Historical Group

NEWSLETTER
and
SUMMARY OF PAPERS

No. 78 Summer 2020

Registered Charity No. 207890

ROYAL SOCIETY OF CHEMISTRY HISTORICAL GROUP NEWS

From the Chair

I am writing to you now in an unprecedented national lockdown. Our country has been hit by a major pandemic, the

Consultancy as a Career in Late Nineteenth and Twentieth Century Britain

This paper examines the continuing role of consultants within the profession of chemistry in the late nineteenth and twentieth centuries. Consultants were a prominent part of the profession in the late nineteenth century, but were overtaken in numerical terms by chemists working in academia, government and industry in the first half of the twentieth century. The paper demonstrates, however, that numbers later stabilised and then goes on to examine the characteristics of those chemists who worked as consultants as compared to the wider chemical community. It argues that the survival of consultancy is best explained in terms of a number of differing models of consultancy work. Whilst for some chemists, consultancy was their main occupation, for others it was a phase in their careers or a secondary occupation alongside another post. The continuing value of consultancy work was related to its very versatility.

A Life of "Continuous and Honourable Usefulness": Chemical Consulting and the Career of Robert Warington (1807-1867)

Anna Simmons, Department of Science and Technology Studies, UCL, UK

Robert Warington (1807-1867) was a central figure in the mid-nineteenth century chemical community, notably through his role in the foundation of the Chemical Society of London in 1841. As demand for chemical services grew, Warington constructed an ultimately lucrative career in chemistry in which consulting played a major part. His formative y

research, it may lead to a different understanding of what constitutes innovation, and to different narratives with regard to respective contributions.

PUBLICATIONS OF INTEREST

Business Census of Entrepreneurs

Members may be interested to investigate a remarkable project which uses the census data from 1851 – 1911 to identify every business proprietor in England, Wales and Scotland. The project has been a massive undertaking with around 10.5 million entries. Further details, including an can be found here: www.bbce.uk

Jeannette E. Brown, *African American Women Chemists in the Modern Era*. Reviewed by E. Thomas Strom.

Patricia Fara, *A Lab of One's Own: Science and Suffrage in the First World War*. Reviewed by Connie Hendrickson.

Helge Kragh, *From Transuranic to Superheavy Elements: A Story of Dispute and Creation*. Reviewed by Paul J. Karol

Jeffrey I. Seeman, "The Back Story, Koji Nakanishi".

, 2020, 45 (1)

Paul Netter, "Jean-Baptiste and Anselme Payen, Chemical Manufacturers in Grenelle Near Paris (1791-1838)".

Charles S. Weinert, "Die Chemie ist Schwierig: Winkler and the Discovery of Germanium".

Arthur Greenberg, "An Old English Pharmacy".

Pierre Laszlo, "Triply Formulated Nitrocellulose: Celluloid, Viscose and Cellophane".

Algirdas ul ius, "Sergey Teleshov, and Tatiana Miryugina, "Forgotten Contribution of V. N. Ipatieff: Production of Butadiene from Ethanol".

Nenad Raos, "Science and Public Perception: The Miller Experiment".

Kaspar F. Burri and Richard J. Friary, "Liberating R. B. Woodward and the Woodward Research Institute from Error".

Book Reviews

Peter Wothers, Reviewed by Carmen Giunta.

Annette Lykknes and Brigitte Van Tiggelen eds., Reviewed by Mary Virginia Orna.

Jeffrey I. Seeman, "The Back Story: Sir Jack Baldwin, FRS".

Back issues of the Bulletin through to 2017 are available open access at http://acshist.scs.illinois.edu/bulletin_open_access/bull-index.php

SOCIETY NEWS

Society for the History of Alchemy and Chemistry: The Partington Prize 2020

The Society for the History of Alchemy and Chemistry is delighted to announce that the winner of the 2020 Partington Prize is Dr Mike A. Zuber of the University of Queensland for his article "Alchemical Promise, the Fraud Narrative, and the History of Science from Below: A German Adept's Encounter with Robert Boyle and Ambrose Godfrey".

Dr Mike A. Zuber is a Postdoctoral Research Fellow at the Institute for Advanced Studies at the University of Queensland. He obtained his doctorate with distinction at the University of Amsterdam in 2017 and subsequently received grant funding from the Swiss National Science Foundation for a postdoc project based at the University of Oxford. He has published on the scientific, religious, and intellectual history of the seventeenth century, with particular expertise in German-speaking contexts.

