

Day 1 (Tuesday 13 July)

Session 1 09:00-11:00 BST

1A - Newtonian Mechanics Revisited | Chair: Rob Iliffe

Newtonian Bodies: Dependence and Independence

Patrick Connolly (Humboldt University of Berlin, Lehigh University)

Isaac Newton's *De Gravitatione* contains an intriguing account of how God might have made corporeal bodies. Specifically, bodies might be the product of nothing other than divinely-created powers and absolute space. Newton claims that one virtue of his account is that it makes bodies depend on God. But what is the nature of this dependence? Most commentators agree that these Newtonian bodies have a very high degree of dependence on God, arguing that they are incapable of even moving or maintaining their unified nature without immediate and continuous divine assistance.

My paper runs counter to this dominant strand of thought in the literature and argues that Newtonian bodies enjoy more independence and causal autonomy than is normally recognized. On my view, Newton adopts a form of conservationism—God must continually will that bodies continue to exist—but this exhausts God's casual contribution to the ordinary workings of nature.

The paper contains three key argumentative moves. The first involves clarifying the relationship between bodies and space. We should reject the view that bodies are to be identified with portions of space endowed with powers in favor of a view on which they are identified with sets of powers situated in space. The second involves taking mobility seriously as a genuine power possessed by bodies. The third involves attention to Newton's claim that God is not an *anima mundi*. These three argumentative steps provide the foundation for a clearer interpretation of *De Gravitatione* and a compelling account of Newtonian bodies.

Reception and Dissemination of Light Interference Experiments in France

Carole Nahum, Independent Scholar

Today, the name of Thomas Young is famous in Optical Sciences, associated to light interference phenomena. However, when at the beginning of the 19th century, the scientist observes fringes on a screen and intends to convince his peers that this attests light travels as a wave in the aether, the same way sound travels in the air, he is strongly criticized. At this time, most scholars are fervent advocates of the emission theory of light which means that light travels as a stream of particles to which Newtonian mechanics can apply.

Less than a decade later, on the other side of the channel, Young's discovery is relayed by young French engineer and physicist Augustin Fresnel.

Famous scientist François Arago, secretary of the French Academy of Science examines Fresnel's first paper in 1816 and, as he notices a similarity between Fresnel's and Young's experiments, he decides to initiate a Franco-Britannic relationship between both physicists. Their exchanges, though epistolary, will prove very fruitful since Fresnel is the winner of the Competition of the French Academy of Science in 1819, for his explanation of light diffraction phenomenon, supported by the interferences.

As a mark of recognition, Dr Young becomes "foreign associate" of the French Academy of Science and from 1821 his experiments and his name (unlike Fresnel's) are part of the lessons of Optics delivered at the French most prestigious school "École Polytechnique". This aspect, based on Manuscripts found at the Archives of this school, constitutes the very original piece of our research.

Epicycloids and Epicycloidal Teeth: A Consideration of Mathematics and Its Applications in the 18th and Early 19th Centuries

Jane Wess (University of Edinburgh)

The talk will use the case of the form of gear teeth to explore wider issues in the application of mathematics.

This talk was initially stimulated by a model demonstrating epicycloidal gear teeth in the King George III Collection of instruments for experimental philosophy dating from 1762. The model is based on the instructions for drawing epicycloids in Emerson's work of 1758, and the description of epicycloids in the English translation of Newton's *Principia* of 1729. The talk will explore the interaction between the treatment of these beautiful curves by the leading mathematicians of the day, their promotion by mechanics and lecturers, and their application to widespread technology in the form of gear mechanisms.

More widely it will consider the extent to which mechanics and lecturers in the 18th century promoted mathematics in order to solve a range of physical challenges, arguing that their rhetoric did not align with what was either obtainable by craftsmen, or indeed efficacious. It will argue that many of those promoting mathematics as a rational solution to physical problems had not fully appreciated the works of those such as Leonard Euler who was using the new calculus to advocate an attitude of optimisation rather than perfection. It will trace the emphasis on mathematical curves such as the epicycloid into the early 19th century with the production of chronometers, when the issues arising from unattainable expectations became manifest.

