Historical Group

NEWSLETTER
and
SUMMARY OF PAPERS

No. 64 Summer 2013

RSC Historical Group Newsletter No. 64 Summer 2013

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meeting on “Chemistry and Medicine: Some Historical Aspects” on Wednesday 23 October are also included.

Finally I would like to thank everyone who has sent material for this newsletter, with particular thanks to the newsletter production team of Bill Griffith and Gerry Moss. I would also like to thank the RSCHG’s outgoing chairman, Alan Dronsfield, for his many contributions to the newsletter and his support to me as editor. If you would like to contribute items such as articles, book reviews, news items and reports to future newsletters please do contact me. The guidelines for contributors can be found in the summer 2012 edition or online at:

http://www.chem.qmul.ac.uk/rschg/Guidelines.html

The deadline for the winter 2014 issue will be Friday 14 December 2013. Please send your contributions to (a.simmons@ucl.ac.uk) as an attachment in Word or rich text format, or on CD-ROM (post to Epsom Lodge, La Grande Route de St Jean, St John, Jersey, JE3 4FL). All contributions must be in electronic form.

Anna Simmons
University College, London

Obituaries

Professor Colin Russell (1928-2013)

Professor Colin Russell died at home on 17 May 2013 after a long illness. The RSC Historical Group had been founded in 1975, but Russell laid the foundations for the Group as we know it today in his period as Chairman between 1977 and 1982. As Alec Campbell remarked in an appreciation in the January 1983 newsletter, Russell “immediately addressed himself to enlarging the Group’s sphere of influence. The fact that the Group now has an established place in the programme of the Annual Congress, alongside the large Divisions of the R.S.C., is due to Colin’s detailed knowledge of the interplay of forces within the history of science in this country, and his personal commitment to the notion of the history of chemistry as an integral part of living chemistry”. I would add that his close links with the RSC and, in particular his rapport with its conference organisers (John Gibson, Angela Fish and Stanley Langer),

lacuna which all historians of chemistry must regret. Russell also developed his writing skills in the 1960s, co-authoring *An Introduction to the Physics and Chemistry of Baking*

of Frank Clarke Hills. In the course of this research he decided to carry out a computer-based prosopographical study of the members of the Newcastle Chemical Society using a mainframe computer. Sadly this project never fulfilled its ambitious objective, partly because the database format used quickly became obsolete, but it laid the ground for the later successful database project, "Studies of the "British Chemical Community, 1881-1972", led by Roberts. Russell then played a leading role in the late 1980s in the development of AS283 "The Rise of Scientific Europe" and he was enthusiastic about the opportunity to show the history of science in different European countries on television. With his course team colleague, David Goodman (also recently deceased), he edited the still valuable textbook *The Rise of Scientific Europe, 1500-1800* in 1991.

While Russell was living in Preston, he discovered that Edward Frankland had been born in the nearby village of Catterall. Russell approached Frankland's biography initially as a local history project and made the astounding discovery that he was the illegitimate son of a local landowner Edward Gorst (and hence a relative of the then well-known right-wing MP Sir John Gorst). This line of research led ultimately to the publication of *Lancastrian Chemist: The Early Years of Sir Edward Frankland* in 1986, which was published under his name, but was very much a joint effort with his wife Shirley, a trained historian. He then published a full biography entitled *Edward Frankland: Chemistry, Controversy and Conspiracy in Victorian England* ten years later. During the research for these books, he discovered an important and hitherto unknown collection of Frankland correspondence still in the hands of the Frankland family, which he, together with his wife, microfilmed and indexed for the benefit of other scholars. They published "The Archives of Sir Edward Frankland: Resources, Problems and Methods" in the *British Journal for the History of Science* in 1990. He then had the idea of creating a computerised index to the microfilms which would then drive the microfilm reader. This entailed the installation of one of the first PCs at the Arts Faculty of the OU in 1982, the futuristic-looking Superbrain II. After two decades of negotiation between Russell and the family, this archive was deposited in the John Rylands Library in 2009, an event which he regarded as one of his major achievements. In the 1980s, Russell became increasingly concerned about the relationship between the chemical industry and the environment. He obtained the funding for one of the first research fellowships in the history of the chemical industry and the environment (held by Sarah Wilmot), and with Coley, Campbell and Wilmot, he published *Chemistry, Society and Environment: A New History of the British Chemical Industry* in 2000. Ashgate published a collection of his articles in its Variorum series in 2010, including an important paper on the history of organic synthesis which first appeared in *Ambix* in 1987 and the paper on the Frankland archive. A long-standing interest in the history of railways finally resulted in *Early Railway Chemistry and its Legacy* (2011), co-authored with John Hudson.