The Society for the History of Alchemy and Chemistry established the Partington Prize in memory of Professor James

OTHER NEWS

Giessen Celebrates (?) the Centenary of the Liebig Museum

All the well-laid plans to celebrate the centenary of the opening of the Liebig Museum in Giessen with a series of events in March 2020 inevitably had to be abandoned because of the Covid-

However, Frankland's zinc dialkyls were the only compounds to find much synthetic application in chemistry. Working with these compounds was hazardous as they inflamed spontaneously in air. Paradoxically, although much of their chemistry mimics Grignard's later discoveries (Fig. 1), they are unreactive towards carbon dioxide. Thus, organic acids, easily achieved by the use of Grignard's reagents on CO_2, were inaccessible from the zinc dialkyls. To be sure, James Wanklyn, a former pupil of Frankland, prepared sodium propionate in 1858 by the action of carbon dioxide on ethylsodium, made by reacting sodium metal with excess zinc diethyl. However, ethylsodium was too reactive to be very useful as a general synthetic reagent.

Philippe Barbier (1848-1922)
Image courtesy of:
https://en.wikipedia.org/wiki/Philippe_Barbier

In 1898, Phillippe Barbier, head of the Faculty of Sciences at the University of Lyons, was attempting to convert 6-methylhept-5-ene-2-one into 2,6-dimethylhept-5-ene-2-ol (Scheme 1). He could have used zinc dimethyl, but the

alcohols, and ketones to form tertiary alcohols (Fig. 2). He noted the instability of some alcohols derived from unsaturated carbonyl compounds and their tendency to eliminate water during distillation. Grignard concluded his paper by expressing his intention to continue his work on the new organomagnesium halides.

CH

Table 1: Grignard's Later Discoveries using his Reagents

Date	Substrate attacked by RMgX	Product
1901	H_2O	RH
1903	CH_2 CH_2	

Furthermore, substantial controversy remains regarding the integrity and interpretation of spectroscopic data, as I will mention at the end.

I should perhaps preface this informal article by saying that my own interest in the history of spectroscopy and its role in astronomy is purely amateur, dilettante really. I have done no original research, I have merely read several contemporary accounts, plus three or four subsequent histories and biographies. I was curious in the first instance to see what, in particular, the early pioneers made of line spectra as complex as, say, that of iron, in the absence of any understanding of atomic structure. Also, to see how laboratory emission and adsorption spectra were generated (by flame, arc, spark and magnesium lamp) and how light was detected: that was by eye, at first, but not for long, as Lockyer at Kensington was one of the first, if not the first, to use photography in the late 1870s. The photocell was not invented until a quarter of a century later, by Geitel and Elster in 1893, when spectroscopy became truly quantitative.

I hope that the reader will forgive informality of this article. I would not presume with a topic mainstream to most chemists, but rather suspect that early spectroscopy and its astronomical context is not one, and hence my aim is simply to introduce the subject to those unfamiliar with it. My sources are the books listed below and the various web-pages I have provided links to.

The Chemistry of the Sun was not the first book on spectroscopy in English. This was a translation of a series of lectures by Gustav Kirchhoff by Henry Roscoe in 1862 [2], which he followed up in 1869 with an illustrated monograph entitled *Spectrum Analysis* [3], based on six lectures of his own given to the Society of Apothecaries in 1868. Shortly thereafter, the Lassell sisters and the astronomer William Huggins translated and edited the second edition of Heinrich Schellen's *Spectrum Analysis*, published in 1872 [4]. The latter's full title was: *Spectrum Analysis - in its applications to terrestrial substances and the physical constitution of heavenly bodies; familiarly explained*.

"Familiarly explained" – this was a hot topic (sic) and Kirchhoff, Schellen, Huggins et al. and Roscoe were all aiming to make the latest research accessible. All four books are readily available in various forms, including online archive and paperback reprint. The originals are well worth viewing, even so, for their fine reproductions of spectra and illustrations of equipment. Roscoe [3] and Schellen et al. [4] in particular, as they contain coloured specqui (e) -3 5 (c) -3 (h) -ta

upon temperature. Unaware of Foucault's work, A. J. Angstrom found similarly and discovered some of the Balmer lines of hydrogen, as did D. Alter, independently. (You might be forgiven for wondering why they are not called Angstrom-Alter lines, the answer is that Balmer was able to find the numerical relationship between their frequencies). Angstrom and G. G. Stokes are credited with the first attempts to lay down the rules of spectroscopy, it was however Kirchhoff and Bunsen who established unambiguously connection between emission and adsorption. Kirchhoff famously proposed a model of the sun's atmosphere and proposed three laws of spectroscopy building on the earlier work of Angstrom. The three laws can be stated as follows.