Sociability, Newton and the Scottish Enlightenment

Derya Tarbuck (Bahcesehir University)

If it is plausibly argued by historians that Newtonianism provided a framework for all the structural changes in how scientific research should be conducted, something else must follow this: A century of organized sociability and innumerable learned societies acted as vehicles for Newton's ideas. However, a look at the earliest intellectual clubs that were

established early in eighteenth-century in Edinburgh poses the question of whether they actually were reactions to the institutionalization of ideas and a reaction to natural philosophy and Newtonian cosmology becoming a canon. This will be investigated through a study of philosophical and literary societies in Scotland of the time, which are the trademark features of the Enlightenment's erudite sociability.

1B - Roundtable: Translating Science For History: A Conversation

Participants:

Greg Radick Univ. of Leeds
 Staffan Müller-Wille, Univ. of Cambridge
 Nils Roll-Hansen, Univ. of Oslo
 Neeraja Sankaran, Utrecht University
 Kersten Hall, Univ. of Leeds

This session features a conversation among contributors to the BSHS Translations, a series featuring English-language translations of primary scientific papers that were originally published in other languages. The translated papers vary widely in subject matter, the primary commonality lying in the fact that they were originally published more than a century ago. **Staffan Müller-Wille** and **Kersten Hall**, for instance, provided a new translation of Gregor Mendel's classic 1866 report of his experiments on hybridising pea plants and what he learned from them about the nature of inheritance. Whereas this translation was by no means the first (English translations of Mendel's text have been published ever since the early twentieth century), Hall's second endeavor for this series, undertaken in collaboration with **Neeraja Sankaran**, was to our knowledge, the first complete translation of Friedrich Miescher's 1871 paper, describing the discovery of DNA, originally dubbed as nuclein. Besides being published within a decade of one another, both afore-mentioned texts are recognised as seminal contributions that laid foundations for such disciplines as genetics and molecular biology—and indeed biology more generally—in the twentieth century. They offer a very interesting counterpoint to **Nils Roll-Hansen's** choice to translate, from Danish, a 1903 article by the geneticist, Wilhelm Johannsen, which was a popular work relating the authors ideas about heredity to running debates on evolution, systematics and plant breeding. In this round table session, the contributors will discuss the motivation and rationale for their choices, the significance of the original text and the utility, both to themselves and the broader HPS community, of having such translations readily available. The session will be moderated by **Greg Radick** who as vice-president of BSHS in 2016, helped launch the *Translations* series.

1C - Lightning Session: Patrons, Publics, and Profiteers: Selling Science in the Nineteenth and Twentieth Centuries | Chair: James Sumner

The long nineteenth century witnessed a vast shift from patron-funded scientific endeavours to public-centred spectacles of knowledge, with business entities seeking to commercialize knowledge and science. Then, throughout the twentieth century, the increasing professionalization of the research process went hand in hand with a profound commercialization of its working materials. Yet, what do we truly mean when we speak of the ‘commercialization’ of science? The contributions of this lightning session provide diverse cases that confront this issue. The session follows a range of nineteenth- and twentieth-century communities in their attempts to carve out their position among scientific researchers and commercial enterprises, and fashion scientific identities for public or private science markets: ‘entrepreneurial’ natural history collectors advancing the commodification of nature; manufacturers of laboratory objects developing their products together with users and advertising them in science journals; regulators of the veterinary profession establishing what could and could not be sold as ‘veterinary medicine’; a surgeon using photographs to establish a professional identity in the global medical community; the Monsanto Plastic Corporation peddling domestic technologies to women in the Cold War; the element discovery community researching unstable elements and their potential commercial use. This session shows how the ‘commercialization of science’ is a heterogenous movement by which market relations were established for research, as well as social and educational purposes. The different modes of commercialization in this session render at times ‘science’ as the producer, some other times as the consumer, or as the background against which the market relation takes place.

Individual Abstracts:

Commercializing and Commodifying Nature: German ‘Entrepreneurial’ Collectors in Southern Africa, 1820-1834

Katherine Arnold (London School of Economics and Political Science)

This talk will examine the role of German ‘entrepreneurial’ natural history collectors operating in southern Africa in the early nineteenth century. In this period, traditional systems of patronage in the German states gave way to collectors financing their own expeditions, as well as scientific societies sending young naturalists to far-flung outposts through subscription-based returns. The pursuit of natural history specimens encouraged ambition and risk-taking: the collector’s search was inherently tied to imperial networks that abetted increasing control over colonial territories and facilitated the uninhibited extraction of flora, fauna, and human remains from colonial environments. This shift established a new commercialization and commodification of nature, wherein all considerations, practices, interactions, and objectives were part of an intricate, locally specific, and systematic cost-benefit analysis with destructive environmental consequences and labor practices.

