Historical Group

NEWSLETTER
and
SUMMARY OF PAPERS

No. 67 Winter 2015

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RSC Historical Group Newsletter No. 67 Winter 2015

Contents

Generation: Origins of the Social Construction of Science, by Derry Jones. There are reports on the RSC Chemical Landmark Plaques unveiled at Johnson Matthey Plc, the University of Strathclyde, Saltend Chemicals Park, Hull and the University of Nottingham. A report also appears of the last RSCHG meeting: “Chemistry and World War One”, held at Burlington House on 22 October 2014.

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 -7(a)-7(s)-6(e)-7( )bnewtnial 8uni( )-126(w-48.684 -156.6599 71P)-9(l)-4(a)-34riale

ROYAL SOCIETY OF CHEMISTRY NEWS

The Chemical Landmark Scheme is a Royal Society of Chemistry initiative recognising sites where the chemical sciences have made a significant contribution to health, wealth, or quality of life. The distinctive blue plaques are publicly visible, giving everyone an insight into chemistry's relevance to everyday lives.

Changes have been made to the application process for the Chemical Landmark Scheme. A maximum of four Chemical Landmark plaques are now awarded each year. To date, over fifty plaques have been awarded, including four international landmarks. Full details of the previous landmarks can be found using the RSC's Places of Chemistry App, which can be downloaded from the App Store or Google Play.

You can nominate a Chemical Landmark by completing the application form. Applications can be made at any time, and will be considered twice annually, at the end of April and October. Please visit

http://www.rsc.org/campaigning-outreach/connecting-with-chemistry/

FEEDBACK FROM THE SUMMER 2014 NEWSLETTER

In the last Newsletter I asked for information about a pair of large sterling silver conical flasks and some unrecognised tubular objects in pure silver, which we had found in a safe in the UCL Chemistry Department.

Alan Dronsfield directed me to the Google Advanced Search where the words silver flask coupled with chemistry bring up a number of references to silver flasks. They have been used in reactions involving strong alkali, or HF or its precursor, which will attach glass. For example lubricating oils have been saponified with alcoholic KOH in silver flasks; "they have been in constant use for the last four or five years and are as good as new" [1]. Again, deuterium fluoride has been made by the reaction of benzoyl fluoride with D_2O in a silver flask [2].

I have not yet been able to find who might have used the flasks. They date from the time when Norman Collie was the Head of the Department; he had wide interests in chemistry himself and encouraged the staff of the department to follow their own interests, and there are a number of possible candidates.

The question over the pure silver tubular devices is a more difficult one and still hangs in the air. The prize for the most reasonable suggestion goes to Michael Jewess. He points out that silver has a high thermal conductivity and is not very expensive until it gets into the hands of silversmiths: perhaps some physical experiment was carried out on gases within the tube which could be immersed in a bath at the desired temperature or surrounded by a heater.

We continue to search.

References

P.H. Conradson, *J. Am. Chem. Soc.*, 1904, **26**, 672

Georg Bauer, *Handbook of Preparative Inorganic Chemistry* (New York, London: Academic Press, 1968), p. 128.

Alwyn Davies
University College London

ANOTHER OBJECT TO IDENTIFY

I have received a query from an RSC member, Dr Peter Barnes, asking if anyone could identify the object pictured. He writes: "These pictures were sent to me by an engineer friend, Stanley Graham. He added the following details: Material is bronze, probably highly leaded. Weight is 2lb 10oz, and diameter about 4 inches. It's very well made. The only marking is in the centre of the concave base 'I.C.I.

The best current guess is that it is probably a laboratory container for a very rare/dangerous/expensive chemical. The

Reading: H. Bassett, “The University of Reading”, *J. Roy. Inst. Chem.*, 1955, **79**, 359-362: doi.org/dp8d9r.

Sheffield: R.D. Haworth and T.S. Stevens, “The University of Sheffield”, *J. Roy. Inst. Chem.*, 1956, **80**, 269-274: doi.org/fbvmmj.

