Historical Group

NEWSLETTER
and
SUMMARY OF PAPERS

No. 61 Winter 2012

Registered Charity No. 207890

COMMITTEE

http://www.chem.qmul.ac.uk/rschg/
http://www.rsc.org/membership/networking/interestgroups/historical/index.asp

This issue contains a wide variety of articles, book reviews and reports. There are two short essays: one by Chris Cooksey on the copperas works at Tankerton; and the second by Henry Rzepa and Chris Cooksey continues an occasional series of articles on mauveine. There are book reviews of Bill Brock's *The Case of the Poisonous Socks: tales from chemistry* published by the RSC; Frank James' new edition of Michael Faraday's *The Chemical History of a Candle* and the American Chemical Society's *Atoms in Chemistry: From Dalton's Predecessors to Complex Atoms and Beyond* which is edited by Carmen J. Giunta. Two RSC Chemical Landmark plaques have been unveiled: one to mark the centenary of Rutherford's nuclear atom at Manchester University and a second for halothane at the Catalyst Science Discovery Centre and Museum in Widnes and reports appear on both of these. There are also reports of the 8th International Conference on the History of Chemistry, two RSCHG meetings, the Society for the History of Alchemy and Chemistry's meeting on Careers in Chemistry and the 250th Anniversary of Smithson Tennant's birth.

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. If you would like to contribute items such as news, articles and book reviews to the newsletter please do contact me. The deadline for the next issue will be 23 June 2012. 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).

Anna Simmons
University College London

ROYAL SOCIETY OF CHEMISTRY HISTORICAL GROUP NEWS

RSCHG Meetings: 2010 and 2011

As in previous winter Newsletters here is a summary of the group's activities.

1. Meetings in 2011. There were three, all well-attended and well-received by their audiences. Unusually they were all joint meetings with other societies or RSC Groups.

(i) *Marie Curie and Aspects of the History of Radiochemistry*, Friday 18 March 2011, organised by Alan Dronsfield and Bill Griffith. A one-day meeting in the Chemistry Centre, jointly with the RSC Radiochemistry Group; reported in the August 2011 *Newsletter* pp. 36-43. It was opened by the French *Chargé d'Affaires*, M. Poimboeuf and by Prof. David Phillips, President of the RSC, and was full, with an RSC-sponsored reception afterwards.

(ii) *Dyes in History and Archaeology*, 12 to 15 October 2011 (joint meeting with the Dyes in Archaeology Group), University of Derby. Organised by Alan Dronsfield and Chris Cooksey. A report appears in this newsletter.

(iii) *Environmental Chemistry – a Historical Perspective.* Wednesday 26 October 2011. A joint meeting with the RSC Environmental Chemistry group, organised by Rupert Purchase and Peter Reed. A report appears in this newsletter.

2. RSC Landmark Plaques in 2011

The Group had been represented at all of the following: at Unilever Port Sunlight Research, Port Sunlight, Cheshire on 30 March 2011 (August 2011 *Newsletter*, pp. 35-6); for Sir Ernest Rutherford at Manchester University on 8 August 2011 (report in the current

Newsletter); at the Catalysis Science Discovery Centre, Widnes, Cheshire on 22 October 2011 marking the discovery of the anaesthetic Halothane (report in the current *Newsletter*). The Group was also represented at an English Heritage blue plaque to Sir William Ramsay at his house at 12 Arundel Gardens, Notting Hill, London on 9 February 2011 (August 2011 *Newsletter*, pp. 36-7).

Meetings in 2012 Two have been arranged so far.

(i) Where there's muck there's brass! – the decontamination of chemical sites. Chemistry Centre, Burlington House, **Friday 23 March 2012**. Organised by David Leaback and Peter Reed.

(ii) Under the Influence – famous textbooks and their authors. Chemistry Centre, Burlington House, organised by Peter Morris. **28 September 2012** (the AGM will also be held then).

We have plans for meetings extending into 2013 and 2014; the Group will also be represented at RSC Landmark plaque unveilings.

Bill Griffith

IDENTIFICATION QUERY

In his *Science in the Dock: Guilty or Not Guilty?* the 77-year old Frederick William Westaway (1864-1946), a former HMI for secondary education, blamed himself for encouraging specialization in science and mathematics in schools to the detriment of students' social, cultural and moral education. As an example of dedication and obsession to research that blinded scientific workers (Westaway intensely disliked the word 'scientist') Westaway referred to a friend of his as follows:

"A former colleague of mine, who had distinguished himself in many ways as a young man and had been on the staff of the Imperial College for some years, decided to follow up a particular line of research that might eventually lead to his election to the Royal Society. His special subjects were chemistry and mineralogy. A necessary piece of apparatus for his research was an extremely sensitive (and very costly) chemical balance, and he was lucky enough to find at Oxford, where he lived, an old house with very solid foundations. He rigged up the cellar as a laboratory and his balance was fixed on a heavy stone slab in such a way that it was virtually vibrationless, despite the not very distant traffic. He managed to finish off his weekly professional work by Friday afternoon, and then went straight away to his laboratory, where he stayed until Monday morning. He slept, so far as he slept at all, on a convenient 'shake-down,' but an alarm clock often called him up, inasmuch as some of his experiments, which proceeded all night long, required periodic inspection. One night I spent a couple of hours with him, but his normally friendly self had become quite changed. I had never seen a man so concentrated on his work and he simply could not tolerate the slightest interruption. I could see I was an interloper, and I stole silently away. Some six years later his research was pronounced to be 'brilliant,' and he was given the coveted Fellowship. Was that distinction dearly bought? His work had not the slightest bearing on industrial processes, on human welfare, or war. It was all 'pure science' – a slight lifting of the veil that had hidden away some of nature's secrets." (1)

Can any reader identify this twentieth-century chemist/mineralogist? The main requirements are that his early career was spent at Imperial College, that either before or after Imperial College he became a 'colleague' of Westaway's (that is, an inspector of

schools) based in Oxford, and that his weekend research involved delicate gravimetric

1923, with some references to more recent developments. A review of this book will appear in the summer 2012 edition of the RSCHG Newsletter.