Controversy in Innovation: Ernst Abbe, the RMS and the ‘Battle of the Glasses’

Lea Beiermann (Maastricht University)

Following a controversy about the resolving power of microscope lenses in the 1870s, this talk explores how the German physicist Ernst Abbe, working for the Zeiss company, profited from the information infrastructures established by microscope users in the Royal Microscopical Society. Drawing on controversy studies and innovation studies, I argue that historians of science have studied controversy and innovation in depth, but they have been less concerned with controversy in innovation. This talk shows that innovation can be deeply controversial, and that controversies shape the information infrastructures that facilitate user innovation.

Follow the Money: Regulating the Commercialization of Medical Science

Jane Davidson (University of Kent and RCVS Knowledge)

Regulating the sale of medical products is a feature of medical professions. The Apothecaries Guild had been regulating human medicine since 1617. An advert for medicines aimed at farmers in 1884 starts the process of veterinary regulation of animal medicines. The Royal College of Veterinary Surgeons (RCVS) and the Royal Agricultural Society of England (RASE) work together to establish what was a veterinary medicine product. Despite control of medicines not being directly within the remit of the RCVS, RASE turned to them as the professions regulator. This extended Pecha Kucha presentation will consider if this was to ensure control of medicines for public safety or to ensure control of the financial benefits.

Publishing and the Profession: Clinical Photography and the Making of South Africa’s ‘Father of Surgery’

Michaela Clark (University of Manchester)

This paper discusses how clinical photography helped to forge the professional profile of Professor Charles Frederick Morris (CFM) Saint, the first surgical chair of South Africa’s first medical school. Born, raised, and trained in England, Saint brought a British medical pedigree and thus scientific respectability to Cape Town’s curriculum with his arrival in 1920. By tracing the practice and purpose of photography in the surgery department over three decades, I seek to demonstrate how Saint made use of patient images to not only teach clinical surgery (in South Africa) but also establish his own professional identity in the international terrain.

Science from the Atom Bomb: How Synthetic Elements Changed the World

Kit Chapman (University of Sunderland)

Since the 1930s, scientists have created elements too unstable to exist on Earth through nuclear reactions. Given this instability, the elements are often portrayed as having little use to society beyond their role in nuclear arms and power. This discussion will reflect on the wider uses of these elements, from medical and safety devices to wider industries, and highlight how the commercialization of these elements has fed into scientific research and discovery.

The Science Fiction Kitchen: Women's Resistant Narratives to Early Cold War Domestic Science

(Kate Heffner, University of Kent)

The American post-war kitchen was a socially constructed landscape, serving both as an imaginary of national interests and a physical site of women's labor. New domestic technologies that were marketed to women were built on utopian imaginaries of liberation from household drudgery. As marketing utilized a rhetoric of utopia to solidify the identity of Cold War motherhood, women within science fiction fan cultures refuted these futurisms by rendering the domestic as a dystopia. This paper investigates the textual imaginaries created in corporate domestic science endeavors in contrast to amateur-based women fans in science fiction writing communities.

'If You Need a New Microscope – Why Purchase an Old One?' Scientific Advertisements in Nature and Their Role in the Printed Forum of the Laboratory Research Community

Max Bautista Perpinyà (Descartes Centre for the History and Philosophy of the Sciences and the Humanities, Utrecht University; Independent Researcher)

This talk examines how commercial manufacturers for laboratory objects inserted themselves in the printed forum of the scientific community in the 1970s. In particular, I look at scientific advertisements in the journal *Nature*, and how they mediated the relationship between commercial enterprises and research scientists. I describe two interrelated points: 1) the scientific attitudes and values that commercial companies displayed in the advertisements and how they related to the values that researchers sought; and 2) the critical roles of manufacturers and advertisements in the research process itself. In doing so, this paper illustrates how commercial competition framed the historical relation between 'innovation' and 'standardization'.