Southampton: N.K. Adam and K.R. Webb, “The University of Southampton”, *J. Roy. Inst. Chem.*, 1956, **80**, 133-140: doi.org/fsqmvw.

Swansea: E.E. Ayling, “University College, Swansea”, *J. Roy. Inst. Chem.*, 1955, **79**, 623-628: doi.org/b7rnbx.
The college is now part of the University of Swansea.

St. Andrews: J. Read, “The United College of St. Salvator and St. Leonard, in the University of St. Andrews”, *J. Roy. Inst. Chem.*, 1953, **77**, 8-18: doi.org/bqgrsj.
Elements of Genius – The Legacy of Chemistry in St. Andrews. A booklet (18 pages) to accompany an exhibition to mark the bicentenary of the department was published by the University of St. Andrews in 2011. The college is now part of the University of St. Andrews.

UMIST: J.K. Wood, “The Manchester College of Science and Technology”, *J. Roy. Inst. Chem.*, 1958, **82**, 755-762: doi.org/bmbkn8.
In 2004 the college merged with the University of Manchester.

University College London (UCL): A. Davies and P. Garratt, *UCL Chemistry Department 1828– 1974* (St Albans: Science Reviews (2000) Ltd., 2013).
UCL is a self-governing College of the University of London.

Bill Griffith
Imperial College London

SOCIETY NEWS

News from the Historical Division of the German Chemical Society

Mitteilungen. Herausgegeben von der Fachgruppe “Geschichte der Chemie” in der Gesellschaft Deutscher Chemiker.

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B 4dca16e8( )-(9)-8-8(16ep7(”)59)-116(m)-12(i)-at-8(lc)-7(d6(d)-8(16ew)-116(1)-85 -1.098 T)--4(d)3.106rS-7(p)-8(i)o5

State University) for her work on physical chemistry and the boundary between physics and chemistry in the twentieth century.

A complete nomination consists of

• a complete curriculum vitae for the nominee, including biographical data, educational background, awards, honours, list of publications, and other service to the profession;

• a letter of nomination summarising the nominee’s achievements in the field of history of modern chemistry and/or the history of the chemical industry and citing unique contributions that merit this award; and

• two or more seconding letters.

Earth. I knew nothing of the earth I trod upon: except that it was set on fire once by an unlucky boy whom the sun, who in those days kept his carriage, sent to take an airing upon the coach box.

Water. I knew nothing about the water I drank: except that we used to be created sometimes by Gods pouring it out of a porridge pot, sometimes by a Goddess when she had a fit of the vapours.

Natural Philosophy. I had heard that there was a science called Natural Philosophy; but was told that it was abstruse and difficult, and in the mean time was crammed with Logic obscurely explained from an obscure text, with Greek Testament drummed in at both ears, and with Geography learnt by hunting out the names of places *coram urbis* upon a map, and above all with Greek and Latin better taught before at Westminster.

Chemistry. I had heard that there was another science called Chemistry but was discouraged from all thought of it by a universal frown, as a science useless if not pernicious, and which considering what it was and by whom taught could be fit only to make a man an atheist or an apothecary.

He says that he was ignorant of science when he graduated but “this complaint would not long subsist if but half the time were given there to the study of chemistry that is consumed for example in the study of the Greek Testament”.

In his later comments on the *Declaration of the Rights of Man and of Citizen* (1789) which was put forward during the French Revolution, he compares chemistry favourably with the legislation.

Chemistry has commonly been reckoned, and not altogether without reason, among the most abstruse branches of science. In chemistry, we see how high they have soared above the sublimest knowledge of past times; in legislation, how deep they have sunk below the profoundest ignorance …..Comparatively speaking, a select few applied themselves to the cultivation of chemistry …the science is acknowledged to be an abstruse and difficult one, and to require a long course of study on the part of those who have had the previous advantage of a liberal education; whilst the cultivation of it, in such manner as to make improvements in it, requires that a man should make it the great business of his life; and those who have made these improvements have thus applied themselves.

