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

RSC Historical Group Newsletter No. 68 Summer 2015

Contents

From the Editor 2
ROYAL SOCIETY OF CHEMISTRY HISTORICAL GROUP MEETINGS 3
ROYAL SOCIETY OF CHEMISTRY HISTORICAL GROUP AGM 3
ROYAL SOCIETY OF CHEMISTRY NEWS 6
RSC Chemical Landmark Plaque for Humphry Davy 6
Wikipedia Editathon 6
Members' Publications 6
PUBLICATIONS OF INTEREST AVAILABLE ELECTRONICALLY WITHOUT CHARGE 7
FEEDBACK FROM THE SUMMER 2014 NEWSLETTER – Alwyn Davis 7
CAN YOU HELP? 8
NEWS AND UPDATES 8
SOCIETY NEWS 8
SHORT ESSAYS 9
The Life of Carl Friedrich Claus: A German-British Success Story – Ralf Steudel and Lorraine West 9
Alfred Henry Allen: An Introduction – Peter Clare and Michele Clare 12
Animal Glue: A Traditional Technological Product – Frederick G Page 16
Alchemist in Residence: Artist Hilary Powell on her One-Year Artist Residency in UCL Chemistry – Hilary Powell 19
BOOK REVIEWS 20
Peter J.T. Morris, *The Matter Factory. A H 0.06 -1.571n5(H 0.0f)5(o)1(t)5(i)eun5(H 0.0f)5( )TJ2TT4 1OOK*

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, book reviews and reports to the newsletter please do contact me. The guidelines for contributors can be found online at: http://www.chem.qmul.ac.uk/rschg/Guidelines.html

The deadline for the winter 2016 issue will be Friday 11 December 2015. Please send your contributions to a.simmons@ucl.ac.uk as an attachment in Word. All contributions must be in electronic form.

Anna Simmons
University College London

ROYAL SOCIETY OF CHEMISTRY HISTORICAL GROUP MEETINGS

Wheeler Lecture and Bragg Nobel Prize Centenary Meeting

Tuesday 13 October 2015 at the **Royal Institution**, 21 Albemarle Street, London, W1S 4BS

11.00 Coffee

11.25 Welcome: John Hudson, Chair RSC Historical Group

11.30 **Wheeler Award Lecture.** Frank James

Where Humphry Davy learnt to be a Chemist: Thomas Beddoes and the Medical Pneumatic Institution in the 1790s

12.30 Royal Society of Chemistry Historical Group AGM

12.45 Lunch break.
Lunch is **not** provided, but there is a café/restaurant at the RI, and there are plenty of sandwich bars, etc., nearby.

Meeting to mark the centenary of the award of the Nobel Prize to William and Lawrence Bragg for their work in X-ray crystallography

Session 1: Chair - Anna Simmons

14.00 Jennifer Wilson (University College London)

The Early Career of Kathleen Lonsdale in X-ray Crystallography working with Sir William Henry Bragg

14.45 Michael Glazer (University of Oxford)

Lawrence Bragg's Role in X-ray Crystallography

15.30 Tea

Session 2: Chair - John Nicholson

16.00 Rupert Cole (Royal Institution / University College London)

Bragg and the Beeb: Lawrence Bragg, the Royal Institution and Televising Science, 1938-1965

16.45 Richard Catlow, FRS (University College London)

Using Synchrotrons, Neutrons and Computers to Unravel the Atomic Architecture of Matter

17.30 Informal tour of RI

REGISTRATION FORM

There is no charge for this meeting, but prior registration is essential. Please use the form below or the flyer included with the hard copy version of the newsletter and send it to Professor John Nicholson, 52 Buckingham Road, Hampton, Middlesex, TW12 3JG, jwnicholson01@gmail.com, by **6 October**.

2. Minutes of AGM at Burlington House, 22 October 2014.
3. Matters arising from the Minutes.
4. Reports:
   Chairman’s Report.
   Secretary’s Report.
   Treasurer’s Report.
5. Future Meetings.
6. Election of Officers and other Members of the Committee.
7. Any Other Business.
8. Date, time and place of next meeting.

Accounts 2014

Minutes of the Thirty-Ninth Annual General Meeting of the Royal Society Historical Group

Held in the Chemistry Centre, Burlington House at 10.30 am on Wednesday 22 October 2014

1. **Apologies for Absence:** None received.