Session 2 11:30-13:00 BST

2A – Writing Science | Chair: Charlotte Sleigh

Literary Constructions: Choosing to Write, or not to Write, about the Trent and Mersey Canal (1766)

Ellen Packham (University of Aberdeen)

In the latter half of the eighteenth century, British civil engineers were striving to enhance their status and assert the identity of their developing profession. One means of achieving a sense of community was through the formation of a shared literary culture. As a profession notorious for what Torrens describes as ‘papyrophobia’, it is perhaps surprising that engineers, in this period, read widely and wrote extensively. John Smeaton (1724-1792), for example, valued good writing and experimented with literary form. Engineers wrote to persuade, to educate, to publicise and to defend their professional decisions.

Nevertheless, the diversity in background and education of eighteenth-century civil engineers meant that some chose to write very little. The Trent and Mersey canal was designed and surveyed by James Brindley (1716-1772), who wrote sparingly and has been portrayed by biographers as an extreme example of the inarticulate engineer who tamed nature for the benefit of an industrialising nation. However, the canal’s proprietors, including Josiah Wedgwood (1730-1795) and Erasmus Darwin (1731-1802), recognised the need for written expertise and a literary strategy to garner the necessary financial and political support to pass an Act of Parliament for their scheme.

This paper explores the publication strategy surrounding the projection of the Trent and Mersey canal, which was fraught with problems and debate, but which demonstrates the literary creativity surrounding eighteenth-century engineering projects. The paper will show that, even where they chose to write very little, engineers’ reputations were dependent on literary constructions as much as on physical ones.

“Not birth, marriage or death, but gastrulation”: The life of a quotation in biology

Nick Hopwood (University of Cambridge)

When the developmental biologist Lewis Wolpert died earlier this year, colleagues and obituarists remembered his dictum, “It is not birth, marriage or death, but gastrulation which is truly the most important time in your life.” This claim about the process that generates the embryonic body plan has been quoted so often since 1983 that it rivals William Harvey’s “Ex ovo omnia” for fame. Quotation was once presented as essential for historians but a luxury for scientists, and it is true that scientific articles rarely include direct, demarcated quotations. Yet quoting is necessary in other scientific contexts and routine in many more. Building on the few existing studies, notably Ralph O’Connor’s analysis of early nineteenth-century geology, the talk will illustrate how quotations can become embedded in recent science. It will reconstruct the genesis and development of the statement that is attributed to Wolpert but should be recognized as a more collective achievement. To this

end, it will begin with prior claims for the importance of prenatal life, then take an international journey from a dinner conversation through an introductory monograph and inspirational poster to textbooks, undergraduate lectures, research seminars, a cabaret sketch and tweets. This will show how the quotation encapsulates the interests and ethos of late twentieth- and early twenty-first-century developmental biology, and also how the conjunction of an esoteric term with familiar, major life events has let teachers engage students and helped journalists report embryological news. Quotations play various significant roles in science.

‘Where lines run smooth, and wit’s with ease expressed’: cosmological philosophy in poems of Margaret Cavendish

Masuda Qureshi (Birkbeck, University of London)

How is poetry a form of philosophical and scientific expression? This paper investigates cosmological philosophy in the poetry of Margaret Cavendish. It identifies how knowledge is pre-disciplinary by bringing together two disciplines that are now distinctive and separate – natural philosophy and literature. While scholars identify how women poets engage with natural philosophy through translation and ideas of physical matter, they are yet to consider how women wrote about the universe. Therefore, this paper asks: in what ways does Cavendish use the poem to engage with cosmological natural philosophy? Using a case-study of poems from Cavendish’s first publication, *Poems, and Fancies* (1653), this paper traces both its English and European scientific influences. This interdisciplinary approach considers the broader philosophical and cultural implications of Cavendish’s poetic language. Accordingly, this study uncovers how Cavendish uses the poetic form to unpack, tease out, and re-pack natural cosmological theories into new ideas. This approach helps decipher the social, environmental, and intellectual contexts that shape Cavendish’s poems. It identifies how Cavendish’s poems are products of several strands of knowledge and are a form of philosophical experimentation. This research also broadens ideas about the woman writer and disciplinary knowledge in seventeenth-century England by untangling the various practices and methods that traverse both poetry and natural philosophy. This paper, therefore, addresses what it means for Cavendish to write a poem philosophically. It drives the need for a holistic approach in literary studies, intellectual history, and the history of science which considers how the poem contains, conveys, and constructs philosophical knowledge.

