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Editorial

In a discipline as inclusive as the history of science, this issue's theme, 'unity and disunity', asks us to think across centuries, borders, and scientific boundaries. As the central research strand of this year's European Society for the History of Science conference, organised in conjunction with the BSHS, it is a topic certain to prompt lively discussion and cutting-edge scholarship in 2018.

Noah Moxham considers our theme in relation to his own research and the academic profession as a whole. Then James Palmer examines its link to the problem of 'dark age' science.

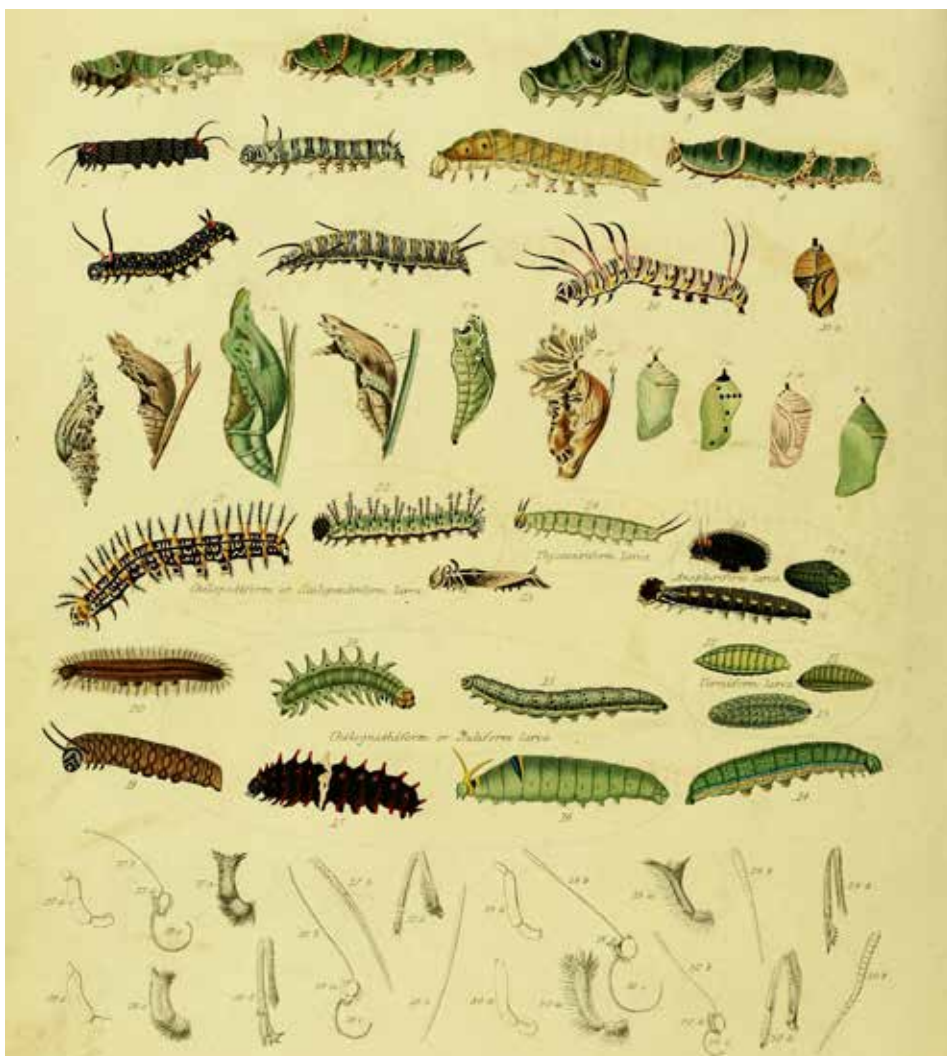
Emily Herring continues the conversation with an article on anti-Darwinian biology in the 20th century, while Anna Gielas reports on her trip to the Teylers Museum in Haarlem.

We also have a research project profile, plus conference and grant reports, and finally an interview with Martha Fleming, currently a Senior Researcher at the British Museum.

I am delighted to be taking over as Editor of *Viewpoint* this issue. Many thanks to Alice for her work on previous issues and during the handover.

Contributions to the next issue should be emailed, by 15 August 2018, to viewpoint@bshs.org.uk.

Hazel Blair, Editor



ABOVE Plate from Thomas Horsfield's *A Catalogue of the Lepidopterous Insects in the Museum of the Hon. East-India Company, Parts I-III (1828-9)*. The catalogue illustrates specimens brought from Java to the Company's museum in London. Image: Public Domain

Unity and Disunity in Academia: Researching Early Modern Science in the 21st Century

Noah Moxham reflects on our issue theme and introduces his latest work on scientific practice in early modern London.

Unity and disunity has, I suspect, a peculiar resonance for academics in general and early career researchers in particular. The dichotomy (or perhaps 'paradox' is a better way to put it) worms its way into every aspect of your working life, large and small. Being securely

employed means becoming subject to a thousand competing and proliferating responsibilities, not all of which necessarily have a lot to do with the qualities that got you appointed in the first place. Not being securely employed often entails subtle and not-so-subtle contortions of your

research persona as you strive to match your supply to the available demand.

At a less existential level, the problem of unity and disunity is built right into the name of our field of the history of science. For early modernists like me this is a low-level irritant – we have to identify ourselves using a term, ‘science’, which we’re supposed to scrupulously avoid in our actual research to avoid anachronism, resulting in some pretty baroque circumlocutions – and for all of us it is a broader methodological headache.