In chemistry there is no room for passion to step in and to confound the understanding - to lead men into error, and to shut their eyes against knowledge: in legislation, the circumstances are opposite, and vastly different.

This, then, was the background in which UCL was founded in 1826, largely by Bentham’s disciples, as an institution which would accept anyone who was academically qualified, irrespective of religion, social status, or nationality, and which would teach those subjects which Bentham so sorely missed at Oxford. When the college opened for teaching started in 1828, it included a Chemistry Department, the first in England [4].

One can speculate how history might have been changed if only Oxford had taught Bentham chemistry. He might have followed a chemical career and we might now be teaching Bentham’s chemistry, but if he had not instead become a social and educational reformer there might be no UCL in which to teach.

It is chemically appropriate that when the time came for his body to be mummified, his head was dehydrated in a vacuum desiccator over sulphuric acid. Although the experiment was chemically successful the result was aesthetically unattractive as shown in the before and after pictures below, and the head on the autoicon was replaced by a wax model.

References

1. T.L.S. Sprigg (ed.), *The Correspondence of Jeremy Bentham* (London, 1968), vol. i, 265.
2. A database containing a detailed catalogue of the Bentham papers, held in the University College London Library can be found at:
   www.benthampapers.ucl.ac.uk
3. Bertel Linder and W.A. Smeaton, “Schwediauer, Bentham and Beddoes: Translators of Bergman and Scheele”, *Annals of Science*, 1968, 24, 259-273. Most of the quotations in this article are taken from Smeaton’s paper.
4. A. Davies and P. Garratt, *UCL Chemistry Department 1828–1974* (St Albans: Science Reviews (2000) Ltd., 2013).

The images in this article are courtesy of UCL Public and Cultural Engagement/UCL Creative Media Services.

A.G. Davies
University College London

From Waterloo to Thiopentone: The Early Chemical History of Intravenous Anaesthesia

2015 sees the bicentenary of Wellington's famous victory at Waterloo. Less well-remembered are the many soldiers injured in that battle who endured their amputations without the benefit of any form of anaesthesia. There's a memorial to Wellington, complete with horse, in London's St Paul's Cathedral and of course we know that the architect of this most magnificent building was the scientist and polymath, Christopher Wren. Curiously, Wren held the key to effective intravenous anaesthesia about 150 years before that fateful battle. As a Fellow of All Souls' College, Oxford, in 1659 he injected an aqueous extract from opium into the vein of a dog, using a quill attached to a bladder as a makeshift hypodermic syringe (today's device was only invented in 1853). The dog was stupefied, but not killed. Sadly, the experimenters found this a curiosity rather than a breakthrough that could open the doors to painless modern surgery. Over a century before this, Paracelsus had used ether to render fowls insensible but also took his work no further. Perhaps we should not be surprised at this - no-one at the time envisaged surgery as being anything other than extremely painful. When in 1800 this view was challenged by Humphry Davy's suggestion that the insensibility induced by nitrous oxide could allow pain-free surgery, the idea was not followed up. Surgical interventions and pain remained inseparable until the mid-1840s, when ether, chloroform and nitrous oxide were used to induce oblivion. These agents were relatively safe and within a matter of months became widely adopted. Around 1900 the risk of death from ether anaesthesia was 1 in 15,000 and with chloroform, 1 in 3,000. Both agents (alongside nitrous oxide used mainly for teeth extractions) were the mainstays of inhalation anaesthesia until the mid-1950s. However, as well as the occasional fatality, they had other drawbacks. In the early days of anaesthesia, induction was sometimes a battle between the anaesthetist and the patient, the latter terrified of the feeling of suffocation induced by the mask. Moreover, on regaining consciousness, vomiting and breathing difficulties were common. Feelings of anxiety/terror could be partially remedied by the use of a potent pre-operative hypnotic drug such as the barbiturate *Nembutal*, but vomiting and breathing difficulties remained a problem until the introduction of fluorinated volatile agents (typically halothane) [1] in the mid-1950s. Anaesthetic agents were clearly absorbed into the blood via the lungs and then carried to their site of action in the brain. Early research focussed on trying to avoid the irritant effects of these gases and vapours on the lungs by delivering the anaesthetic to the brain by injecting it into the blood – i.e. intravenously. This, it was hoped, would also avoid the feelings of suffocation and instead the patiently would simply drift off into sleep.

