10TH ICHC PORTUGAL 2015

CHEMICAL BIOGRAPHY IN THE 21ST CENTURY

9-12 SEPTEMBER
UNIVERSITY OF AVEIRO

CONFERENCE HANDBOOK

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10th International Conference on the History of Chemistry

9-12 September 2015
University of Aveiro, Portugal

"Chemical Biography in the 21st Century"

Isabel Malaquias
Peter Morris
Brigitte Van Tiggelen
(Organisers)

Título
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"Chemical Biography in the 21st Century"
CONFERENCE HANDBOOK

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Table of Contents

Welcome address.....6

About ICHC.....7

Conference theme.....8

Committees.....9
Local organising committee
Programme committee

About the venue.....10

Conference programme
Programme at a glance.....12
Scientific programme.....14
Plenaries and Parallel Sessions.....21
Wednesday 9 September.....22
Thursday 10 September.....23
Friday 11 September.....49
Saturday 12 September.....71

Useful information.....84
Information for presenters in parallel sessions.....84
Computer and internet access.....84
Conference dinner.....84
In case of emergency.....84
Transport.....84
Car rental in Aveiro.....84
Bus to the University.....85
Aveiro map.....86
University map.....87

Index of presenters.....88

10th ICHC 2015 participants.....90

Welcome address

Dear Conference participants,

It is an honour and a pleasure to welcome you to the University of Aveiro for the 10th International Conference on the History of Chemistry. This is the second time in a decade the Working Party for the History of Chemistry has chosen Portugal for its meeting.

We hope that during these four days the interaction between the national and international community will enable communication between historically interested chemists and historians of chemistry, thus fulfilling our hope for an interesting conference. We are very proud to announce that this event has around 60 participants from 21 countries and 3 continents.

The conference includes keynote lectures from several scholars (Jorge Calado, Bernadette Bensaude-Vincent and Michael Gordin) who are well-known for their work and intellectual approaches. We look forward to their contributions which should offer us insights and possibilities for exploring chemical biography in the 21st century. The wide range of excellent conference papers also speak to these challenges.

Without further ado, we sincerely wish you have a great time here, and that the event brings everybody together in sharing, debating and constructing knowledge.

Best wishes to you all for an enjoyable and collegial conference. May you all find possibilities for meeting new friends and developing new networks and collaborations for your future work, while strengthening established ties and partnerships with old friends.

For the Organising Committee	For the International Programme Committee	For the WP on History of Chemistry
Isabel Malaquias	*Peter Morris*	*Brigitte Van Tiggelen*

About ICHC

The Working Party (WP) on History of Chemistry of the European Association for Chemical and Molecular Sciences (EuCheMS) will hold its biannual International Conference on the History of Chemistry (10th ICHC) in Aveiro, Portugal, from 9 to 12 September 2015.

The 10th ICHC will focus on the theme "Chemical Biography in the 21st Century". The general aim of the conferences organised by the WP is to facilitate communication between historically interested chemists and historians of chemistry from all over Europe. Previous conferences organised by the WP were held in Lisbon 2005 (Chemistry, Technology and Society), Leuven 2007 (Neighbours and Territories: The Evolving Identity of Chemistry), Sopron 2009 (Consumers and Experts: The Uses of Chemistry and Alchemy), Rostock 2011 (Pathways of Knowledge) and Uppsala 2013 (Chemistry in Material Culture).

A medium sized conference, the ICHC usually draws around a hundred participants, mostly from Europe, the US and Asia. The high standard of papers is guaranteed by an international scientific committee of prominent scholars in the field of history of chemistry. At the present, this group is chaired by Peter Morris, Keeper of Research Projects at the Science Museum, London. The group consists of Gisela Boeck (Germany), Gabor Pallo (Hungary), Ernst Homburg (Netherlands), Laurence Lestel (France), Antonio Garcia Belmar (Spain), Elena Zaitseva (Russia), Marco Beretta (Italy), Brigitte van Tiggelen (Belgium), Annette Lykknes (Norway), Hjalmar Fors (Sweden) and Soňa Štrbánová (Czech Republic), as well as the Portuguese representatives Ana Carneiro and Isabel Malaquias.

Conference theme

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 for historians of chemistry. More recently the American Chemical Society published the "Profiles, Pathways and Dreams" series which extended the autobiographical form up to the end of the 20th century. For several decades in the latter half of the 20th century, professional historians of chemistry avoided the biographical approach as being inherently too hagiographical and "Whiggish". However following the pioneering work of scholars in the history of physics, notably Crosbie Smith and Norton Wise, Energy and Empire: A Biographical Study of Lord Kelvin (1989), the biography has been taken up anew as a framework for analysing thematic problems and social-cultural questions. This conference will critically examine this conceptual "turn" in the historiography of chemistry and explore ways in which the biographical approach can be fruitfully employed by historians of chemistry.

The conference will embrace all aspects of the history of alchemy and chemistry including the history of materials and the history of biochemistry. Papers might address:

1. Autobiographies as a source for historians of chemistry

2. Biography and discipline building

3. Biographies and nationalism

4. The making and unmaking of chemical heroes

5. Myths and misrepresentation

6. Iconography as a mode of representation in the visual arts, sculpture and photography

7. The historiography of the biographical mode

8. Collective biographies including biographical dictionaries and the "biographies" of research groups

Committees

Local organizing committee
Isabel MALAQUIAS, Universidade de Aveiro **(chair)**
João OLIVEIRA, Universidade de Aveiro
Vítor BONIFÁCIO, Universidade de Aveiro
Helmuth MALONEK, Universidade de Aveiro
Ana CARNEIRO, Universidade Nova de Lisboa
António AMORIM DA COSTA, Universidade de Coimbra

Programme committee
Marco BERETTA, Università di Bologna, Italy
Gisela BOECK, Universität Rostock, Germany
Ana CARNEIRO, Universidade Nova de Lisboa
Hjalmar FORS, Uppsala Universitet, Sweden
Antonio GARCIA-BELMAR, Universitat d´Alacant, Spain
Ernst HOMBURG, Universiteit Maastricht, Netherlands
Laurence LESTEL, Université Pierre et Marie Curie, Paris, France
Annette LYKKNES, Norwegian University of Science and Technology, Norway
Isabel MALAQUIAS, Universidade de Aveiro, Portugal
Peter MORRIS, Science Museum, London, UK **(chair)**
Gabor PALLO, Budapesti Műszaki és Gazdaságtudományi Egyetem, Hungary
Soňa ŠTRBÁŇOVÁ, Ústav pro soudobé dějiny, Akademie věd České republiky, Prague, Czech Republic
Brigitte Van TIGGELEN, Chemical Heritage Foundation, Philadelphia
Elena ZAITSEVA, Moskovskiy Gosudarstvenny Universitet, Khimicheskiy Fakultet, Russia

About the venue

University of Aveiro

The University of Aveiro was created in 1973 and in the following years has transformed itself into one of the most dynamic and innovative Portuguese universities.

Currently the University is a privileged partner for companies and other national and international organisations with which it cooperates in numerous projects and for which it provides important services. The University has 17 Academic Departments that work together in an inter-disciplinary manner according to their academic and research affinities.

Concerning the Chemistry Department, the internationalization and recognition of the quality of teaching and research are established with a Chemistry Eurobachelor Label and a European Master in Materials Science (Erasmus Mundus). At present, the Chemistry Department has the biggest scientific production per researcher in Portugal.

The conference will be held at the University of Aveiro, Complexo Pedagógico.

More information: http://www.ua.pt/#

Aveiro

Allavarium (the Roman name of Aveiro) was known, in the tenth century, for its 'Salinas' (salt pans).

Maritime and port trade (smoked and dried fish, wine, cork, pottery, corn, fruits, wax, leather, tallow and eggs), agriculture, and above all salt extraction encouraged the human settlement in the region and in 1515, King Manuel I granted the "charter" to Aveiro – an outstanding port on the Vouga estuary. This location was probably the centre of maritime loading and un-loading activities, trade, shipbuilding and ship repairing. In the course of time these activities were transferred to the northern shore of one of the lagoon ('Ria') arms, a move that gave birth to a new town, called 'Vila Nova', mainly inhabited by fishermen and seafarers and later integrated into the old borough.

The 'Ria' spreads through the city in a fusion of water and urban environments.

In the city center, the buildings of ‘Art Nouveau’ confer an air of ‘belle époque’ to the city. Today Aveiro is not a large city, so you have enough time to know the major local attractions, sample local delicacies and enjoy a trip along the canals in a traditional boat – the ‘moliceiro’.

More information: http://www.visitcentrodeportugal.com.pt/aveiro/

Conference programme

Programme at a glance

	Sep.09	Sep.10	Sep.11	Sep.12
08:30				
09:00		**Second Plenary Lecture:** Bernadette Bensaude-Vincent	**Third Plenary Lecture:** Michael Gordin	
09:30				Parallel Sessions *Textbooks* *Between Physics and Chemistry*
10:00		Coffee	Coffee	
10:30		Parallel Sessions *Sources for Recent Chemical Biography* *Historiographical Issues in Using Digital Sources, Oral and Video History* *Prosopography*	Parallel Sessions *Biography and the History of Chemical Industry and Chemical Engineering* *Biography and Laboratory History: Cross-Fertilisation between Two Genres*	
11:00				Coffee
11:30				Parallel Sessions *Agriculture and Innovation* *Myths and Misrepresentations in Chemical Biography*
12:00				

	Sep.09	Sep.10	Sep.11	Sep.12
12:30		Lunch	Lunch and WP Business meeting	
13:00				
13:30				Lunch
14:00				
14:30		Parallel Sessions *Controversy and Autobiographies* *Sets of biographies*		Excursion to Coimbra (included)
15:00			Parallel Sessions	
15:30				
16:00	Registration Fábrica Ciência Viva	Coffee	Biochemistry and Pharmacy Chemistry through the Ages	
16:30		Parallel Sessions	Coffee	
17:00	Opening	*Historiography*	Parallel Sessions	
17:30	**First Plenary Lecture:** Jorge Calado	*Discipline Building*	*Biographies as Sources and Sources for Biographies* *Translation and Transmission*	
18:00				
18:30				
19:00	Welcome Party			
19:30				
20:00			Official Conference Dinner	

Scientific programme

Keynote speakers

Professor Jorge Calado
Technical University of Lisbon
"Ghost Science – Writing the History of 21st Century Science"

Professor Bernadette Bensaude-Vincent
University of Paris 1 Panthéon-Sorbonne
"Towards a Biography of Carbon at the Intersection between Nature and Culture"

Professor Michael D. Gordin
Princeton University
"Who Doesn't Get a Biography in the History of Chemistry?"

Wednesday 9 September

16:00	Registration
17:00	Opening
17:30	**FIRST PLENARY LECTURE - "Ghost Science - Writing the History of 21st Century Science"** **Jorge Calado (Technical University of Lisbon) - FÁBRICA CIÊNCIA VIVA**
18:30-20:00	Welcome Party

Thursday 10 September

09:00	**SECOND PLENARY LECTURE - "Towards a Biography of Carbon at the Intersection Between Nature and Culture"** **Bernadette Bensaude-Vincent (University of Paris 1 Panthéon-Sorbonne) - ROOM 5**
10:00	Coffee

10:30 **PARALLEL SESSIONS**

Sources for Recent Chemical Biography: Historiographical Issues in Using Digital Sources, Oral and Video History
(Panel sponsored by the Commission for the History of Modern Chemistry; organised and chaired by Brigitte Van Tiggelen and Jeffrey A. Johnson)

Room 5

David J. Caruso (Chemical Heritage Foundation) "The Problem with Oral History? Oral History Methodology and Historical Research"	**Jeffrey A. Johnson (Villanova University)** "Working with Oral History: From Classical Chemistry to Synthetic Biology"	**Bernadette Bensaude-Vincent (University of Paris 1 Panthéon-Sorbonne) and Pierre Teissier (University of Nantes)** "Building, Preserving and Using Oral Archives on Materials Research. An Attempt Towards The Biography of Research Communities"	**Ana M. Alfonso-Goldfarb, Marcia H.M. Ferraz and Silvia Waisse (Pontifical Catholic University of São Paulo)** "The Role of Oral History in the History of 20th Century Chemistry"	**Muriel Le Roux (IHMC/CNRS/ENS/ Paris 1)** "Talking with the Living: What Methodologies for Today Chemists' Biographies ? "

Prosopography (Chair: Frank James)

Room 7

Hattie Lloyd (University College London) "Humphry Davy's Audience: Collective Biography as a Research Tool"	**Natalie Pigeard-Micault (CNRS/Musée Curie)** "Biographies as Construction of the Collective Memory: The Case of Marie Curie"	**John Stewart (University of Oklahoma) and John Perkins (Oxford Brookes University)** "Situating Chemistry: A Free, Online Tool for the Prosopographical Study of Chemistry"	**Martine Sonnet (IHMC/CNRS/ ENS/Paris 1)** "A Collective Biography of an Emerging Professional Group: Chemists Granted by the French National Fund for Sciences in the 1930s"

12:30 Lunch

14:30 **PARALLEL SESSIONS**

Controversy and Autobiographies
Chair: Gábor Palló

Room 5

Thijs Hagendijk (Utrecht University) "Social Marginalization and Biography: The Case of Henri Dutrochet (1776-1847)"	**Ignacio Suay-Matallana (Chemical Heritage Foundation)** "Chemistry and Experts: Antonio Casares, and his Son José Casares as a Scientific Family"

Sets of Biographies
Chair: Danielle Fauque

Room 7

Gisela Boeck (University of Rostock)
"Biographies of Outstanding Natural Scientists, Technicians and Physicians: A Project on History of Science in the GDR"

Asbjørn Petersen (Hvidovre Gymnasium)
"Contemporary Biographies of Danish Chemists"

Marek Petrik (University of Marburg)
"Biography: Nanoscience meets Historiography"

Birute Railiene (Lithuanian Academy of Sciences)
"*Lectiones Vilnenses Andreae Sniadecki*: Practice of Heritage Dissemination"

Sérgio P. J. Rodrigues (University of Coimbra)
"What Can the Chemists and the Public Learn with the Biographies of Chemists?"