2. **Minutes of AGM** at Burlington House, Wednesday 23 October 2013. These had been published in the summer 2014 issue of the *Newsletter* and were accepted as a true record with one minor amendment.

3. **Matters arising from the Minutes**: There were none.

4. **Reports**:

***Chairman's Report* (Dr John Hudson)**

The Chairman reported on another successful year, in which Group numbers rose to 656. He remarked that as members of the RSC realise they can join groups for free, this number is likely to rise.

Dr Hudson noted that during the year three members of the Group had been honoured. Professor Ernst Homburg had been awarded the H*nQ(5)2(8( )-53(Ho)4(m701T4(r03M4(a)1(r)3(de)1(d)-A(u)4(w)-4(a)1(r)3(5)(ha)1(d 5(a)5.6(m70(r)6( )-5

Gordon Woods asked if there were RSC guidelines about the size of the committee. In reply, Dr Alan Dronsfield informed the meeting that our numbers were relatively high for an RSC committee, but not unacceptably so, and as each member plays an active role, he felt we had got the number about right.

7. Any Other Business: There was none.

8. Date of Next AGM: It will form part of our autumn 2015 meeting in October 2015, and details will appear in the Newsletter once they have been finalised.

John Nicholson

ROYAL SOCIETY OF CHEMISTRY NEWS

RSC Chemical Landmark Plaque for Humphry Davy

On Thursday 17 September 2015, an RSC Chemical Landmark plaque will be presented to the owners of the building in Penzance where Humphry Davy (1778-1829) was apprenticed to an apothecary from 1795 to 1798. Davy began his chemical self-education and performed his first experiments in this period. His master, John Bingham Borlase, recognised Davy's outstanding ability and released him early from his indentures to move to the Medical Pneumatic Institution in Bristol, where among other things he investigated the properties of nitrous oxide, including as a recreational drug. In 1801 he left for the Royal Institution in London, where his work on electrochemistry (a term he coined) brought him fame, including through the isolation of the elements sodium, is presented that the colour changes are related to particle sizes of the dyes: 6,6'-dibromoindigo-dyed carbon nanotubes, used as a fabric surrogate, show an increase in dye particle size upon heating, as judged by electron microscopy. Because we have shown previously that 6-bromoindigo-dyed carbon nanotubes give decreased dye-particle size when heated, we infer that, no matter the indigoid or fabric, smaller particles tend to cause a bluer fabric shade, while larger particles cause a redder shade.

Chris Cooksey and Alan Dronsfield, “Quirks of Dye Nomenclature: 4. Fuchsine, or Four Shades of Magenta”, *Biotechnic & Histochemistry*, May 2015, **90**(4), 288-293 (doi:10.3109/10520295.2014.989543)

Fuchsine, also called magenta, was the second coal tar dye to be produced after mauveine. Fuchsine is composed of a mixture of up to four triphenylmethane dyes that differ only in the number of substituent methyl groups. Unlike mauveine, fuchsine still is widely used today as a biological stain. We describe the progress of fuchsine from its birth as the second coal tar dye, through a variety of modes of manufacture and industrial application, to its current use. We discuss complexities of nomenclature and identification, and the hazards and risks of its various applications.

Peter J.T. Morris, *The Matter Factory: A History of the Chemistry Laboratory* (London: Reaktion Books, 2015).

Peter Morris’ new book looks at the series of shifts in laboratory design from eighteenthdsrom eightom [(va160([(va160([(va

History Division of the American Chemical Society

The History Division of the American Chemical Society is delighted to announce that Professor Dr. Christoph Meinel has been awarded the HIST Prize for 2015. Dr. Meinel's extensive body of historical work has earned him a position at the centre of the international community of historians of chemistry. His research interests include the emergence of chemistry as a discipline, its social history, communication and publication networks. He has also published on various aspects of early modern natural philosophy. In addition to scores of articles in journals such as *Ambix, Hyle, Isis, Angewandte Chemie,* and *Berichte zur Wissenschaftsgeschichte*, Meinel's work has appeared in dozens of multiauthor books, both as an author and editor. His monographs include a major series of books on Joachim Jungius (1587-1657). He has served as president of the German Society for the History of Science, and was the founding president of the International Commission on the History of Modern Chemistry. From 1990 through 1997 and again since 2014 he chairs the History Division of the German Chemical Society (GDCh) and is editor of the Division's journal *Mitteilungen.*