Although the soluble opium extracts used by Wren and others were reinvestigated in 1902 and sporadically over the next thirty years, the major problem with their use was that a dose strong enough to prevent pain could also stop the patient breathing, or cause such shallow breathing that the person's life was in danger. It was clear that anaesthetists would have to look beyond poppy extracts for their intravenous agents.

Chloral hydrate

The first reasonably successful intravenous agent was chloral hydrate. Justus von Liebig had been exploring the reaction betw

an experiment on an unfortunate dog, it was accepted that the introduction of a sulphur atom into the structure imparted a toxic character. In the early 1930s the chemists Donalee Tabern and Ernest Volwiler, working for Abbott Laboratories in the USA challenged this view. Again they found that these sulphur-

when applied to large assemblages. Broken symmetry, the concept that simplicity of laws is not manifest in their consequences, is a continuing philosophical theme, with a tribute to Nambu Sensei. The final section, headed Popularization Attempts, including Pauling's Resonating Valence Bond Theory and the scope of theoretical condensed matter physics, supports Anderson's admission, despite his wide scientific interests, about limited ability for explanations to a lay public. He writes that, although he had envisaged devoting more time to writing in later years, physics proved too strong.

Philip Anderson (born 1923) was brought up in an academic family in Urbana before taking a wartime degree aged nineteen at Harvard. His time in the US Navy as a Chief Specialist (X) at the Office of Naval Research ended after World War II and was followed by a PhD with Van Vleck in the early NMR days. Having married in 1948, he nearly took an academic post in Washington State, but, with no offers from General Electric or Brookhaven, was glad to join Bell Technical Laboratories (BTL) in 1949 on ferroelectricity under Shockley ('brilliant but arrogant and overconfident'); he stayed for thirty-five years. The Nobel Prize for Physics, on the quantum theory of condensed matter, came in 1977. There was a valuable spell in 1953 to 1954 with Ryogo Kubo in Tokyo and a visiting chair until 1975 followed the years 1961-1962 spent at the Cavendish Laboratory, Cambridge; in formal retirement, research continued at Princeton.

Early historical sections of the book include lengthy articles based on chapters of an unfinished 1960s history of

process control remained limited. Many chemical works were clustered together and located close to residential areas, which increased the impact of pollution from waste products on both the environment and the people living there. Alkali works, which produced soda using the Leblanc process, were a particular cause for complaint for local residents. However it was only when wealthy landowners voiced their protests about the impact of pollution on property values that the House of Lords intervened and appointed a Select Committee on Injury from Noxious Vapours in 1862. This resulted in the 1863 Alkali Act, legislation which aimed, with later revisions, to control pollution from chemical works and which also created a new regulatory body, the Alkali Inspectorate.

When Robert Angus Smith (1817-1884) was appointed as the first Inspector (later Chief Inspector) under the Terms of the Act in 1864, he faced the challenge of organizing a team of sub-inspectors and drawing up regulations for inspecting alkali works in order to enforce the regulations of the 1863 Act. His use of chemical analysis, and the adoption of a 'best possible means' approach for preventing the release of pollutants into the atmosphere, whilst also working in a cooperative manner with the manufacturers, were all fundamental to the improvements brought about by the Act. Given the importance of Smith's role, the Alkali Inspectorate and an assessment of Smith's administrative and structural legacy within it form a central focus of the book. b-8(f)gimmit77boo

structure, but also by the elite physicists more concerned with atomi

from 1830-1837. His famous contributions to
Science were Graham's Law of Diffusion and his
pioneering work on dialysis. He founded the
Chemical Society of London in 1841, and
became Master of the Mint. He is
commemorated by this building and
by a statue in George Square.
2 July 2014

John Hudson

RSC Chemical Landmark Plaque awarded to Saltend Chemicals Park, Hull

The plaque was presented on 23 September 2014 by Professor Dave Garner, former President of the RSC, to mark one hundred years of chemical-related activity on the Hull site.