16:00 Coffee

16:30 **PARALLEL SESSIONS**

Historiography
Chair: Bernadette Bensaude-Vincent

Room 5

Marco Ciardi (University of Bologna) and Mariachiara Di Matteo (University of Pisa)
"Biographies of Amedeo Avogadro: Shifting Images of the Scientist during the 20th and 21st Century"

Rachel L. Dunn (Durham University)
"Forgotten Facts: Issues with Biographies of Chemist John Dalton"

Ana Simões (University of Lisbon)
"Writing a Biography of the Quantum Chemist Charles Alfred Coulson: Between Science, Religion and Politics"

Discipline Building
Chair: Peter Morris

Room 7

Apostolos Gerontas (Coburg University of Applied Sciences)
"Biography as a Tool for Identity Building and Discipline Formation in Chromatography"

Jay A. Labinger (California Institute of Technology)
"The Personal Factor: Donald Yost and the (Lack of) Progress in Inorganic Chemistry at Caltech, 1920-1965"

Axel Petit (University of Nantes)
"A Fine-Grain Study of Twentieth-Century Electrochemistry: Towards a Biography of Walter J. Hamer (1907-2004)"

Stephen J. Weininger (Worcester Polytechnic Institute)
"The Short Productive Life of the Hickrill Chemical Research Laboratory"

09:00 **ROOM 5 - THIRD PLENARY LECTURE - "Who Doesn't Get a Biography in the History of Chemistry?"**
Michael D. Gordin (Princeton University)

10:00 Coffee

10:30 **PARALLEL SESSIONS**

Biography and the History of Chemical Industry and Chemical Engineering
Panel organised and chaired by Annette Lykknes

Room 5

Jennifer I. Brand (University of Nebraska-Lincoln)
"Using Narrative Sources in the History of Chemical Process Industries"

Ernst Homburg (Maastricht University)
"Royal Dutch Shell and the Introduction of Chemical Engineering to The Netherlands: The Careers of Waterman, Van Krevelen and Kramers"

Annette Lykknes (Norwegian University of Science and Technology)
"Shaping Identities as Professors of an Institute of Technology: How Two Chemistry Professors at NTH in Trondheim Found Their Place Between Industry and Academy in the 1910s"

John Perkins (Oxford Brookes University)
"Chemical Manufacturers in France, 1740-1810: A Prosopographical Study"

Biography and Laboratory History: Cross-Fertilisation between Two Genres
Panel organised by Peter Morris and chaired by Anders Lundgren

Room 7

Isabel Amaral and Ana Carneiro (New University of Lisbon)
"When Two Biographies Meet: Kurt Jacobsohn (1904-1991) and the Biochemistry Laboratory at the Institute Rocha Cabral"

Danielle M. E. Fauque (Orsay University and CHC-SCF)
"Charles Moureu: A Chemist and his Colleagues in War and Peace, 1914-1929"

Frank A.J.L. James (University College London and the Royal Institution)
"Davy in the Laboratory"

Peter J. T. Morris (Science Museum, London)
"Wilhelm Hofmann and the Development of the Classical Chemistry Laboratory"

12:30 Lunch and WP Business Meeting - ROOM 6

15:00 **PARALLEL SESSIONS**

Biochemistry and Pharmacy
Chair: Isabel Amaral

Room 5

Elisa Campos (New University of Lisbon)
"Petar Alaupovic (1923-2014) and the Making of a New Concept of Lipoprotein"

Chemistry through the Ages
Chair: Ignacio Suay-Matallana

Room 7

António M. Amorim-Costa (University of Coimbra)
"Vicente Coelho Seabra (1764-1804) on Fire, Heat and Light"

Maria T. S. R. Gomes (University of Aveiro)
"The Unsuspected Chemical Skills of Albrecht Dürer: The Chemistry Behind his Palette" (short paper)

João A. B. P. Oliveira and António Morais (University of Aveiro)
"Glassblowers and Scientists: The Forgotten Link" (short paper)

16:00 Coffee

16:30 **PARALLEL SESSIONS**

Biographies as Sources and Sources for Biographies
Chair: Brigitte Van Tiggelen

Room 5

Masanori Kaji (Tokyo Institute of Technology)
"The New Trend of University Archives in Japan: The Implications of Riko Majima's Diaries as Sources for the History of Modern Chemistry"

Guillermo Restrepo (Leipzig University)
"A Bibliometric Approach to Biography"

Jeffrey I. Seeman (University of Richmond)
"Chemical Biography and Autobiography: From 1990 to the Present and Looking Forward"

Translation and Transmission
Chair: Annette Lykknes

Room 7		
Laís Jubini Callegario and Isabel Malaquias (University of Aveiro) and Fernando Luna (State University of Norte Fluminense) "The Evolving Nature of Potash and its Protagonists" (short paper)	**Marília Peres (University of Lisbon) and Sérgio P. J. Rodrigues (University of Coimbra)** "From Jane Marcet to the Viscount of Vilarinho de São Romão. Teaching and Popularization of Chemistry in the 19th Century: A Subtle Gender Issue"	**Yona Siderer** "The Role of Udagawa Youan (1798-1847) in the Introduction of Western Chemistry into Japan"
20:00	Official Conference Dinner	

9:30 **PARALLEL SESSIONS**

Textbooks
Chair: Bernardo Jerosch Herold

Room 5

Vesna D. Milanovic and Dragica D. Trivic (University of Belgrade)
"Sima Lozanić as the Writer of Textbook Chemistry for Secondary Schools"

Jose-Antonio Pariente Silván (University of Valencia)
"The Changes in the Practices of Teaching Chemistry in the Nineteenth Century: Professor Mariano Santisteban"

Charlotte A. Abney Salomon (Yale University)
"Origin Story: Biography, Textbooks, and the Discovery of Yttrium"

Between Physics and Chemistry
Chair: Gisela Boeck

Room 7

Marcin Dolecki (Polish Academy of Sciences)
"Ludwik Wertenstein (1887-1945) as Physicist and Physical Chemist in the Light of his Memoirs"

Maria Elisa Maia and Isabel Serra (University of Lisbon)
"A Biography of Radioactivity Studies in Portugal through the Scientific Lives of Two Women"

Letícia dos Santos Pereira and Olival Freire Júnior (Federal University of Bahia)
"A Nobel to Energetics? Wilhelm Ostwald, Catalysis and Energeticism"

Gordon Woods (Royal Society of Chemistry)
"Henry Moseley (1887-1915"

11:00 Coffee

11:30 **PARALLEL SESSIONS**

Agriculture and Innovation
Chair: Ernst Homburg

Room 5

Ana Cardoso de Matos (University of Évora) and Ignacio Garcia Pereda (Euronatura)
"The Chemist Sebastião Betâmio de Almeida (1817-1864): Between Teaching, Industrial Activity and Intervention in the Leiria Pine Forest"

Maria da Luz Sampaio and Isabel Neves Cruz (University of Évora)
"A Case Study: The Chemical Researcher Joaquim de Santa Clara Sousa Pinto (1803-1872)"

Myths and Misrepresentations in Chemical Biography
Chair: Michael Gordin

Room 7

Willem Vijvers
"More than a Chemist: The Case of Alexander Borodin"

Nuno Figueiredo (University of Lisbon)
"Myth as Oblivion: Hugh Christopher Longuet-Higgins' (In) glorious Struggle to Solve Diborane's 'Perpetual Puzzle'"

Plenary Lecture
Wednesday 9 September

First Plenary Lecture
Ghost Science - Writing the History of 21st Century Science

Jorge Calado
Departamento de Engenharia Química e Biológica
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Taking as a starting point the correspondence of Michael Faraday, and prompted by a few books that hide or suppress crucial images, the author ponders a present in which historical sources have migrated to the ether, where they risk being deleted at the click of a mouse. For better or worse, our past has gone online; it can be sometimes retrieved, but it is also liable to be corrupted and is easily destroyed. Is the digital format the modern equivalent of the fire that destroyed the Ancient Library of Alexandria in 48 BC? Another pitfall for the historian of science is the current generalization of fraud, for personal gain, in scientific research. The scientific world has its own equivalent to the infamous financial world.

Plenaries and Parallel Sessions
Thursday 10 September

Second Plenary Lecture

Towards a biography of carbon at the intersection between nature and culture

Bernadette Bensaude-Vincent
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The notion of Biographies of Scientific Objects (Daston ed. 2000) is highly suitable for chemicals, since one distinctive feature of the chemists' approach to nature is that they consider the individual materials rather than the general properties of matter. A biography of carbon, a familiar and ubiquitous element, the building brick of life, and of civilisation instantiates the entanglement of the histories of materials and civilisation.

In sketching the profile of a biography of carbon, this paper will raise and discuss two historiographical issues:

i) What is the birth date of carbon ? Is it when carbon atoms were formed in interstellar clouds after the Big Bang or when chemists coined the term 'carbon' to refer to the substance shared by coal, diamond and fixed air? Should the narrative follow the trajectories of carbon atoms through the universe or tell the story of our understanding of carbon (its structure, its functions, its cycles,) and of the variety of uses of carbon compounds in our civilization?

ii) Given the variety of carbon allotropes – diamond, graphite, charcoal, fullerenes, nanotubes - and of carbon compounds can we display them as various personae ever creating new adventures that shape the history of the Earth and human history? Since one of the names of carbon – graphite – refers to the act of writing (graphein), I will suggest that the various forms of carbon can be viewed as heteronyms of carbon. Just as the Portuguese poet Fernando Pessoa had various "heteronyms" signing fictions, carbon has several signatures for telling various stories interweaving human history, natural history and cosmic processes.

Keywords: Diamond, fixed air, oil, synthetic chemistry

References

Daston, L. (ed.) (2000): Biographies of Scientific Objects. Chicago: The University of Chicago Press.

Sources for recent chemical biography: historiographical issues in using digital sources, oral and video history

Panel sponsored by the Commission for the History of Modern Chemistry

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For the history of chemistry, as with other sciences of course, we have published research papers, which unlike official documents used by general historians are available almost immediately, but these too must be used with caution if we seek to reconstruct the development of an actual research project. Besides, traditional full-length autobiographies tend to be written long after the fact, and may be composed with deliberate or unconscious distortions and omissions. Furthermore, as such longer works require significant time and effort as well as a facility for narrative writing, many scientists will be unable or unwilling to compose them. So, what alternatives are available to us as historians of recent science?

In a world in which traditional letters have almost completely disappeared as documentary sources, telephone conversations usually go unrecorded, and emails may be inaccessible – oral histories (or similar sources including digital records and video interviews) in the form of autobiographical sketches may become increasingly indispensable if we are to have any sort of insights into the background of researchers and their interactions beyond what can be found in published papers. But these raise many issues, as anyone who has tried to produce or use oral histories soon realizes.

The proposed session is thus intended to address these various issues and to allow maximum time for discussion of different experiences and contexts. We will therefore propose several short (5-minutes) papers, both by those who produce and conserve oral / video / digital sources and those who use them in historical research. In particular, we aim to trigger critical comparisons and considerations in different practices and projects around the world, and to highlight the advantages, disadvantages, and other related issues in the use of these “non-traditional” sources.

The problem with oral history? Oral history methodology and historical research

David J. Caruso
Director, Center for Oral History, The Chemical Heritage Foundation
dcaruso@chemheritage.org

Oral history is a method of preserving the unwritten past through the narrated recollections of individuals; oral histories are not merely conversations with people recorded on some medium for posterity, they are structured interviews designed with specific goals, whether those are to understand the role an individual played in a historic event or a specific culture or to document better the history of, for example, a scientific object, technique, or a piece of legislation. Many oral histories focus on broad topics in an individual's life—family, childhood, education, and factors influencing career decisions—and some oral histories explore specific aspects of the development of organizations, of the moment of innovation, or of the ideas that came out of, for example, an influential scientific conference. Overall, this research methodology and its products serve to elucidate what scientists themselves often obfuscate in their publications: who is actually doing the science (not what was done) and why, what other factors contributed to its success or problems that hindered its progress, and how broader funding, economic, social, political, and personal issues may have affected the work going on in the laboratory. In my presentation, I will discuss both the oral history methodology and the products of that methodology as they relate to biographical historical research, specifically looking at the construction of this primary source from the interview phase through transcription to depositing it with a library or an archive and all the legal and ethical concerns along the way. I will also speak about working with current (digital) and outof- date (analog) materials both as someone who creates oral histories and as someone who curates a collection that includes donations from other individuals and repositories.

Keywords: Oral history; digital and analog primary sources; curation; legal and ethical issues; human subject research

Working with oral history: from classical chemistry to synthetic biology

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This paper will reflect on the value of oral history as a source for modern chemical biography, based on direct experience in two very different projects. The first was a study of German women in chemistry from 1895 to 1945, and when conducted (beginning in 1989) it was still possible to interview one woman who had been born in the 1890s and had begun her scientific education during the First World War. The second project has involved oral-history interviews with contemporary scientists, many with training in chemistry or chemical engineering, who are working in a new interdisciplinary discipline called synthetic biology, which did not begin to organize until the 21st century and is still in the process of clearly defining itself. Precisely because the identity of this new discipline is still in flux, biographical information becomes increasingly helpful in understanding the dynamics of discipline formation, suggesting questions such as the following: why do individual scientists decide to identify with a particular new, pioneering discipline as opposed to an older and more established discipline (such as metabolic engineering, protein engineering or chemical engineering)? Are there gender effects in these decisions (as perceived by the participants)?

To what extent are disciplines shaped by individual leaders as opposed to more general and widespread scientific trends independent of individual actions or influences? Comparing the two projects also allows a consideration of the issues presented by projects that involve oral histories of predominantly older scientists, where documentary evidence may make it possible to supplement or correct fallible memories, vs. those involving oral histories of much younger scientists for whom there are few alternative documentary sources to correct potential biases in the presentation of individual roles, motivations, etc. It is hoped that this presentation will help to stimulate the general discussion over sources for the history of contemporary chemistry and related disciplines, as intended in this session.

