

book reviews

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Personal X-ray reflections. By U. W. Arndt. Pp. 177.
Twickenham: Athena Press, 2006. Price GBP 6.99, USD 11.95.
ISBN 1-84401-694-3.

This book is a delightful record of Uli Arndt's career and his views on science, often very direct and probing, as well as a tribute to his wife Valerie. I learnt from the book's postscript (p. 177) written by his three daughters that Uli did not live to see publication of the book, but he had the satisfaction of seeing the cover and page proofs. He died on 24th March 2006; his wife had died just over a year before and he spent much of the intervening year writing this book. Within protein crystallography, and indeed all of crystallography, Uli was a well known and influential scientist. Various tributes were made on the news of his death within the CCP4 bulletin board and of course formal obituaries have also been published. The book is organized in 13 chapters; the first covers his early years in Germany (1924–1936) and how the family was able to leave the country and move to England, the second his schooldays in London and Birmingham (1936–1942), the next two chapters take us up to and including his PhD (1949), then his research career is detailed in two key phases, namely at The Royal Institution in London (1950–1963) including a sabbatical year in the USA, and then at the MRC's Laboratory of Molecular Biology (LMB) in Cambridge (1963–1988). His retirement projects, also conducted at the MRC LMB, spanned from 1989 to 2004. He ends with an overview chapter on his preferred books and reading.

I first met Uli Arndt in 1975 when I was an attendee at a workshop on the screenless rotation camera and its uses in protein crystallography, which was held in Groningen in The Netherlands. I was a first year DPhil research student at Oxford University at that time and the Head of the Laboratory of Molecular Biophysics, Professor David Phillips, and my supervisor, Dr Margaret Adams, were of the firm view that the cost of sending me would be justified. I did not realize then that I would work closely with Uli in our research collaborations for approximately the first 10 years of my research career, mainly at the new Daresbury Synchrotron Radiation Source, *i.e.* the period spanning the decade 1980 to 1990. I met with Uli usually at the Enraf–Nonius premises in Delft, where the commercial version of his TV area-detector diffractometer was being developed. We also met occasionally in Cambridge and, to my recollection, once at each of my joint work bases of Keele University and Daresbury Laboratory. It is a privilege and honour to be the reviewer of Uli's autobiography for IUCr journals.

The book has given me a much deeper insight into Uli's views and character. I had not expected the sharp wit that made me laugh out loud every other page at his traveller's

tales or his views on science and scientists. It would spoil the fun, because you really must buy this book, to reveal them here Well, OK, here is one (p. 118): at Milan airport Uli thought he would be rerouted *via* Ancona, Roma, Napoli, Domodossola and Torino . . . !

Uli describes his research career as consisting largely of the design of instruments and the development of new techniques. His father was an engineer, who would say to Uli that a scientist (only) investigates the world as it is, but an engineer's job is to study a world he has created himself. Thus Uli remarks (p. 63), 'when I want to be modest in England I say that I am not a real physicist, but more of an engineer; in France I describe myself as not a real engineer but only a physicist'. Another one of these vignettes into his view of science and scientists is more acidic: "I believe that most scientists can be classed as either 'knowers' or 'doers' I place myself emphatically as a 'doer' The really great scientists alternate between knowing and doing phases". The barb then gets delivered by Uli, paraphrasing p. xi, J. D. Bernal ('Sage') preferred reading to doing (research).

In similar mood, he remarks of the (modern) synchrotron-radiation facility as being a vortex of committees although he does state that by 2005 there were more than 20 synchrotron radiation facilities with beamlines offering up to 14 magnitudes more powerful intensity than conventional X-ray tubes (a little exaggeration here, 10 orders at present). Reading this section, I realized I regretted not summarizing for Uli how with his, and Enraf–Nonius, FAST system at the Daresbury SRS 9.6 in a period of 10 years, with my crystallographer colleagues Drs Miroslav Papiz, Steve Andrews and Pierre Rizkallah, with Phil Moore (Engineer), we had broken new ground with applications in supporting academic and industrial users in their structure determinations involving small crystals of small molecules and proteins, in time-resolved DNA fibre studies and high-resolution protein studies. Also our other synchrotron collaboration involving the polychromatic profiles, notably with my colleague at Keele, Dr (now Professor) Trevor Greenhough, neatly revealed in a continuous scan the strong variation of the anomalous scattering available *via* f' , which was published in *Nature* in 1982, his only publication there since the 1950s. I note though that he did cite this paper in his reviews. Overall, he also cited the success of protein crystallography at the Daresbury synchrotron, along with successes in various other countries, in his 2003 review of the same title as this book published in *Methods in Enzymology*. Uli declares that he does not take much notice of citation matters, preferring to take his own time and his own routes. How times have changed!

Detector developers of the time were described as TV personalities or gas people. Uli was the leading TV star of

course. There was a 'fierce rivalry', Uli's words, between the camps (p. 138) summing matters up as 'The development work was expensive and the expense led to competitiveness in the field'. Curiously, there was an earlier fierce rivalry between the two screenless film camera possibilities; the rotation camera of Uli and the precession camera of Professor Xuong in San Diego, also rivals in the TV *versus* MWPC gas chamber options.

Uli was instigator of numerous instrumental developments. His first paper [Arndt (1948). *An X-ray Tube with Adjustable Focus*, *J. Sci. Instrum. Phys. Industry*, **25**, 414–416; full list available at http://www2.mrc-lmb.cam.ac.uk/U_Arndt_publications.html] is already recognizable as having all the hallmarks of an Uli paper. There followed through the decades his initiatives of the linear diffractometer, the scanning microdensitometer, the screenless rotation camera, the TV diffractometer and, in the final decade, the microfocus X-ray tube with specialized optics. He published various

papers in *Acta Cryst.* (9 in all) and *J. Appl. Cryst.* (12 in all), several of them landmark publications.

I will summarize as follows. This book is amazingly good value and it is a compelling read for all who knew him. Those scientists that did not know him would, I feel sure, enjoy this book, as would historians and sociologists of science and scientists. There are intriguing omissions though; nowhere does Uli name his 'fierce rivals', either with detectors or, in effect, his competitors from the intense synchrotron X-ray beamlines (including myself). The book will I believe make a reprint edition; in which case I request that an index be added if only to make it easier to find all those gems of Uli's humour and anecdotes.

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