Unusually for a professional historian of chemistry, Russell was a Fellow of the RSC and a member of Council between 1999 and 2002. Russell became increasingly concerned in the 1980s about the future of the history of chemistry among chemists and at large. He encouraged RSC Publications to take a stronger role in the promotion of the history of chemistry. One result was the *Recent Developments in the History of Chemistry*, based on the model of the Specialist Periodical Reports of the RSC, which appeared in 1985. It was not repeated as regularly as Russell initially hoped, partly because of the difficulty of finding suitable authors, but he edited a follow-up volume *Chemical History: Reviews of the Recent Literature* with Roberts in 2005. For several years it seemed that the history of science would be included in the new National Curriculum and Russell worked hard to ensure that the history of chemistry would be given a suitably prominent position. One result of this drive to promote history of chemistry in schools was the series of coloured wall-charts launched by the RSC in 1992, which sadly petered out after the first wave of charts on organic chemistry (Russell), industrial chemistry (Campbell), chemical atomic and molecular theory (Coley), and analytical chemistry (Morris).

In the late 1980s, Russell obtained "seed money" from the Wellcome Trust to set up a centre for the history of chemistry. He had hoped that Unilever would offer him accommodation at the eighteenth century mansion Colworth House, Sharnbrook, near his home in Bedford as the firm was dropping the house as their research centre. However it became a science centre instead and Russell did not think the house in Port Sunlight offered by Unilever as an alternative was large enough. The centre was very nearly established at the Open University's base in Cambridge until it transpired at the last moment that the floor loading was inadequate for the library that Russell had planned. He then rejected alternatives that he felt were not suitable for the kind of centre he had in mind, including a proposed site at the Open University, and returned the money to the Wellcome Trust. It has to be regretted that Russell's efforts to promote academic history of chemistry have left no permanent mark, as the History of Chemistry Research Group at the Open University has ceased to exist and the History of Science, Technology and Medicine Department was absorbed into the History Department in 2008.

Russell became the Professor of the History of Science at the Open University in 1981 and retired in 1993, becoming a Visiting Research Professor. He was made an Emeritus Professor in 1995. He was president of the British Society for the History of Science from 1986 to 1988 and gave his Presidential Address on "'Rude and Disgraceful Beginnings': A View of History of Chemistry from the Nineteenth Century". He

received a D.Sc. from the University of London in 1978. He was presented with the Dexter Award for lifetime achievement in the history of chemistry by the American Chemical Society in 1990 and the David W. Mellor Medal for Chemical Education from the University of New South Wales in 1995.

He first met his wife Shirley in 1948, when they were both at University College, Hull, and they married in 1954. They had four children, Caroline, Jeremy, Kate and Helena. As Milton Keynes hardly existed in 1970, the family settled in Bedford, where a Service of Thanksgiving was held at the Bunyan Meeting on 30 May 2013.

I worked with Russell at the Open University between 1982 and 1991, with a two and a half year gap in the mid-1980s when I worked at CHOC. His hallmark was his modesty, despite his many achievements, and he was always genuinely surprised when his work was recognised in some way. I remember his astonishment when I told him the theologian and physicist Fr. Stanley Jaki regarded his work on science and religion very highly. A man of deep faith, he had a strong sense of fairness and justice. Russell was the enemy of

Peter J.T. Morris

ROYAL SOCIETY OF CHEMISTRY HISTORICAL GROUP NEWS

Changes at the Top

This will be the last Newsletter that will be headed by my name as Chairman. As indicated by our Secretary below, nominations will be invited at our AGM for my replacement. This has come about because by the end of December I will have served two four year terms as Chair and, apart from any RSC rules and recommendations, I feel it is time that someone else should hold the tiller.

I have had eight enjoyable years chairing the Group and this has come about by working with a very supportive committee and some very helpful co-officers: Bill Griffith and John Nicholson as Secretaries, Peter Reed and John Hudson as Treasurers, and Anna Simmons and Viviane Quirke as Newsletter editors. Nor must I forget Bill and Gerry Moss who form the newsletter production team. Gerry, of course, also maintains our “alternative” RSCHG website.