Keywords: chemistry, chemical engineering, gender, age, synthetic biology, discipline formation, oral history

Building, preserving and using oral archives on materials research. An attempt towards the biography of research communities

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Our contribution leans on an on-going collective project, Sciences: Histoire Orale (SHO).

This one has stemmed from the History of Materials Research Program of the Massachusetts Institute of Technology. This 3-year program, sponsored by Sloan Foundation and Dibner Fund aimed at building a collective memory of materials science and engineering during the second part of the twentieth century. From 2000 to 2003 the principal investigators of the MIT program have gathered a collection of about 30 interviews of materials scientists around the world accessible on line on the website of Caltech Library.

Since 2010, a French corpus of interviews have been added to the initial corpus to create a second website hosted by ESPCI ParisTech (http://www.sho.espci.fr/). Beyond the collection of data for future historians the ambition of the current project is to better understand the emergence of an international community of materials research from individual testimonies.

The SHO website constitutes a heterogeneous set of testimonies whose epistemological coherence and historiographical significance are questionable at first glance.

Indeed, each interview is worth since it carries an individual memory which provides unique information for historians, but the collection of individual testimonies are only loosely linked under the large umbrella of materials research. The project may seem arbitrary because it is based on a “vicious circle”: the choice of interviewees relies on the pre-assumption that we are able to delineate the field of materials research, which is precisely the ultimate subject of our research project. Our contribution relies on practical problems we have faced to build the website and to preserve the set of memories to open the discussion around the writing of the biography of research communities. We would like to discuss two historiographical questions: i) How are we going to build up the portrait of a research community out of a collection of individual interviews? ii) How do we articulate the registers of memories and history?

Keywords: materials research, scientific community, oral archives, individual memories, collective biography

The role of oral history in the history of 20th century chemistry

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Center Simão Mathias for Studies in History of Science (CESIMA), founded in 1994, global main research line is the history of the theories of matter. To make sources available to Latin American researchers, CESIMA developed a Digital Library, which currently comprises more than 30,000 primary sources on the history of science in general, and the history of the theories of matter in particular. As a second step, CESIMA started a project to preserve the memory of the institutionalization of chemistry in Brazil, which began in the first half of the 20th century. For that purpose, the collaboration of scholars specialized in oral history was procured. Initially, to trace the development of chemistry in Brazil, a network of relevant interviewees was plotted, including surviving founder members of the main chemical academic and professional institutions, who pointed out successive interviewees (colleagues and disciples) following the snowball technique. The interviews, mostly focusing on the personal views and the scientific biography of the interviewees, are filmed, stored as digital files and transcribed. The transcriptions are reworked based on available written sources and discussed with the interviewees to produce the final version for publication. Currently, we're conducting a study on the Italian-born chemist G. Cilento (1923-1994), one of the first to earn his BA in chemistry at University of São Paulo - USP (1943), a Rockefeller scholar at Harvard and one of the pioneers of the development of biochemistry in Brazil. He founded the Chemistry Institute of University of Campinas and was twice chair of the Department of Biochemistry, Chemistry Institute, USP. Among various awards, he received the National Prize of Science and Technology. Cilento's papers were donated to CESIMA, being the base of a research project involving postdoctoral and doctoral scholars, who are crosschecking the written sources with oral history records.

Keywords: History of chemistry, 20th century, Oral history

Talking with the living what methodology for today chemists' biographies?

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Writing the history of chemistry in France since the 1960's is a seemingly impossible challenge because primary sources are scarcely preserved and available what ever their public or private status. In this context secondary sources, including biographies, remain quite often a major source. However, French historians do not estimate this genre. Besides the suspicious of being too hagiographical, the genre is dominated by autobiographies which are barely objective.

Regarding biographies, they are often written by journalists after secondary sources and are frequently orientated by the scientist himself. In addition there are focused on most well known chemists when obituaries are far from complete.

Despite these flaws I argue, the biography is essential for a comprehensive history of the second part of twentieth century chemistry. In this paper, after having given a critical analyse of popular biographies, I will "dissect" how historians writing biographies work.

What sources are required? What strategies are they using to gain an access both to archive materials and to the chemist, subject of the biography? Is there any reflexivity between the two strategies? How historians are dealing with the law protecting privacy of individuals, protecting documents? More complicated: what is the posture of historians who must give back either the "actor" or his beneficiaries and the academic milieu if they want to pursue their research?

Through the history of the natural substance chemists of the National Centre for Scientific Research (CNRS), we will see what is the articulation between autobiographies, testimonies (spontaneous and provoked), between written and oral biographies, between biographies and prosopography. Stuck between scientific writing and patrimonial action, the biographical genre asks questions, which impose to rethink our methodology, dialogue and interaction being the heart of the inquiry. This is not specific to the history of science but to the present time history itself.

Keywords: Biography vs prosopography, Present time history, methodology, building of the history of chemistry

Humphry Davy's audience: collective biography as a research tool

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Humphry Davy lectured at the Royal Institution of Great Britain from 1801-1812. He gave lectures on chemistry, but also on geology and vegetable chemistry. The Royal Institution, located in the fashionable district of Mayfair in London, was founded in 1799 to dispense scientific knowledge for useful improvements in society – namely to support industry, agriculture and Empire. Scientific advice was given in the form of public lectures, and Davy's lectures were popular: conservative estimates suggest that over 300 people came to see Davy lecture at any one time between 1801-1812.

My doctoral research aim is to understand the impact that Davy's audience had on the development of chemistry in the early-nineteenth century, and to create as nuanced a study of that audience as possible. This paper questions whether prosopography, a type of collective biography, is a valid research tool to achieve this aim.

I will argue that prosopography is a good research tool with which to study Davy's audience because of the evidence available to the historian. In my research I use newspaper reports, correspondence, published private journals, administrative documents and published works. I do not expect to find evidence concerning every historical actor that attended Davy's lectures, and prosopography is a solution to this paucity of historical evidence. Prosopography will allow me to shed light on connections and patterns between the historical actors in Davy's audience, by identifying common characteristics using an incomplete set of historical data.

Prosopography is interested not in the unique 'great minds of science', but in the average: it establishes common features in a group of historical actors, thus the hagiographical pitfalls of biography can be overcome. However, the challenge with using prosopography as a research tool is that it might describe an audience that is too homogenous.

Keywords: collective biographies, early-nineteenth century chemistry, audiences, Humphry Davy

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Biographies as construction of the collective memory: the case of Marie Curie

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Marie Curie is probably the female scientist to whom most biographies have been dedicated. Buried in the Pantheon in Paris, necropolis of the great men of the Nation, she represents in France the image of the female scientist. She was already idealized during her lifetime and her image has been enriched over the years to integrate, or even better, to penetrate the collective memory, becoming a national icon. However, she was not the only female scientist working at the Radium Institute, in Paris. By comparing Marie Curie's biographies with those of the 45 women who worked with her, I will try to understand the process of construction of the collective memory in France and its impact on the definition of the profile of a woman-scientist but also on the "necessity" of this definition. I will try also to understand the role of biographies in the construction of this collective memory.

Keywords: History of women in sciences, Marie Curie's biographies, collective memory, biography of woman scientist

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Situating chemistry – a free, online tool for the prosopographical study of chemistry

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The Situating Chemistry database is a web-based research tool and a reference guide for storing biographical information on chemists and on others who were involved with chemistry. In addition to biographical data, it can be used to gather and interrelate information about the sites where chemistry was practiced, the networks of materials, processes and substances that circulated around them, chemistry (and other) courses and their audiences, events, organizations, and associated documents and images. The database has been developed for the project Situating Chemistry 1760- 1840, which explores the interactions between the conceptual transformations of chemistry, its institutionalization and the role of chemistry and chemists in innovation in industry and agriculture. It is searchable and the reports it generates include interactive maps. Although developed for the period 1760-1840, it has been designed for use by all historians of chemistry or even historians of science more broadly. The database can be found at http://situatingchemistry.org.

The system's key features will be presented, and Conference participants will be able to sign in to explore the database further and to see how it might be useful in supporting their own research projects.

Keywords: relational database, prosopography, historical geographical information systems, open research tools

A collective biography of an emerging professional group: chemists granted by the French National Fund for Sciences in the 1930s

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Proposition for standard or short paper The National Fund for Sciences, created in 1930, provided for the first time human resources to laboratories, by funding scientists through individual grants. Therefore, from the academic year 1931/1932, scholars who did not get an academic position, could devote themselves to research despite precariousness. Due to the National Fund for Sciences and before the creation of the National Center for Scientific Research in 1939, a new type of scientific worker was born, supported by public funding and exempted from teaching obligations.

I intend in this paper to propose a collective portrait of the 187 chemists (36 female and 151 male) who are part of the cohort of 825 funded fellows (132 women and 693 men) in sciences identified between 1931 and 1939. My work in progress uses statistical and qualitative information about this emerging professional group, which was never studied as such. Individual data are provided after archives mainly produced by the National Fund from the academic years 1931/1932 to 1938/1939 (lists of beneficiaries, activity reports, personal files) or by the supervisory authority: the French Ministry of National Education. Biographical dictionaries, catalogues of libraries and databases complete the sources.

Through a gendered-socio-biographical approach (with a special attention to the cases of chemists' couples), lives and careers of the National Fund for Sciences' chemists are traced, with a special focus on social and geographic origins, curriculum, working/personal lives balance and following careers developments in public research, academic or industrial fields.

Keywords: National Fund for Sciences, Chemists positions, Chemists careers, Scientific workers, Researchers positions, Laboratories human resources, France 1930s, Collective biography, Chemists sociology, Work-life balance

Reference

Martine Sonnet, "Women Fellowships of the National Fund for Sciences in 1930s France: Towards a new type of scientific worker ?" (paper presented at the Women in Science Research Network Conference "Revealing Lives : women in science, 1830-2000, Londres, G.B., May 22-23, 2014).

Social marginalization and biography: the case of Henri Dutrochet (1776-1847)

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In 1996, Thomas Söderqvist suggested that science biographies are particularly interesting media to display the production of scientific knowledge against the light of the socio-political constraints that individual scientists encounter in their strive for acknowledgement. In this paper, I will investigate this idea specifically with regard to the socio-political constraint of marginality.

The central figure in this paper is the French physiologist Henri Dutrochet (1776-1847), whose marginal position significantly determined his struggles for self-assertion. He lived outside of Paris; was not a member of the French Academy; and much of his ideas were not shared by his fellow physiologists. When Dutrochet discovered osmosis in 1826, the phenomenon proved to be a mere source of controversy. People did not agree with Dutrochet's explanations, and the close resemblance of osmosis with other liquid phenomena like absorption and capillarity troubled its acceptation even more. On a more profound level however, the emergence of this controversy was a direct result of Dutrochet's marginality. A biographical approach reveals that Dutrochet performed a balancing act between his own independence and his commitment to the French Academy, knowing that he fully depended on the cooperation of his opponents at the center of the scientific community to arrange for general recognition of his phenomenon.

Eventually, a sui generis acceptation of osmosis failed to occur in France, which not only frustrated Dutrochet, but also sharpened his opinions about the methodologies of science in general. His autobiographical texts (mémoires and letters) reveal that Dutrochet blamed his fellow colleagues for their tendency to define nature in the narrow circle of already-known facts. Consequently, Dutrochet proclaimed experimentalism as the only method that truly enlarges the scope of our positive knowledge.

Keywords: Biography, marginality, socio-political constraints, controversy, physiology, osmosis

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Chemistry and experts: Antonio Casares, and his son José Casares as a scientific family

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The paper will consider the biographies of the Spanish chemists Antonio Casares Rodríguez (1812-1888), and his son José Casares Gil (1866-1961) to discuss the construction of their scientific authority, and expertise in chemical analysis. There were continuities, similarities and differences between both experts that enrich the comparison. Apart from belonging to the same family, both studied pharmacy, worked as professors of chemistry, wrote many publications, conducted chemical analysis, and were members of several academies, committees and governmental institutions.

However, each of them was affected by their own temporal, social, economic and existential factors.

The main aim of this paper is to explore the life paths of both chemists to compare the different elements they employed to construct their scientific authority, and expert credibility. First, I will study how they were not always neutral consultants with objective advice, but scientists with personal and professional interests. Second, I will consider the notion of "scientific family" to analyse not only the scientific creative work, but also the construction of networks of personal interests and social influences employed by both chemists to consolidate their authority and to gain more spaces of influence. Third, I will study how both chemist should be able to appropriate and adapt their expertise, and their scientific knowledge to local traditions and situations.

The comparative study of the biographies of Antonio and José Casares will provide a better understanding of the role of chemical experts in contemporary Spain. Their study–as a scientific family- will allow me to integrate more historical figures, places and questions showing that scientific biographies are an excellent tool to analyse the relationships between expert knowledge, politics and economic power.

Keywords: experts, scientific families, chemical analysis, 19th century, Spain

Biographies of outstanding natural scientists, technicians and physicians: a project on history of science in the GDR

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In GDR already in the 1960s attention was paid to the development of the history of science. Several institutions were founded, history of science became part of the educational programme at the university. So it was necessary to provide literature for the teachers and the students. Several textbooks on the history of chemistry, a biographical dictionary of chemists (which is used until today) and a book series were published with biographies of scientists.

This paper displays the publication process of this series of biographies. It will investigate, who the initiators of the series were and if they had a certain agenda for theselection of outstanding scientists and for the several authors from the beginning. It will be shown, that biographies of chemists only played a subordinated role in the series.

The reasons for it will be discussed.

All published biographies of chemists will be compared to reveal the focus of biographical writing in the context of a Marxist perspective of history. Furthermore several editions of the biographies will be compared. A contrasting juxtaposition of the East and West German editions of the biographical dictionary will conclude the paper.

