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Editorial

Europe, and Britain's place in relation to it, are hot topics of conversation lately, so this issue of *Viewpoint* explores European history of science. We begin with John Krige, returning to consider how European scientists work today at CERN, and how that compared with their predecessors (1-2). Dimitri Bayuk also compares past and present in his discussion of Russian academies of science (5-6), and Ida Stamhuis provides a different sort of comparison in her article on European history of science societies and journals (7).

Three articles in this issue reflect on methods: H. Floris Cohen discusses what can be lost in translation (3-4), Pamela H. Smith urges us to engage in some active history (8-9), and Stéphane Van Damme considers what new directions European history of science should take (10-11). We also feature an article by Louis Dwyer-Hemmings on how his BSHS Undergraduate Dissertation Archive Grant enabled him to delve into the history of the tonsillectomy (12). Our interview is with BSHS News Editor Jessica Van Horssen.

Contributions to the next issue should be sent to viewpoint@bshs.org.uk by 15th August.

Alice White, Editor



The Inauguration of the Proton Synchrotron, with various European nations' flags arrayed above the podium. Image courtesy of CERN © 1960-2016

A brief history of politics and physics at CERN

John Krige reflects on the justifications for science made by the European Organization for Nuclear Research

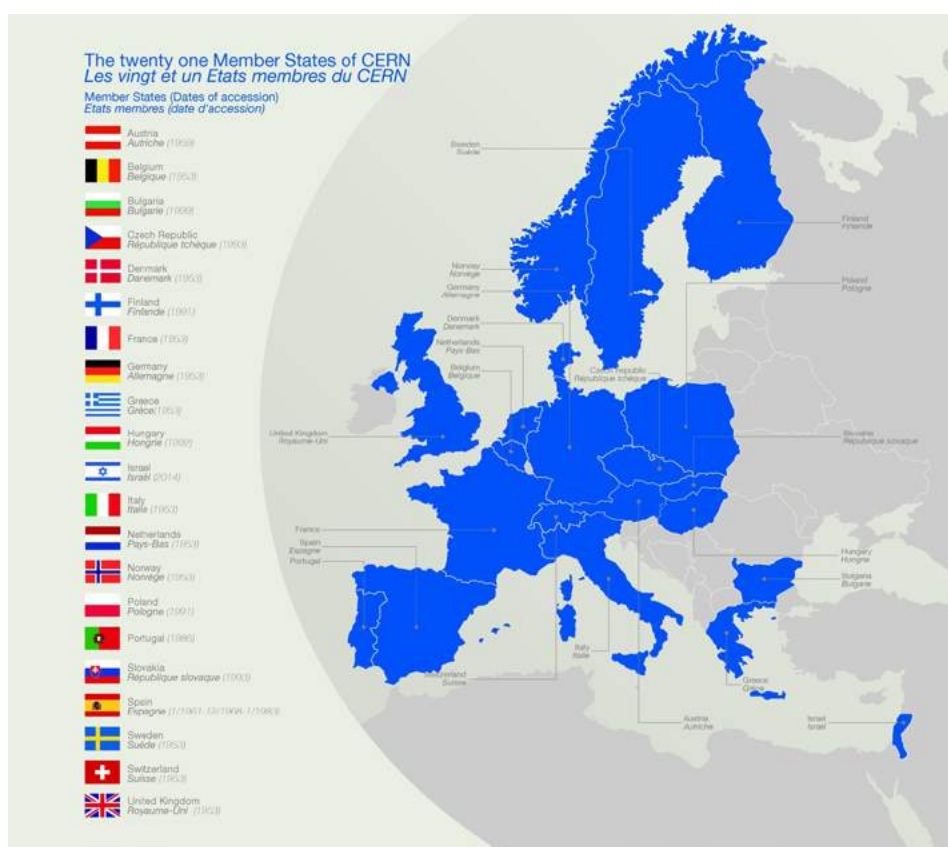
There they were, one female and four male physicists, two of them FRSS, celebrating the discovery of the Higgs boson at CERN in an auditorium at the Royal Society packed with the 'general public'. Dress codes displayed a range of personae from formal to eccentric, from elegant to dishevelled, the physicist as 'everyman', the physicist as bearded bespectacled genius. The science was arcane, the technological infrastructure had pushed the limits of the possible, the discovery was of fundamental importance, was one that talks to us 'about where we all come from' (www.youtube.com/watch?v=UxRYaYP08GM)

High-energy physics is among the most demanding of scientific disciplines, its findings unintelligible but to a gifted few, its costs astronomical (CERN's annual budget in 2015 was about £790 million shared among its member states roughly proportional to GDP: Britain's contribution was some £113 million). Its practitioners have not only succeeded brilliantly in probing ever more deeply into the structure of matter; they are outstanding lobbyists who have managed to lock governments into paying for a research agenda that has little social justification other than that it satisfies the human spirit's yearning to know

the sublime. The awe-inspiring techno-scientific challenges that physicists take on, and their success in making progress — defined as building ever more powerful accelerators and detectors whose findings render the 1960s standard model of the nucleus ever more robust — allows them to evade social accountability.

Physicists are gifted epistemologists: their announcements of a new 'discovery' navigate between the need to get credit — perhaps even a Nobel prize — and the uncertainty that surrounds the 'signature' of the particle for which they have a smattering of 'candidate events'. This sense of the precarious, of the fragility of empirical evidence, abandons them when they are called upon to justify what they do. As historians, we can only deplore our failure to have made the slightest contribution to critical thinking among this scientific community. The best that the brightest can do is to fall back upon arguments that have been repeated over and again for years to justify to the public why so much money should be spent so that so few (there are some 24,000 high energy physicists in the world today) can indulge their passions. We are told that particle beams can be used to cure cancer (as E.O. Lawrence's brother did at Berkeley in the 1930s). That the World Wide Web, invented by Tim Berners-Lee at CERN in 1989 as an information management system, had become an essential global communications technology. They ask who appreciated the social implications of the electron when it was discovered? Or of anti-matter for that matter? The security provided by the standard model justifies the quest for the Higgs whose existence it predicted. By contrast, one random 'candidate event' — the development of the internet — is appealed to in order to justify spending close to a billion euros a year on what is mostly Kuhnian normal science, albeit punctuated by outbursts of creative energy. It's not the mundane science, but the rare breakthroughs that are promoted before the public by scientists who like to dress down to display their creative individuality: it helpfully conceals the upmarket lifestyle some of them have thanks to being among the highest paid members of the research community in the world.

For the founding fathers of CERN, the stakes were quite different. They fought against a generation of men like Bohr, Chadwick, and Kramers who deplored the change in scale from a physics that was affordable, artisanal, individual, to a physics whose budget swamped national allocations for research, replaced a university machine shop with an engineering firm, and had committees allocating time on 'the machine'. Their first director general was chosen to imbue the laboratory with a 'scientific spirit'; he left after a year and was replaced by an engineer. They saw a continent that had once led the world in phys-



The 21 member states of CERN. Image courtesy of CERN © 2014-2016.

ics falling woefully behind the United States, where the field was being transformed by the construction of giant accelerators first at Berkeley then at Brookhaven. They exploited the postwar opportunities provided by a new patron — the state — that came to identify national achievement with scientific and technological pre-eminence in nuclear physics, and was willing to pay for it. They were part of a broader political movement towards European integration that encouraged governments to pool resources (of money, of trained manpower, of industrial capacity) so as collectively to confront an emerging hegemonic superpower. And they could count on the technological support of the United States. Washington was willing to relax the draconian constraints placed on the circulation of nuclear knowledge immediately after the war, both because the 'secret was out' — the Soviets exploded their first atomic bomb in 1949 — and because the US Department of State was now determined to promote European integration, beginning with a Franco-German 'alliance', to meet the communist threat. CERN was unambiguously injected into the geopolitical logic of the early cold war, bestowing legitimacy on the new West German state established in 1949, including Yugoslavia among its first member states so as to encourage Tito's rift with Stalin, and shielding behind the 'neutrality' that came with being located in Switzerland. Superpower rivalry sustained the

funding of American high-energy physics and, by the ricochet of CERN, throughout the cold war. The cancellation of the Superconducting Super Collider let Europe draw ahead after having overtaken its early benefactor, now its major rival: 'Europe 3, the US not even Z-zero' as the New York Times lamented in June 1983 when the W and then the Z bosons were discovered in Geneva.

CERN remains a major instrument of European integration and enlargement. Its member states have grown from the original twelve to 21, and include many countries from the former Soviet bloc. The British government's attitude to CERN mirrors its attitude to Europe: it joined reluctantly, it complained constantly about its budgets (even as British scientists and engineers made major contributions to its performance) and Margaret Thatcher even threatened to leave it. Will a debate on Cexit follow that on Brexit? One history of CERN has been written: it is time for another that injects uncertainty into a narrative of seemingly unbroken, unstoppable success.