PARADOX AND PLURALITY

To the extent that ‘science’ has meaning as a unitary category in the first place, we spend quite a lot of our working time trying to complicate it. No doubt it would create an alternative set of problems, but I sometimes think it might be worth rechristening the field, in English, ‘history of sciences’. French already does this (*L’histoire des sciences*), and I like the idea of our umbrella term making a point of its own plurality.

After all, if we cannot avoid the paradox, we might as well make a virtue of

it. Reflecting on unity and disunity as a theme has made me realise that it is pretty well the heart of every piece of research I have tackled. I wrote my PhD thesis on the Royal Society’s experiments in building an institutional identity for itself, and the difficulties that arose from its peculiar negotiation between individual and collective effort. The most recent project I was part of, a long history of the world’s first scientific journal, the *Philosophical Transactions*, was about the emergence of a new form of communication that sought to hold together a wild miscellany of content. Creating unity in disunity, in other words, was absolutely fundamental to the enterprise.

Even during an interlude when I was not primarily doing history of science, working on a project on news networks in early modern Europe, we were focused on the sheer variety of disparate components – sites, agents, forms, infrastructures, legal and political jurisdictions – and how they nevertheless added up to an apprehensible and, in an important sense, unified network.

METROPOLITAN SCIENCE

Last year I took up a research post that represented a new departure for me. Jasmine Kilburn-Toppin and I became postdoctoral researchers on a new project led by Rebekah Higgitt and funded by the Leverhulme Trust, titled ‘Metropolitan Science: Places, Objects, and Cultures of Knowledge and Practice in London, 1600-1800’.

Our remit is to look beyond institutions and communities that have received a lot of attention from historians of science – the Royal Society chief among them – and to focus instead on the early modern scientific culture of London in a broader sense. In particular, we are concerned with how artificial and technical practice, and natural knowledge, were made or put to use by communities that had other ends in view than simply to promote science for its own sake.

The notion of unity and disunity is very much built in. On the one hand, we are looking at the ways in which it might make sense to speak of an overall metropolitan scientific culture, but it is our starting position that this emerged from

BELOW Georg Broun and Frans Hogenberg’s 16th-century map of London. Image: Public Domain



The Company in London received detailed reports, specimens, maps, & charts.

a great plurality of forms.

At our opening workshop last June, organised at the Science Museum by Jim Bennett, 27 different sites, communities, and institutions were represented, so that, as Jim put it the time, we would at least have some idea at the end of the project of what we had inevitably left out. A necessarily partial idea, he added, since that list of 27 is not by any means exhaustive.

Some of those were institutional creations, others less formally defined communities emerging at the intersection of professional, commercial, and amateur interests in areas like mathematics, chemistry, and botany.

Many of those communities were primarily commercial, such as London's livery companies, regulating its skilled trades, and the long-distance monopoly trading companies, such as the East India Company (f. 1600) and the Hudson's Bay Company trading into Canada (f. 1670). We are looking at those communities in particular, and the kinds of natural knowledge and technical practice they embodied or found it useful to acquire, conceal, or possibly display. We are interested in how they are constituted – lots of these bodies have a formal corporate existence granted by royal charter – but the corporate and professional outlines of those communities did not always match up exactly. London's makers of scientific instruments, for example, did not have their own guild during 17th and 18th centuries, and their members belonged to an array of different companies, which makes for an interestingly fraught trading market and regulatory environment.

THE GOLDSMITHS' COMPANY

And, of course, people slipped between contexts, where they acted differently. As Jasmine's research shows, the expert assayers of the Goldsmiths' Company, who assessed the purity of the metal worked by its members, were also the same people whose expertise the Royal Mint relied on to assess the purity of the coinage. Their

work had national economic importance and there was no easy way of verifying their honesty independently, so the question arises of how public interests aligned with private and corporate ones, and what redress there was when unity between them fell into disunity.

Similar issues arise in the areas I'm focusing on in my own research into the history of the East India Company. In the second half of the 18th century, when the Company acquired a vast territorial empire on the Indian subcontinent, more and more people came to question its legitimacy. It found itself needing to acquire systematic information about the extent, population, and products of its new territories so as to exploit them to the full. It dispatched expert surveyors, botanists, hydrographers, and astronomers to India, and in return the Company in London received detailed reports, specimens, maps, and charts.

KNOWLEDGE COMMUNITIES

Much of that new knowledge was treated as commercially or militarily sensitive, and it was stored and processed centrally, being disseminated only among the Company's servants. In that sense the Company was very much concerned with building communities of knowledge and practice that were limited in scope and tailored to the Company's commercial ends.

At the same time, though, we can detect a greater public commitment on the Company's part to furthering natural knowledge for its own sake, collaborating with organisations like the Royal Society, or the Board of Trade, or the Society of Arts. Manifesting itself as a different type of knowledge community may have helped the Company to project itself as making positive (if disinterested) contributions to national life at a time when its commercial monopoly and its administration of Indian territory were under scrutiny like never before.

These are just a few examples from the early stages of our research. For my colleagues and me, unity and disunity is not so much an occasional preoccupation as the ground state of being. More than that, it is like a natural law – in this case, an inversion of the uncertainty principle. Try to bring one element into focus and the other, instead of vanishing, heaves inexorably into view while the thing you were originally trying to concentrate on suddenly becomes elusive, and the cycle begins again. •

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Notices

ESHS Conference 2018

Registration for the 8th European Society for the History of Science (ESHS) Biennial Conference in London (14-17 September 2018) will close on 30 July.

The conference – co-hosted by BSHS – will centre on the theme 'Unity and Disunity'.

To register, please visit the conference page online at: www.eshs2018.uk.