Keywords: biography writing, Marxist perspective

Contemporary biographies of Danish chemists

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The general market in Denmark is overflowed with biographies and autobiographies of national and international politicians, sports stars and actors. Scientists and engineers are remarkably scarce represented. For a much smaller market The Danish Society of the History of Chemistry has in its 25 years of existence published 21 books, many of these with a title indicating biographical content. The poster will show that most biographies of scientists on the Danish market deals only shortly with the life of the person. The focus is on the work, the scientific thoughts of the time and the relations with the surrounding society and the scientific society. A comparison between the printed biographies and contemporary television features will be made.

Keywords: Danish Chemists, Biographies, The Danish Society of the History of Chemistry

Biography – Nanoscience meets historiography

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Can facts of history emerge from contemporary science? We believe they can – and we prove it! As scientists involved in current nanoresearch, we have uncovered facts of history in the course of work not otherwise history-related. The key to the discoveries has been – biography. Our curiosity was sparked by a simple question concerning one of the materials studied: nickel oxide, NiO, an archetypal nanoantiferromagnet[1]. Mineralogists have named NiO bunsenite, after Robert Wilhelm Bunsen (1811-1899). Was bunsenite originally discovered by Bunsen, then? – Where, and when? – As a matter of fact, neither the biographical records nor Bunsen's own writings support this longstanding assumption. Our own findings[2] point to another prominent 19th century chemist: the German-American Friedrich August Genth (1820-1893). Here, then, biography is at the fore, and from it, further facts of history emerge in quick succession: first, concerning the true discovery of the cobaltammines, rectifying a minor misconception in the history of experimental chemistry, which escaped such deserving historians even as G. B. Kauffman. Second, and more importantly, unforeseen facts emerge touching an apparently unrelated matter: the popular depiction of Justus Liebig's chemical laboratory at Gießen by Wilhelm Trautschold (1815-1876). Therein, 13 chemists – some well-known among them – are portrayed with light strokes of the pen by an accomplished artist. Actually, a comparison with extant photographs is possible in several instances. And yet, two of the individuals have always remained unidentified. Only now, after a careful collation of biographical data on Genth and selected contemporaries, can we reasonably conjecture that one of the two missing names is, in fact, Genth's, and the other that of John Lawrence Smith (1818-1883), the first American to work under Liebig. – Thanks to biography, the list of the chemistry adepts standing at the bench in that venerable "hall of fame" is complete at last!

Keywords: Bunsen, Cobaltammines, Genth, Liebig, Nanoscience, NiO, Trautschold

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„Lectiones Vilnenses Andreae Sniadecki"– Practice of heritage dissemination

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Biographical study and bibliography of published works, also works about Jedrzej Sniadecki (1768-1838), a famous professor of chemistry at the University of Vilnius, Lithuania, inspired us to revitalize a tradition to celebrate his birthday. The event was so popular within the university community in 19th ct.

In 2012 the first event of scholarly readings, named „Lectiones Vilnenses Andreae Sniadecki" was organized. Now it is organized at the same date (30 November) for three years already. During the Lectiones papers and lecture texts by Sniadecki are read. Preference is given to unpublished and less known works. Texts are read by famous specialist of the field, also by enthusiasts. During the discussions suggestions for the commemoration of a chemical heritage are introduced, the place for next event is voted for. It should have a historical link with the activities of prof. Sniadecki. The coming event will include a lecture with demonstration of chemical experiments, and the actors will be involved.

The event was started by a lonely enthusiast, and now it became a good practice for historians of chemistry to meet; each time it attracts community of science history enthusiasts, information is disseminated to reach even wider community. In the paper a good practice of an event will be presented, the suggestions for international scope will be both raised and requested.

Keywords: Biography as a source for event, Jedrzej Sniadecki, Vilnius University, Readings, Heritage projects

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What can the chemists and the public learn with the biographies of chemists?

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In general, the names not to mention the biographies of most of the great chemists are not known by the public. Even the typical chemist know most of the names from dubbed reactions, models, or equipment and, in a some cases, from dubious anecdotes. Even the life, dilemmas, and deeds of Antoine Lavoisier, the chemist whose name can be argued to be best known, is generally not well perceived. This situation is even worse for contemporary chemists. For example the works, life and ideas of Frederick Sanger (1918-2013), who won the Nobel prize of Chemistry twice, is largely unknown. The same for Robert Woodward (1917-1979), Gertrude Elion (1918-1999), and Carl Djerassi (1923-2015), just to refer a few highly interesting personalities.

Chemistry is a science at the service of humanity with most chemists working in the quiet shadow of ebullient illuminated labs. Of course, it could be argued that the History of Chemistry is stuffed with boring or bad examples, mistakes, foolish delusions, boastful prides, stubbornness, and nasty behaviors. But it is also full with genius, selfsacrifice, modesty, kindness, and, of course, normal human lives. All of this can be judge as good, bad, or neutral, but certainly being aware of it can contribute to humanize the image of Chemistry.

In this paper it will be argued that the lives and deeds of great chemists could be better known and appreciated by the public if popularized and humanized in popular formats as stories of profit and example, moral wonder, and surprising anecdotes. More than that, after touching the “heart” of the public, the lives of great chemists can serve as self-help or self-knowledge examples, of course not abandoning the historical accuracy nor easing the moral dilemmas, and always exploring the complexity of the human mind and the serendipity of its actions.

Keywords: Popularization of Chemistry, Public Understanding of Science, Humanity of Chemistry, Biographies of chemists as examples

Forgotten facts: issues with biographies of chemist John Dalton

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In this short paper I will highlight issues with biographies, through a discussion of existing biographies of Quaker chemist John Dalton (1766-1866). I will pay attention to his 'authorised' biographer, William Charles Henry (1804-1892), who was bequeathed all Dalton's paperwork and is often considered to have done a poor job with his 1854 publication. My argument will note how biographers often miss out key details or fail to maximise certain areas of a character's life. With respect to Dalton I am concerned that omitted details are those that would help us understand his character and pedagogy better.

Part of my doctoral research examines Dalton's teaching and the visual methods he used to present information to his students. An early pedagogic work on language, Elements of English Grammar, is central to my argument, but it is largely overlooked by his biographers, as it is frequently only mentioned as an 'early work' and overshadowed by later publications. I hope to show that Dalton's approach to science influenced his approach to language and that there was a commonality to his teaching.

Keywords: John Dalton, teaching, biography, chemistry, grammar, visual tools, tablature

Writing a biography of the quantum chemist Charles Alfred Coulson: between science, religion and politics

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In history of science, as in history tout court, the biographical genre has undergone a process of revival in the past decades, informed by various historiographical trends. Despite differences of approach, proposals seek to create a balance between the unique character of a biographee and the representative function which s/he can play.

In my opinion, this characteristic makes biographies a particularly relevant research tool in the history of science. This will be the standpoint from which I will analyse the challenges faced by the historian of science who envisions the writing of a biography of the quantum chemist Charles Alfred Coulson.

Despite a host of auto-biographical accounts and recollections, biographies, and biographical summaries of those involved in the emergence of quantum chemistry, Charles Alfred Coulson has not yet been the subject of a detailed biographical account, notwithstanding his leading role in the emergence and development of quantum chemistry in the United Kingdom, the discussion of its dynamic relations to physics, mathematics and biology and, finally its successful internationalization. Besides his originality as a theoretical chemist, he was a committed educator and an eloquent speaker. His proselytism as popularizer was, furthermore, intimately connected to his role as a lay priest of the Methodist church.

In this talk, I will assess how the biography of such a multifaceted personality can become relevant to the history of science, and the history of chemistry in particular, and how it can additionally contribute to the on-going debate about science and society, the new roles played by science in the disrupted post-WWII world, and its relation to other forms of knowledge production and circulation.

Keywords: Charles Alfred Coulson, quantum and theoretical chemistry, historiographical considerations on biographical genre, discipline building

Biography as a tool for identity building and discipline formation in chromatography

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Chromatography is a cluster of analytical techniques widely recognized as among the most powerful group of analytical tools for modern chemistry. All through the 1960s and 1970s, chromatography knew an explosive growth, due mainly to the appearance of ultra-fast, efficient and flexible mechanized versions of it (specifically gas chromatography and high performance liquid chromatography). This ran parallel to an attempt of the chromatography practitioners to delineate a distinct "separation science" from chemistry and –in some cases— to proclaim chromatography itself an independent scientific field. This paper traces the use of scientific biography as a tool of identity building in chromatography, discusses the strategies used by the chromatography specialists towards the building of the identity of their field, while suggesting some possible reasons for the eventual failure of the attempt to create a separation science altogether independent from chemistry. Furthermore the claim of several chromatographists to the existence of an independent chromatographic science is discussed.

Keywords: chromatography, instrumentation, separation science, chemical technology, analytical chemistry, discipline, biography

The personal factor: Donald Yost and the (lack of) progress in inorganic chemistry at Caltech, 1920-1965

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Any examination of the comparative roles of individual vs. institutional factors in shaping research programs must surely include a biographical component. When A. A. Noyes came to Caltech in 1920, he established a program in chemistry that rapidly attained world-class recognition. However, inorganic chemistry played a relatively minor part in that department, a condition that persisted until the mid-1960s, especially during the post-World War II period. To be sure, this would not be an atypical description of many major US academic chemistry departments. At Caltech, though, the second-class status of inorganic chemistry was not simply a manifestation of general trends. Rather it can be largely connected to a single individual, the department's (one) inorganic chemist, Donald Yost. An extensive picture of Yost's personal and professional life may be gleaned from the impressively large collection of papers that he deposited in the Caltech archives, as well as from reminiscences of his colleagues and students. Yost was undeniably an accomplished and respected inorganic chemist, who made significant contributions to the field. Nonetheless, his personality, attitudes, and behavior — especially his relationship with Linus Pauling, the major figure of power in the department during most of this period — were key factors in retarding the growth of inorganic chemistry at Caltech. It is even arguable that they were in part responsible for the failure to achieve a major breakthrough— the first preparation of an inert gas compound — nearly thirty years ahead of Neil Bartlett, a missed opportunity that would surely have substantially altered the subsequent course of inorganic chemistry.

Keywords: Donald Yost, Linus Pauling, Caltech, inorganic chemistry, inert gas compounds

A fine-grain study of twentieth-century electrochemistry towards a biography of Walter J. Hamer (1907-2004)

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Many biographies of famous leaders in electrochemistry have been written in the last decades[1]. Each provides invaluable insights about the various contexts that influenced the building of electrochemistry in the nineteenth and the early-twentieth century. In contrast, a lot still needs to be learnt about how this discipline developed after 1945. How was electrochemical research legitimized in the context of Big Science? Did interactions between university, the state and industry reshape electrochemistry? How was experimental electrochemistry carried out in the growing context of "physicalization" of chemistry? [2]

The study of the career of American electrochemist Walter J. Hamer (1907- 2004) will emphasize the relevance of the biographical approach to explore the history of post-1945 electrochemistry. Hamer spent most of his career at the Electrochemistry Section of the National Bureau of Standards where he conducted research on standard voltaic cells. He also worked to improve batteries and eventually became an active member of many industrial societies.

This case study will bring together three points which are usually investigated independently by historiography: lesser-known science, discipline building and innovation process. The fine-grain study of Hamer's trajectory will be a means to understand how electrochemistry gradually became tied to industrial and innovative matters. It will bring support to the idea that scientific biography can lead to a farreaching analysis of recent science.

Keywords: Electrochemistry, Industry, Batteries, Innovation, Physicalization of chemistry

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The short productive life of the Hickrill Chemical Research Laboratory

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Biographies of chemical institutions, like those of chemists and chemical research groups, can inform us about more than just their primary subjects. This will be especially true if the time period involved is one in which the discipline was in the midst of substantial change. Just such a period was underway during the lifespan of the Hickrill Chemical Research Laboratory, 1948-58, when chemistry was experiencing an instrumental revolution. During that time, Hickrill researchers made groundbreaking contributions to the study of aromaticity and the chemistry of carbenes, highly reactive divalent carbon species. The laboratory had been privately created solely to implement the research ideas of William von Eggers Doering, initially an assistant professor at Columbia University, who became a major figure in physical organic chemistry. Doering's first PhD student, Ruth Alice Norman Weil, whose educational background had been in literature and theater, established Hickrill on her substantial estate 70 km north of New York City. Although Weil did no further bench work she was actively involved in choosing the laboratory's roster of international postdoctoral fellows, several of whom subsequently had distinguished careers in academic and industrial research. Day-to-day operations were supervised by Lawrence Knox, one of a handful of African-American PhD organic chemists. The laboratory was well equipped with gas liquid chromatographic and infrared spectrometric capability. While still guiding research at Hickrill, Doering moved in 1952 to Yale University where he had access to NMR spectroscopy.

Hickrill's dissolution in 1958 resulted from several contingent factors, mostly personal. This talk will illustrate the quality of mechanistic organic chemistry achievable in the early days of the Instrumental Revolution, as well as the promise and perils of privately supported, frontline nchemical research.

Keywords: physical organic chemistry, privately funded research, William von Eggers Doering, aromaticity, carbenes

Plenaries and Parallel Sessions

Friday 11 September

Third Plenary Lecture
Who doesn't get a biography in the history of chemistry?

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Biography is a common genre of historical writing in many areas of both history in general and the history of science in particular, and some scientific figures (such as Charles Darwin and Albert Einstein) are treated almost always biographically. Yet the approach is not especially prominent in the history of chemistry. What are the constraints on the genre — practical, narrative, archival, political — that shape who warrants a scholar's personal investment in a biography, and who does not? To illustrate some of these general issues, this presentation focuses on a cluster of chemists straddling the turn of the twentieth century whose careers and lives at least partially overlapped: Friedrich Konrad Beilstein (1838-1906), Aleksandr Butlerov (1828-1886), Dmitrii Mendeleev (1834-1907), Wilhelm Ostwald (1853-1932), and Paul Walden (1863-1957). Their interlinked lives as a cohort could represent one particular path through the history of chemistry, but instead of being treated together they are most often dealt with separately, divided into those who merit biographies and those who play only supporting roles. How do we account for the differences in approach each of these individuals has received, and what consequences does it have for our presentation of the history of chemistry?

