

## Abstracts

### Robert Anderson

Cambridge University

#### **Relationships between Industry, the Academic World and Social Networks in Great Britain**

The overall purpose of this investigation is to compare the development of late eighteenth century chemical industry in different social and scholarly environments. Whilst perhaps accepting Peter Mathias's thesis that "innovations were not the result of the formal application of applied science, nor a formal product of the educational system... determination, intense curiosity, quick wits, clever fingers, luck, capital... and a backer... were more important ... than a scientific training", was it really all a matter of skilled mechanics and cash? To what extent did the proximity of influences such as academics, fellow-manufacturers, overseas visitors, scientific societies, local scientific periodicals and libraries make a difference to entrepreneurial outcomes?

Three rather different cases are being investigated where the chemical industry was being developed: in the Scottish Forth-Clyde Valley, the north-west of England and the English Midlands. Edinburgh had a long-established university, access to government grants for industrial development, and scholarly societies, including the Royal Society of Edinburgh founded in 1783. Manchester had no university; its Literary and Philosophical Society was established in 1781 and the *Lit and Phil's Manchester Memoirs* were being published regularly from 1785. Birmingham was also without a university but a substantial industrial base had been established by mid-century and though there was no formal society, a cluster of entrepreneurs and savants met fairly regularly as the informal Lunar Society from about 1774.

Thus the environments of these three foci of industrial development were very different and it is of particular interest to see to what extent Scottish industry can be judged to have benefited from its professorial community. It is recognised that a study such as this needs to be considered using quantitative measures if meaningful comparisons are to be made. This is very difficult to achieve given the paucity of comparable data for the three centres.

### Bernadette Bensaude

Université Paris I, Panthéon-Sorbonne

#### **Teaching chemistry in the French Revolution: Disciplinary power or art of governance?**

By the end of 1794, the young "one and indivisible" French republic established a Normal School (École normale) to "provide the French people with a system of instruction worth of its novel destinies". More concretely the purpose was to give a fast training to a number of citizens for them to train the future primary and secondary teachers in all the departments of the French territory. Chemistry was integral part of the curriculum, which included both science and humanities.

The phrase 'École normale' clearly conveys a project of normalisation or standardization of education providing a uniform approach to all the sectors of knowledge previously covered by the *Encyclopédie*. This teaching institution was dedicated to the "formation of the man and the citizen". It was meant to shape knowledge and citizenship according to the republican ideals of liberty, equality, and democracy.

However the chemistry lectures delivered by Claude-Louis Berthollet in the aftermath of the

chemical revolution suggest a quite different endeavour. Far from aiming at stabilizing the new language of chemistry and promoting the theory outlined in Lavoisier's *Traité élémentaire de chimie* (1789), Berthollet developed personal views about chemical theories and utilitarian applications. While he stressed the deductive power of chemical theory for enlightening chemical arts, he nevertheless focused on anomalies and peculiar circumstances. The paper will thus stress the gap between the national aspirations or visions of education as a disciplinary power and the vision of chemistry developed by an enlightened expert in chemical theory and arts.

The first section characterizes the goals and ambitions of the creation of the Normal School in the dual context of the political and chemical revolutions. The second section focuses on the course of chemistry: the site, the audience, and the teacher's performance. The final section characterizes Berthollet's personal visions of chemistry and emphasizes the tension between his aspiration to a world ruled by general laws and his concern with anomalies and circumstances. His chemistry oscillated between the power of disciplining the multitude of material substances and reactions and the governance of complex local dynamics.

### **John Christie**

Oxford University

#### **Science, Chemistry and 'Industrial Enlightenment': On some recent historiography**

This paper offers some critical perspectives on two recent books which focus upon the relations of science, technology and industry in the period covered by the 'Situating Chemistry' project. Joel Mokyr's *The Economy Enlightened: an Economic History of Britain 1700-1850* (Yale University Press, 2009) comes garlanded with praise from Nobel laureates, economic historians, and some historians of science. Also lauded is Peg Jacob's even more recent *The First Knowledge Economy: Human Capital and the European Economy* (CUP, 2014). These books both address the same problems, namely the explanation of the Industrial Revolution, and why Britain was the home of its initial occurrence; and they produce comparable, but by no means identical answers, focused upon the scientific and technological cultures of the period 1750-1850.