Correction: surname slip-up

Last issue we interviewed Erin Beeston about PhD life and her research into the history of Liverpool Road Station (*Viewpoint* 115).

Rather embarrassingly, we wrote that her surname was 'Beetson' when it should, of course, have been 'Beeston'. Erin was incredibly gracious when we apologised and simply thanked us that we had not called her 'Eric'.

You can follow Erin's Twitter updates on the station, academia, and life at @Erin_bee.

2018 BSHS Dingle Prize

Every two years, the BSHS awards the Dingle Prize for the best popular book on the history of science.

This year's winner is Andrea Wulf for *The Invention of Nature: the Adventures of Alexander von Humboldt, the Lost Hero of Science* (John Murray, 2015).

The Prize was established in 1997 to mark the 50th anniversary of the Society, and is named after the mathematician, astronomer, and philosopher of science Herbert Dingle, a founder member of the BSHS.

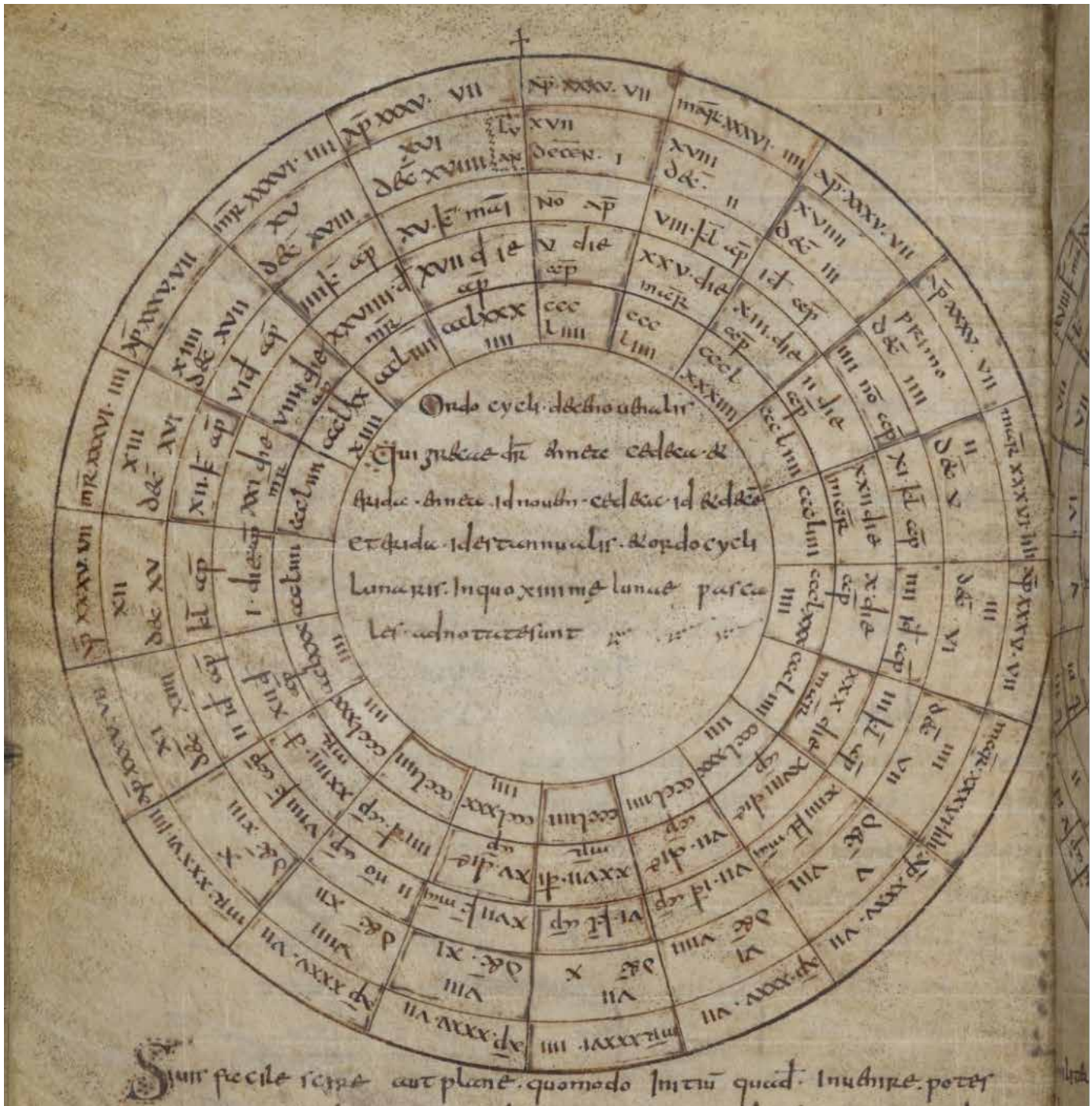
Largest-ever Sun Exhibition

A huge exhibition about the Sun will open at the Science Museum in Kensington on 6 October.

The Sun: Living With Our Star will feature unique artefacts and interactive experiences. For tickets, see my.sciencemuseum.org.uk.

Unity and Disunity in Science's European 'Dark Age That Wasn't'

James Palmer's new Leverhulme-funded project tackles some common misunderstandings about science in the early medieval period.



What happened to science when the Roman Empire broke up in the 5th century? The Romans were good at science and technology. They built aqueducts and impressive basilicas. They studied the stars, developed new techniques of agricultural management, and carefully examined the properties of medicinal herbs. They took knowledge seriously. Some of them, anyway.