SHORT ESSAYS

The Life of Carl Friedrich Claus: A German-British Success Story

The important *Claus Process* is carried out on a very large scale in refineries to convert hydrogen sulfide from oil desulfurization into very pure elemental sulfur with the help of a metal oxide catalyst. H_2S extracted from sour gas is

On 14 June 1900, the widower Carl Friedrich Claus senior, aged 72, married his second wife, the spinster Caroline Barry, who was forty-eight years old at the date of marriage, in Hammersmith. On this occasion, the address of their residence was given as 110 Godolphin Road. In the marriage certificate, Claus is mentioned again as "Chemist". The couple may have lived together for several years already. Ten weeks after marriage, on 29 August 1900, Carl Friedrich Claus died at 9 Oxford Road, Gunnersbury, as a well-off businessman. According to his will of 22 July 1900 his much younger wife inherited his "various houses"; Caroline Claus died in 1926. Descendants of CFC are now living in England and most probably in Germany since his daughter Pauline got married in Frankfurt/Main in 1882 to the chemist and hotel owner Dr. Friedrich Ludwig Roser; they had four children and lived in Wiesbaden. Pauline died in Wiesbaden on 20 January 1924.

Professional Life of C.F. Claus Senior:

Relatively little is known about the professional life of C.F. Claus senior except for the many patents he applied

In Figure 2 [10] a deposit of sulfur crystals on the island of Vulcano (Italy) is shown, formed by air-oxidation of hydrogen sulfide as a component of hot volcanic exhaust gases; the sulfur at this location is also known for its relatively high selenium content of up to 680 ppm [8]. In Figure 2 the gas vents can be recognized from the surrounding orange-red coloured sulfur which evidently is hotter than 25°C since sulfur is a thermochromic material.

Figure 2: Sulfur deposits on the slopes of the volcano on Isola Vulcano (Italy)

Before C.F. Claus senior turned to the chemistry of sulfur he took out patents for bricks made from slag in the early 1870s. At this time he may have worked for the steel industry in Middlesbrough. Earlier, he seems to have already been associated with the Leblanc industry as he patented a process for making chlorine in 1867 [11]. In the *London Gazette* dated 29 August 1876 CFC sr. is mentioned as one of three inventors for "improvements in the manufacture of salts of barium and other salts, which improvements are also applicable to the extraction of silver from argentiferous pyrites"; dated 14 November 1870 [11].

In addition, the following patents (in chronological order) granted to Carl Friedrich Claus sr. during the period 1877-1899 have been found in the literature [12]; they are all dealing with sulfur compounds.

1. British Patent GB 18780816:
   C.F. Claus (1878): *Improvements in the Manufacture of Sulphide and other Compounds of Zinc, and in the Production of By-products Resulting Therefrom*
2. German Patent DE 6733 18790220:
   C.F. Claus (1879): *Mixture of Zinc Sulphide and Barium Sulphate as a Base for Paint*
3. U.S. Patent 264 801:
   Roger W. Wallace and Carl F. Claus (1882): *A Utilization of By-Products in the Manufacture of Coal-gas.* Patented in England on 20 January 1877, No. 273.
4. German Patent 23763:
   C.F. Claus (January 1883): *Verfahren der Reinigung von Leuchtgas mittels Ammoniakgas (Process for the Purification of Coal-gas with Ammonia)*
5. U.S. Patent 272 375:
   C.F. Claus (February 1883): *Manufacture of a White Paint*
6. German Patent 28758:
   C.F. Claus (November 1883): *Neuerung bei dem Verfahren zur Gewinnung von Schwefel bzw. Schwefliger Säure aus Schwefelwasserstoff (Invention concerning the Production of Sulfur resp. Sulfurous Acid from Hydrogen Sulfide)*
7. U.S. Patent 349 981:
   C.F. Claus (September 1886): *Obtaining Sulphur from Hydrogen Sulphide*
8. U.S. Patent 354 393:
   C.F. Claus (December 1886): *Process of Obtaining Sulphur from Sulphureted Hydrogen*
9. British Patent 1895 21380:
   C.F. Claus (1896): *Improvements in the Roasting of Sulphide Ores and Mattes*
10. British Patent 1898 07269 (A):
    Wladimir von Baranoff, Eugene Hildt, and Carl Friedrich Claus (1899): *Improved Processes for Producing the Sulphides of the Alkalies and of the Alkaline Earths from the Sulphates thereof, and for Obtaining from such Sulphides, Free Sulphur, Sulphurous Acid, Sulphide of Hydrogen, and Carbonates of the Alkalies.*

Several of these patents have been granted to him in other countries too, sometimes even earlier than the ones mentioned here. But at present the full texts are available to the authors only for the patents mentioned as numbers three to ten [13].