I think that under my stewardship the Group has remained in good shape. Our membership has increased significantly, thanks to the new RSC policy of offering it at zero cost as part of the overall Society membership package. We have remained in good financial order thanks to the good work of our treasurers, but also because the majority of our membership is now happy to receive their Newsletters electronically, rather than in the paper form. This saving has enabled us to continue our tradition of putting on our conferences at low or zero cost. Here I must pay tribute to committee members who offer to organise these events and quietly get on with the job thus making my work as Chair so much easier.
Finally, I must report that we are seen by the RSC as being one of the more active, and certainly, more helpful, of the subject Groups. With respect to the latter I have to thank those members, and particularly committee members, who respond to “historical” enquiries, either arising from within Burlington House, or

2. Minutes of the AGM: at Burlington House, Wednesday 26 October 2011. These were published in the August 2012 issue of the *Newsletter*, pp. 6-9.

3. Matters arising from the Minutes: None.

4. Reports:

Chairman's Report: Alan reported another satisfactory year, with four well-attended and well-appreciated conferences. We have continued to keep attendance costs as low as possible and indeed this present meeting has cost nothing to attendees. Next year we intend to mount four meetings, three in London and one in Widnes. This past year has seen the majority of members electing to receive our Newsletter electronically, rather than by paper copy and this has resulting in a significant saving (and hence the maintenance of our free, or low cost, conferences. The transition has gone smoothly, and I pay tribute to

Simply click on any you think will aid your research and when the new page is displayed, click on “PDF”

I mentioned that replacing ^{12}C with ^{13}C did not change the indescribable odour of *tert*-butyl isocyanide. However, writing in *Chemistry World*, Phillip Ball [5] reports that isotopic substitution can change the aroma of some compounds. In 1996, Luca Turin suggested that smell receptors sense the vibrations of molecules and found that acetophenone and acetophenone-d_8 had distinctly different odours. Deuteration profoundly affects the vibrational frequencies in the infra-red spectrum. Later, other researchers reported that they could detect no difference between the aromas of the two acetophenones and Turin recently confirmed this, but found that fruit flies could distinguish between them. Eight out of ten fruit flies said that they preferred the non-deuterated acetophenone. OK, I made that up, but using electric shocks, the fruit flies could be trained to selectively avoid one or the other acetophenone. In the most recent experiments, the Turin team tested cyclopentadecanone, the sweet musky perfume Exaltone, using GC-MS-O and found that if it was more than half deuterated, then even naive, *i.e.*, not professional, human testers could detect a burnt note. No need for electric shock training.

References

1. *RSCHG Newsletter*, 2013, No. 63, p. 12.
2. by Prof D. S. Reese, Peabody Museum of Natural History, Yale University.
3. K. Shiomi, K. Sasaki, H. Yamanaka and T. Kikuchi, "Volatile Sulfur Compounds Responsible for a Fetid Odor of the Hypobranchial Gland of Muricid Gastropods *Reishia* (Thais) *clavigera* and *R.* (T.) *bronni*", *Bull. Jpn. Soc. Sci. Fish.*, 1982, **48**(9), 1353–1356.
4. M. Shirasu, K. Fujioka, S. Kakishima, S. Nagai, Y. Tomizawa, H. Tsukaya, J. Murata, Y. Manome and K. Touhara, "Chemical Identity of a Rotting Animal-like Odor Emitted from the Inflorescence of the Titan Arum (*Amorphophallus titanum*)", *Biosci. Biotechnol. Biochem.*, 2010, **74**(12), 2550–2554.
5. P. Ball, "Boost for Controversial Smell Theory", *Chemistry World*, March 2013, 22.

Chris Cooksey

MEMBERS' PUBLICATIONS

If you would like to contribute anything to this section please send details of your publications to the editor. Anything from the title details to a fuller summary is most welcome.

Recent publications by Historical Group Committee Members

Chris Cooksey, "Tyrian Purple. The First Four Thousand Years", *Sci. Prog.* 2013, **96**(2), 171-186.