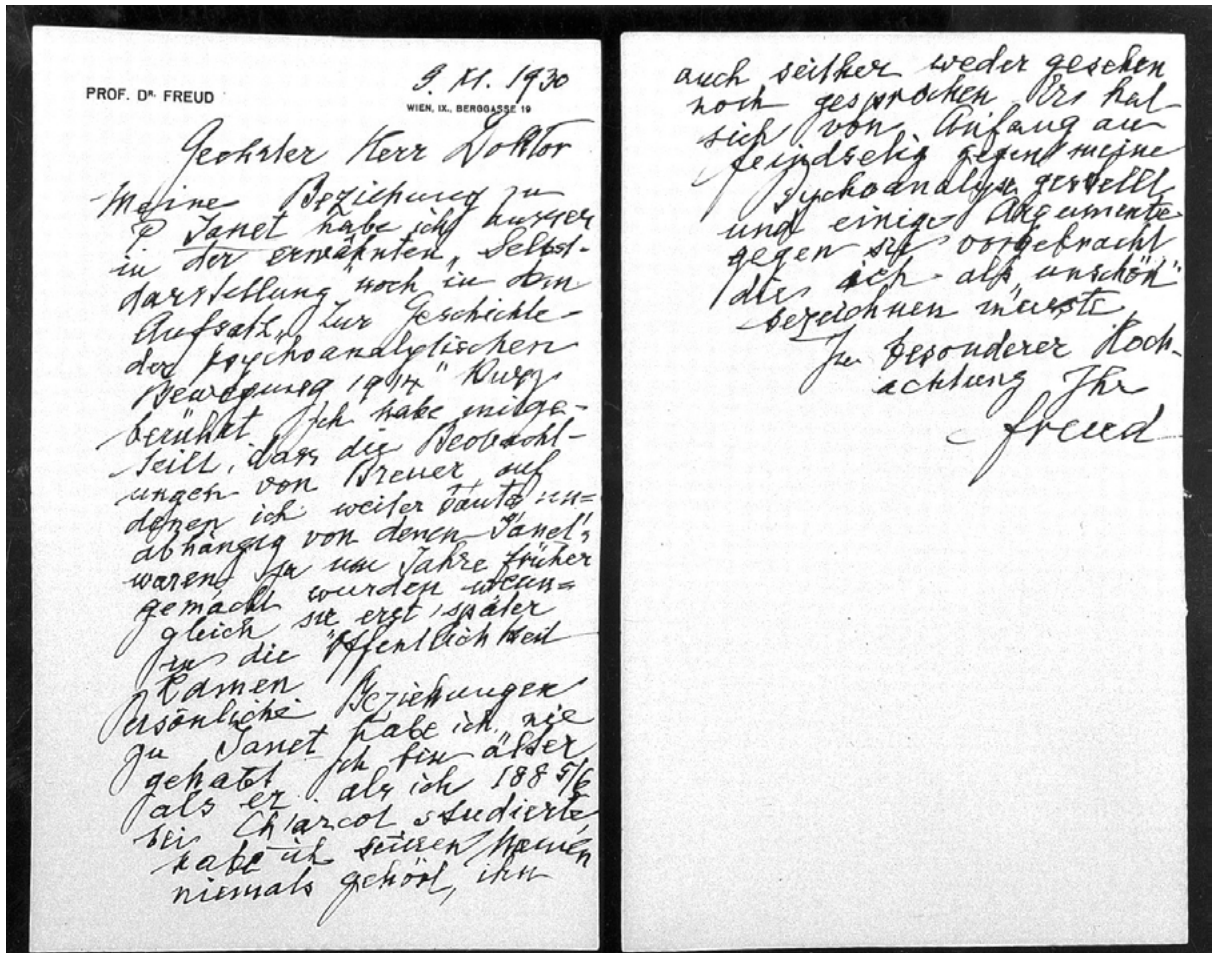
English and its Sister Languages

H. Floris Cohen discusses the trouble with translations and offers tips for translators.

I had just taken over the editorship of *Isis* when we received a manuscript that dealt with the founders of the psycho-analytic movement. These were Austrian and Swiss, so I raised an eyebrow when on perusing the piece I saw *The Interpretation of Dreams* being referred to as 'Das Traumdeutung'. Since even beginners are well aware that German words ending on 'ung' are feminine, not neutral, I began to wonder about the state of the author's knowledge of the language of his or her own protagonists.

A look at the endnotes quickly revealed that the principal source materials used for the piece were books written by, and letters exchanged between, these early psycho-analysts, yet not in the original German but in English translation. Apparently the author took it for granted that translation is a neutral affair, and a translator a machine in which you drop a text in the source language, and then (after some grinding) out pops the same text but now converted word for word into the target language. Everyone who has just bought some unfamiliar piece of equipment knows that to trust its manual, if translated by Google or some half-witted amateur translator, may cause veritable explosions. So much more likely is this with texts in the humanities, with their built-in subtleties and ambiguities, and even more so with so ideologically charged texts as those in early psycho-analysis. To be on the doubly safe side (where a beginning editor likes to be), I did consult a German expert before, on receipt of her briefly damning report, rejecting the manuscript without further ado.

To be sure, this was an extreme case of a



An untranslated letter from Freud written in 1930. Image courtesy of the Wellcome Library, London.

concern that I had come to feel much earlier. While preparing my two hefty volumes on the Scientific Revolution, the historiographic one and *How Modern Science Came Into the World. Four Civilizations, One 17th Century Breakthrough*, I was in the habit of noting down in the original language passages that seemed to me worth being quoted. Of course, in the final round I had either to translate them into English or to look up available translations. To look them up was not an altogether happy experience. As a Dutchman, I was raised on E.J. Dijksterhuis' 1950 masterpiece *De mechanisering van het wereldbeeld*; the original was written in Dijksterhuis' beautifully sculpted prose style, which won him the highest literary prize in the Netherlands. A range of passages in the authorized translation (*The Mechanization of the World Picture*) were however rather jarring. Not only had the style become flat and uneventful, but the contents had undergone

some serious alteration as well. Perhaps the worst mistranslation occurred at a strategic point in the book's argument, the caption for its final Part IV, where the Dutch equivalent of 'the birth of classical science' was now being rendered as 'the evolution of classical science'. This turned what in Dijksterhuis' quite explicit view was a fairly sudden event into one both long drawn-out and growing step by step out of some pre-conceived kernel.

Likewise, I found that the wonderfully pithy French of Alexandre Koyré's foundational *Etudes Galiléennes* had fared no better in English translation. I found that Stillman Drake, who unlike most other translators was a historian of science, and whose command of Italian was superb, had nonetheless in his translation, not of the *Discorsi* but certainly of the *Dialogo*, refashioned Galileo into a Mach-like scientist of the kind that exemplified Drake's own ideal of how science

should be pursued. Also, he did not hesitate to phrase two key passages near the end of the *Dialogo* in a way that softened what the Vatican quickly came to regard as key to Galileo's transgression, notably his mockery of the pope himself. A more recent crime is how Descartes' treatise 'Météores' came out in the English translation of a Dutch book on Huygens, published by a very reputable university press. The person to whom the translation was entrusted, decided that the title of that treatise on rainbows, comets, meteors, and other really or allegedly atmospheric phenomena should be rendered as 'assertions about the weather'.