2B – Narratives of Science and Technology in Modern Agriculture | Chair: Amanda Rees

At first glance, the cutting edge of twenty-first century agriculture, with its robotics, computer systems and biotechnology, appears to be a miracle of modernity. Yet contemporary agricultural and food systems also face a myriad of challenges, from climate change and locust swarms to the COVID-19 pandemic. Just as current events have caused us to question the future of agriculture, so historians of science and technology can question the historical narratives which underpin it. This panel interrogates some of the most fundamental aspects behind the emergence of contemporary agriculture, including

modernisation and the uptake of new technology by farmers. Papers in this panel re-examine the post-1945 drive for modernity in livestock production, the uptake of the insecticide DDT by farmers and the portrayal of genetic modification by biotech firms. These histories highlight the role of agency in agricultural history, as government, business, farmers and consumers grappled with questions of practicality, ethics, environmental impact and public opinion. Critically examining these choices and their outcomes allow us to more accurately frame contemporary agricultural practices and consider alternative futures.

Edges' of disease and boundary animals in agricultural space: farming the twentieth century

K. A. Sayer (Leeds Trinity University)

This paper will interrogate the interconnecting roles of science, medicine and technology in 'modernising' livestock production after the Second World War. At an empirical level, it will interrogate the notions of intensification and industrialisation of animal farming, (i.e. the social and economic systemics, as well as its technical and institutional components) and the debates that emerged around the health and environmental risks and harms generated by the transformations sought in livestock production after 1947, their governance and repair. While, these transformations were highly significant in enabling massive increases in the supply of livestock food at relatively little cost to the consumer, they were also highly controversial on account of new threats that emerged to human health, animal welfare, and the environment. This paper will explore the boundary animals within this agricultural and cultural space, look at the knowledges produced, governance and repair enacted in consequence, and the parts played by science/the image of science and 'scientific' farm futures in this process.

Rethinking the History of DDT in Britain: From Wonder Chemical to Mundane Ingredient

Sabine Clarke; Tom Lean (University of York)

Histories of DDT have not paid much attention to the process of uptake by farmers after the end of the Second World War. While we are told repeatedly that DDT was embraced as a "miracle weapon" in the fight against insect pests, there have been very few explorations of the actual pattern of use of DDT in agriculture. The impression given is that the deployment of DDT by farmers does not require much explanation as the new insecticide was superior in its qualities to any existing chemical, and the post war period was apparently marked by widespread and uncritical enthusiasm for science and technology. This paper shows that the speed and extent of the use of DDT products was much slower for some key crops in Britain than previously claimed, with widespread or routine use not occurring until the 1970s. Apart from variation according to farming sector, we argue that a full picture of the deployment and also the impacts of insecticides in British farming requires engagement with the fact that farmers did not deploy chemicals on their land, but products. The long period of adoption that we describe can be attributed to the fact that the widespread use of insecticides was the result of various types of work. It involved testing chemicals and then packaging them up into smokes, dusts, sprays and seed treatments aimed at particular

pests, as well as the establishment of wider social and technical systems to support use. It depended upon advances in spraying equipment and intermediaries who could help farmers navigate the complexities of identifying pests and appropriate products and interpret the directions for use according to the conditions on each farm. Using chemicals such as DDT was not in fact easy and this paper sets out some of the challenges that scientists, businessmen and government worked to address in order to get British farmers to engage in pest control after 1945.

Selling Biotechnology: Narratives of Continuity and Disruption in the GM Archive

Matthew Holmes (University of Cambridge)

With Britain's exit from the European Union, the possibility of harnessing gene-editing to create new crop plants has been revived once again. Its advocates have sought to avoid the public outrage which accompanied trials of genetically modified (GM) crops by arguing that gene editing has more in common with traditional plant breeding. Drawing upon materials from the Science Museum's GM archive, this paper examines how a similar tactic emerged during the controversy over GM crops in Britain during the 1990s. Biotech firms, most notably Monsanto, attempted to portray genetic modification as the latest step in a historical continuum of plant breeding techniques. Yet this narrative, adopted to soothe public scepticism over the new technology, clashed with the simultaneous portrayal of genetic modification as a revolutionary and world-changing technology. Surveys and interviews demonstrated that GM was quickly perceived as an alien or unnatural technology in Britain. Efforts to counteract this perspective with appeals to the long history of plant breeding ultimately failed, with a moratorium imposed on the commercialisation of GM crops in Britain in 1998.

