened as a result of my amateur chemical activities. On the contrary - I learned a great deal of empirical science, mostly from kids' science books, from some more advanced textbooks and from the fabulous Ullmann's Enzyklopädie that although not wholly comprehensible, could still be scoured for good recipes not just for fireworks and explosives but also for other marvellous things. For example, a mixture of iron filings and sulphur could be ignited to form iron sulphide which, when doused with hydrochloric acid forms hydrogen sulphide - the quintessence of stink bombs. (We didn't know that it was as toxic as hydrogen cyanide, which we knew was lethal, but luckily we came to no harm).



*Mr. Herskovits with his class 1942-1943. Tony is standing in the back row, 4<sup>th</sup> from the left*

One of my earliest accomplishments - at about the age of ten - was to build an electrolysis apparatus. It came about because Mr Herskovics, the 4th grade teacher told us that water, H<sub>2</sub>O, consisted of two parts Hydrogen to one part Oxygen - both colourless, odourless gases. "How do you know?" - enquired the precocious little brat that I was. Because we can take water apart by using electricity. "Is that so? How do you do that?" "Well, you put two carbon rods into a jar of water, connect it to a battery, and watch the bubbles come up". To cut a long story short, I got two carbon rods by wrecking spent torch-batteries, a glass jam jar, and bits of wire and, probably with a bit of help from Mum or Dad, I managed to electrolyse some water and collect

the little gas bubbles in test-tubes placed over the carbon electrodes. Quite a mind -bending experience and quite a source of kudos when I was asked to show it to the whole class! Mr Herskovich obviously has a lot to answer for! He was a great and kind teacher who clearly loved children and whom I remember with great fondness.

One thing that I remember about him is that shortly after the war, when he would have been about 30 years old, he married a beautiful young lady – a Holocaust survivor who came to Timisoara as one of many refugees who came directly from a concentration camp in the Western part of Romania whence they were liberated by the advancing Russian army. This poor young woman, whose name I forget, always wore heavy makeup on one side of her face, attempting to hide a large burn scar. Who knows what horror lay behind it. I can only hope that marrying such a fine man and later taking up a teaching position herself and perhaps having her own children erased some of her terrible experiences. Several children – some of them orphans, also came to town as refugees, many from the city of Cernăuți (the former Chernowitz of the other end of Austro-Hungarian Empire), – we knew them collectively as “the Transnistrians” – they all originated from Western Romania and were rounded up in concentration camps on the far side of the river Dniester. One of the children whom I remember was a strikingly beautiful little girl, whose name (but not face) I forget. Sadly, she had very ugly rotten teeth, for obvious reasons. I am sure she had the problem fixed at some later time, but who knows what other, less obvious, consequences of her past traumas she carried with her.

I used to think that, along with my father’s influence, it was Mr Herskovich who kindled my interest in chemistry. I do recollect another specific incident, however, which may account for my later taking up electrical, rather than chemical engineering. I told the story once in a column in “The Australian Physicist” during the time that I was the President of the Australian Institute of Physics. It was in the January/February 1990 issue and had the title: “Woorlookadat” and was accompanied by a cartoon of a naked Archimedes running along a street. Here it is almost in its entirety:

“Last November’s issue of The Australian Physicist, with its emphasis on articles of educational interest, reminded me that I had vaguely promised Jan Powe, the Associate Editor (Education), to contribute such material but have not yet done so. Perhaps I can remedy that! [Note added later: Sadly, Jan Powe died of breast cancer a very few years later, still a vigorous and vivacious science teacher – a great loss to the profession!]

Along with her invitation to write something, Jan had sent me a cutting from an issue of the New Scientist of a couple of years ago, in which the author of a Letter to the Editor confessed that she had become a scientist as a result of a “Woorlookadat” experience: A classroom demonstration in which convection currents were illustrated by a crystal of potassium permanganate in a heated beaker of water had led to the spontaneous exclamation “Woor...” and the later speculation that the intrinsic beauty of the experiment had “turned her on” to science.