Saltend is a hamlet, just outside Hull, on the north bank of the Humber. It is dominated by a chemical works which hosts a number of industries, most of which have a connection with BP. Noteworthy on the 370 acre site is the BP production of acetic acid (presently 600,000 tonnes per year, the largest plant in Europe) and acetic anhydride (150,000 tonnes per year). Also part of the complex is *Vivergo Fuels*, a joint operation between BP, British Sugar and Dupont, which produces 330,000 tonnes per year of bioethanol from sugars mainly derived from wheat. Our host for the day was the *Hull Research and Technology Centre*, part of BP, which concentrates on catalyst discovery and development, and the testing of new processes, such as novel methods to dehydrate ethanol to ethene, at pilot plant level. Staff members at the Centre were responsible for initiating the Landmark Award and overseeing the day's activities at the local level.

Group photograph of Saltend Chemicals Park staff and RSC representatives (Professor Dave Garner is fourth from the right).
[Images supplied by the RSC]

The Saltend Chemicals Park National Chemical Landmark Plaque

The Historical Group was represented by Alan Dronsfield

Alan Dronsfield

Dan Eley: A Celebration of 100 Years of Life and Science

The presentation of an RSC Chemical Landmark plaque to celebrate the one hundredth birthday of Daniel Douglas Eley, FRSC, OBE, FRS, took place during a half-day symposium held in the School of Chemistry at The University of Nottingham on Wednesday 29 October 2014. There were six speakers and about 300 people attended the event, including many of Dan's former students.

The first part of the programme was chaired by Peter Sarre (Professor of Chemistry and Molecular Physics). After a welcome to the symposium by Saul Tendler (Pro-Vice-Chancellor for Research and Professor of Biophysical Chemistry), Professor Katharine Reid, the current Head of Physical and Theoretical Chemistry, gave the first presentation entitled "Dan Eley: A Perspective".

Dan graduated with first class honours in Chemistry at the University of Manchester in 1934 before starting postgraduate work on catalytic processes supervised by Michael Polyani, the Hungarian-born polymath. He obtained an MSc in 1935 and a PhD in 1937 before leaving for Cambridge to join the Colloid Science Laboratory of Eric Rideal (later Sir Eric Rideal) where he obtained a second PhD in 1940. It was during this period that measurements of ortho-para hydrogen equilibration catalysed by a tungsten surface were made. This led to the publication of the famous Eley-Rideal mechanism in which a gas-phase molecule collides with a surface-adsorbed molecule. Subsequent elevation to textbook status of the mechanism means that citations of the original papers are no longer considered necess(e)-7(.)-46 Rhandeto ha

Professor Thomas. The lecture which focused on the design and application of solid catalysts was illustrated by video clips from Professor Thomas's 1987 Royal Institution Christmas Lectures "Crystals and Lasers".

Professor Peter Norton (Western University, London, Ontario) then presented a talk entitled "Memories and Connections: Nottingham and Back Again". Peter Norton, who was in the first cohort of students to move into the new Chemistry Building in 1960, described his time as a PhD student and as an ICI Fellow in Dan's laboratory. These years were enjoyable and critical for his own later career in Canada during which he interacted with a number of distinguished physical chemists who all held Dan in high esteem. For the one hundredth birthday celebration, he had contacted Professor Gerhard Ertl (Nobel Prize in Chemistry, 2007), Professor John Polanyi (Nobel Prize in Chemistry, 1986 and the son of Michael Polanyi) and Sir David King (University of Cambridge, former Government Chief Scientific Advisor), all of whom responded with warm, complimentary messages and greetings for Dan.