2C – Geo-Politics and Science of the Cold War Era | Chair: Rachel Boon

The divergence between artificial intelligence and computational complexity

Javier Poveda Figueroa (Universitat Autònoma de Barcelona)

Computational complexity (CC) is a subfield of computer science born in the 1960s with the goal of evaluating whether a computer program could be solved in a reasonable amount of time or not. Artificial intelligence (AI) is a multidisciplinary discipline, institutionalized in 1956, that wanted to explain if machines could be intelligent. During their early years, both areas of knowledge did not have contact, even if AI could have benefited from CC during its crisis in the 1970s. One of the reasons could be related to the political problems during the Cold War.

The United States of America (USA) and China were in tension during most of the second half of the twentieth century. The Chinese citizens who were studying, or doing research in the USA were suspicious of collaborating with the Chinese government. One of those persons was the philosopher Hao Wang, who was accused by the FBI of working with the Chinese regime. Maybe that is the main reason why Wang could not work in the emerging field of AI because that area of study was part of the sciences financed by the US military for

aiding in decision making and problem solving in case of war. Wang is considered the father of CC because he made the distinction between tractable and intractable problems using mathematical logic.

This paper aims to explain the historical reasons of the divergence between AI and CC.

An Interview with Trofim Lysenko: Donald Michie and 1950s Soviet Genetics

Matt Wright (Leeds)

In 1957, Donald Michie, a young British geneticist out of UCL, visited the Moscow Institute of Genetics, where he had the opportunity to meet notorious Soviet agronomist Trofim Lysenko. Michie interviewed Lysenko, subsequently drawing on the experience for a series of articles and publications over the months which followed. Many years later, Michie reflected positively on his input into the controversies of the genetics debate in the 1950s, considering his efforts to have killed off the 'much cherished myth' of Lysenko's harm to Soviet science.

This paper will examine Michie's engagement with Lysenkoist science during the 1950s, contrasting his interest with the wider British approach to genetics in the era and exploring how impactful Michie's meeting with Lysenko was. In particular, the academic culture of the research environment Michie worked within will be considered, contextualising Michie's views alongside his colleagues and peers such as Anne McLaren, J. B. S. Haldane, and Peter Medawar. Finally, this paper will briefly consider how and why a young scientist building a career would be willing to take risks on his reputation, and whether that ultimately made a significant impact on Michie's character in the aftermath.

Climate and Crisis in the Sahel: Early 1970s Climate Attribution Theses of Sahelian Famine in the UK

Robert Naylor (University of Manchester)

The famine in the Western Sahel in the early 1970s was a watershed moment. One of the first major post-colonial disasters, it set the tone for Western engagement in the region in the following decades. It was also one of the earliest events that was decisively linked with global climatic change narratives, helping to propel climatic change into the spotlight and shaping responses to the crisis. An interdisciplinary conference held in 1973, and the subsequent report, saw British climatologist Hubert Lamb put forward a tentative theory attributing the Sahelian crisis to a 200-year cyclical climatic process. This controversial 200-year figure, despite being presented in a single-page paper relying on extremely limited data, was spread through international academic and media networks. Lamb's paper and the wider conference report produced new understandings of the famine and justified belief in climatic causation. This viewpoint was largely advanced by the physical science community, which proposed that the Sahel disaster was predetermined by long-term climatic changes. However, many academics have argued that social sciences were largely relegated to exploring the impacts of the crises, rather than the causes, and climatic

changes became a catch-all explanation for a hugely complex event. Lamb's one-page paper and its uptake by specific networks played an important role in shaping our perception of one of the major global events of the 1970s, allowing climate to become an axiomatic threat to the region that requires western intervention to this day.

Session 3 14:00-15:30 BST

3A – Reading Group: Latin America and the Global Sciences

Natalia Gándara (Pontificia Universidad Católica de Valparaíso Chile)

Santiago Guzmán (University College London)

Aleksandra Kaye (University College London, Yale University)

The conversation will focus on the place and role of Latin America in the global scientific networks. To incite the academic discussion, the organisers have selected the 2019 Science and technology studies (STS) paper titled '[International Ties at Peripheral Sites: Co-producing Social Processes and Scientific Knowledge in Latin America](#)' written by Leandro Rodriguez-Medina, Hugo Ferpozzi, Juan Layna, Emiliano Martin Valdez, and Pablo Kreimer.