As works devoted to a perennial issue central to economic history, both are aware that their 'cultural turn' is relatively unusual, seeking explanations outside of 'endogenous factors' (i.e. strictly economic elements such as wages, prices, investment and trading patterns, labour practices and organization, etc.), the epistemic comfort zone of many (but not all) economic historians. To that extent, these are risk-taking books, in principle to be welcomed, and because the cultures they focus upon are scientific and technical, to be welcomed also in practice by historians of science, or so one might expect.

This paper will firstly characterize and differentiate the works in question, then proceed to a rehearsal of reasons for taking a rather more sceptical attitude to them than has so far been evinced, either by economic historians or historians of science. As well as including localized issues of fact and interpretation, and of the exceptionally limited cognizance of chemical science and technology the works exhibit, the critique will address, 1) the degrees of evidential selectivity apparent in each, 2) their reliance upon questionable analytical premises or unstated assumptions to do with the nature of knowledge and practice and their relations, and 3) upon unsustainable notions of what the authors take cultures of science, technology and innovation to be in this period.

Were time to permit, I would offer a countervailing view of science, technology and innovation in this period, which sees it as dialectically stressed, between cultures of openness and secrecy, publicity and espionage, 'philosophy' and business, state and market; and would further emphasize the

analytical value of the accompanying intellectual dialectics between virtue and commerce, *virtu* and luxury, freedom and knowledge, custom and innovation. Such notions will at any rate inform my sceptical approach to these works.

**Rachel Dunn**

Durham University

### **The Chemical Industry on Tyneside 1790-1840**

In this paper I will briefly address the overall picture of chemistry on the River Tyne between 1790-1840. This period saw great change within the northeast chemical industry and I will address some of the most important developments and key sites. The focus will be on the alkali industry and William Losh and Partners, who first introduced the LeBlanc process to England in the early nineteenth century. A discussion of Losh (1770-1861) will bring forth an interesting and influential figure in the local scientific community. In addition to his work on alkali production, he was involved in an iron works, was a friend of George Stephenson and a founding member of the Newcastle Literary and Philosophical Society.

The paper links the topics 'Industry and Innovation' and 'Chemistry and Governance'. Within my discussion I will link the innovation which saw Losh bring the new process to the United Kingdom to the regulations and tariffs on salt production that affected the economics of the process and limited its scale. In addition, the environmental impact of the LeBlanc process will be addressed, with a nod to the influence of new regulations and Acts of Parliament that saw changes throughout the industry.

**Matthew Eddy**

Durham University

### **Moths to the flame: Chemistry and governance in early 19<sup>th</sup>-century Britain**

In 1809 several London industrialists and politicians proposed a bill in the British Parliament to establish a Gas and Light Company that could supply London with the new technology of gas streetlights. Its proposers argued that the wording of the bill created clear boundaries for the industry, thereby allowing the government to regulate it and oversee its activities. After being examined by a select committee and being debated through three readings in the House of Commons, the bill failed. This paper examines the role played by chemical experts in this political process. It is part of a larger project I am formulating about the role played by chemistry in politics and governance. Part of the project seeks to analyze how scientific evidence became evidence in parliamentary select committees, that is to say, within groups charged with providing reliable facts to the government.

The bill was a direct governmental response to the new technology of gas streetlights that had been developed primarily in the factories of the North, outside the London Establishment. The gas in question was an unexpected byproduct of the process used to make coke from coal. The bill was arguably an attempt by London-based interests to create a government sanctioned monopoly for a nascent industry based on a recycled chemical material. The meetings of the select committee, therefore, necessitated the testimony of twenty witnesses that were experts on chemical experimentation and/or management. Concentrating on the Gas and Light Company Select Committee, in this paper I want to examine the evidentiary preconditions that framed the interactions between chemistry and governance by asking: Who counted as chemical experts? Why were they selected? What kinds of testimony did they provide? Who benefitted from the

testimony? In answering these questions I hope to shed light on the political consequences of recycling, the relationship between chemistry and industrial governance, and the role of scientific expertise in the evolution of early 19th century states.

### **Frank James**

Royal Institution, London

#### **How the miners' safety lamp became a triumph of Baconian science**

The wire gauze miners' safety lamp produced by Humphry Davy in the basement laboratory of the Royal Institution towards the end of December 1815 was quickly interpreted as a triumph illustrating the crucial role that science played in industrialisation. The Royal Institution's laboratory assistant, Michael Faraday, referred to it in 1817 as 'An instance for Bacons spirit to behold ... Every philosopher must view it as a mark of subjection set by Science in the strongest holds of nature' and the President of the Royal Society, Joseph Banks, took a similar line. The lamp, indeed, did have a profound significance in continuing Britain's industrialisation into the nineteenth century, as evinced by a statistical analysis of the number of miners killed per million tons of coal produced in the coalfield of North East England. But the triumphalist interpretation of the lamp was forged in the bitter priority dispute fought by Davy during 1816 and 1817 following George Stephenson's invention of another type of safety lamp, also at the end of 1815.