It is often alleged that this changed dramatically in the 4th century with the spread of Christianity in Western Europe. For post-Enlightenment scholars – notably Edward Gibbon (d. 1794), author of *The Decline and Fall of the Roman Empire* – unquestioning faith and devotion undermined the intellectual and spiritual rigour of the Roman world. When barbarian groups migrated into the empire from north and east of the Rhine and Danube rivers, civilisation could scarcely keep going: the empire became kingdoms, law became strained, and learning ground to a halt. A ‘dark age’ had begun.

EARLY CHRISTIAN SCIENCE

But had it? Over the last generation, historians have become well-versed at exposing the forgotten complexity and vitality of the empire’s troubled last century, as well as the richness in the centuries that followed. Critics at the time, such as the 5th-century writer Salvian of Marseilles or the 6th-century British monk Gildas, could be gloomy about the changing social and political world around them. Some could be outright apocalyptic. That does not mean that those voices were the only ones or that their hyperbole accurately reflected everything about their world. The presence of gloomy critics does not mean everything collapsed.

Christians did not, for a start, insist on a simple rejection of sciences. As Rome’s crisis grew, in North Africa St Augustine of Hippo (d. 430) attempted to defend a (mostly) literal interpretation of the account of Creation in Genesis. But he acknowledged that there were many things about nature that could be learned or calculated, and indeed many things that were compatible with belief. Christians, he argued, did their faith a disservice by refusing to engage with such knowledge or making mad statements about it. Any rejection of scientific knowledge because it contradicted faith needed to be conducted in the context of reasoned debate as far as possible.

Augustine’s arguments, if accepted,

scarcely amounted to a complete retreat into biblical scripture. Over a century later in southern Italy, Cassiodorus (d. c. 585) recommended a wide range of readings on mathematics, astronomy, and nature as part of a reformed, Christianised syllabus for his monks. Many authors he recommended as authoritative, including Ptolemy and Varro, were not even Christian. What one needed, he reckoned, was simply knowledge that was useful to faith. But how limiting was such a definition in practice? Cassiodorus wrote about self-fuelling mechanical lamps and water clocks to assist scribes copying books. Conservatism had space for innovation and novelty where ‘useful’.

One might reasonably contend that Augustine and Cassiodorus were far from representative figures of their age. These were prolific and unusual intellectuals, who became famous because they

The richest source of science-based evidence for the period is computus.

appealed to later generations. Indeed, many of their works are known only from later copies.

Here, an important issue is that we do not know exactly what we have lost from the period. Three times as many books have survived from the 9th century alone as from the preceding centuries. But given how many of those 9th-century books were clearly copied from older books, we have evidently lost entire libraries to the ravages of time. We might have lost much, if not most, ‘dark age’ science. We also need to remember that it was through the efforts of early medieval monastic libraries that we have any knowledge of the ‘golden age’ of Roman science in the first place!

The richest source of science-based evidence for the period is computus. Computus is, roughly, the body of astronomical, mathematical, and biblical knowledge that one would need to calculate the first Sunday after the first full moon after the vernal equinox – i.e. Easter. It is highly technical because it

involves synchronising lunar and solar cycles – two things that do not naturally correspond to each other. But it all has to be calculated in advance, rather than by simply observing the age of the moon, because Christians have to observe Lent for 40 days before Easter.

DIVERSE CALCULATIONS

In the context of theories about a ‘dark age’ for science, computus highlights some interesting issues because of its diversity. There was a widespread preference for calculations based on Greek technical models because Alexandria had been the recognised centre of expertise in the Roman Empire. But the adaptation and refinement of that knowledge for calculating Easter, often shaped by local preferences for when Easter should or should not fall, meant that lively debate raged on.

Cummian, writing in early 7th-century Ireland, knew ten different reckonings from across Europe. Communities everywhere had to defend their choices, leading to major public debates such as the Synod of Whitby in 664 and the Council of Soissons in 744 where authority and accuracy were key issues.

Debates about the practical application of scientific knowledge did not exhaust early medieval interests. The famous encyclopaedic works of Isidore of Seville, also in the 7th century, set the tone well, with a range of reflections on astronomy, arithmetic, geometry, medicine, and the natural world more generally. And he was not that unusual: in the centuries that followed, such works proliferated and were copied widely, for audiences from the monastic to the imperial. For sure, it was not always ‘good’ science. But neither was it suppressed unthinkingly by an ecclesiastical conspiracy.

One of the biggest questions historians of early medieval science now have is why previous generations of historians thought there was such a stark ‘dark age’ after the 5th century.

Part of the answer is that surprisingly little work has been done identifying, cataloguing, editing, or analysing the sources. Only recently, Immo Warntjes and Jacopo Bisagni found an unknown 8th-century text for calculating eclipses. It is the kind of thing many historians have assumed never existed. In fact, it seems early medieval science is still waiting to be discovered in all its diversity. •

OPPOSITE An 8th-century rota with information on the lunar cycle. Image: © British Library Board, BL Cotton Caligula A xv, f. 108v.

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French *Naturalistes* vs Darwinian Specialists: Unity and Disunity in 20th-century Biology

Emily Herring explores the work of the post-war French scientists who challenged Darwin.

At the end of a career of almost six decades, in the first pages of the last book he would ever publish, French zoologist and evolutionary biologist Pierre-Paul Grassé wrote:

Everyone should know by now that Darwinism is an ideological system that does not account for evolution in the slightest.

Without any additional context, one might speculate that this statement was written during the 'Eclipse of Darwinism', the period spanning the late 19th century to the early decades of the 20th century, during which the validity of Darwin's theory of natural selection was contested and rival evolutionary theories were proposed. However, Grassé wrote these words much later, in 1980, at which point Darwinism had long outshone the rival theories that had once eclipsed it.