Keywords: Biography, Mendeleev, Butlerov, Beilstein, Ostwald, Walden

Biography and the history of chemical industry & chemical engineering

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Histories of chemical industry, of chemical engineering, corporate histories or histories of institutes of technology/technical universities often include parts of biographies of people involved in the business or in teaching/research. However, in institutional histories these biographies are rarely used as extensive case studies for understanding the establishment, management or development of these institutions/organizations. In this panel we will discuss how an emphasis on biographies can contribute to widening the perspective and offer a level of interpretation that is often missed in traditional histories of industries or institutions. In biographies, several contexts might be combined, be they personal, scientific, social, institutional, political, industrial, cultural or economical, and through a biographical approach the dynamics between a person and his surroundings might be better understood. These four papers will examine how biography or biographical approaches can provide insight into the role of chemistry in technological innovation in the first industrial revolution (Perkins), the history of early modern process development of early alkali and related sulfuric acid industries (Brand), the shaping of an institute of technology between academic and industrial traditions in the early 20th century (Lykknes), and the institutional history of the chemical engineering discipline, generally as well as in the case of one specific university before World War II (Homburg).

Keywords: biography, chemical industry, chemical engineering, technical education

Commentator: Jeffrey A. Johnson

Using narrative sources in the history of chemical process industries

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Biographies and autobiographies are narratives written about "interesting people", a non-random sample of the applied and industrial chemists, chemical engineers, and other skilled workers who all jointly contribute to the development of chemical processing and industrial production. Authors select biographical subjects to attract readers, usually for some combination of their fame (often as the symbolic "Father of Some Great Breakthrough"), their personal charisma (exemplary or notorious), and their affiliation (political, professional, national, or kinship) with the author or with the intended audience. Biographers further select which facts to include and how to weave the narrative according to the conventions of their academic disciplines or philosophical outlook. Thus, for the same subject, different authors will consider different extrinsic and intrinsic factors and forces and different conclusions will draw different conclusions.

Comparing examples of biographic treatment of men identified as key in the bench-to-factory development of the early alkali and related sulfuric acid industries (i.e., the better-known LeBlanc, Roebuck, Muspratt, as well as some essential but less famous men, such as Shanks, a Scottish works manager) by historians of economics, chemistry, and engineering will demonstrate the variations in the pictures drawn of the individuals and of the technical and economic successes and failures in the process development.

Methodologies of recognizing the intentional and unintentional biases and of assessing the advantages and pitfalls of biographical sources will be discussed.

Guidelines for integrating biographical narratives with more easily-verifiable technical and material culture sources will be proposed within the context of writing balanced histories for three separate and important audiences: the educated general public interested in intellectual entertainment; younger people exploring careers choices; and other serious historians of the chemical industries.

Keywords: history of chemical industries, biography as history, LeBlanc Process, sulphuric acid, alkali processing

Royal Dutch / Shell and the introduction of chemical engineering to the Netherlands: the careers of Waterman, Van Krevelen and Kramers

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It is common knowledge that chemical engineering as a discipline emerged in the United States, followed by Great-Britain, while Continental Europe was lagging behind (Guédon, 1980; Divall/ Johnston, 2000). This has usually been explained by the dominant position of the German chemical industry in Continental Europe, characterized by a leading role played by chemists, who collaborated in technical matters with mechanical engineers, and by the important role played by physical chemists such as Arnold Eucken (1884-1950). As a result, it is commonly believed that chemical engineering only started to play a role on the Continent after World War II (Buchholtz, 1979; Guédon).

That picture is oversimplified, though, as will be shown by discussing the introduction of chemical engineering to the Netherlands. Already before World War II, Royal Dutch/ Shell, a company with very intimate contacts to Great-Britain and the USA started initiatives in the Netherlands that paved the way for a chemical engineering approach to industry. In 1927 the topmanagement of Royal Dutch/ Shell decided to expand its petrochemical activities. It enlarged its research laboratory at Amsterdam, erected a laboratory at Emeryville, California, largely devoted to chemical engineering, and appointed Hein Waterman (1889-1961), professor of chemical technology at Delft, as scientific advisor to the company.

Waterman, who was a master in so-called graphical-statistical methods, together with his pupil Dirk van Krevelen (1914-2001) and his future colleague Hans Kramers (1917-2006) would play a great role in the introduction of chemical engineering to the Nethelands, as well as pioneering a new approach to “unit operations,” in terms of the transfer of mass, momentum, and energy. In my paper I will argue that a detailed focus on these three biographies offers a level of interpretation that stays out of the picture when one writes tradition institutional history of the chemical engineering discipline, or of Delft Technical University. I will conclude with an overview of the careers of Kramers’ students, that illustrates the huge importance of chemical engineering for the Dutch chemical industry.

Keywords: Shell oil, chemical engineering, Delft Technical University, chemical industry

Commentator: Jeffrey Johnson

Shaping identities as professors of an Institute of Technology: How two chemistry professors at NTH in Trondheim found their place between industry and academy in the 1910s

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Expectations were high when the Norwegian Institute of Technology (NTH) was established in Trondheim in 1910. Modelled on the German Technische Hochschule, NTH was an academic institution with modern teaching and research facilities.

Professors were expected both to conduct academic research and engage in development projects with industry, thus to have a double competency.

Some professors felt squeezed between the scientific tradition on the one hand, and the empirical-practical know-how on the other. How did this tension affect the expectations and roles of the professor? In addition to establish laboratories and study programs, chair a department and be inspiring teachers each of the professors were meant to open up research which was industry-relevant and at the same time scientific and publishable. Also, the Institute of Technology was the first of its kind in Norway, and although many had studied at a Technische Hochschule in Germany NTH should be developed from scratch, adjusted to the needs of the budding Norwegian industry.

How did the first chemistry professors solve this challenge? As will be demonstrated in this paper, as a group the chemistry professors succeeded both at the academic level and as consultants, however to different degrees. I will argue that two of the four professors employed in the 1910s identified mainly as “academics” while the remaining two considered themselves first and foremost as industrial chemists. I will particularly look at how two of them shaped their roles as professors between academy and industry in the 1910s and discuss how a focus on their biographies can be used to understand the shaping of an institute.

Keywords: Norwegian Institute of Technology, professor role, research, industry, consultant, biography

Chemical manufacturers in France, 1740-1810: a prosopographical study

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The period from the mid-18th century to the early 19th century saw the development of a substantial chemical industry in France, with enterprises that ranged from large-scale plants, such as Chaptal's in Montpellier, producing heavy and fine chemicals for national and international markets to small workshops producing chemicals for a local dyeing industry.

Over one hundred such manufactures have been identified with perhaps three times that number of entrepreneurs involved in them. These 300 or so individuals provide the basis for a prosopographical study. This will analyse their social origins and the networks of kinship, connection and patronage through which they sought political protection and economic advantage, as well as the capital and credit necessary for their operation. The focus of the presentation will be on their educational experience and cultural backgrounds and, in particular, on the extent to which they were acquainted with chemistry, not least through the large number of chemistry courses that developed from the mid-18th century, both in Paris and most provincial cities. This, in turn, will throw light on the larger question of the role of chemistry in technological innovation in the first industrial revolution.

1750 has been chosen as the starting date because it marks both the rapid expansion of the textile industry, which was the primary driver of the growth of the chemical industry, and the rapid growth in the popularity of chemistry. 1810 saw the crisis that bought to an end the 10 years of boom which had brought many new entrepreneurs into the industry.

The study uses a prosopographical database designed, in the first instance, for chemistry from 1760 to 1840. The designers (John Stewart and John Perkins) hope to present the database in another session of the conference. It can be viewed at http://situatingchemistry.org.

Biography and laboratory history: cross-fertilisation between two genres

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Biographies of chemists are a well-established genre in the history of chemistry. As chemists usually work in laboratories and some chemists have been involved with the design, construction and/or renovation of laboratory buildings, their biographies should shed light on the history of the chemistry laboratory and its development. In practice however the space devoted to the laboratory in such biographies is usually focused on the people working in the laboratory and their research rather than the physical building and its contents. On the other hand, the study of laboratories and laboratory buildings as physical artefacts has hardly begun and again the focus has been largely on what has been carried out in the space rather than the laboratory itself. Is it possible for biographical studies to shed more light on the design, construction and use of laboratories? Can these novel examinations of the laboratory as a physical building show how personality and ambition helped to shape the development of the chemistry laboratory? We believe that the answer to these two interrelated questions is "yes" and in their different ways these four papers aim to show how laboratory studies can benefit from biography and vice-versa.

Keywords: Laboratory, laboratory design, chemical education, scientific architecture

When two biographies meet: Kurt Jacobsohn (1904-1991) and the biochemistry laboratory at the Institute Rocha Cabral

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The paper focuses on the combined biographies of the German-born chemist Kurt Paul Jacobsohn (1904-1991) and of the laboratory of biochemistry of the Institute Rocha Cabral (IRC), in Lisbon, therefore combining and contrasting two kinds of biography, each with its own historiographic specificities: a scientist, notably his career, scientific production, personal and professional options, constraints, relationships and contacts; a laboratory, in particular, its location in the city, its dynamics, organization, lay out, funding and personnel.

Jacobsohn was born in Berlin to a Jewish family, the beginning of his professional life coinciding with the rise of Nazism in Germany. Following the completion of a doctorate supervised by Carl Neuberg (1877-1956), in 1929, he moved to Lisbon, upon invitation of the physician Ferreira de Mira (1875-1953), then the director of the IRC.

For quite some time, Mira had been writing articles in newspapers advocating private-funded research, which persuaded Bento da Rocha Cabral to donate part of his fortune to fund a facility devoted to biomedical research. The IRC resulted from an act of philanthropy and was established in Cabral's former residence, which underwent the necessary adaptations to its new purpose, the inauguration taking place in 1925.

With time, Jacobsohn and the biochemistry laboratory located on the 3d floor of the building operated a shift in the IRC's biomedical disciplinary hierarchy. His laboratory grew in importance and "colonized" new spaces inside the IRC and established closer links with chemistry, a discipline Jacobsohn taught at the neighbouring Faculty of Sciences of Lisbon, in this way contributing to free biochemistry from medical jurisdiction and turning the IRC laboratories of biochemistry almost an extension of the Faculty of Sciences.

Keywords: Kurt Jacobsohn, biochemistry, medicine, Institute Rocha Cabral

Charles Moureu: a chemist and his colleagues in War and Peace, 1914-1929

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Between 1914 and 1918, French laboratories in faculties and institutes engaged energetically in the war effort, under the general supervision of the Ministry of War. A great deal of information on this episode was published in 1920 in Charles Moureu's book La chimie et la guerre. Science et avenir. Moureu, a professor at the Collège de France known for his work on acrylic acid, was appointed vice-president of the "Aggressive Products" section of the Ministry's chemical warfare service in 1915. In this capacity, he had oversight of all sixteen Parisian academic laboratories working on poison gases and related matters. Notable among the laboratories were those of Victor Grignard (Nobel Prize winner in 1912), Gabriel Bertrand, Marcel Delépine, André Kling, and Georges Urbain, all of them leading chemists.

After the war, Moureu became president of IUPAC (1919-1922), as well as of the Société chimique de France (SCF, 1923-1925) and several other learned societies.

Several of the scientists who worked with him during the war also went on to serve as presidents of the SCF, including Bertrand (1920), Urbain (1926-1928), and Delépine (1929-1931). Among those who became members, in some cases presidents, of IUPAC Commissions were Grignard, Delépine, Bertrand, Urbain and Kling.

In this paper, I examine the organization of France's wartime chemical laboratories and their transition back from war to peace, through Moureu's eye.

Keywords: Charles Moreau, chemistry in wartime, chemical warfare, IUPAC

Davy in the laboratory

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The chemical research of Humphry Davy (1778-1829), first at the Medical Pneumatic Institution (opened 1798) in Bristol and then at the Royal Institution in London (founded 1799), is frequently, if not usually, portrayed in terms of a series of major discoveries: the physiological effects of nitrous oxide, an early understanding of electro-chemistry (a term he coined), of sodium and potassium, of the elemental nature of chlorine, of the miner's gauze safety lamp etc. All these discoveries required access to well-equipped laboratories and this talk will discuss how Davy learnt his experimental practice in Bristol and how he applied it when he moved to London. In doing so he established the Royal Institution as a major site for chemical research something which had never been intended by its founders. Thus Davy's biographical trajectory from provincial obscurity in Penzance to metropolitan fame, via Bristol, had, as one of its effects, of contributing to the creation of a laboratory that became a major location of chemical research throughout the nineteenth century and well into the twentieth.

Keywords: Humphry Davy, inorganic chemistry, physiology, fame, Royal Institution

Wilhelm Hofmann and the development of the classical chemistry laboratory

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August Wilhelm Hofmann was a central figure in mid-nineteenth century organic chemistry, the development of the synthetic dye industry and the professionalisation of chemistry. In this paper, however, I am concerned with another important facet of Hofmann's career, the introduction of the modern chemistry laboratory with its benches, bottle racks, and fume cupboard. To be sure, Hofmann was not responsible for the introduction of any of these specific aspects of the chemistry laboratory, but he brought them together in the 1860s and in doing so, shaped laboratory design across the world for the next century. As it well known, he was the founding director of the College of Chemistry (now part of Imperial College) in London in the mid-1840s, then helped to design the palatial laboratory buildings at the Universities of Bonn and Berlin in the mid-1860s and then helped chemists in other countries to construct similar laboratories.