To be sure, I also encountered absolutely brilliant, apparently flawless translations. Most often the men to translate these texts were

latter not being my native tongue, I made sure to have the outcomes checked by English-speaking historians of science (as also with the present piece, which I wrote in English but which Alice White kindly corrected for me). A possibly interesting case presented itself last year, when a professional translator worked on the shortened Dutch pop version of my *How Modern Science Came Into the World*. Given the fairly restricted amount of comments that I usually receive from copy editors called upon to improve my academic English, I was bold enough to give it a try and to begin translating my own book myself. True, it had been a great pleasure to write it in my native language for a change. It was meant to be appealing to a wide audience (indeed, at the time it sold 12,000 copies). I

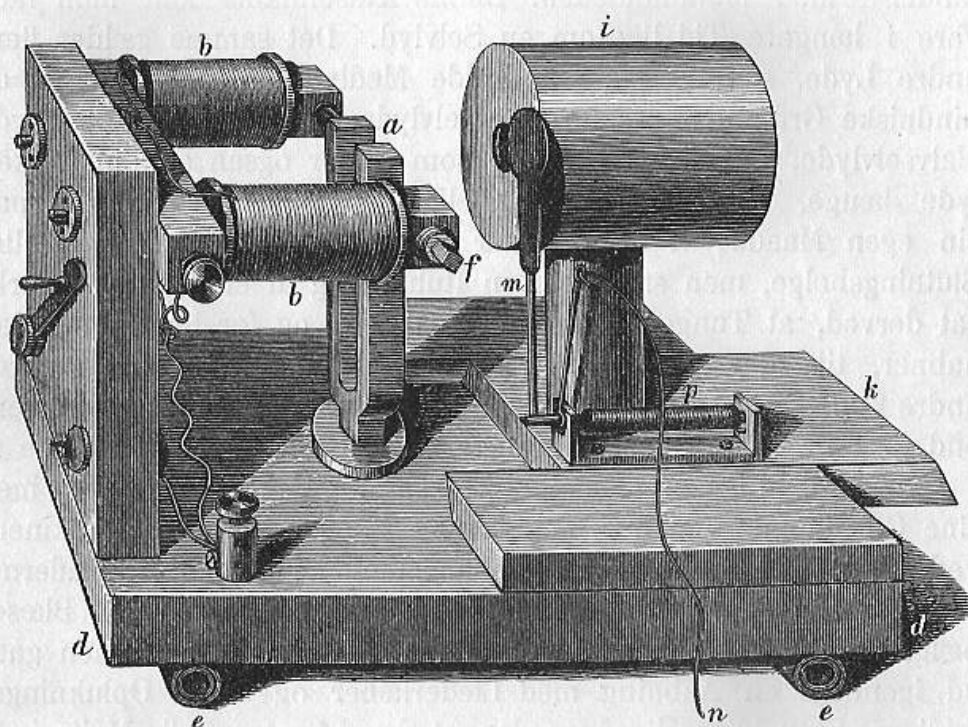
out that, like almost every translator, he is a humanities person with but little mastery of the science side of things. Many track changes later, we decided to call our intensive, emailed collaboration a 'co-production', and that is what it is called on the copyright page of the book that came out in November last year with Cambridge UP under the title *The Rise of Modern Science Explained. A Comparative History*.

The moral of the story is, I suppose, pretty obvious: Never Ever Trust A Translation! Or rather, make sure to check what the translator has made of the original, if you can. Surely there are limits here. I don't read any Arabic, so when in a late 19th century translation of a passage by al-Biruni I encountered a term that struck me as probably much too modernist,

I sent a message to Jan Hogendijk, who helpfully provided me with a more historically responsible term. And of course there are purists ready to tell you that, if you want to write about the history of science in ancient China you first have to spend a decade learning the language, and then try again. Precisely that turf-protecting attitude is why, over half a century after Joseph Needham set out on his admirable 'Science and Civilisation in China' project, there still exists in English no reliable, let us say 300 pages long, by and large chronologically ordered survey of the history of Chinese science.

So a second moral is that in a matter as delicate as the several thousand languages in use among us humans, including the resulting problem of how to communicate between these, viable compromises have at times to be struck. However, the compromise should never be a naive belief that if you want to write about Freud, Jung *e tutti quanti* you can safely consult their works and their exchanges in your own mono-language, even if that language has finally come to replace Latin as the one standard language of scholarly

communication. We non-native speakers of English stand ready to adopt, as indeed we must, the language into which many of you, dear readers, have been born, and make the best of it. But we are not prepared to watch our own native languages, sources likewise of many an interesting scholarly idea, being ignored under the mistaken assumption that a translated text is by definition equivalent to the original.



The Helmholtz Resonator, from Tonempfindungen, which was translated into English by Alexander J. Ellis and titled On the Sensations of Tone. Image in the public domain.

late 19th century British gentlemen of the Victorian variety. When at work on my book *Quantifying Music* I had enjoyed Helmholtz's seminal *Tonempfindungen* in the original, and its English translation *On the Sensations of Tone* proved to my delight to be both fluent and utterly faithful. The contemporaneous translator, Albert Ellis, knew the field of musical science and acoustics inside out; apparently he felt fully at ease with German, and he confined his own well-informed views on the subject to some well-marked footnotes and additions.

Over time I have done some translating myself, always from Dutch into English. The

had done my utmost to write it in as playful a style as I could muster without lapsing into undue simplification, and it was a wonderful experience to find, when on the lookout for a fitting expression, some seven alternatives presenting themselves at once to me in my native language, rather than the one or two I have as a rule to make do with in English. Even so I thought that I could do the translation myself. Well, I couldn't. On inspecting the first few paragraphs, two experts persuaded me that just about every sentence would have to be rewritten. So I gave up and found an Englishman with a good deal of experience in translating Dutch texts. It soon turned

Scientific Academies in Russia: Transcontinental Imperial Projects

Dimitri Bayuk explores the European and global relations of Russian Scientific Academies.

In 1949 Sergei Vavilov, the President of the Academy of Sciences of the USSR between 1945 and 1951, privately expressed his doubts about the Jubilee to be celebrated that year. It was the 225th anniversary of the Academy, and Sergei Vavilov believed that it was contradictory or even absurd that the Academy of the USSR had existed for longer than the USSR itself. It was common practice in Soviet times to view all historical events before October 1917 as preparatory and intermediate phases, to the extent that even school textbooks on USSR history began with Neanderthals and Cro-Magnons. However, as far as the Academy is concerned, there were several different organizations of this kind in the Russian Empire, the USSR and Russian Federation, and often they were only barely connected to each other. Thus, the Russian Academy of Sciences after 2014 is completely different organization to the earlier organisation bearing the same name and even the same President.

In 1991, the Russian Academy coexisted with the Academy of Sciences of the USSR, and in 1992, they gave birth to a new creation, which was different from each of its parents. The academy of the socialist years represented a dramatic contrast with the very first scientific academy in Russia, the Imperial Academy in Saint Petersburg (SPB Academy). The Imperial Academy was created according to the will of Peter the Great, although only formally established after his death. The Imperial Academy was one element of Czar Peter's empire-building. This academy was not the first scientific institution in Russia, but those before the Imperial Academy were directed towards education or technical or military applications, whereas the SPB Academy had research as its primary goal.

The later incarnation, the academy of the first socialist republic, pursued a policy of complete isolation, to the extent that when future Nobel prize winner Sheldon Lee Glashow wanted to go to his parents' native country to work in the Institute of Physics



A map from Illustrations de Description géographique, historique, chronologique, politique et physique de l'Empire de la Chine, to which Antoine Gaubil contributed. Image courtesy of the Bibliothèque nationale de France.

in Moscow under the guidance of another future Nobel prize winner Elia Frank, the Soviet government refused to let him enter. The Imperial Academy differed considerably; it was comprised entirely of foreigners. There was only one member born in Russia, the Academy President Laurentius Blumentrost (1692–1755), but due to the rules of the day, he could not be entitled academician, being the President.

It is rather difficult to imagine what idea Peter the Great had for the Academy when he launched the project: he died months before the first academicians reached Saint Petersburg. His successor, Empress Catherine I (1684–1727), was not interested in the initiative, but the Academy came into creation anyway due to inertia. The first members of the Academy started to arrive in summer of 1725, and on 27 December (in the majority of Europe it was already 7 January 1726) the SPB Academy began its work. It is not quite clear whether they held a kind of opening ceremony or simply proceeded with the first session, but it was a rather solemn affair, held

in the presence of Her Majesty and high-rank nobility. The first lineup was more or less homogeneous: German-speaking scholars educated in more or less protestant tradition, who had graduated from Tübingen, Königsberg or Leipzig universities, and who were recommended by Christian Wolff. Against this background, the figure of Joseph Nicolas Delisle is a notable exception, as he was French, from Catholic family, and without any noticeable connections with Christian Wolff. This outsider was present because he had been invited by Peter the Great himself.

In 1717, Peter the Great had visited a session of the Paris academy of sciences and had made the acquaintance of Guillaume Delisle (1675–1726), who shortly thereafter became the court's royal geographer. Peter the Great wanted him to come to Saint Petersburg as the head of a cartographic administration that he planned to create. Such an administration was necessary, he felt, because he intended to mould the territories beyond the Ural Mountains into more clearly defined forms. This presented a challenge because the vast and

low-populated regions had harsh climates and complicated living conditions. Peter's rise to the throne took place at a time of long-lasting military conflict with the Chinese Empire of Qing. One could have called this a war, if it had not been for the paucity of the troops involved in combat actions. The conflict ended with Russia's defeat, but the Qing government was in no position to profit effectively from its victory because of the challenges presented by the region's geography: it was so poorly explored that it was not even clear what to claim during peaceful negotiations in 1689. The Russian Czar and his advisers understood that any decisive advantages in dividing this part of the world could be won by whoever understood it better.