THE MODERN SYNTHESIS

Indeed, between the 1930s and 1950s, Darwinism had reinvented itself, successfully combining the findings of Mendelian genetics and the Darwinian theory of evolution by natural selection, thus providing a common framework for biological research. This ambitious enterprise, later named the 'Modern Synthesis' by Julian Huxley, one of its architects, was the result of the collective works of life scientists from different theoretical backgrounds (including genetics, embryology, ecology, zoology, palaeontology, and botany).

For the remainder of the 20th Century, this new Darwinism was the dominant research framework in evolutionary biology. The architects of the Synthesis

retrospectively presented their work as the first successful unification of biology into a single coherent science. The group, though dominated by English-speaking scientists, was fairly international. However, as another architect of the Synthesis Ernst Mayr noted, France was the one major scientific nation that did not get the Neo-Darwinian memo. Grassé and several of his colleagues represent a little-studied case of institutionalised 20th-century anti-Darwinism.

In post-war France being anti-Darwinian was not synonymous with professional marginalisation.

At first glance Grassé's radical position might appear to be nothing more than a historical curiosity, but he was in fact one of the most respected scientists of his time in his own country. Twentieth-century biology in France was something of an oddity. The first chair of genetics was created in 1945 – decidedly late in comparison to other Western countries. Similarly, institutionalised anti-Darwinism persisted late into the

20th century in France. The Chair of 'Evolution of Organised Beings' at the Sorbonne was held by a stream of anti-Darwinian, Lamarckian biologists from its creation in 1888 until late into the 20th century.

Grassé, who held the chair from 1940 to 1967, was a renowned entomologist who spent most of his career working on his monumental *Traité de Zoologie*, which was published in 48 volumes. This zoological encyclopaedia was an absolute reference for French biology students who would, up until quite recently, refer to it as 'Le Grassé'. Over the course of his career, Grassé also published several books on evolution in which he persistently and vehemently criticised the Modern Synthesis.

In post-war France, then, being anti-Darwinian was not synonymous with professional marginalisation. *Au contraire!* Institutionally speaking, Grassé was one of the most powerful scientists of his day. In addition, he was far from being alone in harbouring such sentiments. Among the many French life scientists who held similar views was his friend and fellow entomologist Albert Vandel, who published over 150 papers on terrestrial isopods (or cockroaches as they are more commonly known). Like Grassé, Vandel wrote several books on evolution with a strong anti-Darwinian agenda. In a 1961 talk, he declared:

Evolutionism would have known a better development if, fifty years after [the publication of Lamarck's Philosophie Zoologique], Darwin hadn't driven it down an unfortunate route where it almost got stuck.

These zoologists took issue with the main conceptual components of the theory of evolution *à la* Modern Synthesis. First, the Neo-Darwinian notion of adaptation, they said, rendered organisms too passive. Adaptation should be conceived as autoregulation, as the organism actively reacting to changes in the environment rather than the organism passively 'being adapted' by natural selection.

They also rejected the Neo-Darwinian idea that the accumulation of accidental genetic mutations, in conjunction with natural selection, could give rise to complex structures such as the eye or the human brain.

Their evolutionary works contained lengthy rebuttals of Neo-Darwinian theories. However, they failed to provide an alternative explanation for evolution that could replace natural selection. Therefore, in order to establish themselves as legitimate alternatives to their Neo-Darwinian adversaries, Grassé and Vandel had to resort to different strategies, some more historical than biological.

NATIONALISTIC BIOLOGY

They wrote their own versions of the history of biology in which Jean-Baptiste de Lamarck was the heroic father of evolution, with Darwin relegated to the role of talented but unoriginal supporting act. They made no attempt to disguise the nationalistic character of their narratives, insisting that their evolutionism was linked to French thinkers such as Lamarck, philosopher Henri Bergson, and Jesuit palaeontologist Pierre Teilhard de Chardin. The rival Anglo-American tradition, to which the Modern Synthesis belonged, had, they said, given rise to considerably less iconic geniuses.

As the representatives of the 'intellectually superior' French tradition, Vandel and Grassé saw themselves as belonging to a proud lineage of *naturalistes*, or thinkers possessing encyclopaedic knowledge and mastering numerous scientific disciplines like the great French naturalists of the past, Buffon, Cuvier, and Lamarck. According to this view, the Neo-Darwinians of the Modern Synthesis, on the other hand, glorified a different kind of scientist, one who had emerged more recently: the specialist.

There was, according to Vandel and Grassé, an inferior (Darwinian) synthesis and a true synthesis. Their 'true synthesis' all took place in one mind, the mind of the *naturaliste*. The Darwinian scientist lacked the intellectual depth that only a genius having devoted their life to the study of nature could possess. The Modern Synthesis was inferior because it was an incoherent aggregate of independent



ABOVE Jean-Baptiste Lamarck represented in a stipple engraving by A Tardieu, after Julien Léopold Boilly, 1821. Vandel and Grassé saw Lamarck as the hero of French evolutionism. Image: Wellcome Collection, CC-BY-4.0

specialities with no internal harmony.

Both zoologists drew a parallel between the intellectually infertile Modern Synthesis enterprise and the evolutionary process itself: in the same way that groups of organisms that are too specialised, in structure and behaviour, are doomed to go extinct because they are no longer able to create new solutions in a changing environment, scientific research programs resting upon specialisation provided a superficial and ultimately unproductive understanding of nature.

Enthusiasts for the Modern Synthesis in Britain and North America, well assured that their strategy would in fact allow

them to carry biology into the future, did not feel the need to respond to these attacks from across the Channel, or pond, respectively.