At the close of the first session Professor Martyn Poliakoff, Vice-President and Foreign Secretary of the Royal Society presented Dan with a certificate to mark the fiftieth anniversary of his election to the Society.

Professor Dave Garner (Past President of the RSC, Professor Emeritus, School of Chemistry) then spoke about the activities of the RSC and especially of the criteria for the award of Chemical Landmarks. He drew attention to the list of

Meeting Reports

Chemistry & World War One

This full-day meeting was organized as the Historical Group's contribution to the RSC events marking the outbreak of World War One. It was held on 22 October 2014 at Burlington House and attracted an audience of fifty-two. Unfortunately, the planned live stream to the Catalyst Science Discovery Centre at Widnes (Cheshire) had to be abandoned, although it is hoped to stage such ventures in the future. The meeting comprised seven speakers and the topics covered included not just British perspectives but also German and French. As part of the meeting, Dr Tony Travis (The Hebrew University of Jerusalem) was presented with the Wheeler Award for his outstanding contribution to the history of chemistry, and a fuller-version of his talk will be produced separately. The meeting was rounded-off with some concluding remarks from Professor Alan Dronsfield (past Chairman of the Historical Group) that drew on his own family's connection with World War One. The Historical Group is grateful for a grant from the RSC towards the costs of this meeting.

Peter Reed

The Chemists' War: 1914–1918

Michael Freemantle, Author of The Chemists' War: 1914 –1918

Britain declared war on Germany on 4 August 1914. Between then and the Armistice on 11 November 1918 an estimated 15 million people died as a result of the war. The toll included not only battlefield fatalities but also military and civilian deaths resulting from starvation, disease and otot /TT1 1 Tf -48.938 -1.634 Td [(T)-11(h)-9(e25.34 Td [(T)(T)28)-4hU [(

Powers the availability of the vital nitrate ceased following the Battle of the Falkland Islands on 8 December 1914, when the British Royal Navy gained a major victory over the Imperial German Navy. Germany then quickly turned to industrial processes for capturing atmospheric nitrogen that had been developed from around 1905: the electrothermal production of calcium cyanamide, based on the work of Adolf Frank and Nikodem Caro (the Frank-Caro process); and the synthesis of ammonia from its elements by the high-pressure method invented in 1909 by physical chemist Fritz Haber, with the aid of his British assistant Robert Le Rossignol, and adapted to industrial production by Carl Bosch of BASF, at Ludwigshafen. Manufacture of ammonia, at nearby Oppau, commenced in September 1913. There were also the high-voltage electric arc processes for nitric oxide, first developed by Birkeland and Eyde in Norway. The cyanamide and Haber-Bosch processes were of critical importance to Germany. This stimulated technical improvement and massive expansion of all the synthetic nitrogen processes, as well as major developments in the production of concentrated nitric acid by catalytic oxidation of ammonia (mainly the Ostwald process). The Haber-Bosch process came to the forefront from 1916-1917 mainly as a result of the Hindenburg programme of state-led industrialization and the opening of the Leuna works at Merseberg in 1917. The astounding technical brilliance of the process could not be matched by the Allied nations. Synthetic ammonia inaugurated a new era in industrial chemistry, based on the application of high pressures and catalysts, and including the growth of a key sector: nitrogen products as fertilizers.

The British Chemical Industry and World War One: The United Alkali Company

Peter Reed, Independent Researcher

When on 4 August 1914 Britain entered the First World War the country was unprepared for conflict and was forced to mobilize quickly. It is estimated that British forces fired 250 million shells and produced about 25,000 tons of 'battle gases' during the course of the war, which it has become known as the 'Chemists' War'. Production of chemicals for the war effort was directed by the Ministry of Munitions and its Trench Warfare Department (with the Treasury overseeing financial costs).