Elsewhere, in The Matter Factory (London: Reaktion Books, 2015), I have described how the modern chemistry laboratory (what I call the classical chemistry laboratory) came about and Hofmann's role. Here, I wish to examine Hofmann's involvement in laboratory design in biographical terms. How did he come to create a new type of laboratory building? Why did he seek to change the design of chemistry laboratories and why was he keen to propagate his model in other countries rather than seeking to preserve a technological edge for Germany? In doing this I will explore his background as a son of an architect and a student of Liebig, his experiences in London, and his internationalism. In particular I will ask if he promote his model of the laboratory building in order to influence how chemists carried out chemistry in a similar manner to Lavoisier using chemical language to control how chemists thought about chemistry.

Keywords: Wilhelm Hofmann, organic chemistry, Bonn University, Berlin University

Petar Alaupovic (1923-2014) and the making of a new concept of lipoprotein

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At the I David Rubinstein Memorial Lecture, Petar Alaupovic (1923-2014), transcribing the poem The Road Not Taken, by Robert Forest, described his own journey:

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I—
I took the one less travelled by,
And that has made all the difference.

By using a biographical approach, this paper focuses on the reasons underlying Alaupovic's choice of a 'less travelled' path; in particular, its consequences in elucidating lipoprotein metabolism and in isolating and classifying them.

Following a Ph.D. in Chemistry, in 1956, at the University of Zagreb, Alaupovic goes to the University of Illinois, USA, (1957-1960) under a post-doctoral programme. In 1960, he moved to Oklahoma Medical Research Foundation, as a researcher of the Cardiovascular Section. He had freedom to reflect on what area of biochemistry to investigate, provided it was related with coronary heart disease.

This paper aims to show how Alaupovic, a Croatian scientist who admired French culture, chose to focus on lipoproteins; unlike his American peers he resorted to the European scientific tradition, in particular to Michel Macheboeuf's (1900-1953) views on lipoproteins. Consequently, Alaupovic was led to a new concept of lipoprotein, which entailed a new lipoprotein classification based on apolipoprotein composition, constituting an example of the translation of scientific knowledge at the conceptual level. In the meantime, evidence accumulated showing that lipoproteins were interconvertible, which together with Alaupovic's definition of lipoproteins was conceptually easier to grasp than with conventional definitions, explaining its wide acceptance.

At first, only Apolipoproteins A and B were considered. By using immunologic and protein chemistry, Alaupovic isolated and characterized additional apolipoproteins, proposing today's standard ABC nomenclature at the 'Concordance of Graz', in 1973.

Keywords: Biographical approach, Petar Alaupovic, history of lipopropteins, geographies of science

Vicente Coelho Seabra (1764-1804) on fire, heat and light

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The principle of combustibility and the phlogiston theory of combustion dominated chemistry for most of the XVIIIth century. From Stahl to Lavoisier the evolution of the concept of Phlogiston as a compound of the matters of heat and light, was the evolution of the concept "matter of fire" to caloric. The phenomena of the calcination and the combustion were at the center of such an evolution. Starting with Stahl´s theory, the evolution went on with those of many celebrated men who followed him, namely, Black, Priestley, Lavoisier/La Place, Macquer, Scheele, Crawford and J. H. Magellan. In 1788, Vicente Coelho Seabra, a Demonstrator of chemistry at the Chemical Laboratory of the University of Coimbra, Portugal, where he had graduated in Natural Philosophy, in 1787, has joined the group of those men, publishing his own Memoir on Heat . In the same year, he resumed and summarized the subject of this Memoir in the first volume of his textbook Elementos de Chimica. In such a Memoir, he considers the main theories advanced on Fire, Heat, Light, Combustion and Calcination processes by some of the authors who, at the time, had written at length on the subject. In his considerations on these theories, he presents and puts forward several different points of view which we will try to analyze and substantiate, commenting and emphasizing their meaning and scientific innovation.

Keywords: Vicente Seabra, Heat, Fire, Light

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The unsuspected chemical skills of Albrecht Dürer: the chemistry behind his palette

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Albrecht Dürer lived from 1471 till 1528. He was a great Renaissance painter and a gifted craftsman, with carving and engraving skills, who elevated printmaking to an independent art. He lived in Nuremberg, in the centre of Europe, and travelled to Italy, and Netherlands. He was aware of the major novelties of his time (he printed the image of the rhinoceros that arrived in Lisbon in 1515), and his "cabinet of marvels" expresses his scientific curiosity. He was a mathematician, wrote a manual of geometry and three books on human proportions, and his life is well documented as he also produced biographic texts. Dürer´s house possessed a small kitchen for pigments and glue preparation. By that time, colours were limited by the available pigments. Some pigments from the ancient world have already disappeared, for several reasons (tyrian purple needed a large amounts of snails), and many of those available were expensive, as they came from remote locations (dragon blood was extracted from an Asian tree), or came from semi-precious stones (the blue ultramarine was lapis lazuli). However, the Dutch synthesis of white lead was known for long. Prussian blue had not yet been synthesized, and it was not until the 19th century that other synthetic and metallic blue inks were available. In middle age, the ink preparation was seldom referred, but was so important that the price of a painting was calculated by the value of the pigments rather than by the time the artist took to produce it. Albrecht Dürer referred that the boy who grounded the colours earned 2 stivers (at 24 stivers the florin), while an ounce of ultramarine cost 12 florins. Chemical skills were necessary to prepare the ink. Painters also knew that excess paint prepared and not used needed to be protected from oxygen.

Keywords: chemistry of colours, paints, pigments, Albrecht Dürer

Glassblowers and scientists: the forgotten link

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When glory comes to celebrate the discoveries in the course of the history of chemistry there is a forgotten contribution to these achievements: the glassblowers. In fact, most of the times, it was, and sometimes still is, necessary to use glass apparatus and instruments which are not available, and so the need to build them. For this purpose the chemist either would rely upon a glassblower, or sometimes he is a skilled glassblower himself. If for the first ones the names were not retained, for the second ones men such Gabriel Fahrenheit, Wilhelm Geissler and Robert Bunsen were the makers of their own instruments. Even today, with the increased use of instrumental methods of analysis, there is a need of experienced glassblower. The history of scientific glassblowing will be revisited, some glassblowers whose names survived will be mentioned, and the unknown glass skills of some well known scientists will be emphasized.

Keywords: History of Chemistry, Chemical heroes, Scientific glassblowers

The new trend of university archives in Japan: the implications of Riko Majima's diaries as sources of the history of modern chemistry

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Until recently, one of the obstacles to studying the history of modern chemistry in Japan was the country's lack of systematic archival systems. After the Meiji Restoration, Japan started its full-fledged modernization and introduced many new institutions, but not contemporary archival systems. Modern Japanese were eager to destroy and replace everything old. Accordingly, they did not pay much attention to archival materials. This lack of attention caused many difficulties for researchers studying biographies of scientists in Japan, including those of chemists. In fact, it was often impossible to find any archival materials related to even eminent chemists such as Ogawa Masataka. Although he became famous for his discovery "nipponium" (allegedly element number forty-three), I could not find any valuable documents at Tohoku University, where he served as president. However, the past twenty years have brought significant changes as Japanese academics have realized the importance of archives and established such repositories at many universities.the importance of archives has finally been realized, and many university archives have been established.

Thanks to this new movement, researchers have gained access to various valuable archival materials. The case of Riko (Toshiyuki) Majima (1874–1962), a firstgeneration research chemist provides an excellent example of this change. Majima kept diaries from his youth until three years before his death at the age of 87. Most of these diaries were preserved by one of his sons and microfilmed in 2007 by the Archive of Tohoku University, where they were made available to the public. This paper will analyze Majima's diaries and discuss the implications of this archival awakening for the study of the history of modern chemistry in Japan.

Keywords: the history of modern chemistry in Japan, university archives, diaries, Riko Majima

A bibliometric approach to biography

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Mathematical chemistry is an emerging field of chemistry that already counts with leading scientists who have shaped the discipline. One of those is Lemont B. Kier and in the current work we explore an important part of his biography, namely his scientific production, collaboration and influence in science. To do so, we use a bibliometric approach covering the period 1956-2010. We found four main themes of research, spanning 28 subject categories, with Pharmacology & Pharmacy being the most prolific ones. Professor Kier has collaborated with 102 scientists and his publications have been cited 11,828 times in ISI Web of Knowledge documents by 3,583 authors. About half of those cites point to 10 publications, which we call Kier's top 10, and that have been cited in 40 subject categories; multidisciplinary chemistry and computer science with applications being those with most documents citing Kier. We found that 57% of the authors citing Kier's top 10 work in a collaborative way giving place to a community of more than 2,000 scientists working in Mathematical Chemistry. It was found that Kier's work bridges pharmacy, chemistry, mathematics, and computer science together in an attempt to address questions on molecular interaction through molecular structure.

Keywords: biography, bibliometrics, mathematical chemistry

Chemical biography and autobiography: from 1990 to the present and looking forward

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Encompassing over 25 years, the author's experience in chemical biography and autobiography is extensive. He created and edited the 20-volume series Profiles, Pathways and Dreams of autobiographies of eminent chemists published by the American Chemical Society(Seeman 1990). He has written numerous biographical memoirs of chemists(see, for example: Seeman 2014b, 2005, 2014a, 2013a, 2012b). He has produced and directed many internet-based (and open-access) video interviews of chemists(see, for example: Seeman 2010, 2014c, Rouhi 1997). He has edited the publication of the entire Nozoe Autograph Book collection in 15 consecutive issues of The Chemical Record, a journal of the Chemical Society of Japan, and contributed five accompanying essays to the project(Seeman 2012a, 2013b). Based on these endeavors, he will discuss biographies and autobiographies as sources for the history of chemistry; the role of biography and autobiography in enhancing the feeling of community among chemists (discipline building); the transparency of nationalism among research chemists; the appreciation of leaders in the field and the loyalty to one's own teachers; the validity of selfreporting the events of science versus myths; the methodology of chemists in reporting on their own life stories; and the importance of collections of books and videos as quickly identifiable resources and outlets for the community.

Keywords: biography, autobiography, video documentaries and interviews, autograph books, internet-based historical resources

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The evolving nature of potash and its protagonists

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Potash, presently known as potassium carbonate, has been used in art since antiquity.

The history of potash can be characterized by some important protagonists and events, among them: Robert Boyle's (1627-1691) differentiation of fixed and volatile alkaline salts; Duhamel du Monceau (1700-1782) and the classification of mineral fixed alkali (soda), vegetable fixed alkali (potash) and animal alkali (volatile alkali); the acceptation of 'potash' as the substance official name by the French Academy of Sciences in 1762; and the decomposition results of soda and potash (1807) using the voltaic cell by Humphry Davy (1778-1829) (Jensen, 1980; Partington, 1961).

Due to its commercial value, particularly during the eighteenth century, the incentive for its production among the colonies increased, as well as the number of scientific works to encourage the economic development of metropolis. In this context, we highlight the publication of Alographia by Friar José Marianno da Conceição Velloso (1741-1811).

This was a three volumes collection of which the first one (1798) was dedicated to the potash production. Friar Velloso was a Brazilian naturalist who conducted numerous activities in the service of the Portuguese Crown. In fact, he was even charged of the direction of the Literary House of Arco do Cego, in Lisbon that was created in purpose under the Crown patronage to publish all-important scientific works that could push ahead the agricultural and industrial progress of Portugal and its overseas domains.

We will bring to light Friar Velloso's efforts in selecting, translating, commenting and publishing the most updated scientific information about potash production and possible new contributes from more than two tens Brazilian plants from which it would be possible to extract the substance. All that would provide the country with greater scientific and economic autonomy.

Keywords: potash, Velloso, biography

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From Jane Marcet to Viscount of Vilarinho de São Romão. Teaching and popularization of chemistry in the 19th Century: a bubtle gender issue

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The British Jane Marcet (1769-1858) was an enthusiast of Chemistry that attended the lectures of Humphry Davy (1778-1829) at the Royal Institution in London. Those lectures were very popular amidst intellectual people and interested both men and women. Encouraged by her husband, Alexander Marcet (1770-1822), and their friends she wrote, in 1805, the book Conversations on Chemistry. Although the name of the author was not revealed until a quarter of a century later, her gender was freely admitted as female.

Conversations on Chemistry was a highly succeeded leading mark in the popularization of Chemistry and inspired, among others, Michael Faraday (1791-1867).

It is estimated that over 100000 copies of the book have been sold, primarily in the United States. In addition, it was translated and adapted into several languages with great success.

In Portugal Jane's book was adapted by Viscount of Vilarinho de São Romão (1785-1863) after a French version, dated from 1825, by Anselme Payen (1795-1871), both versions without reference to the fact that the original book was written by a woman. The Viscount, António Lobo Barbosa Teixeira Ferreira Girão, was a Portuguese politician, farmer, writer and academic with broad scientific interests and actively committed with Portuguese development. In his version of the book, published in 1834 and written during the five years he was hidden by political reasons, he introduced many footnotes, comments and extensions reflecting his own interests and chemical knowledge.

This paper aims to analyze how Jane's Conversations on Chemistry was adapted by Payen and Vilarinho de São Romão, who changed the original text, omitting that the author was a woman, and to discuss the importance of this book and its Portuguese version in the context of the teaching and popularization of Chemistry in the 19th century in Portugal.

Keywords: Jane Marcet, Anselme Payen, Viscount of Vilarinho de São Romão, Chemistry in the 19th century in Portugal, gender issues

The role of Udagawa Youan (1798-1847) in the introduction of western chemistry into Japan

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Several generations of Japanese scholars in the 18th-19th century translated and appropriated science from Europe into Japan. The Udagawa family is known for her translations from medicine to pure basic science. Three generations of family members translated anatomy and internal medicine; pharmacy, and botany. Udagawa Youan (1798-1846), a multidisciplinary scholar continued and shifted from pharmacy to botany and to chemistry as a discipline by itself. Youan's botanical work included composing supplement to his stepfather's book on botany, citing 23 Dutch books, and his introduction of the Linnaean taxonomy to Japan.