I. Karapanagiotis, D. Mantzouris and C. Cooksey, "An Improved Method for the Analysis of Tyrian Purple Samples and the Application to Historical and Archaeological Samples", DHA31, Antwerp, 2012. http://www.chriscooksey.demon.co.uk/dha/DHA31abstracts.doc

Ioannis Karapanagiotis, Dimitrios Mantzouris, Chris Cooksey, Mohammad S. Mubarak and Panagiotis Tsiamyrtzis, "An Improved HPLC Method Coupled to PCA for the Identification of Tyrian Purple in Archaeological and Historical Samples", *Microchem. J.*, 2013, **110**, 70–80.

Alan Dronsfield and Peter Ellis, "Antabuse's Diamond Anniversary", *Drug and Alcohol Review*, November 2012. Published online, DOI: 10.1111/dar.12018.

This paper recounts the history of this once-popular drug used to fight alcohol dependency. Its mode of

original and unpublished essay on any aspect of the history of alchemy or chemistry. The prize consists of five hundred pounds (£500). The competition is open to anyone with a scholarly interest in the history of alchemy or chemistry who, by the closing date of 31 December 2013, has not reached 35 years of age, or if older has been awarded a doctoral thesis in the history of science within the previous three years. Scholars from any country may enter the competition, but entries must be submitted in English and must not have been previously submitted to another journal. The prize-winning essay will be published in the Society's journal, *Ambix.*

Entries should be submitted electronically as e-mail attachments. We prefer files to be Microsoft Word documents (Word 93–2013 or higher), although these may be accompanied by a PDF version if desired. Essays must be fully documented using the conventions used in the current issue of *Ambix*. Essays must not exceed 10,000 words in length, including references and footnotes. All entries must be submitted with a word count.

All entries should be sent to The Hon. Secretary, Dr Anna Marie Roos, at anna.roos@history.ox.ac.uk, with the words "Partington Prize" in the subject heading. Two documents should be submitted: the first, a separate title page giving the author's name, institution, postal address, e-mail address and date of birth (and, if relevant, the date of the award of the Ph.D.). The second should be the essay. The author's name and contact details must not appear on the pages of the essay as the identity of the author will not be made available to the judges. Essays (no more than one from each competitor) must be received no later than midnight GMT on 31 December 2013.

The decision of the judges appointed by the Council will be final. The Society reserves the right to divide the prize between two or more entries of equal merit, or not to award a prize should no essay be deemed of suitable standard. The name of the winner will be announced by 30 April 2014.

News from the Chemical Heritage Foundation (CHF)

Carsten Reinhardt, professor of history of science at Bielefeld University will become president and CEO of the Chemical Heritage Foundation (CHF) effective from 1 August 2013. He will be the third president of CHF, succeeding Thomas R. Tritton, who is retiring.

Reinhardt was selected following a worldwide search for a leader with a great depth of experience in the history of science and technology. He has extensively researched and published on the impact of chemistry on society through topics including the history of industrial research, the emergence of instrumentation, and chemistry's links to physics, biology, medicine, and technology.

News from the ACS Division of the History of Chemistry

The recipient of the 2013 HIST award of the Division of the History of Chemistry of the American Chemical Society is Professor William R. Newman, Distinguished Professor and Ruth Halls Professor of History and Philosophy of Science, Indiana University. This award is the successor to the Dexter Award (1956-2001) and the Sydney M. Edelstein Award (2002-2009), also administered by the Division of the History of Chemistry. The HIST Award will be presented to Professor Newman at the autumn national meeting of the American Chemical Society in Indianapolis in September 2013.

Liebig-Woehler-Freundschaft-Preis

The 2013 Liebig-Woehler-Freundschaft-Preis has been awarded to Dr Neill Busse for his University of Giessen dissertation "Die chemische Elite: Das Netzwerk Justus Liebig und seiner Schüler".

USEFUL WEBSITES AND ADDRESSES

http://faculty.cua.edu/may/history.htm

The Commission on the History of Modern Chemistry (CHMC)
www.chmcweb.org

The European Association for Chemical and Molecular Sciences (EuCheMS) http://www.euchems.org/

Forum for the History of Chemical Sciences

The Forum for the History of the Chemical Sciences is a group of scholars and students whose aim is to promote research, education, and communication on the historical, social, and philosophical aspects of chemistry and related chemical sciences and technologies.
fohcs.blogspot.com or via http://www.hssonline.org/about/society_interest_groups.html

The Society for the History of Alchemy and Chemistry
www.ambix.org

For details of how to join the Society, please fill in the online application form by following the link from www.ambix.org/join-us/#howto
or contact the Treasurer and Membership Secretary: John Perkins, 19 Nethercote Road, Tackley, Oxfordshire, OX5 3AW. (shacperkins@googlemail.com).