The organisers encourage scholars to debate and reflect upon the networks of global science, the hierarchies of knowledge production and circulation, and the collaborative nature of science. Familiarity with Latin American history is not a prerequisite for participation in the session.

3B: Circulations | Chair: Mary Brazelton

Disease, immigration, and the conceptualisation of trachoma in Britain, 1880-1914

Vesna Curlic (University of Edinburgh)

Trachoma is an infectious eye disease, which was at the heart of the medicalisation of the British immigration system in the late nineteenth and early twentieth centuries. At the turn of the century, trachoma transformed from an obscure ophthalmological concept to part of the mainstream political and medical imagination, causing significant consequences for potential immigrants, with whom the disease became deeply associated.

My argument begins with an analysis of the disparate ways that trachoma was understood in the ophthalmological community. I examine debates among medical practitioners on three main themes of trachoma's contested disease identity: its curability, its visibility, and its aetiology. In particular, I focus on debates about trachoma's relationship with race, wherein ophthalmologists attempted to correlate susceptibility to trachoma with racial and climatological factors.

Trachoma's contested and racialised disease identity took on further implications in the port, where it among the most common reasons that potential immigrants were rejected, after the implementation of the 1905 Aliens Act and restrictions against 'undesirable' migrants. Disputed medical concepts like curability and aetiology were applied by immigration officers to justify refusing entry to certain migrants, including refugees fleeing religious or political persecution. Ultimately, this paper considers the way that niche medical debates were culturally diffused and the ways these medical ideas could radically impact the experiences of marginalised, ill individuals.

Bibliographic globalization in the history and historiography of modern mathematics

Michael Barany (University of Edinburgh)

The problem of comprehensive and timely mathematical bibliography was at the forefront of mathematicians' international discussions at the turn of the twentieth century. By mid-century, two dominant enterprises provided the connective infrastructure that would hold together the mathematical literature for the remainder of the century and set the terms for new bibliographic undertakings up to the present: the Europe-based *Zentralblatt für Mathematik und ihre Grenzgebiete* and the America-based *Mathematical Reviews*. These abstracting journals and the large mathematical and publishing networks that contributed to them together created a meaningfully global mathematical literature, changing in the process how mathematicians organized their research communities and their ideas alike.

Creating a coherent literature included developing systems of classification—initially *ad hoc* and variable tables of contents and cumulative indices—that eventually became the formal, hierarchical Mathematics Subject Classification shared between the *Zentralblatt* and *Mathematical Reviews*. Editors and reviewers collaborated to articulate, enforce, and adapt a view of the whole of mathematics that responded both piecemeal and macroscopically to a discipline whose personal, geographical, and intellectual scales expanded dramatically in the latter half of the twentieth century. A view of mathematical globalization that emphasizes the distributed labour and effects of producing an integrated bibliographic infrastructure has consequences both for historical understandings of modern mathematics and for historiographical approaches to accounting for research and institutions in mathematicians' global era. These include hypotheses relating mathematical research infrastructures to organizational forms, career patterns, conceptual structures, and philosophical structuralism connected with modern formations in the discipline.

Regulating the Circulation of Knowledge across Borders: A transnational approach

John Krige (Georgia Institute of Technology)

This paper will explore the contours of a grey zone of knowledge that is neither classified, nor can circulate freely, and then trace the historical arc of one major instrument – export controls – as mobilized by the U.S. national security state to regulate its movement across national borders. With this empirical case study in hand I will discuss the interest of a transnational approach to knowledge circulation as a method that can help us to overcome the more or less total absence of any engagement with this gray zone in the scholarly literature. It is an approach that both encapsulates the role of scientific internationalism but that also escapes from the epistemological obstacles that it places to our understanding of the political economy of knowledge production and circulation in an interconnected world.