This talk will thus do two things. First, it will provide an account of how the Davy lamp was developed which will ignore the rhetoric deployed in the subsequent controversy, and will argue that there was very little scientific knowledge in his invention (first theme of industry and innovation section). Second, I will discuss how that rhetoric was forged, both specifically about the lamp, but more generally how it contributed to the still widely held notion, ultimately stemming from Bacon, that scientific knowledge and practice is the motor for industrialisation (third theme). The mismatch between practice and rhetoric, as exemplified by the safety lamp, critiques the frequent assertions made by scientists, engineers, politicians and popular writers about science and its role in society.

### **Peter Konečný**

#### **Communicating an Industrial Innovation: Development of the European Amalgamation Process in the Habsburg Monarchy, 1785-1792**

My talk will consider two consecutive themes of the main topic. How it was that a metallurgical (and also chemical) innovation designed by Ignaz von Born spread at state-wide level (Habsburg Monarchy) aiming to supplant a reliable technology (liquation), which was used successfully for centuries. Yet, unlike previous research my analyses will not focus on the person of Ignaz von Born and his struggle, but rather on the conjuncture of specific sites of local knowledge, academic research, and pictorial practises which facilitated the way of the amalgamation process into the centre of metallurgical industries in the later 18th

century even far beyond the borders of Habsburg dominions.

Secondly, I will analyse more specifically how co-developers of this innovation used sophisticated communication on textual, pictorial and practical (artisanal) levels to promote and further improve the amalgamation process or to adapt it to local requirements. Articles and whole books were written, plans drawn and circulated, practical demonstrations or comparative trials were arranged to promote and to perfect this innovation based on new knowledge of the chemical and mineral composition of gold-silver or silver-copper ores and of their proper technological treatment. I will also try to show how existing technologies and sites were reshaped or integrated into the complex structure of the amalgamation process.

The analyses of both localisation and communication of the European amalgamation process in the Habsburg monarchy aims to show the complex links between fiscal interests and scientific/technological practices in Central European mining industries in a time of radical changes.

### **Thomas Le Roux**

Centre de Recherches Historiques (EHESS/CNRS), Paris

#### **Chemistry, Industry and Governance, Paris and France, 1760-1840.**

This paper will explore the role of chemistry in the governance of industry in Paris and other places in France from 1760 to 1840. In the middle of the eighteenth century, the place and the status of industry in French society were all but granted. Innovation and risk were two major concerns: town dwellers as well as administrators were reluctant to foster its development. But, from 1760s onwards, a change occurred. This shift was linked to the improvement of chemistry both in laboratories and factories. Chemistry became a synonym for progress and future and fitted with the development of political economy and liberalism. Moreover, it became a way for contributing to the improvement of public health. The first step of this change took place in Paris and Rouen with the new regulation of acid workshops and factories during the 1770s. The leading role of Lavoisier's new chemistry helped to reconfigure regulation in favour of industrial production. Then, the French Revolution brought prominent chemists (Guyton de Morveau, Fourcroy, Chaptal) at the head of government. With other administrators close to their interests, they participated to the abolition of previous rules and prepared the 1810 decree on harmful industries which gave a major place to chemical plants in the development of economy and justified their presence in cities. The Paris Health Council, created by the minister of Interior Chaptal in 1802, was the leading body who implemented the new regulation, not only in Paris, but in whole France. Most of the members of this Council were chemists (Deyeux, Cadet de Gassicourt, Darcet, etc.) and very close to industrial interests. In contrary to town dwellers, they asserted that production of chemical products were good for society, in spite of its pollution and risk, and that permitted chemical industry to be settled in towns. Chaptal, who created the *Société d'Encouragement pour l'Industrie Nationale* in 1801 and stayed its irremovable president until its death in 1832, embodied this new alliance between chemistry, industry and governance.