The Society for the Propagation of the Music of the Chemist-Composers

This is an informal association that has been formed to publicize the music of chemist-composers. http://faculty.cua.edu/may/SPMCC.htm

The Working Party on History of Chemistry (WP)

Information on the activities of the WP can be found on its website:
http://www.euchems.eu/divisions/history-of-chemistry.html

Walter Sneader's website 'Sources of information about drugs and medicine'
http://historyofdrugs.net

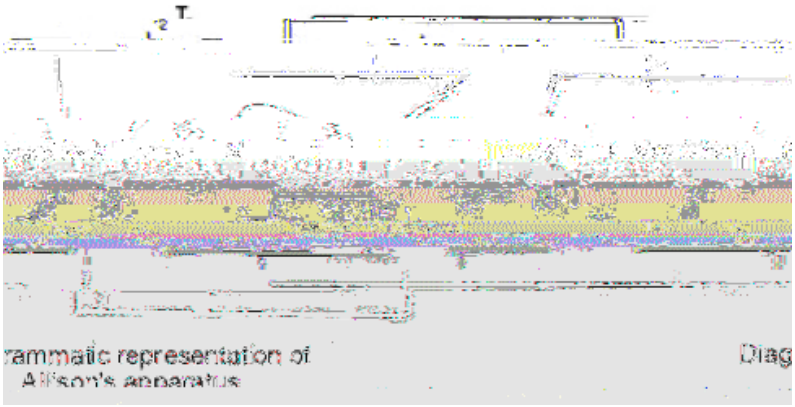
Website for the history of science and technology in Europe
http://histsciences.univ-paris1.fr/

Website of the Max Planck Institute for the History of Science (Berlin)
http://www.mpiwg-berlin.mpg.de/en/index.html

Selection of English-language papers relevant to the history of chemistry
http://web.lemoyne.edu/~giunta/papers.html

Website for the Nobel Prizes
http://nobelprize.org/

SHORT ESSAYS



Allison and J. W. Beams devised an apparatus that could detect and measure this time lag and published their first paper on the phenomenon (which rapidly became known as the Allison Effect) in 1927 [5]. The apparatus is shown in the diagram below. Light from a spark was polarised by the Nicol prism (N) and then passed in succession through cells B_1 and B_2 containing the solvents or solutions. At the same time the

living there that Michael received rudimentary schooling, and from there, on 7 October 1805, that he was taken on as an apprentice bookbinder by George Riebau of N^{o} 2 Blandford Street, a few streets away (Figure 2). Despite the proximity of Riebau's shop to the parental home, the norm would have been for Faraday to take up residence with his master.

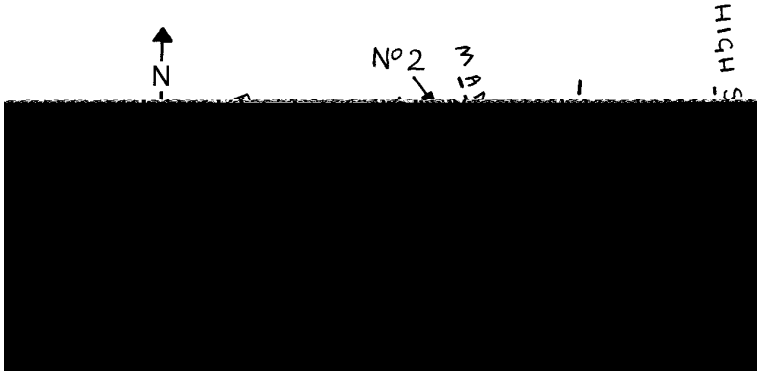


Figure 2: Modern Street Plan with *Former* Street Names According to Ref. [9].
King Street, Blandford Street, and South Street are now all called Blandford Street, numbered east-west. Riebau's shop was N^{o} 2 Blandford Street, OS reference TQ 281(6) 815(5) by GPS near the front door, and is now numbered 48. High St is now called *Marylebone* High Street. George Street and Charles Street are now both called George Street. The other street names are unchanged. Portman Square is three blocks south-south-east of King Street.