Guillaume Delisle preferred Versailles to Kunstkammer, and by 1726, both he and Czar Peter had died. Thus, his brother, Joseph Nicolas, arrived on the banks of the Neva River to head the cartographic administration. Even before he had completed his long voyage, a letter was sent from far-off Beijing. Its author was seeking to establish contact, without knowing precisely where Delisle was at the time. The author was a Catholic priest, Antoine Gaubil (1689–1759), who wrote to his supervisor in Paris and asked him to reassure M. Delisle that he would fulfill what he had promised and what he had not been able to do yet. Gaubil and Delisle stayed in contact until Gaubil's death, and exchanged more than a hundred letters, Gaubil also communicated with many other SPB Academy members and Russian government officials. But why was Gaubil involved with Delisle and the SPB Academy?

The first French Jesuits were sent to China in 1685. Together with other European monks admitted to Qing's court they succeeded in persuading the Emperor Kangxi to launch a tantalizing process of mapping China. By 1717, the projects' results were presented to the Emperor. This was the famous Jesuit map, prepared for publication by Jean-Batiste Bourguignon d'Anville (1697–1782), which appeared as a part of Jean-Batiste Du Halde's *Description de l'Empire de la Chine* in 1735. Gaubil took part in this titanic initiative immediately after joining the French Jesuit mission in Beijing in 1723. He had access to maps of various different Chinese regions, and he produced reduced copies supplemented with his own explanations and commentary, which he sent to Paris. In 1732, when a Russian caravan passed through Beijing, he agreed to send another copy of the maps to the SPB Academy in 1735, when the next Russian caravan was



Portrait of Joseph Nicolas Delisle by Conrad Westermayr, and engraving from *Continuation de l'histoire des voyages*, vol. 72 (1768) showing Joseph-Nicolas Delisle's observatory in Beryozovo (1740). Images in public domain.



expected to arrive. However, in 1735, the caravan could not reach China. It eventually arrived in Beijing in 1736, but, as far as we know, at this time Gaubil sent nothing to the academicians of St. Petersburg.

It was only a decade later, in 1745, that the *Atlas of Russia* was published in St. Petersburg. This work, which is also known as *Delisle's Atlas*, demonstrates the cartographer's knowledge of the southern and eastern domains of the Russian Empire. Gaubil's maps would have been of great help to Delisle in producing his *Atlas*, and indeed, St. Petersburg newspaper the *Sanktpereburgskie Vedomosti* reported in 1734 that Delisle had received a Chinese map from somebody from Beijing. Though the newspaper later attempted to disavow this report, it would be more than logical to assume that Gaubil had sent some of his materials to the SPB Academy, and the academicians had attempted to conceal the delivery. He continued to be involved with Russia, though: in 1739 he was elected an SPB Academy member, and the 9th volume of the Academy's *Novi Commentarii* (1764) published some results of his Beijing observations. These observations had enabled him to calculate the geographical coordinates of several settlements in Siberia with impressive accuracy, including Yakutsk, which is now the capital of the Sakha (Yakutia) Republic.

After his auspicious start at the Academy, Delisle's service to Russian science ended with a scandal. In 1747, he decided not to prolong his contract with the Academy and left St.

Petersburg for Paris. A year later, it was discovered that throughout his affiliation with the cartographic administration he had copied all of the maps that came into his hands, and that he had taken all of these copies to Paris after his departure. In other words, he was doing in St. Petersburg precisely what Gaubil was doing in Beijing! Such manoeuvring left many outraged, but it had enabled Delisle to fulfill his obligations in the first place. Even before he had arrived in Saint Petersburg, he already had a contact in Beijing, which was suspiciously fortuitous. The simplest interpretation of the story is that Delisle's work was part of a French special operation invented by the Versailles intelligence service, made possible by a spy chain incorporated into foreign state bodies. There are some researchers who subscribe to such an account, but in fact, Versailles itself profited too little from the operations, and Russian scientific development profited too much, making this an unlikely interpretation.

Regardless of what politics facilitated Delisle's work, its outcomes for Russian science were tangible. Delisle helped to educate generations of astronomers whose systematic observations, produced in carefully organised scientific expeditions to the most remote part of the country, resulted in the heyday of astronomy in Russia and, later, in the USSR, for decades and even centuries.

European History of Science: Societies & Journals

Ida Stamhuis describes some of the differences between the BSHS and the ESHS, and their respective journals, the *BJHS* and *Centaurus*

Usually the establishment of a Society will precede the start of its flagship journal. So it went for the British Society for the History of Science, which was founded in 1947, and which was followed 15 years later by the first volume of the *British Journal for the History of Science*. The order of the founding of the European Society for the History of Science in 2004 and the start of *Centaurus* in 1950 was an entirely different story though. This must be understood against the phenomenon that Europe is not a nation state but a union of nations, and the European identity is a fragile concept compared to the identities connected to the European nation states, as we all know.

Centaurus was started in Denmark. It was created because: 'Workers in the field of science and medicine are being attracted to the study of the ways in which their early predecessors treated their problems and reached their results.' It's clear from this statement that, at first, the driving force behind European history of science was the historical interest of scientists. The first list of associate editors was long and the regional orientation was varied: in addition to many European countries, South Africa and several countries from the Americas were represented. Although several Spanish language countries were included in that list, the languages of the journal were English, French and German and not Spanish.

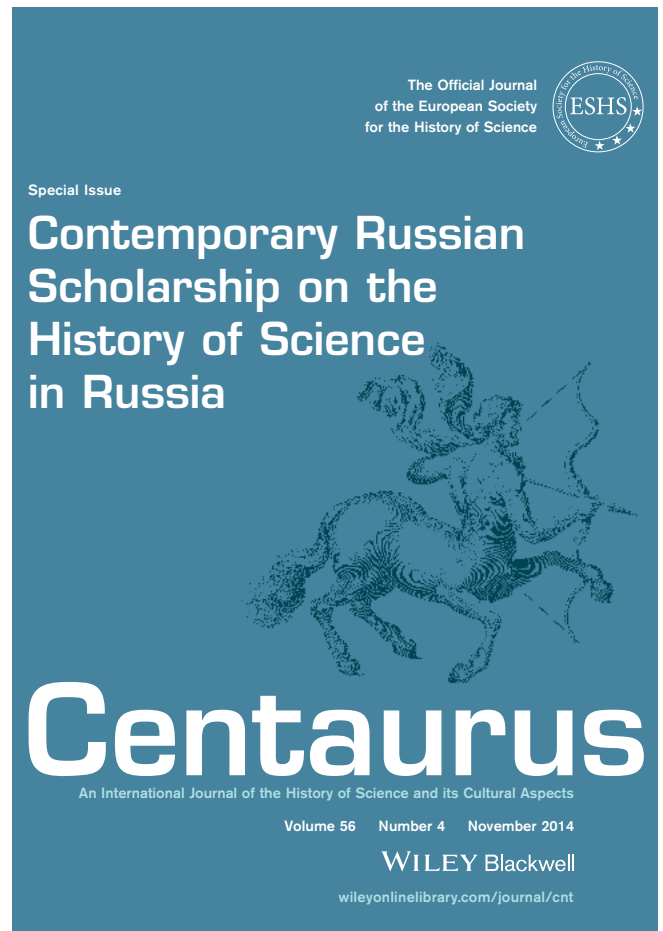
Over the years interest in the history of science increased and the discipline went through a process of institutionalization and professionalisation. More journals were established. Many countries started national journals in their own language and founded their national history of science societies. International and national journals and societies existed side-by-side.

Although it took quite some time, political, economic and social developments in Europe ultimately resulted in the establishment of the European Society for the History of Science (ESHS) in 2004. Just as one can be both British and European, one can be a member of both the BSHS and the ESHS. The ESHS provides access to a broad European community and

the last conference in Lisbon drew more than 400 delegates. For English-speaking members, the ESHS and its conferences provide a terrific opportunity to step out of their comfort zone and encounter new perspectives. This year's conference in Prague is a great opportunity to meet European colleagues whilst discussing the conference theme: "Science and power, Science as power" As with the BSHS, contributions from all fields are welcome, ranging from astral sciences, statistics, physics and other branches of "hard science", through chemical and biological disciplines to social sciences and the humanities.

Soon after the ESHS was established, the editor of *Centaurus* decided that the moment had arrived for *Centaurus* to become formally affiliated with the ESHS, and in 2007 it became the 'Official Journal of the European Society for the History of Science.' The target audience no longer consisted mainly of scientists, but, because history of science had developed into a respected discipline, of scholars in history of science. I became the new editor in 2009 although I was not located in Denmark, but in The Netherlands. The official language of the journal became English.