NEWS AND UPDATES

Society for the History of Alchemy and Chemistry
2011 University of Oxford Undergraduate History of Chemistry Prize

The Society for the History of Alchemy and Chemistry is pleased to announce that the first winner of the prize is Carolin

The Commission on the History of Modern Chemistry (CHMC)
http://www-wissenschaftsgeschichte.uni-regensburg.de/CHMC.htm

Digital library of the Conservatoire National des Arts et Métiers
http://cnum.cnam.fr

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

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

For details of how to join the Society, please see the on-line form (follow the links from the main page), 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.org/Divisions/History/index.asp

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 based lecture course by Georges Bram, professor of chemistry and history of chemistry at the Faculty of Science, Paris Sud-Orsay
http://histoirechimie.free.fr/

Website of the Bibliothèque Nationale de France
http://gallica.bnf.fr

Website of the Historical Centre of the Ecole Polytechnique
http://www.polytechnique.edu/home/about-ecole-polytechnique/history-and-heritage/the-major-periods/

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

Russian Academy of Sciences. Website of the Institute for the History of Science and Technology

http://www.ihst.ru

An English version is available in test mode.

http://www.ras.ru/en/index.aspx

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/

years as a source of Nordhausen sulfuric acid. It has been suggested that the marcasite nodules could have been used as a source of sulfur which was used at the nearby gunpowder manufactory, dating from 1573, at Faversham, just 11 km away.

Whitstable Castle

Following Charles Pearson, a subsequent owner, Wynn Ellis, renamed the house Tankerton Tower and there were a succession of

Geoffrey Pike, *Copperas and the Castle*, Friends of Whitstable Museum & Gallery, 2000, 73 pp. An invaluable summary with 163 references.

Tim Allen, *The Forgotten Chemical Revolution*, British Archaeology, Issue 66, August 2002.

http://www.britarch.ac.uk/ba/ba66/feat2.shtml

Chris Cooksey

Mauveine - the final word? (3)

Interest in the iconic dyestuff mauveine remains high. Some recent developments since the last mention (1) here are reviewed and related to the publications of William Henry Perkin (1838–1907) in the 19th century.

Synthesis

That the synthesis is "laborious and tedious" (2) seems to be a recurring conclusion. Christoph Heichert and Horst Hartmann (3) declare "Although the procedure of Mauvein production was rather simple – a sulfuric acid solution of crude aniline is to treat with potassium bichromate – it has several malices making it difficult to handle and demands of the producer a great deal of skillness and engagement." In 2011 John Plater (4) thought "At first we anticipated it would be easy to reproduce Perkin's patented work" but only

contain at least thirteen different components. Separation by preparative HPLC was followed by extensive characterisation by NMR (1H, 13C, HMBC and NOESY), MS and UV/Vis which provided an exact identification of the structures of seven of them. A further seven mauveines could only be characterised by HPLC-MS.

All the mauveine salts contained very little pseudomauveine, 1% or less, except one. This was a sample from the (Henry) Edward Schunck (1820–1903) collection of chemicals at the Museum of Science and Industry in Manchester which was labelled "mauveine C27H24N4": it contained 49% pseudomauveine (C24), 41% monomethylated pseudomauveines (C25) and smaller amounts of the C26 and C27 derivatives. In addition, the anions found were acetate (68%), chloride (13%) and sulfate (17%). But Schunck was a natural dye chemist and published nothing about synthetic dyes, so it seems likely that this sample was a gift and most likely from Perkin. In 1879 Perkin (16) published a recipe for isolating pseudomauveine from commercial mauveine which involved precipitating the less soluble mauveine sulfates, adding ether to the filtrate to precipitate pseudomauveine sulfate, then repeatedly dissolving the product in concentrated sulfuric acid followed by adding water. Boiling the product with potassium hydroxide solution gave a free base which analysed as $C_{24}H_{20}N_4$ from which salts, the hydrochloride and hexachloroplatinate, could be made. Schunck's sample appears to be from a partially successful separation, followed by an incomplete conversion to the acetate. Perkin suggested structural formulae for pseudomauveine and related compounds, but warned "I bring these forward merely as suggestions; experiment alone can settle the true constitution of these bodies."

Proposed structure of pseudomauveine (Perkin, 1879)

Experiment, well, at least physical methods, have achieved the goal of structure elucidation.

The colour

Mauveine is an iconic colour, instantly recognised by most chemists certainly. So it is rather odd that little attention has been paid to the molecular chromophore responsible for this colour. What can be said is that there is general agreement that the visible absorption spectrum comprises an intense single band centered at about 549nm, relatively unperturbed by the methyl groups present in the sample (by no more than about 10nm). In recent times, great advances have been made in predicting colour from quantum mechanical first principles (driven largely it has to be said by the need to assign chiroptical spectra in terms of absolute configuration (17).