Any lingering doubt that the modern N^{o} 48 was formerly Riebau's shop at N^{o} 2 is dispelled by the close resemblance between a contemporary drawing (Figure 3), and a modern photograph (Figure 4), which are included in the online version of the newsletter. The irregular spacing of the first-floor windows distinguishes the house from other houses nearby.

Figure 3: Riebau's Bookshop [10].

"N^{o} 2" appears above "RIEBAU", and "Blandford St" below.

Riebau recognised Faraday's talent and generously facilitated Faraday's intellectual development. At the same time, Faraday's training as a bookbinder developed his skill with his hands. Without Riebau, science would almost certainly have been deprived of one of its greatest thinkers and experimentalists. Riebau

encouraged Faraday to read scientific books that passed through the shop, including Lavoisier's *Elements of chemistry*, Jane Marcet's *Conversations on Chemistry*, and Thomas Thomson's four-volume *System of Chemistry*. For electricity, Faraday used the *Encyclopaedia Britannica* article by James Tytler and *The Dictionary of Arts and Sciences*. In early 1810, Faraday began to attend the lectures of Mr Richard Tatum at 53 Dorset Street off Fleet Street [2, L30], not to be confused with the Dorset Street in Marylebone. Faraday also attended meetings of the City Philosophical Society which Tatum had established (in the 1820s, the CPS was to be informally absorbed by the Society of Arts [2]). Faraday received tuition to improve his writing from Edward Magrath of the Society. He attended Sir Humphry Davy's lectures at the Royal Institution in Albemarle Street on 29 February, 14 March, 8 April, and 10 April 1812. Faraday made visits to bridges and waterworks to improve his general knowledge of civic and industrial installations.

Abbott. As well as engaging in theoretical discussion, Faraday describes his construction of two voltaic piles and his electrolysis of aqueous solutions, moreover in a style that gives the reader confidence in the accuracy of his observations. Abbott was doing his own experiments, and one assumes that their amateur efforts had been going on for some time (compare [L30]). The principal reason for the correspondence – the two men met frequently – was set out in Faraday's first letter begun on the afternoon of Sunday 12 July 2012 [L3]. Faraday justified communication by "Epistolations" (his own neologism) as "improving the mind of the person who writes, & the person who receives". Faraday sought among other things to improve his "Grammar &c" and his ability to express himself. He noted that ideas "generated and formed in the head" became "clear and distinct" in writing.

But on 7 October 1812, Faraday's apprenticeship with Riebau ceased, and he took up a journeyman position with Henry de la Roche, of "King Street, Portman Square". At this period, before postal districts, it was normal to locate minor streets by reference to a nearby major street or square, which allows the identification of King Street with that in Marylebone, *i.e.* the westernmost section of the modern Blandford Street (Figure 2). The work load was high, and Faraday had presumably lost the part-time laboratory in Riebau's back room. In consequence, the correspondence became one-sided for the next five months, with Abbott writing numerous letters to Faraday but Faraday writing only two to Abbott, neither specifically discussing science [L14, L16]. Faraday wrote to another City Philosophical Society friend, T. Huxtable, "I must resign philosophy entirely to those who are more fortunate in the possession of time and means..... I am at present in very low spirits" [L15]. Faraday later recalled having thought that "trade" was "vicious and selfish" and having imagined that "the service of Science ... made its pursuers amiable and liberal" [L419].

Ironically, Faraday's escape from the bookbinding trade was assisted by his skill in that very trade. Faraday had presented to Riebau bound volumes of his notes of Tatum's lectures. Through Riebau, these were seen by a Mr Dance who lived in the adjacent Manchester Street (Figure 2) at N^{o} 17. It was Dance [13], a member of the Royal Institution, who gave Faraday his tickets to Davy's lectures in early 1812. With the encouragement or recommendation of Dance and/or Riebau, Faraday may have procured a meeting with Davy in early October 1812. At any rate, Faraday was sufficiently known to Davy that when the latter injured his eye in late October 1812 (a nitrogen trichloride explosion), he chose Faraday to serve as an amanuensis while he recovered. (Presumably Faraday did this outside his working hours for de la Roche.) And at some time during the last four months of 1812, Davy saw Faraday's bound volume of the notes he had taken of his own, *Davy's*, lectures. Davy had in May 1812 resigned from paid employment with the Royal Institution, but was still an honorary professor. In a letter to Faraday of 24 December 1812 [L17], Davy warmly promised to do what he could for him: "It would gratify me to be of any service to you. I wish it may be in my power". Faraday was an obvious choice should any junior post become available at the RI.