From the many different addresses CFC sr. had in England one may conclude that he worked mainly as a freelance chemist. However it is not exactly known which of his many inventions enabled him to make the money that

The Action of Water on Lead

In 1888, and during his presidency of the Society of Public Analysts, Allen read his paper "The Action of

The first European commercial glue making from animal remains and hides appears to have been in Holland, dating from the end of the seventeenth century, followed by a works in England at about 1700 [1]. Nevertheless, the early history of violin making from the Brescia area of northern Italy in the early sixteenth century (other stringed instruments date from as early as the ninth century) shows the Brescian and Cremonese master craftsmen used glue prepared from animal remains. To the present time such glue remains the traditional choice on the basis of certain properties required not only by the violin maker but also by the cabinetmaker or restorer. Because of the development of structural jointing in cabinet making and the treatment of surfaces with veneers in the seventeenth century onwards, the reliance upon animal glue developed. The first British patent appeared in 1750 for fish glue and was soon followed by others involving animal remains and bones.

Glue Making

Animal glues are made from the protein material extracted from the bones, hides and other animal remains by boiling in water. This extracted material is cooked to form a gelatine-like material that-3(l)3( )]TJ 8rs r 41mae gtine

Testing Glues

This may involve a simple procedure such as gluing two wooden blocks together for breaking by measured mechanical means. One important laboratory test called a ‘Bloom’ test (or gram test) appears in various BSI publications [3], but a simple practical method of testing is described by Schofield [4]. In his report, animal glue was compared with modern PVAs and polyurethanes by measuring the force necessary to break a glued standardised joint.

Not unexpectedly the animal glue joint proved the least effective but had the great advantage in that the breakage occurred at the glue line, there being no damage to the timber which was not the case with other adhesives. Reproducible laboratory measurements of the jelly strength and the viscosity of glue also show a direct relationship to adhesive strength. Indeed, glue is sometimes graded on the basis of its gel strength – this is a measure of how many grams of force are needed to achieve a 4 mm depression by a plunger of fixed diameter into a 12.5% gelled solution of the glue at 10ºC and is known as the Bloom Gelometer test. Grades may vary between 32g and 512g by this method and a measure of 192g is judged best suited for woodworking joints. The higher the gram strength the stronger the glue and its higher molecular weight – but its gelling time is shortened. Clearly, animal glue is strong glue as proved in Schofield’s tests in which he showed its computed bonding strength to be seventy-six per cent of the best modern PVA.

With cold-setting glue, the bond strength develops with loss of moisture through the wooden interfaces or directly to the atmosphere. Variations in joint strength do occur dependent upon the nature and species of timber used. Nevertheless, in the limited variation of humidity and temperature that a piece of furniture might normally experience, animal glue has value. Here, the bond’s moisture content fluctuates with ambient temperature and humidity in a similar way to that of the wood. Consequently, there is a uniform moisture content equilibrium across the entire glued joint. This may result in lower stress than in the case of an impermeable glue line given by, for example, a cured PVA bond at nil moisture content. Whilst remaining susceptible to excess moisture this aspect of animal glue becomes an advantage to the violin repairer or woodworker, inasmuch as a joint can be re-opened if needslc(1)3(m)-0.339 -v1366n6.42,(aomv)b2(sa)255(T23891(s)1(s)1(o w1(4di)(sn5(T2389147 o4e(238980n0)-16g.0980s

printing and ink making in the street to traditional stone lithography tested on found bricks and concrete slabs. These workshops extend the project's reach to a wider public exploring the chemistry and stories of the materials through participatory making and informal exchange.

