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EDITORIAL

Editorial 70 (the platinum issue)

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This 70th issue of the journal is dedicated to the memory of Peter Nelson who recently passed away and whose last article appears in this issue. Peter was a man of very diverse chemical interests that included chemical education, the periodic table, electronic structure and thermodynamics.

Over the years he contributed 10 full length articles to the journal as well as conducting many more reviews for us. My first encounter with him was in the early 1990s while I was still completing my PhD at King's College, London and it was on the question of the relative occupation and ionization energies of the 4 s and 3d orbitals in transition metals, which we discussed in a number of short pieces in the journal *Education in Chemistry*. Peter was a wonderfully knowledgeable chemist who will be greatly missed by all who knew him.

The second article concerns the discovery of the elements, and in particular the element rhenium. As is well known, the discovery of most elements has been a rather controversial affair, and especially so in the discovery of this element which is usually attributed to Walter and Ida Noddack. In recent years a Japanese chemist, Kenji Yoshihara has claimed that the element was first discovered by his fellow countryman, Masataka Ogawa, while working with William Ramsay at University College, London in the early years of the twentieth century. In a book entitled A Tale of Seven Elements, I re-examined the evidence that Yoshihara had provided and arrived at the conclusion that this attempt at a rehabilitation might have been mistaken.

In the current issue some other Japanese scientists, led by Yoshiteru Maeno have reopened this case and conclude that Ogawa's nipponium was indeed the same element that was eventually named rhenium. Incidentally, and as a curious aside, this case presents an interesting anomaly to the supposed IUPAC rule whereby a name that has been proposed for an element, that is later deemed not to exist, should never be used again. Nipponium, or rather nihnoium is the official name that was given to element 113 by IUPAC a few years after it was discovered in the twenty-first century. Perhaps the IUPAC rule should be changed to say that a formerly rejected name can be used provided one changes the spelling of the name!

The next article is by a pair of distinguished Italian theoretical chemists who provide a very readable account of density functional theory, Fukui functions and chemical reactivity, including the origins of these approaches in the earlier Thomas–Fermi method. The article

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concludes with some recent studies that originated from these now classic approaches and how they are providing more accurate measures of chemical reactivity.

Article 4 is by Viswanathan and Razul from India, and concerns the increasingly important topic of the orthogonality of orbitals. This is a topic which is frequently mentioned in articles on relativistic effects in chemistry. However, this is usually done with little or no explanation of how or why the orthogonality conditions cause the contraction of the innermost electron orbitals which is conveyed to less stable orbitals in any given atom or molecule.

Talking of relativistic effects in chemistry, the article that follows, by Nenad Raos, who works in Croatia, is a less technical survey article about just this topic, and one that should be welcomed by historians and philosophers of chemistry wanting to understand these quite new developments in chemistry.

The philosophy of chemistry continues to be of relevance to the field of chemical education. Article 6, by Margaret Blackie from South Africa consists of an intriguing and philosophically motivated approach to improving the teaching of chemistry and in particular organic chemistry. This is carried out through an epistemic framework that is influenced by Rom Harré's brand of realism and what the author calls a stratification of the knowledge in terms of "knowing how" and "knowing why".

No issue of *Foundations of Chemistry* would be complete without the inclusion of at least one article on the periodic table of the elements. In this instance the contribution comes from the Brazilian author, Da Silva, who argues that the retention of the 18-column or medium-long form of the periodic table is more a matter of 'habit' than what is dictated by the scientific facts.

Alan Goodwin from Manchester in the UK provides an interesting and detailed account of a early classic textbook of chemistry that was written by James Muspratt in 1860. This book then serves as a platform for Goodwin's partly biographical account of the changes in chemical education that have taken place in the UK since around 1960, when the author graduated in chemistry.

The final full-length article is an interview that was conducted with me by Edit Talpsepp who is a philosopher of science based in the wonderful city of Tartu in Estonia where there continues to be a good deal of interest in the philosophy of chemistry.[1]

Finally, the issue closes with a concise review of a new book on thermodynamics by Robert Hanlon. The reviewer is none other than the world's leading textbook author, Peter Atkins, an emeritus professor from the University of Oxford.

Reference

Vihalemm, R.: Are laws of nature and scientific theories peculiar in chemistry? Scrutinizing Mendeleev's discovery. Found. Chem. **5**(1), 7–22 (2003)

[1] Perhaps the best-known Estonian philosopher of chemistry was Rein Vihalemm, the author of several articles in this journal, such as one published in 2003 (Vihalemm 2003).