Huge demands were placed on the chemical industry with the United Alkali Company as one of the largest companies within the heavy-chemical sector (principally producing alkali, sulphuric acid and bleaching powder) contracted to manufacture a wide range of chemicals for the war effort while maintaining wherever possible its production of chemicals for homeland use. Much of this work centred on its Central Laboratory that had been established in 1890 to move the company away from its dependence on the obsolete Leblanc process, though by 1914 the Company was still largely dependent on this process.

UAC's wartime work relied on the Central Laboratory (under the leadership of Julius Raschen) working closely with total production in 1918. At the same time a synthetic nitric acid programme was launched that was still under construction in November 1918. France's chemical production made huge progress during the war in almost every field; explosives advanced from 9 tons per day in October 1914 to about 750 tons at its peak in March 1917. The contribution of the Americans and British, together with the colonial workforce, to this success was huge and victory would not have been possible without it.

Chemistry, Patents and the Transformation of the European Pharmaceutical Industry in World War One

Dr Viviane Quirke, Oxford Brookes University

Histories of chemistry in World War One have tended to focus on the chemicals 'that kill', i.e. those involved in the manufacture of shells, bombs, and war gases, while histories of medicine have tended to concentrate on heroic surgery, the identification of new diseases, or the development of medical specialisms, such as orthopaedics and psychiatry. This paper focused on the chemicals used to treat the wounds, shock and trauma caused by war, as well as diseases that are common in wartime, in particular venereal diseases. The paper argued that, although not as many new drugs were developed in World War One as in World War Two, their manufacture and use in the First World War helped to transform the European pharmaceutical industry, contributing to the diffusion of chemical knowledge and practice, of a particular way of 'knowing and doing'.

Before the First World War a number of chemical drugs were already in use, including plant alkaloids such as quinine, morphine, and digitalin; synthetic drugs (e.g. barbiturates, aspirin and other analgesics and antipyretics); and anaesthetics (chloroform and ether). In addition, the arsenical drugs Salvarsan and Neosalvarsan, which had been developed by Paul Ehrlich and marketed by Hoechst AG in 1910 and 1912 respectively, were used for the treatment of syphilis before – and most importantly – during the conflict. Not only did these drugs mark the birth of modern chemotherapy, they also helped to transform the European pharmaceutical industry.

Indeed, before World War One, many of the chemical drugs listed above had been manufactured in Germany, and by the 1900s the Big Three (Bayer, BASF, Hoechst) dominated chemical-pharmaceutical patents. This led to a number of 'patent wars' which preceded the Great War, prompting the introduction of new Patent Acts in 1907 in Britain and Switzerland. Meanwhile France, which did not allow the patenting of drugs or processes, pursued a strategy of emulation and imitation that would endure until after World War Two.

The abrogation of German patent rights during World War One, by further enabling the transfer of chemical knowledge and knowhow, stimulated chemical-pharmaceutical innovation and boosted the growth of science-based firms in countries at war with Germany. This was achieved thanks to collaboration between private companies and public research institutions, under the coordination of government bodies such as Britain's Medical Research Committee, or the Royal Society's Chemical (later Drugs) Subcommittee, thus paving the way for the scientific-military-industrial complexes of World War Two and the Cold War.

From Bunsen to POWs in Britain: Dr K.E. Markel, a Chemist in the Great War

Colin Chapman, Chairman, RSC Bristol & District Section

On the declaration of war on 4 August 1914, the British Government immediately ordered male civilians of military age with Germanic origins then living in Britain to be arrested, questioned, and if deemed a potential spy or saboteur to be interned for the remainder of the conflict, irrespective of their circumstances. In the event some 23,000 Germans and Austrians were detained, mostly on the Isle of Man, until 1919. After the sinking in May 1915 of the *Lusitania* with the loss of some 1,200 lives, the internment policy was more strongly enforced.

