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A Personal Recollection of H. M. Powell and the Oxford Laboratory of Chemical Crystallography★

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In a contribution to the first issue of this *Journal* Professor Powell [1] hinted that my entry into the field of structure analysis was non-typical and a brief explanation may be in order. During the early years of the second World War my employers, who were involved in the purification of uranium, had encountered serious analytical problems. In the absence of the powerful techniques later developed it was suggested that, with the very special features of X-ray atomic spectra, the potential of X-ray spectrometry should be investigated. While suitable equipment was being designed and built, and in the absence of any work on X-ray spectrometry in Britain, it was arranged that I should spend some time working with H. M. Powell to gain at least some experience of X-ray techniques. To this end I arrived in Oxford on 5 June 1944 – the day before more important happenings elsewhere. It is perhaps relevant to say that I was an experienced industrial research laboratory worker but until then had not worked in an academic environment.

The main facilities of the Laboratory of Chemical Crystallography were housed in a basement of the University Museum in which a large table served as a desk for writing, calculation and drawing. An adjoining cellar housed the X-ray generator and darkroom. The Laboratory facilities were shared between the students of Mr Powell and those of Dr Dorothy Hodgkin. Mr Powell had an office adjacent to a laboratory at the other end of the Museum where Frank Welch, the invaluable and indispensable departmental factotum, had his workshop and other facilities. It was all somewhat of a change for me after my experience hitherto in industry but I was made most welcome and was soon sharing bread with peanut butter and 'Marmite' for elevenses and lunching at one of the excellent British Restaurants which existed in Oxford at that time. I soon got to understand and appreciate the value of the different approach to life and work in the new surroundings.

At first I think that Mr. Powell was a bit uncertain as to what he should do with me to meet the open remit from my employers so he asked me to try to tidy up some outstanding matters left over from the work of a previous research student. I did not find this intellectually very satisfying and after a few weeks asked him whether he had any outstanding project I could take on which would not otherwise be tackled at that time. As he has already described [1] he produced a small tube of yellow crystals of the quinol : sulphur dioxide complex (which it was clear had been in the drawer for some time) and so I was, almost despite myself, launched into the field of X-ray structure analysis. I remember that at the time Mr. Powell suggested that the sulphur dioxide was somehow trapped in the structure and in a literature survey I discovered that many more similar complexes were known to exist: I soon realised that Caspari's β-quinol [2] must be a similar complex with methanol. Mr. Powell was at that

★ Dedicated to Professor H. M. Powell.

time very busy so he was happy, with great advantage to me, to let me get on with the various stages of the structure analysis but was always ready to discuss matters when necessary and to advise me from his profound knowledge of all aspects of the subject. I well remember the way he would roll his eyes upwards as though seeking for inspiration and with a characteristic smile and voice inflection make a most cogent point.

Details of the structure analysis, described elsewhere [3], are not relevant to this note and have anyway, with the pasage of 40 years, become somewhat blurred, but two things still stand out: the tedium of Fourier series summations using Beevers–Lipson strips (happily no longer necessary) and the excitement one weekend when electron density plots showed clearly for the first time an indication of the mode of linkage of the quinol molecules into two interweaving cages with holes in which the added molecules were trapped. I think it was at this stage that Mr. Powell, showing another aspect of his wider interests, first mentioned to me his neologism 'clathrate' to describe this type of structure [4] – although he had almost certainly had this in mind for some time.

I stayed in Oxford for a few more months filling in details of the basic structures and paid visits back after my return to industry before the papers were published. The experience of working with Mr. Powell had been a memorable and invaluable stage in my research career and I was most happy when his contributions to science were recognised by his election to the Royal Society and promotion to a chair at Oxford.

Perhaps I should say in postscript that X-ray spectrometry was never used in the uranium problem (although it was used in other projects) but the experience I gained in X-ray diffraction methods proved invaluable in many other industrial projects.

References

1. J. E. D. Davies, W. Kemula, H. M. Powell, and N. O. Smith: *J. Incl. Phenom.* **1**, 3 (1983/4).
2. W. A. Caspari: *J. Chem. Soc.* 2944 (1926); 1093 (1927).
3. D. E. Palin and H. M. Powell: *J. Chem. Soc.* 208 (1947); 571 (1948); 815 (1948).
4. H. M. Powell: *J. Chem. Soc.* 61 (1948).