## **John Perkins**

Oxford Brookes University

### **The political economy of chemistry: chemistry, innovation and industrialization in Rouen, 1770-1815**

Over the period 1770-1810 rapid economic and demographic growth, together with the city's topography and climate, combined to make Rouen a site of serious chemical pollution as the heavy chemical industry (the lead chamber process for the manufacture of sulphuric acid and then the Leblanc process for artificial soda) expanded, contracted, collapsed, expanded and collapsed again in the context of wider economic and political developments. Pollution, and the disputes it engendered, was at its height in the period 1805-1810. The various political authorities called on chemists for advice on the siting of chemical plants and especially in adjudicating between manufacturers and local inhabitants over claims of damage due to pollution. The chemists themselves, their own industrial activities and connections, the status of their expert knowledge and the language through which it was expressed quickly became caught up in the disputes. Through these disputes we can explore how chemists presented themselves, their expertise, and hence chemistry, in relation to the competing interests involved. We can see how chemists and their science came to be aligned with competing ideas of public good versus private good, of self-interest and the national interest, of the role of government and of the nature of an urban community. And how chemistry, for which its practitioners claimed the status of universal and impartial knowledge, came to be aligned with particular and partial economic and social interests.

*This will form the main part of the paper. The remainder of the paper will be concerned with the wider contexts, cultural, economic and social and political, in which these experts operated and which informed the positions they adopted in considering claims of pollution. These will only be touched on in the presentation at the workshop but will be fully developed in the written version.*

Alongside their participation in these pollution disputes chemists in Rouen, together with their contemporaries in other French towns and cities, had been developing a conception of the economic and social significance of chemistry that resonated with and underpinned the positions they adopted as experts in pollution. In their public pronouncements (lectures, speeches, academic memoirs, textbooks, articles and journalism) the mainly physicians and apothecaries who opened chemistry courses in the major towns and cities of provincial France between 1770 and 1790, presented a new and powerful image of chemistry. Going well beyond the idea of chemistry as the mother of all the arts, which can be found in chemical and alchemical writings of the 17<sup>th</sup> century and earlier, they constructed chemistry as a form of political economy. Central to this was an understanding of the role of chemistry in innovation. However this body of ideas has been almost entirely ignored by historians exploring the role of science in 18<sup>th</sup> century industrialisation. Almost without exception they have focused on the mechanical sciences, even when drawing on the writings of Jean Antoine Chaptal, a leading chemist and industrialist and a popular and influential exponent of chemistry's fundamental role in innovation and in the creation of wealth and social progress.

*The second part of the paper will discuss the development of this conception of chemistry as political economy.*

In Rouen as elsewhere in provincial France chemistry courses were at the heart of the construction of chemistry as a public science and then in securing and propagating the conceptual transformations associated with Lavoisier. At the same time many of the lecturers on these courses used their chemical knowledge to exploit economic opportunities, as experts, as advisers/consultants, business partners or manufacturers: Chaptal again is the best-known example.

In Rouen the rapid growth from mid-century of the cotton textile industry and then from the early 1770s of the heavy chemicals industry provided expanding economic opportunities for chemists. And the image of chemistry as a form of political economy had particular resonance in such a major industrialising centre.

The third part of this paper will consider the industrial activities of four Rouen chemists, in particular their role in innovation, and the sites and networks through which they operated:

Pierre François Mesaize (1748-1811)	apothecary, chemist, lecturer, expert
François Antoine Descroizilles (1751-1825)	apothecary, chemist, lecturer, consultant, industrialist
Bernard Nicolas Pluvinet (1761-1822)	physician, chemist, lecturer, industrialist
Jean Baptiste Vitalis (1759-1832)	priest, lecturer, chemist, industrial consultant

The final part of the paper will explore the social and political allegiances, both local and national, that these and other Rouen chemists exploited as they constructed their careers and public lives. These allegiances, in turn, informed the positions they adopted as experts in the pollution cases.

### **Lissa Roberts**

University of Twente

#### **Some thoughts on chemistry and governance**

A productively revealing way to transcend the twin poles of thinking about chemistry's history [*penser l'histoire de la chimie*, to play on François Furet's famous title] as bound by theoretical development, on one hand, and economic activity and growth on the other, is to highlight its historically interactive relation with governance. This presentation will broach an overview of what the historical relationship between chemistry and governance entailed, based on a historically relevant definition of the (unfortunately trendy and too-often misused) terms 'governance' and 'governmentality'. Together these terms remind us of 1] the need to look beyond the role of (state) governments in the regulation of chemical activities and institutionalization in order to appreciate the broader history of social interventions that were directed toward shaping chemical activity and understanding in relation to their socio-economic, political and (physical) environmental contexts; and 2] the value of thinking of governance in terms of practices and processes - of acts of governing, if you will - rather than simply in terms of the (institutionalized) bodies and groups that officially governed.