3C – Medical Products and Spaces | Chair: Vanessa Heggie**Let the Patient Be Electrified: The Public Understanding of Medical Electricity from Franklinism to Quell®**

Lisa Nocks (IEEE History Centre)

‘The ownership of a knife does not make a surgeon, nor does the ownership of a set of electrical instruments . . . make an electrotherapist’ wrote John E. Butler, in *Textbook of Electro-therapeutics and Electro-surgery* (1878). Likewise, in *Popular Treatise on Medical Electricity* Henry Woodward reminded his readers that medical electricity had efficacy despite ignorant operators who favored ‘long-continued and powerful shocks.’ The popularity of home electrical devices for pain mitigation motivated cries of quackery and inspired warnings even from those who published popular home remedy texts. ‘An invalid who wishes to employ electricity without submitting to the experienced operator’ wrote Edward Bliss Foote in *Plain Home Talk* (1880s), ‘should obtain from an intelligent source, special directions for his individual case.’ We have, in the early twenty-first century, a new phase of popular home electrical devices. Despite our supposed sophistication and their advertised safety, it is unlikely that consumers of TENS or other electrical devices to manage their pain, or who submit to professional electrical stimulus procedures such as Functional Electrical Stimulation (FES) really understand the process, and there is still no consensus about the long-term value of electrical stimulation despite continued research and development. My presentation is a comparative analysis of the promotion and public reception of medical electricity, especially home-use devices as a the basis for arguing that whether or not electrical stimulus devices have efficacy for pain, there is a common social, rather than medical thread that ties current trends in this area to the past.

Pain, Faith and Hope in 19th Century Greek Spas

Melina Kostidi (University of Thessaly)

In ancient Greece the practice of bathing played a very important role in religion and medicine. According to ancient Greek mythology baths purified, healed and offered strength. In ancient Greece water was used for therapy in Asclepieia, the temples of worship of Asclepius. He was the Greek god of medicine who was honoured and worshiped as a hero-healer. In the nineteenth century, Greek state doctors and chemists seemed to have been influenced by ancient Greek and Roman mythology and literature. They stated that baths in Greek myths purified, healed and offered strength. They described the use of baths in ancient times in an effort to encourage their contemporaries to follow the example of their ancient ancestors despite the time distance of thousands of years and the intervening period of Ottoman Occupation.

In my paper I will claim that 19th century medical texts on hot baths offered scientific validity to the Greek spas and created an early form of spa tourism in Greece. The scientific treatises and medical guidebooks to Greek spas are considered valuable historical sources, because patients- in search of hope and relief -used them to find all the relevant information for the trip. On the other hand, doctors were able to recommend the proper form of therapy for their patients. I will argue that the writers of medical texts on Greek spas referred to Hippocrates’ treatise, *On Airs, Waters and Places*, translated by the Enlightenment thinker Adamantios Korais to encourage the use of thermal and sea baths.

Keywords: spas, thermal, bath, medical tourism, gender

UTIs, Dipstick Testing, and Scientific Stagnation in Modern and Contemporary Britain

Agnes Arnold-Forster (McGill)

Urinary tract infections are the most common type of bacterial infection. Women are at greater risk, with a lifetime incidence approaching 50%. Despite this formidable burden on patients and healthcare systems, the history of UTIs is almost unknown. This paper will partially address this lacuna, investigating the development of dipstick testing for UTIs in the 1950s and using oral history interviews to explore the critiques of this diagnostic method that have since emerged among scientists, patient support groups, and activists.

Dipstick testing is supposed to detect evidence for infection in urine samples. However, studies have shown that these tests miss nearly 50% of infections, leaving women with little recourse to effective treatment and vulnerable to chronic or embedded UTIs, and a range of other bladder conditions. This is partly because the threshold for determining the presence of a UTI is based on research carried out in the 1950s, which used urine from women with pyelonephritis, meaning the results were not representative of patients with acute UTIs and the subsequent microbiological threshold developed was too high to identify all infections.

While much of the history of science focuses on progress and positive developments, what can this instance of stagnation and neglect tell us about the priorities of scientific and medical research? In response to this disregard, women have taken matters into their own hands, advocating for better testing and more research. As a result, despite its mundanity – or perhaps because of it – the bladder is a place where multiple issues of modern science and medicine meet.

Session 4 16:00-17:30 BST

Science, Racism, And Colourism In The Modern World- A Global Historical Analysis

This online panel seeks to highlight the work of early career scholars/PhD students actively engaged in research surrounding the history of science, race, and colourism from the late fifteenth to the early twentieth centuries. With globalisation as a strong focus in the history of science currently, this panel will centre the discourse within a transnational and intersectional context, bringing to the fore traditionally marginalised narratives of race, gender, and class; particularly those concerning populations outside Europe and North America.