This struck a resonant chord in me because I distinctly remember the classroom experience, which, well over 40 years (but considerably under 50 years) ago, permanently warped my mind. It happened one day that Mr Herskovics, the fourth form teacher, came into the classroom carrying the battery from his motorbike. He sat up on the corner of his desk, as was his habit, with his feet dangling over the side, and put the battery down beside him. He then took a few things out of his pocket, one at a time. A length of wire (d.c.c.: 'double cotton covered' they used to have in those pre-plastic days), a long coach bolt and a few nails. An air of suspense was building up. It was quite clear that he was going to do something unusual; he was that sort of bloke.

"Well", he said when he saw that he had our attention, "today I want to tell you a story about a young apprentice bookbinder who was a very poor but very clever lad. His name was Michael Faraday and he lived in London a long time ago. He used to like reading very much and had read many of the books that his master had given him to bind. ( "Here we go: He is trying to get us to read more!" ). As he was talking, we were all intently watching his hands. He seemed to be fiddling with that bolt, winding the wire on it like one winds string upon a bobbin. Quite distracting, really.

The story continued, that Michael Faraday had heard about a very famous man who used to give very interesting science lectures, and that young Faraday went along to these lectures and was very impressed by what he heard and wrote down every word of it. ("How could he do that, I ask you. What's he trying to sell us here? Pay more attention to writing?") "And then he copied it all out in the finest copperplate handwriting".

( "Here we go! Handwriting! ..." ) "And went along to see the famous man and presented him with a copy of these notes that he had, himself, bound into a handsome book."

- " Why did he do that? Are you paying attention, Klein?".

- " Yes Sir, you said he was a bookbinder, Sir"

- "Very good. An apprentice bookbinder, actually. But when he took the book along, he asked the famous man if he could become an apprentice chemist instead, and the famous man said all right". Or something like that. Meanwhile, he had continued fiddling with the wire, which by now was all wrapped around the long bolt.

"Now, I want to show you something very interesting", said Mr Herskovich. "You all know that a magnet can pick up steel pins and nails, but this bolt can't, of course, because it isn't a magnet" and he showed us that indeed, it couldn't. Big deal! (Or equivalent... the phrase had not yet been invented). "Well, I 'll tell you something that young Michael Faraday did later on, when he had learned everything he could from that famous scientist and had become a famous scientist, himself. One day, he picked up a bolt like this one, and wrapped a lot of wire around it, just as I did, and then he took a big battery..."

"No, Klein, not like this one. This one is off my motorbike; they didn't have motorbikes in those days. He had another one. Now stop interrupting!"

"So, Michael Faraday took the two ends of the wire that was wrapped around the bolt and touched them momentarily to the two bits of metal sticking out of the top of the battery, like this, and ..." Zap! Sparks. ("So what! I've seen bigger sparks than that...")

"Now watch this." The bolt with the wire wrapped around it, just a piece of steel before, was now picking up the nails scattered on the benchtop!

"Woorlookadat!" It had become a magnet! Just like mum's magnet with which she picks up dressmakers' pins! It blew my mind! There and then I decided to become a chemist, just like young Michael Faraday. It was almost seven years later that I was saved from that fate when I discovered that what I really wanted to be was an Electrical Engineer. It took another seven years for me to make the further discovery that Michael Faraday was really an experimental physicist and that it was actually physics that had gripped my imagination all those many years ago.

That the story was wildly inaccurate is beside the point. I may even have remembered it incorrectly. But the magic of physics spoke for itself. It still does, from time to time, when I experience the thrill of something really new. Such as holograms; new permanent magnets so strong that I can't separate them with my fingers; levitating superconductors at liquid nitrogen temperature; electron holograms of a single flux quantum and so on, ... and so on.

But I 'll never forget the first experience...the first "Woorlookadat". Nor will I forget Mr Herskovics who left as great an impression on me as did Michael Faraday himself, and certainly a greater one than the famous Sir Humphrey Davey, whom I had almost forgotten. Perhaps physics teaching is a worthwhile occupation after all!"

To be continued in the next issue