At the core of the project is an interdisciplinary imagination and commitment to the overlap of artisan and scientific practices and methodologies. Throughout the year I have been inspired by conversations with Dr Simon Werrett and membership of the Society for History of Alchemy and Chemistry. The idea of the duel 'labatorium' and 'oratorium' functions of the alchemical workshop are key to developing how this may take contemporary form through ways of performing, making, and sharing hidden techniques across the arts and sciences. At its core, the work plays with ideas of value – the way we value people, places [illegible]

The Matter Factory describes how chemical laboratories and buildings have changed to meet the differing needs of the subject between 1600 and 2000. It does not attempt to review the detailed development of the chemical laboratory but rather to show how certain features of the laboratory were important determinants in their design and operation. These features included the furnace, the supply of gas and water to the bench, the availability of reagents, the provision of fume chambers (or cabinets), the chemical balance, the polarimeter, the multitude of very sensitive instrumentation and in more recent times the over-riding importance of safety. The starting point for the author's researches are the images of particular laboratories whether paintings, engravings or photographs, and these are supplemented by visits to extant historic laboratories or modern facilities. This accounts for the large number of illustrations in the book, most of which are well produced and thus allow the reader to follow quite closely the author's analysis. The illustrations are also accompanied by an extensive list of references to enable the reader to pursue further investigations.

The Matter Factory is also concerned with the laboratory in its social a0(ss)1(e)-t91(y)88(i)92(90(o)88(c)8(th)-4()-1 archives cover ventures not just in Belgium but also in Britain, USA, France, Germany, Russia, and more recently Southeast Asia as well as in many other parts of the world.

In the period to World War One the business focused on the soda-ash trade using Ernest Solvay's patent for the production of soda ash by the ammonia-soda process either by issuing licences (as in the case of Brunner Mond in the UK) or by developing their own plant (in many cases taking over plant from other manufacturers). It was only in the period between the World Wars that the business began to diversify into electrolytic manufacture of caustic soda and chlorine, the latter for PVC and rubber. The post-World War Two period, brought greater diversification than ever before in its history as it started production of organic solvents, pesticides, peroxides, plastics (including polyethylene and PVC), veterinary products and pharmaceuticals. In the 1960s many chemical businesses including Solvay diversified into the production of chlorofluorohydrocarbons (CFCs) for use as propellants for aerosol sprays but the venture proved controversial and in 1996 the weight of accumulated evidence brought a total ban, at which point Solvay switched to the more benign hydrofluorocarbons (HFCs).

An important feature of the business was its initial financial structure as a limited partnership with managing partners (*gérants*) that allowed the Solvay family to retain a tight hold on the business, and the associated financial regulations did not require the accounts to be made public. *Gérants* were members of the Solvay family, and even silent partners were carefully selected against the needs of the business. This structure remained in place until 1967 when the business became a joint-stock company but with a structured share-holding that still allowed the Solvay family to retain control.

At over 600 pages, *Solvay* is a weighty tome of information, but with the text usefully divided into sections and through careful use of the thorough index the reader will find rewarding details. It is thoroughly recommended to those with an interest in the history of chemistry and the chemical industry, but it will be of particular interest to business historians.

Peter Reed

Marco Fontani, Mariagrazia Costa and Mary Virginia Orna, *The Lost Elements: The Periodic Table's Shadow Side* (Oxford: Oxford University Press, 2015). Pp. 531. ISBN 978-0-19-938334-4. £25.99.

What do the following elements have in common: *asium*, *bythium, columbium*, *didymium* and

MEETING AND CONFERENCE REPORTS

The Life and Work of Sir John Cornforth AC CBE FRS

Royal Society of Chemistry, Burlington House, London, 18 March 2015

The Nobel-prize winning organic chemist Sir John Cornforth died aged ninety-six on 13 December 2013. This meeting, attended by over seventy-five people, was held to honour Sir John's memory and to recognise his intellectual achievements in synthetic and biosynthetic chemistry.

The four speakers and two Chairs (Sir Alan Battersby and Professor Chris Willis) all had a close scientific association with Kappa, (a nickname acquired by Cornforth from his first forays in laboratory work in Australia), and were able to add their own personal anecdotes and reminiscences. Kappa's three children attended the meeting, and our understanding of the nature of the man was further extended by his son (another John Cornforth), who described his father's prowess outside chemistry – as a chess player, a gardener and a tennis player

The Popják-Cornforth (PopCorn) Collaboration on the Stereochemistry of Biosynthesis: NIMR and Milstead