Udagawa Youan is mostly known for his chemistry books. In order to appropriate new discipline new terminology had to be invented.1 Youan invented many new terms for his translations from 24 books, based also on his chemical experiments. Some of the terms he coined are in use today. His largest book on chemistry, Seimi Kaiso,"Introduction to Chemistry," (1837-1847), is based mainly on a Dutch translation of William Henry's book (An Epitome of Chemistry, 1801) and on N.C. Fremery's Dutch version (Grondbeginselen der Scheikunde, 1800) of Antoine Lavoisier's Traité Élémentaire de Chimie (1789). Youan made efforts to understand and explain the new concepts of chemistry, that were very different from Japanese thought, while trying to find the appropriate terms and kanji in Japanese. In another work, Kouso Seimika, "Chemistry of Light", following Lavoisier's Traité, Youan explained the combination of light and warmth with materials. The Chemical Society of Japan was established in 1878; Prosperous chemical industry was established. In this study Youan's life and his contribution for building a common language in chemistry that later facillitated the development of chemical industry in Japan will be presented.

Keywords: Udagawa Youan biography, chemistry in Japan, Antoine Lavoisier, translation of chemistry, Seimi Kaiso

Parallel Sessions
Saturday 12 September

Sima Lozanic as the writer of textbook chemistry for secondary schools

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The teaching of chemistry, as an independent subject in secondary schools in Serbia, dates from 1874. Prior to that, chemistry was studied within the framework of physics and mineralogy. The rules on writing secondary-school textbooks in Serbia were passed in 1895. Within one year, Sima Lozanic wrote a textbook and submitted it for publication. Sima Lozanic (1847-1935) was a chemist, scientist, Professor, Chairman of the Academy of Sciences, the first Rector of Belgrade University, Ambassador to London, Minister of the Economy and Minister of Foreign Affairs, a diplomat. In the mid-1880's, at the time of a reform and modernisation of grammar school, Lozanic worked on compiling a modern chemistry curriculum and introducing teaching through experiments in secondary schools.1 Apart from chemistry, Sima Lozanic also studied pedagogy (1868-1870) at the well-known school of pedagogy in Küsnacht near Zurich.

At Zurich University, Lozanic studied chemistry under Johannes Wislicenus, and subsequently spent one year at August Wilhelm von Hofmann's laboratory for organic chemistry.2 Scientific textbooks are at the crossroad between disciplines such as history of science, history of education and history of books and reading.3 We analysed Sima Lozanic's textbook Chemistry for Secondary Schools, dating from 1896 to gain insight into what amount of chemistry knowledge was presented to young people in Serbia in the end of the 19th century, and what principles textbook written. We needed to develop the methodology for analysing and evaluating the quality of this textbook within the context of the period when it were created. Sima Lozanic's textbook is characterised by the high level of systematicness when it comes to the manner of presenting its contents and consistency of approach throughout the book. It may be assumed that the mentioned approach was developed during the course of Sima Lozanic's studies under Wislicenus and Hofmann.

Keywords: Sima Lozanic, chemistry teaching, chemistry textbook, textbook quality

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The changes in the practices of teaching chemistry in the nineteenth century: the professor Mariano Santisteban

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At the beginning of the nineteenth century the first laws that led to the establishment of secondary education in Spain were enacted. At that moment physics and chemistry lije a unique subject was defined. This subject has no equivalent outside the educational context the and nowadays. The subject birth was related with a pedagogical tradition based on a demonstration teaching. It was the use of laboratory made by teachers, in addition with new teaching tools created by them, which joined the two disciplines into one in the school context.

Scientific development is often associated with cultural modernization and economic progress of a country. This idea is central to the process of transforming the teaching of chemistry (and also of Physics) during the nineteenth century. This paper aims to show how the objectives, contents and practices related to science education changed, as well for training future scientists as for the public in general.

This work studies the training and teaching career of Professor Mariano Santisteban in order to achieve this objective. In order to show the Santisteban's creativity, the reader will know tools like pencil and paper problems, which were generated to strengthen his demonstrative practices. This paper will be focused on the Santisteban's textbook development. It will be showed how through the different editions of his manual the contents were adapted to the level of the official program prescribed for secondary education. Therefore will be demonstrated how mathematics was losing presence in favour of the latest scientific, advances, especially in the part of chemistry content.

Keywords: School disciplines, physics and chemistry, paper and pencil problems, Mariano Santisteban, Bibliography

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Origin story: biography, textbooks, and the discovery of yttrium

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Finnish chemist Johan Gadolin (1760-1852) often receives credit for the discovery of the element yttrium, a claim based on a paper published in 1794 detailing his recognition of a new earth, later named yttria, found in the chemical analysis of a mineral from a quarry in Ytterby, Sweden. However, Gadolin neither found the stone itself nor isolated the element, and the substance that he describes in the paper is not a metal but a new earth, one of a fundamental class of material substances that ceased to exist in the first decades of the nineteenth century.

Drawing on Gadolin's writing, works in the wider context of contemporary chemistry, and subsequent chemical literature, this standard paper establishes the meaning of Gadolin's work within the late-eighteenth-century chemical community and explores how his 1794 observations and description of a new earth, as defined contemporaneously, became known as the discovery of the first rare earth element by the transformation of the claim over time. This transformation occurred largely within textbooks as authors wrote the history of chemistry through biography, not only by joining chemists' lives to their work but also by providing a "biography" for each element as it was cataloged. By the late twentieth century, these elemental origin stories became simplified into the table format now found in many reference books, drastically reinterpreting much of the history in the process. The example of yttrium makes clear the obfuscating effects of imposing a standardized and biographical format of history onto the diversity of substances addressed by modern chemistry.

Keywords: elements, textbooks, discovery, Sweden

Ludwik Wertenstein (1887-1945) as physicist and physical chemist in the light of his memoirs

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Ludwik Wertenstein was born in Warsaw. He studied physics at the Imperial Warsaw University. After one year of study he was expelled for participation in the students` protests against the policy of Russian government. He continued his education in France at the Sorbonne, and became an assistant of Maria Skłodowska-Curie (1908-1913).

In 1913 the Mirosław Kernbaum Radiological Laboratory of Warsaw Scientific Society was opened (Towarzystwo Naukowe Warszawskie), with Maria Skłodowska-Curie as the honorary director and Ludwik Wertenstein as the on site chief from 1914. He headed the laboratory till the outbreak of WWII, and developed it into the main center of radiological research in Warsaw.

Wertenstein was also professor of physics at the Free Polish University (Wolna Wszechnica Polska).

In the years 1925-27 Wertenstein worked at the Cavendish Laboratory at Cambridge University under Ernest Rutherford.

In 1934 the cooperators of Wertenstein in radiological laboratory: Marian Danysz and Michał Żyw discovered new radioactive isotopes: 17F and 42Sc. Wertenstein corresponded with many important scientists, i.a.: Ernest Rutherford, Max Planck, Maria Skłodowska-Curie, Lise Meitner, and was a friend of James Chadwick and Kazimierz Fajans.

Wertenstein also engaged himself in the long-term popularisation of physics and physical chemistry.

Wertenstein was of Jewish descent, so he had to hide himself from the Nazi government – and eventually fled from occupied Poland via Slovakia to Hungary. He accidentally died due to a mine explosion in January 1945, during the battle for Budapest.

Wertenstein vividly described his reflections about scientific interests, activity and his last years in memoirs (preserved in manuscripts), which constitute a very valuable source for the historians of physics and chemistry.

Keywords: radioactivity, memoirs, popularisation, Maria Skłodowska-Curie, Ernest Rutherford

A biography of radioactivity studies in Portugal through the scientific lives of two women

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In Portugal, since its discovery, radioactivity became a strong incentive for scientific studies of chemists and physicists. From the early 20th century, applied studies concerning waters and minerals were carried out by some chemists most of them published in Revista de Química Pura e Aplicada, founded in 1905.

Later, in the years 1940 and 1950, fundamental studies on radioactivity were also developed by the Professors of the Faculty of Sciences of Lisbon, Branca Marques (1899-1986) and Marieta da Silveira (1917-2004), as well as by other collaborators.

These two researchers, working in two different groups, had careers very different from each other but that can be considered as typical of scientists in Portugal in their time.

The biographies of the researchers, as well as other studies in radioactivity, and the activity of the scientific revues, allow to characterize the development of scientific research on radioactivity in Portugal and to understand how this development was integrated in the international program in radioactivity studies.

From the analysis of these sources we can also get some significant indicators in order to sketch a general biography of the Portuguese scientific environment which conditioned the research and the careers of the two Professors.

Keywords: radioactivity, Branca Marques, Marieta da Silveira

A nobel to energetics? Wilhelm Ostwald, catalysis and energeticism

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The German chemist Wilhelm Ostwald (1856-1932) is one of the most controversial characters in the history of chemistry: On the one hand, Ostwald is presented as one of the pioneers of Physical-chemistry, responsible for institutionalization and popularization of this field, and for his investigations on rates of reaction, chemical equilibrium and catalysis that gave him the Nobel prize of Chemistry in 1909. On the other hand, Ostwald is seen as a great opponent of atomic theory in the end of 19th century and principal spokesman of Energeticism, a scientific program which sought to unify and reinterpret the science in terms of transformations of energy (Deltete, 2007).

However, this Ostwald's representations are not presented in an integrated manner, resulting a double image to Ostwald in history: like a pioneer of new research camps and great chemist and like an opponent of most fruitful and important chemical theory.

This duality hides possibles relations between your scientific works, your energeticist program and his epistemological convictions, as indicated some writings and lectures (Ostwald, 1894; 1909; Nobel, 2015). Consequently, it seems necessary to articulate these diverse aspects. In this work, we present some aspects of the relation among Energeticism and catalysis and some motivations to write an Ostwald's new biography – an integrated biography.

Keywords: Wilhelm Ostwald, Energeticism, Catalysis

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Henry Moseley 1887-1915

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Moseley was a remarkable scientist who's practical and reasoning abilities as a physicist led to a recognition of atomic numbers, a fundamental concept to chemists. Would this talent lead to a Nobel Prize, especially for one so young?

Henry was born into an academically able aristocratic family, followed by a privileged Eton College and Oxford University education funded through (un-needed) scholarships. These provided an excellent foundation for a committed scientist who wisely joined the Manchester group headed by Ernest Rutherford researching atomic structure. Could the combination of his ability and this wise choice lead to a Nobel Prize? Just possibly.

After two years Rutherford reluctantly allowed Moseley to direct his own research into Xrays produced by electron bombardment of metal elements. In only18 months he obtained a linear relationship between the wavelength of these X-rays and a metal's 'periodic table sequence number' (now atomic number). Should it be called the Moseley number?

Problems in Mendeleev's table such as atomic weight-atomic number inversions were thus explained and the number and periodic table position of undiscovered elements identified.

However the 1914-1918 War started and Moseley felt compelled to join his fellow Old Etonians as British officers. He disregarded Rutherford's advice that he would better serve his country applying his science ability in civilian areas of military value. Meanwhile Arrhenius recognising Moseley's discoveries had nominated him for both physics and chemistry Nobel Prizes.

Sadly his science skills were used as a Royal Signals officer who was shot by a Turkish sniper on 10 August 1915, its centenary being last month. Nobel prizes are never awarded posthumously so one can only surmise whether, aged only 27 he deserved a Nobel Prize, nor whether it was more likely in chemistry or physics. Certainly Britain's ablest science casualty.

The chemist Sebastião Betâmio de Almeida (1817-1864): between teaching, industrial activity and intervention in the Leiria pine forest

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The chemist Sebastião Betâmio de Almeida is an example of the link, in the 19th century, between science and economy. Almeida, following Saint-Simon ideas as some other contemporary figures, tried to make a closer relationship between his teachings in the Industrial Institutes of Porto and Lisbon, and his interventions in the Portuguese activities of agriculture, forestry and industry. He wrote some studies about the soda economy or the glass or resin industries. Follower of a scientific base in the national industry, in 1853 Betâmio de Almeida tried to start the publication of the journal Technologia Chimica, directed to the industrial community. Recognising his mprofessional quality, the government named him for several commissions, as a study trip to the 1855 Paris Universal Exhibition.

The study of the personal and professional career of this chemist, let us make, with a case study, an approximation to the 19th century Portuguese economy and society, namely in the following aspects: a scientific formation existing in the country; the contacts established between Portuguese scientists and the colleagues in other countries; the way of establishing these contacts, with internships in foreign countries and study visits favouring the ideas and technology transfer; the worries existing in Portugal related to the divulgation of science and technology progress; the different ways science men put their knowledge and experience to the service of agriculture, forest and industry development; the intervention of these men in the state structures.

Keywords: Biography, Industrial Institutes, Agriculture, Forestry, Industry

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A case study: the chemical and researcher Joaquim de Santa Clara Sousa Pinto (1803–1872)

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Joaquim de Santa Clara Sousa Pinto was born in Cinfães, Viseu, Portugal, in 1803. He was a professor of Chemistry in two of Porto´s institutions of technical and scientific learning: the Academia Politécnica from 1837 to 1872 and Escola Industrial do Porto from 1859 to 1871.

His career spanned over 3 decades, but unfortunately not enough is known about his life to give us a complete insight into his work.

However, in 1852 it is known that he registered a patent for a device that produced gas lighting using vegetable products.

This shows that his technical and scientific knowledge was advanced as it was only around this time that the first installations for the production of gas lighting from coal were introduced in Europe.

It is only his knowledge of the use of chemistry in the Art's field that can explain his innovative capacity, which puts his work on a par with scientific developments that were taking place at the same time in other European countries in the field of the use of raw materials for gas purification.

This project aims at uncovering as much of the operational and scientific knowledge of Joaquim de Santa Clara Sousa Pinto as possible, which is indispensable to our understanding and the making of the chemical mind in the 19th century Portugal.

The biographical data that this case study hopes to gather will constitute an important methodological tool for a better understanding of Joaquim de Santa Clara Sousa Pinto as an innovative chemist.