One such method is known as time-dependent density functional theory (TD-DFT) and it would be expected to predict $_{max}$ to an accuracy of around 20nm or less. Whilst this may not sound especially accurate, this value is not based on any pre-parametrisation. Quantum mechanical effects such as electron correlation, solvation and other erstwhile difficult aspects of these calculations are included in the theory, one now accessible in general purpose computer codes such as Gaussian 09 (18). Armed with such a tool, the visible spectrum of mauveine A was calculated for the four tautomers shown below. The model comprised the chloride salt of the cation (Figure 1 (below), an ion-pair), with an additional two solvent molecules bridging the ion-pair in

which the rotational conformations of the aryl substituents can be determined in part by this solvation.

Fig 1

The calculation details are summarised as:

&b97xd/6-311g(d,p)/scrf(cpcm,solvent=methanol) (19), which decoded means that a long-range correlated &b97xd density functional was used (20) as shown to be appropriate for prediction of visible spectra (21), employing a large basis set and including both a continuum solvation correction for methanol as solvent and discrete solvent molecules (methanol modelled by water). This model was used to obtain a fully relaxed molecular geometry, and then TD-DFT theory applied at the larger 6-311++g(d,p) basis set level.

The calculated electronic spectra are shown in Figure 2. The predicted $_{max}$ is ~440nm for tautomer 1, subject to a maximum error of about 20nm (up to ~ 460nm). This corresponds to the colour orange, and not mauve! The extinction coefficient is calculated to be particularly large. An error of ~100nm in $_{max}$ is considered well outside the normal errors to be expected for this theoretical quantum mechanical procedure and must cast a

Figure 2: TD-DFT calculated spectra
(as #b97xd/6-311++g(d,p)/scrf(cpcm,solvent=methanol) for four tautomers of mauveine.

found at this blog (22). Not previously considered in the literature is what the colours of other tautomers might be. Tautomer 2 (which has a rather different resonance structure with a more quinoidal form) shows a dramatically different $_{max}$ at ~670nm, which would give the compound a clear blue colour, although the extinction coefficient is rather lower. but tautomer 4 in particular may benefit from additional hydrogen-bonded solvation. Tautomer 3 is intermediate, with $_{max}$ ~550nm, and a second peak at 410nm, which indeed gives a mauve colour. Tautomer 4 is the most promising, with a single band of $_{max}$ ~500nm. The energies of tautomers 2-4 relative to tautomer 1 are respectively 23.4, 24.2 and 23.8 kcal/mol higher in energy, but tautomer 4 in particular may benefit from additional hydrogen-bonded solvation.

So it is indeed somewhat ironic that a modern theoretical explanation of the colour of such an iconic substance is causing such problems! In this regard it is worth noting that Perkin himself reports getting the substance in crystalline form, and yet despite this, no X-ray crystal structure has ever been reported, even for the phenazinium base (23). One might hope that a single-crystal x-ray structure will in the future at stal x-ray st

8. See ref 2.
9. T.M. Brown, C.J. Cooksey and A.T. Dronsfield, “Perkin’s mauveine - a fortuitous discovery?” *Education in Chemistry*, 2000, **37**, 75–77.
10. See ref 4.
11. See ref 3.
12. W.H. Perkin, “On Mauveine and Allied Colouring Matters,” *Journal of the Chemical Society*, 1879, **35**, 717–732 (p. 728). DOI: 10.1039/CT8793500717.
13. See ref 4.
14. J. Seixas de Melo, S. Takato, M. Sousa,

23. The closest is; N. Malek, T. Maris, M. Simard, and J.D. Wuest. *J. Am. Chem. Soc.*, 2005, **127**, 5910–5916. DOI: 10.1021/ja042233m. Unfortunately, the cation (the base phenazenium ion) is reported as too disordered to obtain structural information for it.

Chris Cooksey and H. S. Rzepa

HISTORICAL REMINSCENCES

This is a new section of the newsletter which begins with a contribution from David Leaback in which he discusses chemistry and industry in Tower Hamlets, his family's links to the area and the plaque commemorating William Henry Perkin. The editor would welcome chemical reminiscences from members on suitable subjects such as former colleagues or laboratories they have worked in for this section.

Capturing Some Social Changes Linked to Chemistry & Industry in Tower Hamlets

Figure 1: A current view of the remains of The Hope Chemical Works, E9

My entry to this begins with the recent photograph in Figure 1, a significant but forgotten remnant of an influential enterprise appropriately called the 'Hope Chemical Works,' set up in the 1850s by an ex-surgeon named Carless, in the top north-eastern corner of Tower Hamlets. It had been driven out of the Bow Common part of the London Metropolis because it practised a 'noxious chemical trade' contrary to new local Medical Health regulations (1). Carless had abandoned his former chemical experiments to make artificial leather, when he discovered the growing demand for the lighter coal tar components, and so he started fractionating coal tar naphthas using pot stills at that site in Figure 1. This was then an isolated dry spot on a soggy White Post Lane that snaked its way eastwards across Old Ford Marsh towards Stratford. As time went by, Carless found his chemical workplace increasingly surrounded by many complementary new enterprises needing his products, such as the Atlas Synthetic Dyeworks, manufacturers of waterproof cloths, synthetic plastics etc., as well as useful other trades for building and running what amounted to London's first chemical science park (4). Thus his enterprise grew with mergers and acquisitions and a gradual transition to the use of petroleum feedstocks for the production for refined fuels. Long after Carless and others had to move out of the Bow Common area on medical health grounds the mammoth gasworks on Bow Common Lane

that he used (2) was still allowed to pollute the area, as my brother and I found when visiting our grandparents in the late 1930s. Indeed our grandparents' small house on the corner of Robeson Street was almost in the shadow of the clanking, hissing structures which continuously belched sulfurous, dirty fumes. In this neighbourhood, our grandmother had raised ten children in a house and atmosphere where there was scarcely space to hang out clean washing to dry (2).