Grassé and Vandel's persistent assaults, on the other hand, translated their fear of seeing their own kind, the noble *naturaliste*, go extinct, and their nostalgia for the bygone era when it was still possible for one individual to hold a whole body of knowledge together in one mind. •

Forgotten Periodicals of the Teylers Museum in Haarlem

Anna Gielas speaks to curators Trienke van der Spek and Esther van Gelder about a little-known collection of scientific journals in the Netherlands.



ABOVE The periodicals section of the Teylers Museum in Haarlem. The library boasts over 5,000 titles and over 100,000 copies of periodicals from all over the world. All images: courtesy of the Teylers Museum, Haarlem.

One of the first things Martinus Van Marum (1750-1837) did as the director of the newly-founded Teylers Museum in Haarlem was to set up numerous subscriptions to philosophical journals. Since its inception in 1784, the Museum has been overseen by the two Teylers Societies, one for philosophy and arts, the other for religion. 'The central goals of the Museum were to make research possible for experimenters and knowledge accessible to the interested public,'

explains Trienke van der Spek, the Head of the Science Department and Chief Science Curator.

SCIENTIFIC EXCHANGE

From the very beginning, philosophical journals have been a crucial acquisition category. Van Marum did not only procure leading and internationally known periodicals run by individual editors, such as Lorenz Crell's 18th-century chemical journals, and later the *Annales*

de Chimie of Louis Bernard Guyton de Morveau, Antoine de Lavoisier, and others, as well as William Nicholson's *Journal of Natural Philosophy, Chemistry, and the Arts*. He also initiated an exchange system with European societies and academies. For example, he regularly sent the Teylers Society transactions (which were printed in French and Dutch) to the Royal Society, receiving the *Philosophical Transactions* in return.

Like in the case of the *Transactions*,

which could not be acquired from the Society by individuals who were not Fellows, van Marum acquired study material that the Haarlem philosophers could hardly obtain or afford otherwise. And because the town had no university, Teylers served a crucial function for both local and regional researchers during the 18th and 19th centuries.

As a site of research, Teylers offered impressive facilities to experimenters: 'With the biggest electrostatic friction machine of its time as the most prominent feature, the museum was a state-of-the-art electrical research laboratory when it opened its doors in 1784,' explains Esther van Gelder, Junior Science Curator at Teylers Museum.

The costly equipment, and the Museum in general, were set up through the bequest of the tradesman Pieter Teyler (1702-1778). He bequeathed all his possessions to the Teylers Foundation, initially headed by five of his closest friends. It was the Foundation that started the two Teylers Societies.

Pieter Teyler was motivated by enlightened ideals rather than any notable passion for natural philosophy. What Teyler lacked in philosophical interest Van Marum made up for with fervent ambitions: 'He wanted Teylers to fulfil a national role as a philosophical and technological centre for research and education,' van der Spek has discovered.

DUTCH KNOWLEDGE CENTRE

Van Marum's grand plan was inspired by Napoleon's efforts to install similar institutes in France. The Dutch philosopher corresponded with Louis Napoleon, who reigned the Netherlands, about this possibility. 'But van Marum's aspirations were, in this respect, far bigger than those of the societies' directors, which led to discussions, restrictions in his budget, and ultimately a big clash,' van der Spek adds.

Over the last 234 years, Teylers has not just survived minor and major challenges, but it has also managed to maintain a notable unity of philosophical collections and sites: 'The journals, minerals, books, and other material from the 18th, 19th, and 20th centuries, as well as the building itself, have remained completely intact,' van der Spek emphasises. 'The collections, the library, and the archive are all kept *in situ*, and even the two Teylers Societies and the Teylers Foundation exist until the current day,' she continues.

In the 1950s, Teylers stopped being a science institution and became primarily devoted to maintaining heritage



ABOVE The Museum is considering digitising its collection of Dutch periodicals to make them more accessible to researchers and the public. The curators welcome feedback on their digitisation plans.

Van Marum's grand plan was inspired by Napoleon's efforts to install similar institutes in France.

and serving the public. But one of the librarians tried to uphold the notable exchange system of periodicals – and succeeded until the 1980s. At this point, Teylers received the transactions and proceedings from over 500 societies around the world, including those published in Ukraine and Chile.

A FORGOTTEN COLLECTION

Little-known to scholars and the public, the Museum today holds over 100,000 copies of periodicals. 'Our collection includes 5,000 titles,' says van Gelder. 'The Teylers journal collection boasts

complete runs of all major European academies and learned societies, and could potentially reflect the changes in science communication from the late 17th to the 20th centuries.'

The Teylers curators plan to publish an online catalogue of the museum's journal collection sometime this summer. And they also want to go a step further: they would like to make parts of the journal collection available online. Having all necessary equipment at hand, van der Spek and van Gelder ponder the idea of digitising the periodicals.

The ever-increasing number of digitisation projects has led to complete volumes of transactions, proceedings, and journals from the last 350 years being made readily available on the web. But in contrast to the unity and wholeness of available volumes, the scholarship on this historical medium remains fragmentary.

Notable accounts of the history of philosophical periodicals and their editorship do exist, including the scholarship on the *Philosophical Transactions* by Aileen Fyfe, and on *Nature* by Melinda Baldwin. Some transnational, comparative research on how periodicals were established as an infrastructural element of knowledge production has also been undertaken by Alex Csizsar.

But what is currently missing is a comprehensive understanding of today's scientific journal's history.