Centaurus also has much in common with the *BJHS*, in that all good quality history of science papers are welcome to be submitted. Like *BJHS*, the journal can be accessed electronically in many university libraries all over the world. *Centaurus* has embraced a



Above: the special issue of *Centaurus* on History of Science in Russia from 2014. Below: registration for the ESHS annual conference is still open!

European focus, which can be seen in the format of articles and reviews, such as the special issues: 'Russian Scholarship on the History of Science in Russia' from 2014; 'New Perspectives on Cold War Science in Small European States' from 2013; and the Essay Review from 2012: 'The STEP initiative: Attempting to Historicize the Notion of European Science.' A future issue on 'Artisanal Culture in the Early Modern Iberian and Atlantic World' is currently being planned.

For more information on the ESHS and *Centaurus*, visit the website of ESHS (www.eshs.org). You can also always reach me by email, or in person at the meetings of the BSHS and ESHS.



Experiments in the early modern European investigation of nature

Pamela H. Smith describes the experiments and experiences of the hands-on history taking place in the Making and Knowing Project.

The Making and Knowing Project began in 2014 with the goal of creating an open-access critical digital edition of an intriguing late 16th-century French manuscript, *Bibliothèque nationale de France, Ms. Fr. 640*. This anonymous manuscript is the written result of actual workshop practice in the 16th century, and it gives unique insight into craft and artistic techniques, daily life in the 16th century, and material and intellectual understandings of the natural world.

The Making and Knowing Project is producing the digital edition and English translation of this manuscript by a series of “expert crowd sourcing” workshops and courses that involve students, practitioners (such as sculptors and conservators), scholars of the humanities and social sciences (history, art history, anthropology, and museum scholars), natural scientists (chemists and conservation scientists), and practitioner-scholars from the emerging field of the digital humanities.

The first stage of transcription and translation of the manuscript was carried out in a series of three-week summer palaeography workshops that bring together graduate students (of, for example, French literature, history, and art history) to gain skills in middle French script by transcribing and translating the manuscript. The first palaeography workshop was held in June 2014, during which 15 students from European and North American universities transcribed and translated about a third of the manuscript (concentrating on metalworking “recipes”). The following summer (focusing on colourmaking recipes), the students were able to complete a draft of the



Above: Colourmaking in the Making and Knowing Project, 2015-16. Below: The colour of gold without gold on silver, fol. 29v. Images courtesy of the Making and Knowing Project.

entire transcription and translation. The next workshop (which will also include digital text analysis as well) is scheduled for June 2016.

With the support of a National Science Foundation grant, the second stage of the project—the Laboratory Seminar—began in September 2014. In the Laboratory Seminar (Columbia University graduate history course: Craft and Science), students (12 each semester) conduct historical and laboratory research on the recipes transcribed and translated by the palaeography workshop.

Laboratory research focuses on attempting to understand the materials, techniques, and processes recorded by the “author-practitioner” in the manuscript, as well as gaining insight into the mental and material world of a 16th-century workshop. The students engage in text- and object-based research, as well as hands-on materials research in the lab by

reconstructing recipes in the manuscript. They then bring together this research by the end of the semester in multi-media essays that form the historical and material commentary for the critical edition of the manuscript. The course is offered every semester for at least three years (2014-17).

The yearly cycle of the Project culminates in a Working Group Meeting that brings together scholars, practitioners, and the students from both semesters of the Craft and Science seminars to discuss and critique the student-authored annotations, as well as to listen to lectures and discussions by scholars and practitioners on the year’s theme. This phase of the project is designed to provide expert oversight over student work and on the critical edition.

The final phase of the project, which we began in 2015, is the design and development of the digital environment for the completed critical edition and translation. This stage includes a Digital Humanities Seminar in which humanities and computer science





students are helping to design the features of the final digital edition, which is planned to go live at the end of 2019.

We have all been delighted and often surprised by how much novel insight we have gained through reconstruction of the author-practitioner's instructions and recipes. Our research has allowed us to decipher the manuscript's often obscure recipes, materials and techniques; it has taught us about the nature of experiential knowledge, showing us that failure, repetition, and "extension" are simply normal aspects of learning through experience, a useful lesson in today's high-stakes testing educational regime.

Our experiments have also taught us much both about the unexpected lives (and instability) of materials, as well as their properties. We have come to understand better the author-practitioner's bodily intimacy with some materials he used, and how this understanding may have shaped his classification of materials into taxonomies. We have been able to begin to delimit some parts of his taxonomy of materials—his material imaginary—to see the ways in which he reasoned and experimented across types of materials in order to hypothesize about useful materials and probable results of his trials (see above left). We have gained insight into his primary areas of inter-



Above left: *Thinking across materials* : testing calcined alabaster as molding material, fol. 83r. Above right: *Altering sulphur in various ways*. Below: *Red lake making (left) and horn scrapings colored with red lake to make a "rose," fol. 10r (right)*. Images courtesy of the Making and Knowing Project.

est, which include imitation of all types, from life casting roses in metal, to sleight of hand tricks, to transforming the state or properties of one material to resemble another (see previous page, bottom), or attempting to alter a material to take on properties that are not native to it, such as transforming a brittle material (such as sulphur) into a malleable one (such as wax, see above right).

The author-practitioner worked to challenge his materials, manipulating them to take on the often contrary properties of another material in order to transform the rough into the "impalpable," the lean into the fat, the hard or brittle into the workable, the sour into the sweet, and the elements of earth and stones into the simulacra of gemstones. Over the last two years, we have thought much about why the author-practitioner might compile this record of practice, and we are always fretting as well about the potentials and pitfalls of using our reconstructions as historical evidence.

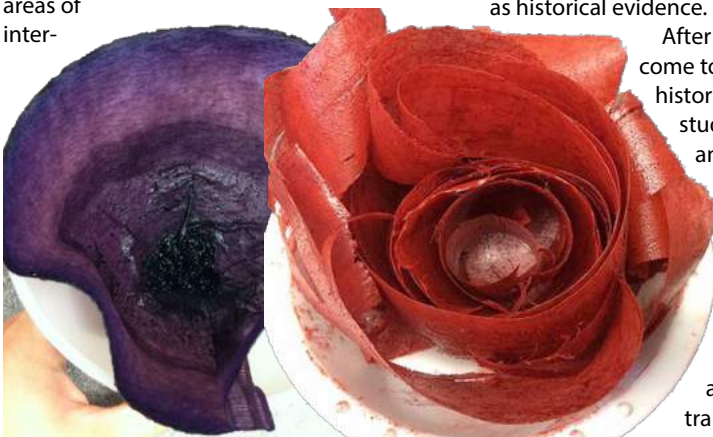
After all this work, I have come to see how odd it is that historians whose object of study is historical materials and techniques, including historians of material culture, of art, and of science, have generally not considered engagement with the materials of their historical topics as an essential part of their training and research. I

have come to think that we have missed a necessary part of our intellectual toolbox, namely, a literacy in materials and techniques. I think the only efficient—perhaps the sole—way of beginning to acquire this literacy is through hands-on work with materials and techniques. The reconstruction of historical techniques and objects provided to students by the Making and Knowing Project cannot make any of the participants truly proficient in this literacy, but it can begin to provide such a training. It can make the student aware of what she does not know, or does not yet even know how to ask. While students in the semester-long course will never reach the stage of true literacy or skilled and expert practice-knowledge, they will begin to appreciate the rigor and time needed to attain it, and will catch a glimpse of the shores that limn the vast seas of our historical ignorance.

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Some Further Reading:

- Project website: www.makingandknowing.org/
- Donna Bilak, Jenny Boulboulé, Joel Klein, and Pamela H. Smith, "The Making and Knowing Project - Reflections, Methods, and New Directions," in Pamela H. Smith, ed., *New Directions in Making and Knowing, a special Issue of West 86th: A Journal of Decorative Arts, Design History, and Material Culture*, forthcoming 2016.
- More photographs from the project: www.flickr.com/photos/128418753@N06/albums



Researching European Sciences: new stakes & new challenges

Stéphane Van Damme analyses some future avenues for the history of science, and explains how he has used new approaches in his research on metropolises.



(Above) *London seen across the Thames from Milford Stairs*, by Wenceslaus Hollar, circa 1643 - 1644. (Right) *Milkmaid*, from *The Cryes of the City of London* by Jacob Gole, 1688 - 1724. Images courtesy of the Rijksmuseum.

So far, my career has been a truly European one, and I really believe in European history of science as such in a very strong pluralist way, integrating not only British and French traditions but also German, Iberian, Italian, Dutch, Scandinavian and East European practices. With these influences in mind, there are new stakes and new challenges for European history of science. Some essential elements of the multifaceted relations between scientific knowledge and culture are at risk of being overlooked by historians of science unless we broaden our perspectives.