Recently my wife and I visited that Bow Common Lane location and found that at last those gasworks had disappeared and the air was good to breathe. It seems that health regulations had not been sufficient to make life better there and it needed Hitler's bombs and the shift to petroleum which Carless pioneered to complete the clean-up. We took another photograph (Figure 2) from exactly the same spot as that illustrated earlier (2) showing the railway arch where my brother and I played ball all those distant Sundays ago. That arch survives in Figure 2, but where my grandparents' house once stood, it is now a leafy green open space. There my wife and I sat near the maturing sycamore which marks a place with so many memories of childhood: family gatherings where Uncle Fred entertained us all at Christmas (2); my Aunt Jean stood all dressed to go dancing 'Up West' but most momentous of all, was where I heard my Scottish mother exchange a few words in what turned out to be schoolgirl German with my grandfather (2).

Figure 2: A current view of Robeson Street corner, Bow Common Lane, E3

While the War ended such family events, I sometimes accompanied my father on his visits to Uncle Fred's subsiding house at 174 Bow Common Lane. There, the attractions hinged partly on whether he had had to saw more off the legs of his bed so he could sleep level, or whether he was serious when he asserted that his fearsome catfish could be made to smile. However he always urged me to keep on with my studies on chemistry at school because he had missed the opportunity to qualify in chemistry in his youth. He had to work to help out with family finances and then was conscripted into the army, along with my father, Gus. After both of them were wounded abroad in the First World War, they ended up in an East End where work was hard to find, especially for ex-soldiers in their twenties with no

advanced skills.* Fortunately, Fred got a messenger job in the Pharmacy at the Mile End Hospital (see Fig. 3) and later helped my father secure a porter's job there where he met a young Scottish nurse without whom my brother and I would not have happened!

Figure 3: A current view of Bancroft Road Buildings, E1, showing from the left, the former Marriage Registry Office; the entrance to Mile End Hospital, and the Public Archives and Local Studies Library, standing in front of Queen Mary and Westfield College.

This account of chemistry in Tower Hamlets would not have happened until I eventually found out from my mother that the exchange in German with grandfather arose from his father having come from Hanover to St. George's East in about 1850, to live and work in the sugar refineries (2, 6). I asked Uncle Fred and my father about that, but they knew very little. Having learned to do laboratory research, I squeezed odd moments to investigate and found a death certificate of that grandfather, and showed it to my father, who was very excited and soon took it to show Uncle Fred. He was so delighted that I suggested that the two of them did more research on our forebears' lives, but I found them reluctant to do so. This puzzled me because that single certificate had excited Uncle Fred and my father just like children. Recalling that I had witnessed similar resistance in elderly people unwilling to venture into unfamiliar skills for fear perhaps of looking stupid, I named this new, unrecognised phenomenon 'The Fred and Gus Syndrome.' I continued feeding them with the delights of discovering where their grandparents lived in Shadwell/St George's East.

Figure 4: A current view of the Council block of flats in Sutton St, E1 and the Perkin memorial plaque I initiated there in 1991 (See ref. 3).

One day in the library, something totally unexpected happened! I read that the very part of St. George's East to the left of the scene in figure 4 where my forebears had come to live was directly opposite a block of Council flats on the site where the famous chemist Sir William Perkin had lived. Here as a youth, had he discovered how to make the world's first synthetic dyestuff. From that discovery and mine, I went on to find out not only new aspects of that romantic Perkin science story (refs. 1 to 7), but also how to use the story as a tool to show ways to promote science among underprivileged communities in Tower Hamlets and elsewhere (6, 7). I found that this approach worked well generally, but there were exceptions. For instance, I have yet to find any resident in that block of flats to the right of Figure 4, who knows anything about the story of that Perkin plaque attached to its southern Cable Street wall. Also when I mentioned that matter to the Tower Hamlets' mayor who had once kindly come to the unveiling of the very same plaque (3), he or his successor could recall nothing thereof. I suspected symptoms of the above 'Fred & Gus Syndrome' at the Town Hall!

David Leaback

* A depressingly parallel situation for the million or so youngsters currently without jobs or any prospect of 'Gladwell type' skills like Chemistry (7), or others opting out of expensive but appropriate further education, skills and qualifications.

References

1) D.H. Leaback, *Perkin in the East End of London*,(Authentica: Radlett, Herts, 1990).

2) D.H. Leaback, "Discovery in the East End," *East End Record*, 1988, **12**, 1-16.

3) D.H. Leaback, "Making the Perkin Story Work," *Science & Public Affairs*, 1994, 25-28.

4) D.H. Leaback, "The demise of London's first science park," *RSCHG Newsletter*, July 2005, 15-21.

5) D.H. Leaback, "Perkin's Pioneering Enterprise," *Chemistry in Britain*, 1988, 787-789.

provided by Frank James, Historical Group committee memb

found time to speculate which of the current researches might be identified as the most promising ones.