ABOVE Detail from the Teylers Postroom: unbound journals ready to be sent out to other libraries worldwide. Initiated by Van Marum, the notable journal exchange system at Teylers has resulted in the museum's possession of a diverse collection of scientific journals. This is a rich resource that the curators hope to bring to the attention of scholars worldwide.

Van der Spek and van Gelder wonder whether there are ways to make the Teylers collection useful to periodical scholarship in general and the history of science in particular. The two curators support the Museum as a site of research. And so, van der Spek and van Gelder ask, what exactly should be digitised?

Since most of the English, French, and German periodicals in the Teylers collec-

tion are available on the internet, the two curators are considering scanning only the Dutch journals.

WHAT TO DIGITISE?

'Should we focus on a small corpus or digitise a bigger selection? Or maybe only the plates – and integrate them with already existing platforms for digitised journals?' van Gelder wonders. It is questions like these with which the two curators also turn to the BSHS and its members for advice and information.

Periodicals have helped to unify and foster philosophical endeavours. Now we as scholars of these endeavours are invited to use the philosophical periodical more strategically, to foster historical research and understanding.

The periodicals will be available shortly at: www.teylersmuseum.nl/nl/collectie/boeken-overzicht. •

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FURTHER INFORMATION

Teylers Museum is open Tuesday-Friday, 10am-5pm; Saturday, Sunday, and Public Holidays, 11am-5pm.

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'Should we focus on a small corpus or digitise a bigger selection? Or maybe only the plates...'

PROJECT PROFILE:

'Narrative Science' at LSE

What functions do narratives play in science? The **Narrative Science** team introduce their new EU-funded project currently under way at London School of Economics.

We are an interdisciplinary group of historians and philosophers of science based at the London School of Economics and Political Science, with specialist expertise ranging across psychology, chemistry, geology, economics, and biology. It is a great pleasure to offer the readers of *Viewpoint* a tour around our project, and we hope to involve many of you in our panels, workshops, reading groups, and conferences over the next three years. This introduction is also therefore an invitation to come and make yourselves at home.

NARRATIVE KNOWING

Historians care deeply about narrative, carefully composing their own and attending to narratives that make up the existing historiography. But thanks to its epistemic features and functions, narrative matters for a whole host of other enterprises, particularly within science, technology, and medicine. This observation is exciting because it means a form of analysis and understanding in which we historians are particularly expert can be found operating inside the very contexts that we study.

Thus far, this deeper exploration of narrative in knowledge-making has only been pursued in select HPS contexts, some of the best-known examples following the tradition established by Gillian Beer in her work on Darwin. In addition, HPS scholars have moved well beyond an understanding of science as necessarily grounded by natural law, to expand the range of ways to know, or styles of reasoning, that might exist in knowledge communities. Here our attention to narrative contributes to and builds upon the likes of *Science Without Laws* (2007). Our project – 'Narrative Science' – harnesses all of this momentum, to compile case studies and create resources that comprehensively map 'narrative knowing'.

The project is motivated by the observation that large areas of knowledge, practice, and communication within scientific communities exhibit, or are constituted by, narrative. The emphasis we have just placed on narrative within the communal work of scientists, engineers,



ABOVE The Narrative Science team with speakers and participants at their latest workshop, 'Narrative Science and its Visual Practices', held in April 2018.

medical professionals, anthropologists, or whomever we might be studying, serves an important purpose. When we offer the idea of 'narrative science' to people, their first thoughts are often about the dissemination of science to wider audiences, an activity in which the 'fashioning of a narrative' clearly plays an important role. This is, after all, one of the historian's own primary activities.

We recognise the importance of such phenomena, but we feel it is an aspect of history that is already sufficiently covered by historians of public science and publishing. We are therefore choosing to put our energies into the exploration of examples that are not so well explored, mapped, or understood, and our emphasis on narrative knowledge-making and sharing *within* practitioner communities is intended to guard against mission creep. Our kinds of narrative starting points might include the developmental narratives of embryology, geological reckoning through time, a chemist's completion of a new synthesis, and the writing of psychological observations.

DEFINING 'NARRATIVE'

All this talk of narrative prompts the question of definitions. Well, within HPS and STS, we are quite comfortable keeping

the definition of narrative open, leaving everyone free to develop the most appropriate labels for their sites. At the same time, this openness of definition does not mean we are proceeding without any sensitising guides. Existing work in literary criticism and narratology can help elucidate the structures and functions of narrative science.

Accordingly, we have been dedicating part of our time to select readings in these areas, including 'Embedded Narratives and Tellability' by Marie-Laure Ryan (1986), Gérard Genette's *Narrative Discourse* (English translation 1980), and Hénaff and Morhange on 'The Anecdotal' (2009). Even at this early stage such cross-pollination is proving to be exceptionally productive and stimulating, though we anticipate the need to start developing narrative categories of our own, ones better suited to describing the work of narrative in the sciences.

One good example of where these interests and aims are leading us appeared in our most recent workshop 'Narrative Science and its Visual Practices'. Science abounds with visual materials: 3D models, photos, diagrams, maps, graphs, and so on. Scholars in the history, philosophy, and social studies of science have highlighted various features and

roles of these objects and the practices in which they are embedded, including reasoning, speculation, demonstration, illustration, and communication.

In our workshop, our invited speakers focussed on the association of visual practices with narratives. In some cases, visual objects embed narrative qualities in themselves; in other cases, narratives are needed to make sense of the visual materials. Future workshops will likely include emphases on sciences that sometimes take a historical turn (geology, evolutionary biology, and so on), as well as narrative expertise in professional settings like social work, accounting, law, and engineering.