One way that we can achieve a broadening of scholarly perspectives is to put Europe in its place in a global framework. By this, I do not mean that we should simply 'provincialise' or regionalise Europe, but that we should restage European sciences by multiplying different perspectives. The challenge of constructing such a framework can be achieved by enlarging the geographical scope of our scholarship to not only include empires, but also through discussion with experts in South-American, Chinese, Indian or South Asian histories. It's important that we avoid replacing the grand narrative of the Scientific Revolution with a grand narrative of the process of globalization, and therefore falling into

another teleological trap. We should explore other possibilities in terms of researching and writing history of science. For instance, paying attention to the multiple ways that European sciences were challenged by other non-European traditions (and were sometimes produced by these challenges), should lead to more dense descriptions of these practices of encountering, translating, circulating without the assumptions that these processes were obvious, peaceful and always successful. The study of asymmetries, failed translations and failed encounters are as important as the study of the trajectory of a world science which succeeded to dominate the globe (and even, some argue, produced the idea of globalization).

Counter-narratives in the history of science can be particularly valuable methodological tools to help create this bigger picture. They can displace the historical chronology focussed on the "old regime of science" and contrast Early Modern Sciences with the modernist paradigm. For instance, currently, I am working on a project which addresses the geographical and anthropological dimensions of sceptical knowledge in France between 1650 and 1780. The research project is influenced by recent discussions in the history of

science about information and credibility on the one hand, and the history of anthropology and the spatial turn that examines on the other. I'm investigating how thinking in terms of space affected the questions people asked, and how practices of mobile knowledge and material culture produced a new sceptical anthropology, equivocal knowledge and alternative models of science. Naturalists, natural philosophers, and travelling scholars all warned against the dangers of missionary travel accounts, and the power of narratives that tended to enlarge the divide between the Europeans and others.

European (and global) history of science today is also challenged by the need to go beyond the micro-analytical level of focus and also to re-open a discussion about the definition of sciences in the early modern period.

Debates about scientific exceptionalism and the contribution of early modern sciences to modernity abound in textbooks, even after thirty years of new works and ideas. It's important to move forward and to think differently about this big divide between science and society. The material turn in history is now growing



(Right) View of the Seine, part of the Louvre and the Tuileries in Paris, by Reinier Nooms, circa 1656 - 1662.
 (Below) A Watchman from Paris, by Gaspard Duchange, 1708.
 Images courtesy of the Rijksmuseum.



and not limited to the study of scientific instruments. In that respect, I think still important to maintain a strong dialogue with social sciences (sociology and anthropology).

Here I can give an example from the role played by the natural philosopher in Old Regime societies, *A toutes voiles vers la vérité*. The distinction between *philosophe* and philosopher has often been linked to two different spheres of activity: on the one hand the publicist and man of letters, and on the other the scientist, scholar, and natural philosopher. The intense dialogue between the history of philosophy, history of science, and cultural history now allows historians to go further. But Enlightenment philosophy is not confined

to writings and concepts – it can be seen at once as knowledge, social practice and a cultural object far exceeding the context of teaching in schools and universities. By importing methodological discussions from social history of science (the first part), an urban history of science (the second part), the global history of science, and finally political history, we can attempt to decipher the social and cultural density of



philosophy in the Enlightenment, density that is becoming also apparent beyond the traditional spaces where its production and reception seem most legitimate.

To what extent could such an approach help us to better understand the social and political divide produced during the Old Regime of sciences? Instead of viewing the situation as a battle between the culture of innovation versus the culture of traditions, we can deepen our understanding of the complex relationships that people had to nature through scientific practices. By integrating reflections about popular ways of thinking, we can also go beyond 'naturalism', and pluralise the history of science. We can get away from an interpretation of nature as having a fixed hierarchy and discourses by considering lots of different interpretations. Instead of reinforcing the language of order used by scientists to produce a neat picture, we should describe the variety of languages and rationales used to decipher nature during the early modern period. The obsession with scientific revolution, epistemological breakthrough, and social hierarchies should be replaced by a more productive and dynamic portrait of how amateur sciences worked hard to produce these divisions.

Another challenge confronting historians of science in Europe today comes from environmental issues, which have modified our research agenda even if sometimes we don't want to see it. My current research examines the interaction between science and place, in particular, the emergence of a natural history of metropolises which emerged during the 17th century and lasted until the end of the 19th century when urban ecology started to split the field into different sectors of research (natural sciences and social and urban studies). The natural sciences played a central

role in metropolitan development. Scientific expertise was linked to a new metropolitan public sphere and was a decisive factor in the origins of metropolitan environmentalism: a political cause based on preservation efforts and the idea of urban natural communities. Articulating sciences and politics, natural history and political economy in the urban context is a way of assembling a unified project based on a physical and social history of the metropolis (urban botany, urban geology, mineralogy, etc.). In the last decade, history of science has connected with environmental history and paid more attention to environmental sciences and medicine, such as meteorology, and environmental health. The time is ripe to build on this connection and bring in discussions that have been occurring on the fringes of our discipline, in the histories of geology, biology, zoology, and pharmacy, to create a history of urban natural sciences and the physical history of metropolises such as London, New York, and Paris. Between the mid-18th and mid-19th centuries, this sort of science offered a way of writing and thinking that helped scientists and authorities to make sense of what a metropolis was, and what its limits and the boundaries were.

To conclude, European sciences are an interesting site of observation if we don't consider them as a form of exceptionalism, and instead, come back to them with a de-centred view in terms of space, social and cultural components.

BSHS Grant Report: Tonsils, tensions, and trials.

Louis Dwyer-Hemmings reveals how a BSHS grant enabled him to investigate one of the most common operations of the 20th century.

In 1927, what one Daily Express journalist referred to as a 'wicked operation' was performed on over 80,000 British schoolchildren. This operation was tonsillectomy, the surgical removal of the tonsils, which for many years was the most common reason for a child to be in hospital. Although a routine operation, tonsillectomy occupied a controversial and ambiguous position in Britain through most of the twentieth century. As I argue in my undergraduate dissertation, the changing cultural place of tonsillectomy in Britain was shaped by healthcare structures, professional concerns, patient-advocacy movements, and political controversy. Precisely because tonsillectomy was a routine operation, it is an invaluable case study through which broader trends in British healthcare provision can be explored.

From around 1900, the British state began expanding healthcare access through state-funded and provided medical schemes. In 1908 the School Medical Service was established, and with progressive expansions of its mandate, the tonsils of greater numbers of children were brought under medical scrutiny. From 1911 the National Health Insurance Act provided medical care during the sickness of poor workers, easing the financial strain on poor families. Hospitals run by local authorities were established from the late 1920s, providing a site at which specialist ear, nose and throat (ENT) surgeons could develop their discipline. Tonsillectomy, due to the anatomical position of the tonsils between the nose and throat, justified this otherwise eclectic discipline. Furthermore, because it was thought to be a quick and easy operation, and many doctors were paid per intervention into the 1940s, financial incentives supplemented the ideological justification of an emerging medical speciality. As more sets of tonsils

could be classified as 'diseased', more families could afford medical interventions, and greater numbers of doctors became invested in the operation, financially and intellectually, the structure of state healthcare systems facilitated increasing rates of tonsillectomy towards the middle of the century.



A Mackenzie-type tonsillectomy guillotine. This style was used from the late 19th century, but fell out of favour over the twentieth century. Image courtesy of the Wellcome Library.

These structures were supplemented by national concerns with the state of the population, and prevailing medical theories. A 1904 Interdepartmental Committee on Physical Deterioration reinforced concerns about the physical deterioration of the British population, first noticed in volunteers for the Boer War (1899-1902). ENT surgeons exploited this concern, using the popular 'focal theory' of infection which suggested that general, systemic disease could be attributed to locally infected sites. Many disorders, from sore throats, to arthritis, to nonspecific mental and physical underdevelopment, could thus be attributed to diseased tonsils. By invoking this theory in a context of national anxiety, surgeons could both justify their performance of tonsillectomy, and persuade parents to submit their children to it.

Tonsillectomy rates rose steadily towards the middle of the century, as a result of these structural, medical, and ideological

factors. It became a routine operation, and during the interwar period was entrenched in British culture. In the East Sussex Records Office archives, I found evidence of just how embedded the operation was. At ten minutes to ten on May 1, 1936, the three year-old son of John Cowell, Guillian Cowell, was put under anaesthesia for tonsillectomy. Although a well-respected surgeon performed the operation, Guillian had collapsed by the turn of the hour, and despite thirty minutes of resuscitation sadly passed away. Today, the wisdom of undertaking the operation in this context, and the evidence for the value of the operation itself, would be minutely scrutinised and challenged. However, during an inquest three days later, neither the coroner, the surgeon, the police pathologist, nor even Guillian's father, raised any question about the operation. Guillian's death was ascribed to a

'misadventure'. As the status of tonsillectomy was stable, once it was deemed medically 'necessary', any unpleasant outcomes were accepted as natural. Cultural changes had rendered the operation invisible, and thus unassailable. The BSHS sponsorship enabled me to gain a richer understanding of how profoundly tonsillectomy was integrated into British interwar healthcare culture, and I was more able to accurately track the changing status of the operation throughout the twentieth century. It also gave me the opportunity to undertake some fascinating archival work, which is an invaluable experience for any developing historian of science.