The Landmark Plaque was presented to Professor Rod Coombs, Deputy Vice-Chancellor of Manchester University by RSC President Prof. David Phillips. The text on the plaque reads:

Ernest Rutherford
on the occasion of the 100th anniversary
of the discovery of the atomic nucleus
by Ernest Rutherford,
a Nobel Laureate in Chemistry
and pioneer in nuclear physics, at
the University of Manchester

Professor Sean Freeman, of the Nuclear Physics Research Group School at the University of Manchester said: “It is a real pleasure for the Royal Society of Chemistry to be involved in the celebrations of the centenary of Rutherford's discovery of the atomic nucleus. His genius uncovered the structure of the atom and effectively initiated the whole area of nuclear physics. It is particularly nice for the RSC to join us in the opening ceremony of the conference as Rutherford won the Nobel Prize for Chemistry *'for his investigations into*

Chemical La

Professor Colin Suckling (left) and Professor Paul O'Brien presenting the plaque to Dr Jenny Clucas

We then made our way to the outside of the building, to find that in the space of a few seconds the plaque, now covered by a curtain, had been fixed to the wall. Professor Suckling then unveiled the plaque. Among the many guests present was Professor Martyn Poliakoff, who earlier in the day had given a series of chemical demonstrations to children belonging to the very popular Catalyst Saturday Science Club and their parents. Thanks are due to Meryl Jameson (Catalyst) and Pauline Meakins (RSC) for organising a very successful and enjoyable event.

John Hudson

The Catalyst Science Discovery Centre

The Catalyst Science Discovery Centre (or 'Catalyst' as it is simply called on the building) is on Mersey Road, Widnes, Cheshire (WA8 0DF; e-mail info@catalyst.org.uk, website www.catalyst.org.uk, tel. 0151 420 1121. It is open from 10.00-17.00 on Tuesdays to Fridays and from 10.00-17.00 on Saturdays and Sundays; closed on Mondays (except during local school holidays). There is an admission charge of £4.95 for adults and £3.95 for children.

I visited it on Saturday 22 October as part of the unveiling of the RSC plaque to the centre (see previous report by John Hudson). Remarkably it is the only science and discovery centre in the country devoted to chemistry. It was opened on its current site in 1986 and is run by a charitable Trust. The building was originally built as offices for John Hutchinson's alkali works (probably in 1862). After the absorption of Hutchinson's by the United Alkali Company, in 1891 the building was leased in 1893 (and then subsequently sold in 1898) to Barnett Dutton, Auctioneers of Widnes, later becoming part of the Gossage soap works, founded by William Gossage (1799-1877) in 1908. Finally, with the rest of the Gossage estate, it was acquired by Imperial Chemical Industries Ltd, on 5 October 1948, and adapted for use as laboratories. After it closed in 1961 the Gossage Building was used by several companies including Hughes and Treleaven, who were the last owner before Catalyst was established.

There are five floors in the centre. The ground floor conta24 -r/ontp T1rs. u 1,eion workpriced

of topics and materials, e.g. soaps, dyestuffs, autocatalysts, photovoltaic cells, batteries etc. There is a Periodic Table near the entrance where there is still space to sponsor your own element. On the first floor there are two lecture theatres and a working laboratory where no less than 900 presentations of chemical experiments were conducted last year. Various chemical processes are covered here too in the well-lit and well-arranged galleries, e.g. on the Leblanc, Solvay, Castner-Kellner and other processes; materials such as penicillin, DDT, polythene, halothane (discovered in 1951 in the nearby ICI Widnes laboratory) etc. are shown. On the second floor there are exhibits on plastics. Don't miss the top floor called the Observatory: this glass-covered structure gives magnificent, panoramic 360 degree views of the surrounding Merseyside area, most of which had housed some of the world's largest chemical industry (ICI and other firms); some are still there of course, much has gone.

A visit to Catalyst is highly recommended: it is possible that, sometime in the future, we will hold a meeting of the group in this exciting space.

Bill Griffith

MEETING AND CONFERENCE REPORTS

8th International Conference on History of Chemistry

The 8th international conference on history of chemistry organized by the History of Chemistry Working Party of the European Association for Chemical & Molecular Sciences was held at Rostock, 14-16 September 2011. The aim (like previous meetings e47tr0 Td [87ssociatiare0.0iEuropeR-16 Septe is stilence onSciences wt Rost(u)1(tu6(cal & culaIne0.0te)

The workshop themes that I attended were wide in scope. In a session on alchemy Matteo Martelli (Berlin) teased out the transfer of Greco-Egyptian alchemy to Byzantium from fragmentary documents, while Adriaan Minderhoud (Amsterdam) described how seventeenth-century Amsterdam had been a meeting place for (al)chemical knowledge. Joel A. Klein (Indiana) supplied further evidence of the roles of weight balance and sensory impressions in the analytical practice of alchymists. In a session on chemistry and war Andrew Ede (Alberta) suggested that WW1 had been a catalyst in causing American Federal government to fund chemical education as opposed to the smaller-scale promotion by individual states before the war. In a poignant talk by the doyen of Polish historians, Roman Mierzecki (Warsaw) told the moving story of the clandestine activities of a group of Polish chemists during the Nazi occupation, while Malte Stöcken (Bieldefeld) delineated the various ways German chemists had acquired and distributed foreign literature during WW2. Because it was the 200(sensory im)9(pr62/(W0fr62/(h934718. 59 3888

Dyes in History and Archaeology 30: a joint meeting with the Historical Group

A joint conference of the Historical Group and Dyes in History and Archaeology took place in Derby on 12-15 October 2011. The last meeting in the UK, also a joint meeting,

The organisers of DHA30 are very grateful to Bruker AXS, manufacturers of XRF

Institution to measure heat transfer and absorption through gases in long tubes, involving galvanometers and thermopiles. He found that nitrogen and oxygen were almost entirely transparent to heat but, surprisingly found that the smaller components of the atmosphere, e.g. CO_2, water vapour or ozone absorbed more that 80% of the radiation that passed through them. He explained this finding in terms of molecules: here compounds could vibrate in more ways than individual atoms. He quickly realised that, although the quantity of gases such as CO_2 in the atmosphere was small, because of their very powerful absorptive properties they exercised a disproportionate effect on the absorptive power of the atmosphere as a whole. Thus a significant alteration in the quantity of water vapour or CO_2 would produce changes in the climate, something that had probably happened in the past. As a result he described what we now know as the Greenhouse effect, now recognised as one of the major drivers of global climate change.