Keywords: Chemical, Chemistry, Gas, Industry, Innovation

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More than a chemist: the case of Alexander Borodin

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Myth and misrepresentation in biography may have many causes. I confine myself in this talk on the problems faced by the biographer of a chemist who made important contributions in other fields as well. The outstanding example is Alexander Borodin.

He is well known as a Russian composer and member of the circle called Mighty Five, a nationalist group that fought for a truly Russian music. This image is a myth and played a large role in the literature on Borodin.

However, I chiefly want to talk about another myth, which concerns his biography.

Alexander Borodin, the chemist – indeed the same person – is usually misrepresented.

His achievements in chemistry present problems to biographers who are not scientifically trained. This leads to descriptions that are often wrong and sometimes hilarious. More importantly, Borodin's character is thus distorted. He considered himself foremost a professor of chemistry. Music was always important to him, but never prevailed above science and teaching.

Much has been written on Borodin, the composer, cursorily mentioning his other achievements. In these books his research in chemistry is either neglected or overrated. A few examples will be briefly discussed. At the other end of the scale, we find stories about a certain chemist or doctor, who happened to become famous for "Strangers in Paradise".

A number of biographies, written by historians of science or by musicologists in various languages, will be compared.

Keywords: Borodin, organic chemistry, composer, musician, Russia

References

Willem Vijvers, Alexander Borodin: composer, scientist, educator (Amsterdam, 2013).

Myth as oblivion: Hugh Christopher Longuet-Higgins' (in) glorious struggle to solve diborane's "Perpetual Puzzle"

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In 1943, Hugh Christopher Longuet-Higgins, then a 19 year-old undergraduate chemistry student at Balliol College, Oxford University, published a paper with his tutor Ronald Percy Bell, which would catalyze a sudden and unexpected turnover in the long standing debate over the structural puzzle posed by the boranes (compounds of hydrogen and boron). Until today, the legend of the young Longuet-Higgins among theoretical chemists emulates the "Emperor's new clothes" story, with Linus Pauling playing the Emperor.

In my presentation, I will address the story behind the 1943 paper and analyze Longuet-Higgins' original essay to Bell and the dramatic differences between it and the subsequent joint paper. I will address Longuet-Higgins' famous achievement in geometry at the time (together with his younger brother Michael) and show how his mathematical mindset determined the content and form of his original essay to Bell. I will also show how his use of outdated bibliography and of an abandoned concept of the hydrogen bond played a crucial role in this work. I will further address the historical significance of the 1943 paper with Bell, its true impact and how it failed at its primer goal.

Finally, I will show that Longuet-Higgins' contributions to boron chemistry were actually several, different in nature and in rapidly changing historical and theoretical contexts, and that eventually led to William Lipscomb's three-center 2-electron bond concept, which was built on one of Longuet-Higgins' theoretical creations. Strangely enough, Longuet-Higgins' foundational contributions to theory in this particular field seem to have never received due recognition and all that was left, and ever existed, was thisn myth which raised his young self to Olympic immortality in the form of a diffuse, fundamentally wrong and oversimplified legend.

Keywords: Hugh Christopher Longuet-Higgins, diborane history, boron chemistry history, quantum chemistry history

Useful information

Useful information

Information for presenters in parallel sessions
- All rooms are equipped with a projector and a PC, as well as Internet connection. A member from the staff will be responsible for each session room and will help the participants in the preparation of the computer.
- The rooms of the Parallel Sessions will open 10 minutes before the beginning of the session so that participants have time to download their presentations.
- Make sure that your presentation is ready before the beginning of the session.
- The chair-person will make sure that you keep to time during the presentation.

Computer and internet access
Visitors at University of Aveiro may connect to Eduroam for wireless networking.

Network name (SSID): eduroam
Username: chemistry@visit.uaveiro.eu
Password: 10ichc
Network access period: 09.09.2015 - 12.09.2015
Information to configure the internet access is available on the following webpage: http://www.ua.pt/stic/pagetext.aspx?id=15224.

Conference dinner at Meliá Hotel
Cais da Fonte Nova, Lote 5
3810-200 Aveiro, Portugal
GPS: 40.638452; -8.64497

In case of emergency
In the case of an emergency, please call the following number:
112 – Ambulance

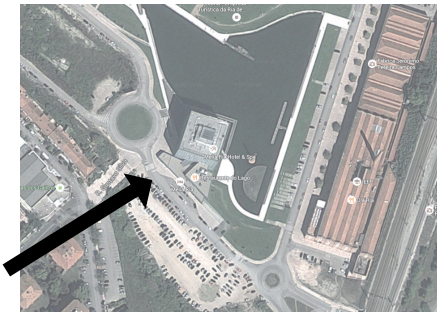
Transport
Information about public transport by bus in the Aveiro region will be provided at the information desk, and can also be found at the Moveaveiro website: www.moveaveiro.pt.
Taxi: Aveiro Taxi +351 234 385 799
Train: CP - Comboios de Portugal - www.cp.pt

Car rental in Aveiro
Auto-Jardim - http://www.auto-jardim.com/our-locations
AVIS - http://www.avis.com.pt/

Bus to the University

Every morning a bus will pick up conference participants in 3 points in town: at Meliá Hotel (08:20), in front the Museum near the cathedral (08:30), near Moliceiro Hotel (08:40) and will bring them to the University (Complexo Pedagógico).

After the morning session, by 12:40, the bus will transport participants from Complexo Pedagógico to Crasto refectory where lunches will take place, except on Saturday.



Meliá Hotel (08:20) - Cais da Fonte Nova, Lote 5

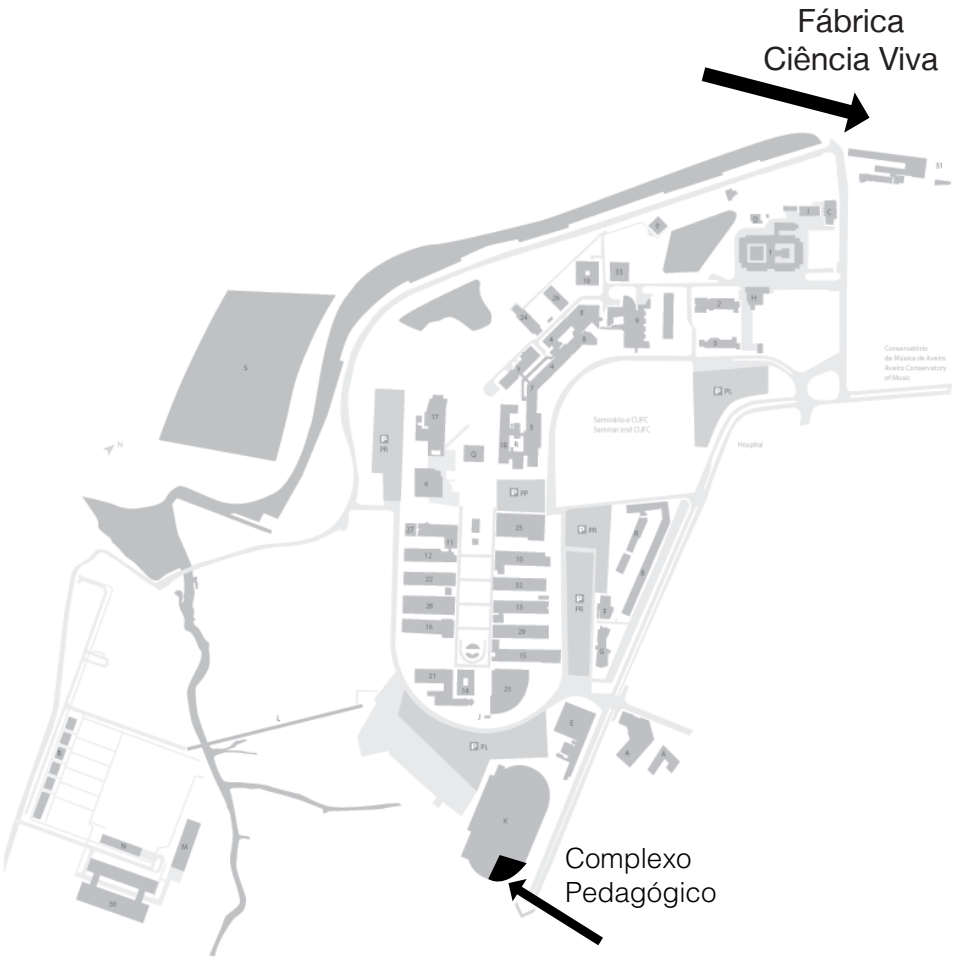
Museum near the cathedral (08:30) - Av. de Santa Joana Princesa

Near Moliceiro Hotel (08:40) - Rua João Mendonça

Aveiro map

1 - Fábrica Ciência Viva
Rua dos Santos Mártires, nº 1A | GPS: 40.638314, -8.658102
2 - Meliá Hotel Ria
Cais da Fonte Nova, Lote 5 | GPS: 40.638452; -8.64497
3 - University of Aveiro
Campus Universitário de Santiago | GPS: 40.630372, -8.657656
4 - Moliceiro Hotel
R. Dr. Barbosa de Magalhães 15 | GPS: 40.642109, -8.656118
5 - Afonso V Hotel
R. de Dr. Manuel das Neves | GPS: 40.630372, -8.657656
6 - Imperial Hotel
R. Dr. Nascimento Leitão 1 | GPS: 40.639915, -8.652477

University map



Index of Presenters

Alex Petit, 47	Centre François Viète, Université de Nantes, France
Ana Cardoso de Matos, 79	University of Évora, Portugal
Ana Carneiro, 57	New University of Lisbon, Portugal
Ana M. Alfonso-Goldfarb, 30	Pontifical Catholic University of São Paulo, Brasil
Ana Simões, 44	University of Lisbon, Portugal
Anders Lundgren, 17	University of Uppsala, Sweden
Anders Ödvall	Stockholm, Sweden
Annette Lykknes, 51, 54	Norwegian University of Science and Technology, Norway
António M. Amorim-Costa, 62	University of Coimbra, Portugal
António Morais, 64	University of Aveiro
Apostolos Gerontas, 45	Coburg University of Applied Sciences, Germany
Asbjørn Petersen, 39	Hvidovre Gymnasium, Danmark
Bernadette Bensaude-Vincent, 25, 29	Université Paris 1 Panthéon-Sorbonne, France
Bernardo Jerosch Herold, 19	Technical University of Lisbon, Portugal
Birute Railiene, 41	Lithuanian Academy of Sciences, Lithuania
Brigitte Van Tiggelen, 26	Mémosciences and Chemical Heritage Foundation, USA
Charlotte A Abney Salomon, 74	Yale University, USA
Danielle Fauque, 58	Orsay University and CHC-SCF, France
David J. Caruso, 27	Chemical Heritage Foundation, Philadelphia, USA
Dragica D. Trivic, 72	University of Belgrade, Serbia
Elisa Campos, 61	New University of Lisbon, Portugal
Ernst Homburg, 53	Maastricht University, Netherlands
Fernando Luna, 68	Universidade Estadual do Norte Fluminense, Brasil
Frank James, 59	University College London and the Royal Institution, UK
Gabor Pallo, 15	Budapesti Műszaki és Gazdaságtudományi Egyetem, Hungary
Gisela Boeck, 38	University of Rostock, Germany
Gordon Woods, 78	Royal Society of Chemistry, UK
Guillermo Restrepo, 66	Universidad de Pamplona, Colombia
Harriet Lloyd, 32	University College London, UK
Ignacio Suay-Matallana, 37	Chemical Heritage Foundation, Philadelphia, USA

Isabel Amaral, 57	New University of Lisbon, Portugal
Isabel Malaquias, 68	University of Aveiro, Portugal
Isabel Marília Viana e Peres, 69	University of Lisbon, Portugal
Isabel Neves Cruz, 80	University of Évora, Portugal
Isabel Serra, 76	University of Lisbon, Portugal
Jay A. Labinger, 46	California Institute of Technology, USA
Jeffrey I. Seeman, 67	University of Richmond, USA
Jeffrey A. Johnson, 26, 28	Villanova University, USA
Jennifer I. Brand, 52	College of Engineering, University of Nebraska-Lincoln, USA
João A. B. P. Oliveira, 64	University of Aveiro, Portugal
John Perkins, 34, 55	Oxford Brookes University, UK
Jorge Calado, 22	University of Lisbon, Portugal
Jose-Antonio Pariente Silván, 73	University of Valencia, Spain
Laís Jubini Callegario, 68	University of Aveiro, Portugal
Letícia dos Santos Pereira, 77	Federal University of Bahia, Brasil
Marcia H.M. Ferraz, 30	Pontifical Catholic University of São Paulo, Brasil
Marcin Dolecki, 75	Polish Academy of Sciences, Poland
Maria da Luz Sampaio, 80	University of Évora, Portugal
Maria Elisa Maia, 76	University of Lisbon, Portugal
Maria Teresa S. R. Gomes, 63	University of Aveiro, Portugal
Martine Sonnet, 35	IHMC/CNRS/ENS/Paris 1, France
Masanori Kaji, 65	Tokyo Institute of Technology, Japan
Michael D. Gordin, 50	Princeton University, USA
Muriel Le Roux, 31	IHMC/CNRS/ENS/Paris 1, France
Natalie Pigeard Micault, 33	CNRS/Musée Curie, France
Nuno Figueiredo, 82	University of Lisbon, Portugal
Peter J. T. Morris, 56, 60	Science Museum, London, UK
Pierre Teissier, 29	University of Nantes, France
Rachel L. Dunn, 43	Durham University, Ireland
Sérgio P. J. Rodrigues, 42, 69	University of Coimbra, Portugal
Silvia Waisse, 30	Pontifical Catholic University of São Paulo, Brasil
Stephen J. Weininger, 48	Worcester Polytechnic Institute, USA
Thijs Hagendijk, 36	Utrecht University, Netherlands
Vesna D. Milanovic, 72	University of Belgrade, Serbia
Willem G Vijvers, 81	Naarden, The Netherlands
Yona Siderer, 70	Yavne, Israel

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