An incandescent solid, liquid or gas under high pressure emits a continuous spectrum.

A hot gas under low pressure emits a 'bright-

And Lockyer, and Lockyer,
Gets cockier and cockier,
For he thinks he's the owner,
Of the solar corona'.

It seems, though, that Huggins was even less popular, public and scientific acclaim and many honours, not withstanding, if remarks by friends such as Crookes are anything go by. I shall spare you the remark I have in mind, it can be found in the next book I am going to mention, except to say that, coming from a friend, as it does, it caused me to wonder what on earth his enemies might have said about him. I should perhaps add in fairness to Huggins, though, that these astronomical gents had plenty of opportunity to irritate each other as they were given to sailing off together in cramped ships to study eclipses in far-flung places.

An excellent alternative to *Science and Controversy* would be Barbara Becker's *Unravelling Starlight* [9], an award-

were not dropping their own work and queueing up to collaborate with him on *Dissociation*. Nevertheless, we see in hindsight that he was asking the chemists to split the atom in effect! Lockyer, who died in 1920, lived just long enough to see that happen. He also saw the idea of ionisation develop towards the end of his career, when he did let go of some of his theoretical proposals, in the face of evidence and valid criticism. He was however a great astronomer and

work which led to the design of the respirator used by the British army. The canisters in early masks used activated

after his original article. At the 2019 exhibition in Cambridge, Peter Wothers highlighted that it appeared in the Notices Section from Foreign Sources in *Chemical News,*

The full text only deals with periodicity unlike some other honours and it is striking how much of the English text after two translations still identifies Mendeleev's genius. The full text and its translation are available from the author at gandp16@talktalk.net.

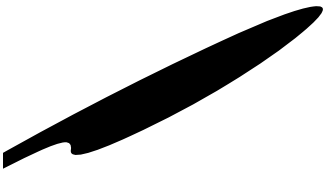
Two Great Chemists Clash

In 1894, from a detailed series of experiments, British chemist William Ramsay concluded that in atmospheric nitrogen there was an 'impurity' of molecular weight about 40. What was it? There was no space between the halogens and the alkali metals. This was a perplexing problem for chemists, but particularly for Mendeleev for whom the similarity of properties within a group was unquestionable.

Mendeleev considered various atomicities to determine the atomic weight and hence its periodic table position.

O (16) F (19) Na (23) Mg (24) If A was diatomic like other gaseous elements.

Thomas Carnelley (1852-1890) was an Aberdeen chemistry professor who had previously studied at Owens College and been a private assistant to Henry Roscoe in Manchester. Carnelley had determined many physical properties (melting point, conductivity etc) of substances which substantiated the position of elements in the periodic system. Some years ago, I found a florid translated letter, part of which follows.



shooting, but also Freemasonry, with which he was heavily involved. Plus, at least one specific detail is wrong: Kipping cannot have closed the chemistry department for a day in 1922 for the staff to all go to the Test match, because there were no Test matches in England that summer.

This book has obviously been written with enormous affection for its subject. Colonel Shaw elevated the lecture-demonstration to a very high standard, and his role in inspiring several generations to study chemistry cannot be overemphasised. He deserves to be remembered, and this book does him great service by keeping his memory alive.

John Nicholson

Kit Chapman, *Superheavy –Making and Breaking the Periodic Table* (Bloomsbury Sigma, 2019), Pp. 304, ISBN 978-1-4729-5389-6, £16-99.

The superheavy elements are defined by the author as 104 (rutherfordium) to 118 (oganesson) inclusive; only since 2016 has IUPAC confirmed their existence and names. This book seeks to survey them in three parts divided into twenty-one

Final program: April 2021

Conference dates: 18-22 May 2021.

*Due to the Covid-19 pandemic, it might be necessary to alter some dates at a later stage.

Proposal Guidelines

The Steering Committee encourages the submission of panel/session proposals, but also accepts the submission of stand-alone papers. The 13ICHC welcomes proposals on any topic on the history of chemistry, broadly understood, including historical works on molecular sciences, life sciences, industry, technology, and education. It also welcomes papers on the teaching of history of chemistry, in order to reach out to the wider community and to the younger generation.