Arie Jan Haagen-Smit's contribution to air quality

Professor Peter Brimblecombe, University of East Anglia

Photochemical smog characterised twentieth century urban air. It was observed in Los Angeles in the early 1940s and after the war the LA administration felt it would take a few months to solve the smog problem. Despite investigations by Raymond Tucker, a pollution expert, he failed to recognise that Los Angeles smog was formed by reactions in the atmosphere, so it remained a problem. In the late 1940's Arie J Haagen-Smit, a biochemist concerned with crop damage, began to study the smog and recognised the presence of ozone as a reaction product. This early research realised that the smog had impacts, not only on health, but it also damaged materials such as rubber. Perhaps more importantly Haagen-Smit recognised the policy implications and wrote: "a proper evaluation of the contribution of air pollutants to the smog nuisance must include not only the time and place of their emissions, but also their fate in air." His picture of the smog was relatively simple, seeing it as arising from petroleum vapours from automobiles, but this view was opposed by automobile manufacturers and oil companies. Ultimately our modern understanding of smog chemistry came through the work of Philip Albert Leighton, a well-known photochemist, and his team. His book *Photochemistry of Air Pollution* of 1961 implied the regulatory significance of smog chemistry; as Morris Katz said: "in order to control such harmful by products… [we need to] know the facts concerning their formation and reactions." The pivotal role of the hydroxyl radical was really not completely clear until Hiram Levy II (1971), where the radical begins to be seen as a basic ingredient for the production of photochemical smog. Despite this improved understanding and the early realisation that chemistry needed to inform policy, the smog problem proved long and difficult to solve. However, chemistry contributed to the way air quality was managed in a world where air pollution issues had become more comp.985 c 0.029 Td [(ouTd [(onl5 [we

Various nuisances caused concern for the Inspectorate. Sulfur waste was produced during the third stage of the Leblanc process and by the 1870s some 500,000 tons of waste were produced annually in Britain with 2 tons of waste resulting from every ton of soda produced. Most of this was dumped on land surrounding the alkali works and was a constant source of SO_2 and H_2S pollution. Copper works in Swansea and St Helens were regular polluters. The smoke comprised a concentrated mix of gaseous SO_2 and HF with particles of copper, sulfur, arsenic, lead, antimony and silver. Ammonia was an infrequent polluter but any release caused a major hazard.

Portland cement works were regularly reported to the Inspectorate. Offending nuisances included dust, KCl, Na_2SO_4 and K_2SO_4 and a smell originating from the organic matter in the clay. Although furnaces were redesigned regularly the dust remained a problem well into the twentieth century. Potteries were also brought to the attention of the Inspectorate, because of black smoke from burning coal for kiln heating. Salt-glaze potteries were singled out because during the final twenty-minutes of firing NaCl was thrown over the red-hot pottery with the release of gaseous HCl.

Changes to the regulatory framework were adopted from the 1870s to strengthen the powers of an Alkali Inspectorate facing an ever-increasing list of nuisances. These changes included “best practicable means,” continuation of central regulation, enforcement by legal prosecution and swifter regulation of nuisances. The impact of these nuisances on public health and occupational health was studied seriously from the 1870s; previously the prophylactic benefits of the nuisance vapours were often promoted. The 1895 Factory and Workshop Act required notification of industrial diseases for the first time, but it was with the appointment of Dr Arthur Whitelegge as Chief Inspector of Factories in 1896 and Thomas Legge as the first Medical Inspector of Factories in 1898 that a concerted effort began against industrial disease.

An article covering the main topics in this talk will be published in *Ambix* next July in a volume commemorating the 1962 publication of Rachel Carson’s *Silent Spring*.

The life and work of Frederick Challenger

Professor Richard Bushby, University of Leeds

Fred Challenger is chiefly remembered for his work of biomethylation. After a rather unpromising start (He obtained a third class London external degree in Chemistry from Derby Technical College) he obtained a position working with F.S. Kipping at University

The emergence of health concerns of the heavy metals and metalloids

Chris Cooksey, Watford, Hertfordshire

Arsenic compounds were known from antiquity to be toxic and are popularly associated with fatal poisoning. Inorganic arsenic poisoning kills by allosteric inhibition of essential metabolic enzymes, leading to multi-syste

To earn a living as a chemist in the nineteenth century, multi-sector working was almost essential, with around 70% working in more than one sector. For careers beginning from the inter-war years onwards the figure was just under 50%. It was interesting to consider the individuals discussed in depth at this meeting: Henry Armstrong, William Crookes, William Nicol and Alfred Spinks in these terms.

A spell working abroad formed part of the careers of roughly 20% of Institute of Chemistry members born in Britain over the whole period investigated. Not surprisingly, the Dominions and Empire were the principal regions for overseas employment. Mobility also occurred within the United Kingdom as chemists moved about presumably for career advantage. Analysis of the individuals for whom there is data on at least twenty years of their career was carried out, with both mobility and stability within a single firm analysed. The most striking pattern appeared in industry. For those whose careers began in the interwar years, success was found via stable careers as bureaucratic careers were rewarded. However, those whose careers began after the Second World War found success with mobile careers.