On 19 February 1813, such a post did become available when the laboratory assistant at the Royal Institution, William Payne, attacked the Institution's instrument maker, John Newman, and was sacked. On 22 February 1813, Davy sent a note

nnono2(a)-7(v)-nt( )-24(t)-4(I)-50
a

4. “Annual General Meeting – Report”, *J. Soc. Arts*, June 1876, **24** (No 1232), 787-792.

World War I has been called the Chemists' War because of the crucial part played by chemistry in the conduct of the war and Michael Freemantle's book reflects this wider role.

The book provides a detailed guide to the different explosives and the role of different metals in shell construction, and considers the different types of warfare gases, such as lachrymators (xylyl bromide) that irritate the eyes, sternutators (diphenylchlorarsine) that irritate the nasal passages causing vomiting, choking agents (chlorine and phosgene) that act as asphyxiators, vesicants (mustard gas) that blister the skin and blood agents (cyanides) that interfere with the oxygen take-up of blood, all of whom were used singly or in combination when deployed. Interestingly, it is generally accepted that it was the French who first used gas warfare in World War I when they deployed tear gas (ethyl bromoacetate) in August 1914 and this started an escalation on the part of the major participating nations that involved the use of more harmful agents, a variety of deployment methods and larger quantities of gases.

It is often difficult to find reasonable estimates of casualties and weapons to express concisely the impact of a war but this is probably not the case with World War I. The total number of casualties is estimated at over 37 million, with Britain suffering about 2.5 million casualties. It is estimated that the British alone fired 250 million shells over the period of the war, 28 July 1914 to 11 November 1918, which works out at about 100 shells per minute. It is also known that on certain days of this conflict that involved close-fought trench warfare as many as 66,000 British troops died. Reading this book prompts several moral questions about the futility of such loss of life and how justified it is to continue using tactics that result in such high daily loss of life for such little gain of territory or advance. There is also the question as to whether given the nature of trench warfare, the chemists' contribution actually shortened the war and reduced what might have been even higher casualties.

This is a very well researched and written book, and though aimed primarily at the general reader it has a good deal to interest historians of chemistry as well as historians of technology and medicine, and those engaged in war studies. Given its structure and thorough index, the book could also become a useful reference work. At £18.99 this is a book every chemist should try to read

Peter Reed

Carl Djerassi, *Chemistry in Theatre: Insufficiency, Phallacy or Both* (London: Imperial College Press,

manage to touch on peer review, scientific fashion and student evaluation. Like *Insufficiency*, the play *Phallacy* has a romantic undercurrent, but essentially it involves the abrasive interaction between an art

While successful treatment of the hydrogen chloride gas and the sulfur waste reduced the level of pollution in Widnes, the economics of the Leblanc process were improved, confirming the adage: where there's muck, there's brass!

Runcorn and Widnes in the First Half of the Twentieth Century
Dr Diana Leitch, Information Consultant

The creation of the United Alkali Company in 1890 came just before the building of the Manchester Ship Canal in 1894. The latter, together with the building of the Transporter Bridge in 1905, transformed the transport infrastructure of the area. The two towns of Runcorn and Widnes which had been divided by the River Mersey were brought together, improving transport to the hinterland of Manchester and the passage of chemicals. Companies on both sides of the river thrived and developed. Using a wide range of illustrations from both her family's own collection and other local collections, Diana was able to show some of these transport changes and also late-nineteenth and early-twentieth century images of firms such as McKechnie's, Wigg's, Mathieson's, Gossage's, Evans, Lescher and Webb, Castner Kellner, Salt Union and Towers Glassblowers. The role of firms in World War I such as Pilkington's and Sullivan's and the lead up to the creation of ICI in 1926 by the amalgamation of many local firms was also illustrated, as were early copies of the ICI Magazine and its contents. Rare photos relating to staff who worked at KEMET (Chemical and Metallurgical Corporation) and ICI Research Laboratory, Widnes, in the 1930s were