Among the Germans living and working in Britain in 1914 were chemists who had migrated from continental Europe during the nineteenth and early twentieth centuries to take up employment in industries embracing the chemical sciences. Some had been swiftly promoted, others had even founded their own companies. A few German owners had been sufficiently astute to give their firms British names to disguise their true origins; nevertheless from 5 August 1914, many such men were considered guilty as possible traitors until proved innocent, hence few avoided arrest and interrogation. Some German chemists had taken out British Citizenship long before the outbreak of hostilities, but unless they could demonstrate they were "working for the national good", this carried little weight. Among those who were not interned was Karl Markel who had been invited to England by Ludwig Mond, a former fellow student of Robert Bunsen, to tutor his sons, Robert and Alfred. Markel subsequently worked for Brunner and Mond before becoming Technical Director of Warrington soap manufacturer Crosfield. On his retirement in 1911 he moved to London, and in 1915 set up a Prisoner of War Relief Agency using his own and others' wealth to provide elements of comfort to men held captive because of their origins. This lecture described some of Markel's outstanding philanthropic work for German internees and, later, combatant prisoners of the First World War in Britain.

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.

Derry Jones writes: the publications below may be of interest to members. They are chiefly book reviews or essay reviews in rather more physics-based journals and newsletters.

Derry W. Jones, review of Morton A. Meyers, *Prize Fight: The Race and Rivalry to be the First in Science*, published in *Contemp. Phys.*, 2013, **54** [1] 67-68. Discusses MRI (Lauterbur, Mansfield and Damadian) and other cases.

Derry W. Jones, review of Peter Mansfield's, *The Long Road to Stockholm*, published in *Contemp. Phys.*, 2013, **54** [4] 219-220. Autobiography about NMR and the emergence of MRI.

Derry W. Jones, "Crystallographic Centenary Celebration: The Emergence of X-ray Analysis", *Contemp. Phys.*, 2013, **54** [6] 267-270. Essay review of A. Authier's *Early Days of X-ray Crystallography.* Review includes comparisons with P.P. Ewald's large, edited but multi-authored volume of fifty years earlier; the book includes some quite early history of crystallography.

Derry W. Jones, "Wrinch: Mathematics, Models and Molecular Biology", *BCA Cryst. News*, 2013, No 125, 21-22. Book review of M. Senechal's *I Died for Beauty: Dorothy Wrinch and the Culture of Science.* Senechal knew Bernal, Biographies - whether in the form of books or articles - have always been an important genre in the history of chemistry. General histories of chemistry have often taken a biographical approach, most notably the four volume work of J.R. Partington. Many chemists, especially in the German-speaking world, have written autobiographies which along with the formal obituaries produced by national academies of science have formed an important source of information

Living in a Toxic World (1800-2000): Experts, Activism, Industry and Regulation

8th European Spring School on History of Science and Popularization

Maó (Menorca), 14-16 May 2015

The School is structured around four key-note lectures and a research workshop and focuses on issues regarding the regulation and risk management of toxics from the perspective of different actors (industry, government, experts, activists, stakeholders, patients, etc.) during the last two centuries (1800-2000). The keynote lectures will be delivered by four outstanding scholars covering four particular toxics (fumes, pesticides, lead, and mercury) from the beginning of nineteenth century to the end of the twentieth century. The workshop "Living in a Toxic World" is organized in three thematic sessions and one poster session. Participants will present papers on many other toxicants (polymers, aluminum, asbestos, arsenical pigments, etc.) as well as studies on food additives, regulation of drugs and environmental toxicology. Participants will deal with issues related to regulation, standardization, risk management, experts, law, public health, activism, controversies and so on. The School sessions and discussions will be conducted in English.

For a full programme and details see:
http://blogs.iec.cat/schct/activitats-2/escola-de-primavera/8th-european-spring-school/

Deadline for registration with discount: 31 March 2015:

Deadline for registration: 8 May 2015

For more information please contact the organizers: José Ramón Bertomeu Sánchez bertomeu@uv.es and Ximo Guillem-Llobat ximo.guillem@uv.es