In the second paper, "Contingent Careers: Armstrong, Crookes and Nicol," Professor William Brock of the University of Leicester examined the different career paths taken by three nineteenth-century British chemists. The organic chemist Henry Edward Armstrong (1848-1937) had what might be taken as a conventional academic career, namely initial training in England (under Hofmann at the Royal College of Chemistry) followed by postgraduate studies in Leipzig with Kolbe. Following part-time jobs at St Bartholomew's Hospital and the London Institution and abortive attempts to obtain posts in Leeds, Cambridge and the Royal Institution, from 1879 until 1912 he taught at Finsbury Technical College and the Central Technical College in South Kensington (part of today's Imperial College). His research was in the field of organic chemistry, but he also made considerable efforts in encouraging chemistry teaching in schools. Outside academia he held many consultancies with dyestuffs companies, breweries and agricultural field stations. He spent his long retirement (1912-37) engaged in popular journalism that was frequently highly critical (often amusingly so) of developments in twentieth-century chemistry. Curiously, it is for this work in retirement that he is best known today.

The chemical physicist Sir William Crookes (1832-1919) also studied chemistry at the Royal College of Chemistry, but did not go to Germany for further training. Despite his discovery of a new element (thallium) in 1861 and his FRS in 1863, he was always unsuccessful in gaining an academic appointment. He was forced instead to earn his livelihood by other means and he turned to photographic and chemical journalism and chemical consultancy. He was the founder, owner and editor of the weekly *Chemical News* from 1859 and this became the basis of his financial success. All of his research (mainly in spectroscopy, cathode rays, radioactivity, etc) was done in a home laboratory and financed largely by hiTJ 0 89 e chf-6(n)cthat he isrk i

was the internal candidate. So great was his disappointment at not being appointed (the post went to Percy Frankland) that he abandoned chemistry completely at the age of 39. A lover of the countryside, he spent his long retirement unconventionally caravanning around the Highlands of Scotland. Nicol is one of several nineteenth-century chemists who became "lost to chemistry," though his is an extreme example because his pockets were sufficiently deep from inheritances and photographic patents to allow him "the life of Riley." In generalizing from these three case histories, Prof. Brock drew attention to the ways in which parents, marriages and wives, inheritances, knowing the right people and networks, choice of research field, and the psychological factor of humiliation (or the fear of it), must all be considered in discussing career patterns.

The third paper was given by Sally Horrocks of the University of Leicester and was entitled "Chemistry as a Career for Girls from World War II to the Sex Discrimination Act." Dr Horrocks' paper explored why it was difficult for women to have the same type of careers in chemistry as men and the attitudes towards appropriate gender roles in science. During the Second World War a widespread perception of a shortage of 'scientific manpower' existed. However, women scientists were not generally seen as a solution to this problem and Dr Horrocks related women's stories of frustration about how they were not employed in the war effort.

The perceived shortage of scientific manpower following the Second World War did not necessarily mean that the employment of women would now be a seen as a solution. Dr Horrocks quoted from the *Girl Annual* of 1959 which did discuss a career in nuclear fusion for girls but concluded that "the career of the confidential secretary can be just as exciting as tearing atoms apart." This quote reflected a tendency in popular culture that suggested science was not a suitable career for women. The 1951 film, the Young Wives' Tale echoed this sentiment, with the character of the young working mother employed in a chemical laboratory portrayed as efficient, controlled, constrained and unfeminine. There were, however, some positive portrayals of women working in industrial laboratories. Dr Horrocks showed a film from the Media Archive for Central England of the opening of a research laboratory for Birds' custard with its female chemist employees.

However, by the mid to late 1960s attitudes began to change. With the arrival of the contraceptive pill, the assumption that women would leave employment when married changed. There was an increase in the number of women studying science at university. A shift in popular culture was also evident. In the *Girl's World Annual* of 1970 welding and research in chemistry were considered as possible career options. The change in attitudes towards women was enshrined in the Sex Discrimination Act of 1975, but the change in the wider cultural climate had started before this date. Dr Horrocks concluded that rather than bemoaning the treatment of women chemists, it is important to look at the wider world of careers for women and to analyse the changes that occurred over a longer period.

In the final paper, Viviane Quirke of Oxford Brookes University spoke about "From Chemistry, to Pharmacology, to Biotechnology: Alfred Spinks's career from wartime chemist to government advisor." Alfred Spinks (1817-1982) occupies an important place in the history of British chemistry in the second half of the twentieth century. Not only did he help to shape the R&D strategy of Britain's largest chemical group, Imperial Chemical Industries (ICI), but he also advised the British government on research policy in the 1970s to early 1980s. In her paper, Dr Quirke examined the successive phases in Spinks's career, as he moved from ICI's Dyestuffs Division, where he was research chemist from 1942, to ICI's Pharmaceutical Division, where he became head of the Division's new Pharmacology Section in 1953, and then to ICI's Main Board, where he was responsible for the R&D of the entire group from 1970 until his retirement in 1979. During this last

phase of his career his advice went far beyond the group, as a member of the Advisory Board of Research Councils (ABRC) and founding member of the Advisory Council for Applied Research and Development (ACARD), culminating in his role as Chair of a Joint Working Party on Biotechnology (which produced the influential 1980 'Spinks Report'). These successive phases were linked not only to Spinks's changes in function, from bench chemist, to research manager, to Main Board member and government advisor, but also to changes in focus, from synthetic organic chemistry, to pharmacology, and later biotechnology and research policy. Spinks's career was therefore a multi-disciplinary as well as multi-phase career. In her concluding comments Dr Quirke argued that it illustrated a number of constants in successful twentieth-century chemical careers:

The role of 'boundary' research areas where chemical knowledge and expertise have a significant part to play (in this instance pharmacology in the 1940s-50s).

