

Preface

The historic threads of scientific enquiry that are woven into the fabric that is our understanding of the natural world (and the benefits that stem from its application in technology) should not simply be the province of scientific historians (nor even, heaven forbid, sociologists of science or cultural theorists); they should inform practitioners and the wider public alike of the debt today's scientists owe to their scientific forbears as well as demonstrating that the body of scientific knowledge is continually growing and some portion of it changing. Indeed, the processes, requirements and timescales of science, and the distinction to be made between them and those of technological development, need to be much better understood, particularly by those who formulate and execute public policy and those who direct and manage industrial, commercial and financial enterprises and not least by scientists themselves.

At the beginning of the 20th century, inorganic chemistry was overshadowed by developments in organic and physical chemistry, developments in both of which were to lay the foundations for the re-invigoration of inorganic chemistry and the sub-disciplines of coordination and organometallic chemistry that characterised the latter half of the century.

It is our purpose to provide a perspective of this formative period (and its manifestation in certain areas of contemporary inorganic chemistry) through the contributions of one of the foremost practitioners, Joseph Chatt.

Isaac Newton suggested that his own scientific vision was so great because he had 'stood on the shoulders of giants'. In a humbler sense, all scientists see further and deeper than they otherwise might, because of the work done by those who went before. However, with an ever-increasing volume of scientific publication, it is difficult for today's scientist to keep up with new material in his or her own field, let alone to explore and appreciate the wider significance of the earlier literature. While this is understandable, not only might they fail properly to acknowledge work with a bearing on their own, but they also lose sight of the methods (often very limited) available in the past that provide a proper testament to the magnitude of earlier contributions. We should know what it was that ensured that this earlier work has stood the test of time (particularly the test of modern scientific methodology). In addition, the over-dependence on computerised literature searching methods tends to reduce awareness of material published before the mid-1960s. This is significant, as the post-war period up to that point was the time when Joseph Chatt and his collaborators (as well as other major contemporary figures) were especially productive.

Today's science is much more of a team (one might even say a corporate) activity, with the idea of scientific leadership of the sort provided by Chatt (and amply exemplified by the various contributions in this volume from his former students and co-workers) being seen increasingly as old-fashioned. However, for today's research students and their supervisors at least, it should be informative if not instructive to be offered an appreciation of what it was like to work for such an individual, particularly the testing and challenging but essentially supportive environment in which Chatt's students researched.

There are those who look at the close involvement that exists today between science and business and are concerned that science is damaged by such interactions. It is significant then to draw attention to Chatt's employment and support by Imperial Chemical Industries Ltd during the period 1949 to 1962. (Chatt's internal ICI reports for the period have been archived at the John Innes Centre, Norwich, UK.) It says much about Chatt that his independence and strength of character saw to it that he produced fundamental work of the highest standard. It says much about ICI's very senior staff that they believed in the importance of participation in the scientific enterprise at its most fundamental. On the other hand one is also forced to conclude that there were others in ICI who tended to dismiss the workers at The Frythe as pampered academics and who did not regard Chatt's work as being of any value to them. Whether this was so, or simply appeared so to those unable to conceive of or appreciate its significance or potential, cannot now be gauged. One may simply speculate whether a greater understanding on both sides of the gulf that inevitably separates the output of purely scientific work from that needed to secure a commercial opportunity from a technological development based upon it (and the presence of some mechanism within the company purposefully designed to bridge this gap) might have led ICI to gain an advantage from the developments in coordination and organometallic chemistry potentially available to them. Suffice it to say that ICI was not the only large chemical corporation that found difficulty in reconciling the shorter-term demands of commercial operation and financial performance with the longer-term needs of research and development. Indeed, the problem remains a general and contemporary one.

Today's generation of academic scientists, particularly in the UK, have operated in an environment in which they have felt obliged to secure funding for their work primarily by stressing its 'relevance' or its potential for application, even when this has been at the expense of purely curiosity-driven research. Some argue that academics themselves are partly to blame because of their unwillingness to recognise and support creativity and adventurousness through the peer review process. Others argue that there is no incompatibility between fundamental work done for its own sake and that done with some end in view. Indeed, this principle was well exemplified by the overall purpose of the Nitrogen Fixation Unit set up by the Agricultural Research Council at the University of Sussex under Chatt's direction. That it was so successful from a scientific point of view arose from a further principle that characterised Chatt's stewardship of the Nitrogen Fixation Unit, namely the recognition of the contributions to be made by different disciplines and by the purposeful interactions between them.

The gap between scientists and those seeking to develop the results of their science that was characterised in Chatt's time by ignorance and indifference may have been narrowed, though it may well now be more characterised by suspicion and antagonism arising from a failure of scientists and their sponsors to recognise the motivations, methods, language and timescales of each other. The wiser manager and investor do indeed recognise the long-term importance of 'pure' research (as well as understanding that the timescale is often measured in decades and not reflected by the demands of quarterly reporting of business performance!): there are just not enough of them to provide, business-wide, scientifically literate and technologically creative management. Today's successful academic should be at ease with a portfolio of fundamental research driven both by curiosity (particularly at the interfaces with other disciplines) and by technological or societal need and must be willing to appreciate the intellectual challenges associated with technological development (as well as its inevitable shorter-term focus). There are not enough of such academics either.

It is important to look back at the contributions of major figures of the past to assess, with a longer historical perspective, whether their reputation stands the test of time. We know that such assessments have been made about major figures such as Newton (and Hooke's contributions) and Darwin (and Wallace's contributions). In one particular sense, this volume provides a starting point for that assessment as far as Chatt is concerned.

As Peter Tasker's comments in his Introduction indicate, this volume grew out of the 34th International Coordination Chemistry Conference held at the University of Edinburgh, in July 2000. While most of the contributions presented to the 'Joe Chatt Chemistry' sessions are reproduced in expanded form here, we have also sought contributions from Chatt's contemporaries and students, whose reminiscences give a true measure of the man. There are, in addition, contributions which concentrate more on the chemistry with which Chatt was associated and, in various degrees, link Chatt's work, particularly on phosphine-, hydride-, olefin- and dinitrogen-metal complex chemistry and chemistry, biochemistry and biology of nitrogen fixation, with the very latest developments in these topics. These include chapters from recipients of the Chatt Lectureship, conferred by the Royal Society of Chemistry.

While this book is not solely biography, history, scientific text or conference proceedings, we hope that the mix of each will be of interest to many. We thank all the authors who have provided contributions and believe that they truly reflect the legacy of a great chemist to modern coordination chemistry.

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