International Summer School

The Inter-Divisional Teaching Commission (IDTC) and the Maison Européenne des Sciences de l'Homme et de la Société, Lille, 22 - 26 June 2015



Participants (above) & one historic instrument they studied (Right).

The aim of the 1st International Summer School for Sciences, History and Philosophy of Sciences, Technology & Science Education was to provide a platform for young researchers, postdocs, Ph.D. candidates, teachers and practitioners from academia and schools to meet and share cutting-edge developments in the field.

In particular, this gathering aimed to investigate and improve how scientific, historical and philosophical techniques could be used in science teaching to make education and the foundations of sciences more interesting. A key question was: how can history and philosophy of sciences assist in solving the crisis in science education in Europe? How could new approaches to science education produce reliable knowledge and demonstrate the limits to certainty? The seminars and workshops were structured to delve into such questions in-depth, and provide a full day of focusing on each subject rather than on a variety of subjects.

Keynote speakers and invited lecturers included Joseph Agassi (Israel/Canada), Jean Dhombres (France), Helge Kragh (Denmark), Nicholas Maxwell (United Kingdom), Patricia Radelet de-Grave (Belgium) and Shahid Rahman from Lille 3 University of Lille (France).

The organisers gratefully acknowledge the support of the BSHS for this initiative.

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Science and Orthodox Christianity Conference

National Hellenic Research Foundation, Athens, 3 - 5 September 2015

It is not often you get to participate, let alone help to organize, a conference which is the first of its kind. This was the case nevertheless in the 'Science and Religion' conference which took place in Athens from September the 3rd to the 5th, under the aegis of the NARSES project (narses.hpdst.gr). Science and Religion conferences are of course not new. If anything, the field itself is in full bloom, as recent publications from Peter Harrison, Ronald Numbers and David Livingstone seem to indicate. This three-day conference, however, was the first to specifically tackle the relationship between the natural sciences and eastern Orthodox Christianity, a subject conspicuous in its absence in the various Science and Religion handbooks. This, as the participants in Athens were keen to observe, is about to change.

And what a company of participants there were! Ronald Numbers delivered a keynote lecture on the interaction of science and religion around the world, and whether the terms themselves could mean something in changing contexts. Peter Harrison addressed the tantalizing common origins of science and religion. Michael Shank showed how a 15th century ecclesiastical dispute resulted in Copernicus reading the *Almagest* many decades later. And the list goes on, with speakers from France, Belgium, China, Russia and (of course) Greece tackling a variety of issues.

Conversations were not limited to within the National Hellenic Research Foundation. Pedestrians crossing the nearby Boy Scout Square were likely to hear groups debating Aristotle and Gemistus Pletho over plates of fried zucchini, tzatziki and grilled meat. Wherever its location, the conference was deemed a success by all present. For us working in the NARSES project, dedicating to creating a database of all sources in Greek on science and religion from the 4th century AD to the 20th, the conference was both a vindication and a revelation. It had at times seemed that the field of the history of Orthodox Christianity and Science is a lonely place. We now know that this is not the case. Or as Numbers said, in his characteristic style: "There is gold in 'dem 'thar hills!"

Kostas Tampakis
National Hellenic Research Foundation

BSHS Notices

BSHS Website News

Have you visited the BSHS website lately? We're making a lot of changes, and would love your help! We have a new Blog feature, where members can write features about how their research on the History of Science is applicable to current issues, events, and ideas. This is a great way for you to spread the word about your work, so don't be shy!

We are also looking for video and audio materials for the website. Are you giving a talk over the next few months? Why not record it so we can feature it on the website? Get in touch if you're interested, and we can help.

When is the last time you looked at the Travel Guide section on the website? It's undergoing some changes, and it would be great if you could get involved. While we currently have fantastic descriptions of various sites around the world of interest to the History of Science, we want to feature videos of these sites on the website so visitors can take a virtual road trip, accessing places both near and far. If you've written an entry for the Travel Guide and would like to revisit it, or if you happen to be going somewhere new, let us know and we can work with you to film your trip.

For more information on new developments, check out the website (www.bshs.org.uk), and get in touch with our News Editor, Jessica van Horssen (news@bshs.org.uk), for more details!

Conference: Science & Islands in the Indo-Pacific World

Cambridge, 15-16 September 2016

The Indo-Pacific has played an important role in the production and development of scientific and cultural knowledge. Focusing on Indo-Pacific islands, this 2 day conference will explore their spatial and temporal role within the history of scientific knowledge. Across the two oceanic regions, islands acted as spaces of transit – which linked origin and destination for travellers, explorers and merchants – and also served as a home for indigenous communities. Bringing together historians from the early modern to the modern period, this conference seeks to explore knowledge production across geopolitical, social and cultural contexts. We aim to shed light on questions related to the islands' connectedness or disconnectedness, as well as to the formation and transmission of information and indigenous knowledge on, about, and between islands in the region.

For more information visit: www.bshs.org.uk/conferences/other-bshs-meetings or email BSHS.IndoPacific@gmail.com

Conference Report: End of the Kilogram?

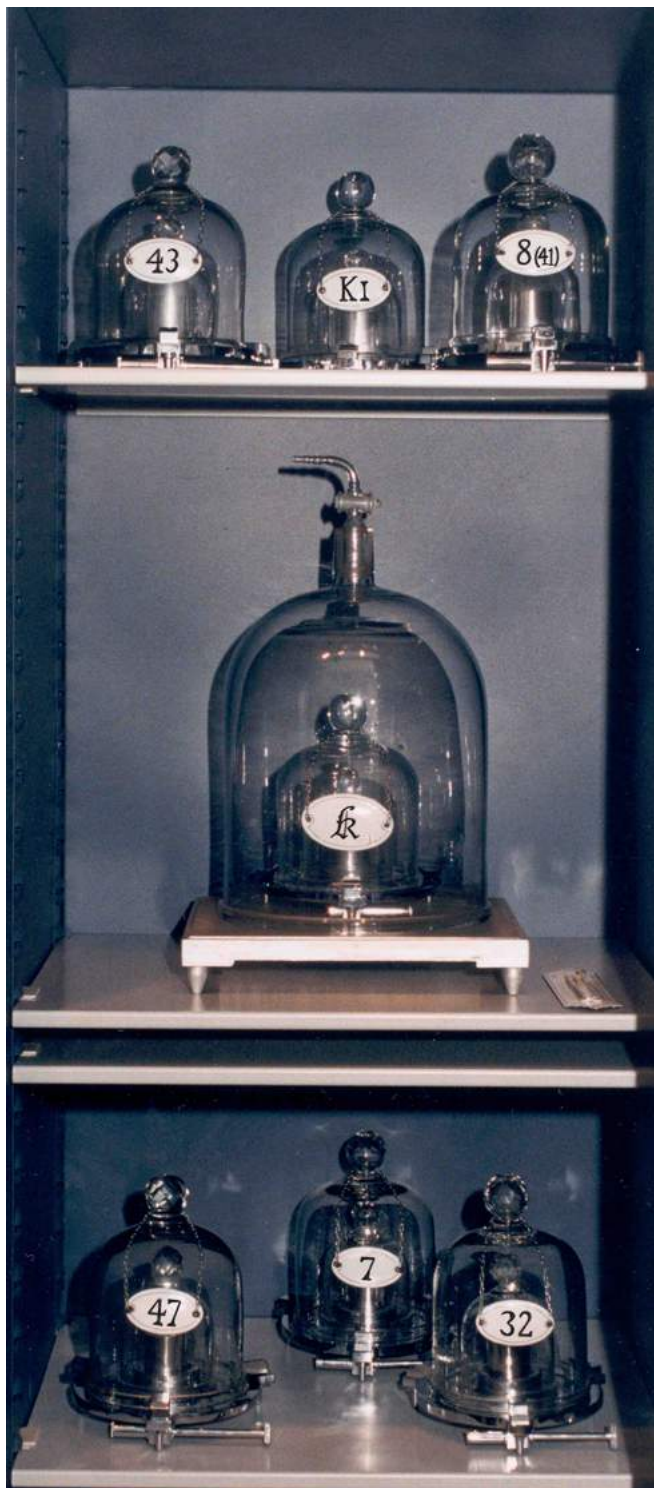
National Physical Laboratory, March 17th, 2016

On March 17th 2016, a conference entitled "A History of Units from 1791 to 2018" took place at the National Physical Laboratory in Teddington ("Home of Measurement", according to the station's welcome sign). The conference – organised by the History of Physics Group and sponsored by the BSHS and the Institute of Physics – was divided into sections, containing talks on the measurement of the major physical quantities, including mass (Richard Davis and Bryan Kibble), length (Terry Quinn), time (Rory McEvoy), electrical phenomena (Daniel Mitchell and Edward Davis) and temperature (Hasok Chang and Graham Machin). Over the course of the day, the talks ranged from historical material to contemporary science, as well as predictions about the future of metrology. In Graham Machin's case, "Temperature scales: Past, Present & Future", it contained all three!