Hence, the history of chemistry and governance cannot be glossed as an inventory of government oversight and regulation, though this is certainly part of the story. The very instruments of chemistry, for example, can be investigated as simultaneously vehicles of natural inquiry and governance, most pronounced perhaps in cases related to issues such as the measured assessment of composition and 'purity'. Important too were the ways in which governance practices, themselves expressions of a particular socio-technical imaginery and/or regime of expectations, gestured toward the future.

### **Anna Simmons**

University College London

#### **Scaling Up, Branching Out and Moving On: Sites for Wholesale Pharmaceutical Manufacturing in London, c. 1760- c. 1840**

This paper contributes to the theme of chemistry, industry and innovation by analyzing the development of the pharmaceutical industry in London in the late-eighteenth and early-nineteenth centuries. Although various studies of individual UK firms exist, little has been written about the

development of the industry as a whole before the late-nineteenth century. Additionally, a tendency to focus on Newtonian mechanics as responsible for both innovation and industrial developments means that the early origins of the pharmaceutical industry have not been considered within a broader history of industrialization.

Within the individual histories of pharmaceutical firms, a narrative of innovation often dominates, especially with regard to how the introduction of new drugs into pharmaceutical and medical practice shaped the history of a business. However firms responded to the discovery of new drugs in different ways, not only undertaking manufacture themselves, but also by purchasing or importing the new product or forming arrangements with other manufacturers. The networks and markets that pharmaceutical manufacturers were part of and operated within thus also require analysis. By considering them within a context of the circulation and consumption of drugs a different picture of the industry's early development emerges.

British pharmaceutical manufacturers had specific strengths in terms of their access to worldwide markets, the networks they belonged to (e.g. merchants, medics, government, empire), and their capacity to process and manufacture huge quantities of drugs, which drove the early development of the industry in the UK. The scaling up of existing chemical-pharmaceutical apparatus and expansion in terms of workforce, site and product range are all significant factors in the development of bulk drug production in London from c. 1760 to c. 1840. This is a key period in the development of the pharmaceutical industry in Britain as it saw a transition from shop-based to factory-based manufacture. By studying the location, size and nature of sites for pharmaceutical manufacturing and the networks they were part of, this paper will highlight the diversity, scale and scope of pharmaceutical production at this time. This diversity was united by a loose but coherent chemical-pharmaceutical culture which benefitted from the close linkage of scientific and artisanal knowledge and practice to create businesses from which the modern pharmaceutical industry originated.

This paper is part of a wider longitudinal study on the development of sites for wholesale drug manufacture in London which seeks to develop our knowledge of the materials and markets that the London pharmaceutical trade supplied and served and the individuals and networks involved. Sources used will include the records of the Society of Apothecaries, which housed the largest pharmaceutical manufacturing laboratories in London at this time, and the firms founded by Thomas Corbyn, William Allen, Luke Howard and Thomas Morson.

**Marie Thébaud-Sorger**

### **Grasping fluids invisible to the naked eye/fighting against the fire: Entrepreneurs, inventors and amateurs at the end of 18th century (France and Britain)**

In this presentation I intend to start from the assumption that a common field of knowledge emerged in the late 18<sup>th</sup> century, not only theoretical but also practical, constituted by steam, heat and gases. I have already highlighted the fact that it fostered the creativity of a cross-cutting research within a milieu of entrepreneurs, provincial academics and craftsmen at the forefront of innovation, who created a whole set of micro-inventions proposals for urban improvements, public buildings, streets, domestic uses in answer to various expectations. The path of creativity which led from one invention to another clearly reveals its coherence when one considers the specificity of this class of 'elastic fluids': transparent, not visible at bare eye, with some specific chemical properties (and precisely, ones not fully defined). A large set of technological devices was therefore produced, endeavouring to adapt the materials able to capture those fluids (e.g. metal pipes and



springs, varnished fabrics, leather valves..) in order to resist alternative cooling, pressure, volatility, elasticity, and avoid fires.