Runcorn and Widnes - T

Personal Reminiscences of Fluorine Research

John Holloway, OBE, University of Leicester

My research was in inorganic fluorine chemistry and, seminal to the development of work in this area, was the role of UF_6 in facilitating the production of the atomic bomb. Of similar importance was the influence of that select band of chemists, such as Harry Emeléus, who kept alive an interest in inorganic chemistry in the UK in the 1940s when it seemed that the subject had declined into mediocrity, and also Norman Haworth who made the University of Birmingham a cradle for the growth of fluorine chemistry research in the country. My career grew out of my parents' conviction that education via a good grammar school might provide a route out of the tough mining environment in which I grew up. A series of serendipitous events led to a life working with this most exciting of elements in Birmingham,

In 1810 he studied muriatic acid (HCl) hitherto assumed, by Lavoisier’s definition of acidity, to contain oxygen. Davy was unable to decompose it electrochemically and deduced that it contained an element which he named chlorine from its green colour. He tried to electrolyse fluoric acid (HF), known since the eighteenth century, persisting with his attempts and may have succeeded since he produced some temporary damage to his fingers and eyes. He believed th

Phil spoke briefly about his admiration for this great chemist and presented members present with free copies of a DVD he had made of a recording of R.B. Woodward lecturing on his work on cephalosporin. This presentation was given in 1965 and was video-recorded at the Technion University, Haifa, Israel.

Hofmann and the Beginnings of Organic Synthesis
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The purpose of the paper was to provide a general historical introduction to the topic of organic synthesis. According to the *Oxford English Dictionary* the first recorded use of the term *synthesis* occurred in the lectures of Peter Shaw, the English Newtonian lecturer and disciple of Boerhaave. Before then, Greek philosophers and alchemists commonly used the terms *diakrisis* for the separation and analysis of materials, and *synkrisis* for the aggregation and composition of new materials. These usages can be seen in Stahl's definition of chemistry as "the art of resolving compound bodies into their principles and recombining them" (1723), and in Dalton's chapter "on chemical synthesis" in his *A New System of Chemical Philosophy* (1808), in which he stated that "chemical analysis and synthesis go no farther than to the separation of particles from one another and to their reunion". Long before Dalton, synthesis was clearly a chemical aspiration. In his lectures at Glasgow

interact with the metal (the Dewar-Chatt-Duncanson model). When in 1964, WH came out with rules of pericyclic reactivity based on the conservation of orbital symmetry, their diagrams can be traced directly *via* Dewar's back to Galois. I make this point since I do not believe the association is sufficiently well known. Moving forward again to the period 1958-1963, three separate groups following in Stork's stereospecific footsteps carried out experiments which directly showed that pericyclic reactions were more generally not only stereospecific, but also inexplicably so (to them at least). The fruit, so to speak, was now hanging low. But neither Vogel (1958), Corey (1963) nor Havinga and Schlatmann (1961) managed to pick it, although the latter came within a cat's whisker.

Finally, Woodward did so. He too had observed a reaction very similar to that carried out by Corey and Havinga and Schlatmann, during his attempts to synthesize vitamin B12. He took these three observations and his own and talked to a chemist who was immersed in symmetry and Galois' group theory as applied to molecular orbitals, Roald Hoffmann. Like most puzzles, the pieces just dropped into place! The review article of 1969 formalising the observations in a set of rules has become one of the most famous in the history of chemistry. Not least because there was a section entitled *predictions* (every good theory has to make verifiable ones) and the wonderfully teasing *Violations. There are none!* k

theory. He considered it to be central to the development of organic synthesis. Nonetheless, Woodward realised that the determination of organic chemical structures was in the process of being transformed by *instrumentation*. He argued that one of the most important uses of this new instrumentation was the monitoring of reaction mixtures. No longer tied to the proof of structure as its primary *purpose*, organic synthesis could now become supremely creative. Organic chemists were placing a new Nature alongside thd12(o)-8(s)-6(t)()-8(d12(o)(r)-5(y)-8-111((h)-81(a)-7( )-111(n)-8)-oan)-8bchhareadtive.-8(s)-6(t)(36(i)-4(n)-8(s)-6(t)-2

American Chemical Society – Division of the History of Chemistry

Dallas, 16-20 April 2014

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