At this point it is worth explaining the paradoxical conference title, which may have perplexed many (if not all) readers. The rationale behind it was made clear by Terry Quinn's opening talk on the history of the Metre Convention and the Bureau Internationale des Poids et Mesures (BIPM), for which he was Director 1988–2003. Starting on March 19th 1791, in Paris, a report concerning the reformation of units was drafted for the consideration of the French Assembly. It proposed a new system of units that were defined in relation to permanent features of the world. According to the propounders, this system, being "taken from nature", would be accessible to all nations, for all time; no metrological reform would need occur ever again.

"That was a good idea" said Dr Quinn, referring to the 1791 paper, "[...] but as you know, they couldn't do it; but we are planning to do it in 2018".

Since the 1960s, the BIPM have been implementing a programme of metrological reform that aims to redefine the base units in terms of fundamental physical constants and atomic properties. If all goes according to plan, by 2018 the BIPM will have successfully linked the kilogram



The international prototype of the kilogram, shown in its safe. This photograph is reproduced with the generous permission of the BIPM, which retains full internationally protected copyright (Photograph courtesy of the BIPM).

(the last SI unit defined by a material artefact) to Planck's constant, and will have decided upon its method of realisation. The physical

artefacts, like the standard kilogram (pictured) will then have only historical significance.

A likely candidate for the kilogram's realisation is the *watt balance* method, whose discoverer, Bryan Kibble, gave the final talk of the day with a personal recollection – the "real story" – of how this came about. It was with rare delight that we heard Kibble describe how his evening musings led to a simplification of the methodology of using the balance – making it not only easier to use, but more reliable, and its results more accurate. For those not familiar with the watt balance, it's essentially a very accurate scale used in conjunction with carefully controlled electromagnetic parameters, which allow the determination of mass from a mathematical treatment ultimately based upon Planck's constant.

In conclusion: for those with a comfortable acceptance of the everyday metre, second and kilo, the dalliance with meticulous measurements and scientific fundamentals may seem as irrelevant as 'guessing how many angels can dance on the head of a pin', but its importance to everyday life cannot be overstated, especially when so much of modern science and the things we take for granted (such as mobile phones) become ever more dependent upon extremely exacting measurements. We have entered an age where the fundamental units of scientific practice need to be more reliable than material artefacts, and thanks to the efforts of people like Bryan Kibble and his peers, we now have a method of potentially achieving such reliability.

The conference organisers would like to acknowledge the generous support provided by the British Society for the History of Science.

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The Viewpoint Interview

Jessica van Horssen is the BSHS News Editor (see p.13!) and a senior researcher at the University of Chester

Who or what first turned you towards the history of science?

I fell into it by accident! I've always wanted to explore the complex relationship people have with the natural environment, at once a symbol of national pride and a reality of national economy. Doing this type of history "from the ground up" has allowed me to analyse the past from different perspectives, and entering the world of the History of Science through Environmental History has been exciting. The Manchester iCHSTM was my first real foray into the History of Science, and the people I met there, as well as the papers I heard, made me realise there was great, innovative stuff happening in the field, and I'm thrilled to be a part of it.

What's your best dinner-table history of science story?

When I tell people that I study asbestos and cancer, it can be a bit of a lead balloon! However, almost everyone has an asbestos story, and I prefer to listen to these stories rather speak about my own research too much. This listening has helped me form an appreciation for the ways toxic substances and toxicity impact lives differently, depending on who, when, where, and how a person interacts with it.

What has been your best career moment?

Well, it was an amazing moment to hold my book, *A Town Called Asbestos: Environmental Contamination, Health, and Resilience in a Resource Community* in my hands, but the real highlight was working with others on digital companion pieces. The community I examine in my book is French Canadian, and it's unlikely they will ever read my published research. I decided to write a digital Asbestos graphic novel, available in both English and French, so the community would have access to my work. This, and other digital outputs like

podcasts are real highlights in my career, and I think they make my research more engaging and accessible.

And worst?

Honestly, short term contracts. Early career scholars have so much anxiety around job prospects, and understandably so. The lack of stability in academia today is a real crisis, and the uncertainty that comes with that is awful. I've got a great community of early career researchers around me, whom I admire so much, and it's really important to have these people as comrades in the academic trenches, offering support and laughter through these challenging times.

Which historical person would you most like to meet?

I would love the opportunity to speak with the scientists who accepted research funding from the asbestos industry on the condition that the industry could control the publication of their reports. They may have wanted to find out what asbestos does to the human body, but they also found ways to stretch their ethical boundaries for profit. There were a group of who relied on a constant supply of lungs stolen from the bodies of dead Canadian asbestos miners, smuggled across the US border to their laboratory. I would love the opportunity to talk with them about how they justified this work. I would also like to talk with the asbestos workers who had their lungs stolen to access their lived experiences, which I think are so important to a fuller understanding.

What are your favourite history of science books?

Joy Parr has been a constant source of inspiration and motivation for me, even before I had the opportunity to work with her. Her book, *Sensing Changes: Technologies, Environments, and the Everyday, 1953-2003* is so fantastic in terms of both content and methodology. She uses the central idea, "I am here, therefore I am," highlighting the importance of place in historical analyses. I also enjoy how she communicates her work: each chapter focuses on a different sense! This has encouraged me to think of writing history in new ways to help convey different perspectives, different ideas.

Parr also created an accompanying web-page for each chapter, with additional audio, visual, and archival material. Such a source of inspiration!

If you did not work in the history of science, what other career might you choose?

I've always just wanted to make history fun! If I wasn't an academic, I think I'd work in a role that is even more public-facing. I've worked as a public historian throughout my career, and I could see myself engaging with the past and public through these avenues in really rewarding ways. Alternatively, I could work on growing a beard so I could join the circus!

What would you do to strengthen the history of science as a discipline?

I don't think history should stay in a book or beyond a paywall, and I truly believe historians of science should actively engage with the world around them. I'd encourage the discipline to more fully reflect the diverse societies of the past and present. The History of Science can often project a "Dead White Men of Privilege" image that isn't truly reflective of the field. Encouraging and promoting diversity within our scholarship, and actively seeking out ways to disseminate it beyond the ivory tower of academia are the way forward.

How do you see the future shape of the history of science?

BIG! New technologies like data mining and GIS allow historians of science to analyse much larger amounts of data more efficiently, building upon past studies and moving the discipline into the future. This also enables historians of science to access materials, people, places, and ideas, and to go beyond traditional archives, and to have a much wider frame of analysis to seek out the more hidden histories of science that are so fascinating. My current project on the transnational path of asbestos contamination and disease aims to do just this, but I'm certainly not the only one. It's always so exciting to see results of these big data studies, and I think they remind us that we have always lived in a "global world," connected to people and places both near and far, not constricted by national borders.

The British Journal for the History of Science

Forthcoming papers include:

- Jenny Bulstrode, 'The industrial archaeology of deep time'
- Noah Moxham, 'An experimental 'Life' for an experimental life: Richard Waller's biography of Robert Hooke (1705)'
- Dmitri Levitin, 'Newton and scholastic philosophy'
- Matthew Adamson, 'Les liaisons dangereuses: resource surveillance, uranium diplomacy and secret French–American collaboration in 1950s Morocco'
- Federica Turriziani Colonna, 'Heredity, evolution and development in their (epistemic) environment at the turn of the nineteenth century'



www.bshs.org.uk/publications/bjhs

Viewpoint: the Magazine of the BSBS

Contributions

All contributions and correspondence should be sent to the Editor, Alice White, School of History, University of Kent, Canterbury, Kent, CT2 7NX; viewpoint@bshs.org.uk. Electronic communication is preferred. *Viewpoint* is issued three times a year – in February, June and October. The next issue will be in **October 2016** and the deadline for copy is **15 August 2016**.

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