The enduring legacy of research networks (in this case Nottingham - ICI – Imperial College – Oxford).

The importance of a reward system allowing a certain fluidity between academic and industrial careers.

Nevertheless, some distinguishing factors that set Spinks's career apart were also identified: his was an extraordinary career, tied to an extraordinary company – ICI, and to a particular time and place – Britain in the 1950s-1960s, where the legacy of wartime projects endured, whilst recognising the value of 'Blue Sky' research.

The meeting concluded with a lively discussion based around the question "How did chemists' careers change over a century?"

Anna Simmons

The 250th anniversary of the birth of Smithson Tennant celebrated

Smithson Tennant (1761-1815) was born in Selby, near York, on 30 November 1761. He was later (in 1804) both to identify and isolate osmium and ruthenium, announced in a classic paper – a miracle of concision (S. Tennant, *Phil Trans. Roy Soc.*, 1804, **94,** 411). On 30 November 2011, 250 years later to the day, York University held a *Smithson Tennant Scientific Symposium* with lectures on the chemistry of osmium and iridium, and of what little is known of Tennant. A 250th anniversary birthday cake was made and an excellent, special 'Smithson's Ale' brewed by the Brown Cow Brewery, Selby, presented and joyfully consumed. I gave a short talk on Tennant. Although it is well known that no portrait of him was ever produced, two of the six speakers nonetheless had an image, from Google, of a person purporting to be him: it all goes to show that the internet is not infallible! I did show a portrait of John Locke, to the portraits of whom Tennant is said to have had a resemblance.

The meeting was sponsored by the RSC, BP, Johnson Matthey and the University. *Platinum Metals Review* produced a 'virtual third issue' containing a number of historical papers on Tennant and on iridium):
http://www.platinummetalsreview.com/virtual-issues-2/#VI3

Bill Griffith

FORTHCOMING MEETINGS

Royal Society of Chemistry Historical Group Meetings

Where there's muck there's brass!: Reclamation of Chemical Sites

This one-day meeting will be held at the Chemistry Centre, Royal Society of Chemistry, Burlington House, Piccadilly, London W1V 0BN on Friday 23 March 2012, beginning at 10.30am. The landscape of Britain has been transformed over many millennia, but in more recent times industrialization has had a major impact, with the chemical industry and industries using chemical processes at the forefront. The waste products are varied in their potential danger and in their quantity, but the remediation of these sites has become very important in the last 30 years or so. This meeting will review a number of different sites each with its own challenges to understand the progress being made. The Olympic stadium would not be there had the toxic waste not been removed: the opening talk by speakers attached to the Olympic Delivery Authority will address the issues. Full details of the programme and a booking form are enclosed with this Newsletter: please register and send your remittance as soon as possible if you wish to attend.

Bill Griffith

Society for the History of Alchemy and Chemistry Meetings

Sites of Chemistry in the Nineteenth Century, 6-7 July 2012

Institute for the History of Medicine and Science 'López Piñero', Valencia, Spain

This is the second conference in a series of four entitled, the *Sites of Chemistry, 1600–2000*, which deals with the multitude of sites, spaces and places where chemistry has been practised. Full details on the project, which is funded by SHAC and the Wellcome Trust, are available at www.sitesofchemistry.org . The main purpose is to analyse, first, who was practising chemistry in a particular site, where, how, to what ends, and the physical, social, cultural and economic organization of these sites; and second the wider social, economic, political and cultural contexts for the practice of chemistry through detailed examination of chemists' interactions, in and around these sites, with other actors.

Oxford Seminars in the History of Chemistry: February 2012 – May 2012

13 February: Chemistry and the Environment

Oxford Brookes University, Gipsy Lane, Headington (16.00-18.30)

Joint meeting with the Environmental History Seminar

Jean Baptiste Fressoz (Imperial College): "Chemistry and the Transformation of the Environment, 1750-1850."

John Perkins (Oxford Brookes University): "Chemical Expertise and Industrial Pollution in Rouen, 1770-1810."

6 March: Charles Webster - Paracelsus: Chemistry and Revolution

History Faculty Lecture Theatre, George Street, Oxford (17.00-19.00)

Charles Webster (Emeritus Fellow, All Souls, Oxford, and previously Reader in the History of Medicine and Director of the

2 May: Chemistry in Oxford at the end of the 17th Century

History Faculty, George Street, Oxford (15.00-17.00)

Anna Marie Roos (Oxford University): “The Learned Dr Plot (1640–1696), Philosophical
Wine, and the Oxford Philosophical Society.” t a paper, withc6(224)Tc -08.001 T704500010.665 -.1D5 T

Dr Marie Maynard Daly, Her Life and Legacy. See http://www.scs.uiuc.edu/~mainzv/HIST/index.php on the HIST website.

CALLS FOR PAPERS

24th International Congress of History of Science, Technology and Medicine
University of Manchester, 22-28 July 2013

The theme of the Congress is "Knowledge at Work." The organisers construe the theme broadly to include studies of the creation, dissemination and deployment of knowledge and practice in science, technology and medicine across all periods, and to encompass a variety of methodological and historiographical approaches. The deadline for symposia