It also reveals the various places of knowledge which could have been part of the change in the understanding of natural elements and the atmosphere. I will start with one or two case studies—the fire extinguisher, a new kind of ‘economic stove’. Using these, I wish to explore the way proposals and inventions shaped, beyond a narrow scientific and academic group, a large community of ‘Improvers’, who undertook Trials and Experiments for all kinds of audiences (consumers, supporters, funders, administrators), and do this in relation to the rise of Societies of Arts in France and Britain for instance. Whereas they aroused the public’s interest by making visible the atmospheric fluids as an expression of a powerful agent acting upon matter, they also contributed to disseminating cutting-edge knowledge within a new visual and sensory culture.

### **Joppe van Driel**

University of Twente

#### **The Salt Police**

Eighteenth-century industry, trade and empire hinged on the production and regulation of common salt. Besides being an important raw material for many crafts, common salt was foremost the main antiseptic. Without it no agricultural surplus for trade, nor any provision for sailing crew could be provided for. Because not all salts harvested across the globe were equally suited for conservation, controlling the production of a powerful antiseptic would yield significant advantages in a world of increasing commercial rivalry. Common salt was therefore a political matter, on the one hand acting as a trump card in international competition, on the other hand itself subjected to detailed administrative regulations. Departing from the eighteenth-century history of antiseptics and their regulation, this paper aims to trace the interrelation between chemistry, industry and administration from the ground up. It analyzes three interrelated sites. First, the network of Dutch salt refineries, where material and knowledge production of antiseptics took place. Second, the ‘oeconomic’ factory of Watse Gerritsma in Friesland, which used the waste of salt refineries to produce an assortment of chemical salts for the conservation of various commodities. Third, the on-site classes of Driessen, where a ‘salt police’ was manufactured to regulate antiseptics on a national scale. The paper examines thereby how the chemistry of salts evolved in concert with ‘oeconomy’, encompassing the management of both product lifetime and waste exploitation. It further asks how the eighteenth-century bifurcation between pure and applied chemistry helped to replace the broad ‘oeconomy’ with separate economics, resource management and public health, finally depoliticizing salt in the first half of the nineteenth century.

Therewith, the paper will bring together questions of chemistry and governance - how did sites and networks of governance interact with combined material and knowledge production in chemistry? - with questions of chemistry and the circulation of materials - what regimes of recycling were integral to industrial developments and how to understand material agency in this context?

### **Simon Werrett & Leonie Hannan**

University College London

#### **Chemistry and the Circulation of Materials, 1760-1840: A Position Paper**

This position paper will use cases developed by members of the research cluster on ‘Material Histories of Chemistry’ which first met in December 2013 to explore general issues relating to the study of the circulation and recirculation of materials in chemistry between

1760 and 1840. The paper will examine three questions. First, we ask why it matters to do 'material history', proposing that such a study can reveal much about chemistry that histories based on texts and ideas alone cannot access. Second we ask what would be the salient features of a history of materials and their properties in chemistry during this period? Finally, how can we use materials as resources for doing history? We propose a range of practical engagements which can generate new questions about the history of materials and the social practices and tacit knowledge they entail. The discussion will use examples from papers by Werrett, Hannan, Weber, Van Driel, Simmons and others considering the circulation of materials in the era of revolutions. Between the 1760s and 1840s, scientists, manufacturers and farmers went to great efforts to make more efficient and sustainable use of materials for scientific research and industrial and agricultural production. They sought to manage, control, and reconstruct economic regimes that were harmonized with the natural environment, based on material circulation rather than accumulation, and mutual cooperation rather than competition. The papers we will be discussing explore these practices across sites including the home, workshops, laboratories, manufactories, and farms in Britain, Prussia and the Netherlands.

**Andreas Weber**

University of Twente

**Making Money Circulate: Chemistry and 'Governance' in the Career of Coins in the Early Nineteenth Century Dutch Empire.**

The governance of the early nineteenth century Dutch empire in Southeast Asia heavily relied on the circulation of coins. However, making circulation work was never an easy endeavour. By zooming in the richly documented activities of J. Goldberg (1763-1828), C.G.C. Reinwardt (1773-1854), and W.A.A. Poelman (1758-1835), this paper examines how government functionaries, chemists and assayers struggled to ascribe value and authority over coins in an imperial environment. In particular the in-depth analysis of a minting site in Surabaya in the eastern part of the island Java, offers a fascinating view on the historical complexity of material management in which practical chemical expertise played pivotal role. Taken together the paper argues that historical inquiries into the materiality of coins provide an ideal vista to shed fresh light on the co-evolutionary relationship between chemistry and governance in the early nineteenth century world.