JOIN THE DISCUSSION

We hope this introduction whets your appetite. Our materials will soon begin to find their way online through our dedicated website, which is currently under construction. In addition, you can come and join in the discussion at various international conferences this year, including HSS, SHOT, ESHHS, and of course the 'unity and disunity'-themed ESHS meeting in London.

For those of you who want to get stuck in straight away, we are happy to report that a special issue on 'Narrative in Science' has already been published in *Studies in History and Philosophy of Science* (volume 62, 2017). This includes papers on the role of narrative in political science, palaeontology, biology, social science, natural history, the clinic, and chemistry, alongside more extensive introductions to the idea of narrative science.

If you begin to suspect there may be narrative science operating in your context of study, we would love to hear from you. Thank you to *Viewpoint* for this opportunity to say hello! •

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This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme. The principal investigator is Professor Mary S Morgan, and postdoctoral researchers include Dr Sabine Baier, Dr Dominic Berry, Dr Kim Hajek, Dr Andrew Hopkins, Dr Robert Meunier, and Dr Mat Paskins. In the first instance, please direct correspondence Dr Berry.

Conference Report: BSHS Postgraduate Conference

UNIVERSITY OF MANCHESTER, 4-6 APRIL 2018

Peter Rees and **Chase Caldwell Smith** share the highlights.



Images (L-R, clockwise): Harriet Palfreyman; Grant Collier; Kim Walker; Grant Collier.

Over 70 early-career researchers descended on the University of Manchester Centre for the History of Science, Technology, and Medicine (CHSTM) for the three-day BSHS Postgraduate Conference in April. Attendees hailed from all over the world, including Russia, Turkey, Germany, France, Denmark, the US, and throughout the UK.

The location was apt: several papers based their arguments directly on historical sources from Manchester or wove the city into their narratives. CHSTM engaged delegates with the city's rich history through a selection of field trips, including a historical walking tour, a visit to the Manchester Museum, and a tour of the world's oldest inter-city passenger train station, located on the grounds of the Manchester Museum of Science and Industry. Erin Beeston, outgoing BSHS Student Representative and a CHSTM PhD student, led the captivating tour of this train station, which is the subject of her own research.

Each evening delegates enjoyed relaxed social events in the heart of the city. First, a wine reception offered the opportunity to mingle and learn about each others' interests. For several attendees, ourselves included, this was their first experience of a history of science conference outside of

their own department, so the chance to make inter-university friendships was particularly exciting. On the next evening we enjoyed Bright Club Manchester, a hilarious set of stand-up comedy acts where performers poked fun at their academic endeavours, quirks, and dilemmas.

The friendly and supportive atmosphere of these social events extended to the academic sessions. The conference papers covered a wide variety of subjects, with panels ranging from 'Borders and Boundaries' to 'Understanding Animals', and from 'Tradition and Change in Medicine' to 'Dis/Abling Discourse and Dis/Abled Bodies'. All three of S, T, and M were approached from a number of angles, so we can only hope to offer some personal highlights.

GEOGRAPHIES OF SCIENCE

One prominent theme was geography and the environment, and the 'Geographies of Science' panel brought together students studying subjects as diverse as the vertical scientific histories of the Himalayan Mountains, the circulation and significance of French cartographic images during the reign of Louis XIV, and the evolution of the word 'milieu' in the ontological history of the environment. Pratik Chakrabarti also addressed this theme in his keynote lecture, reflecting

on what he termed the 'naturalisation of history' in early 19th-century India.

A second exciting theme, the relationship between science and society, was most explicitly investigated through the 'Science, Nations, and the State' panel. The first paper explored the influence of dialectical materialism and state-planning on penal science in 1920s Soviet Russia. We then moved to the Philippines and into the 1930s for the second paper to discuss the Filipino scientific community under American administration and its central role in postcolonial nation-building.

The third paper explored Cold War-era scientific diplomacy through the establishment and development of the Scientific Committee on Antarctic Research. This science and society theme was also taken up by a paper on a different panel, through the radio airwaves of British science populariser John Maynard Smith, whose dulcet tones were broadcast to the lecture theatre as the talk's finale.

SCIENCE AND LITERATURE

Science and literature, and the history of the book, were interrogated in the 'Reading Science' panel. One paper analysed marginalia in copies of Isaac Newton's *Principia Mathematica* (1687) to infer possible ways in which this text may have been read. Another paper used mid 19th-century check-out lists from the Manchester Free Library, the first free library in England following the 1850 Public Libraries Act, to explore the diverse backgrounds of readers of scientific and philosophical texts. This idea of close-reading and engaging with scientific thought through texts was present in several papers, suggesting its importance as a theme.

The conference provided an insight into the expansive scope and possibilities of our discipline. As early-career researchers, we found this opportunity to present an academic paper and engage in intellectual discourse in a supportive but rigorous setting extremely valuable.

We extend heartfelt thanks to CHSTM for hosting, and in particular to the student convenors whose hard work was reflected in the smoothness and success of the conference.

Thank you to all fellow delegates for the stimulating papers, extensive discussions, laughter, and convivial atmosphere. There is much to be excited about in the future of the history of science, technology, and medicine! •

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Grant Report: Women's Antarctic Research

Morgan Seag reports on a breathtaking find made possible through BSHS funding.

I've been searching for Dr Lois Jones. You've probably never heard of her, even though she's the very sort of 'pioneering' woman in science we have been celebrating in recent years.

Dr Jones was the first American woman to lead a scientific expedition to Antarctica. The promising young geochemist submitted a proposal to the National Science Foundation's Office of Antarctic Programs in 1969, just after completing her PhD, at a time when women were still barred from US Antarctic stations.

ANTARCTIC RESEARCH

Dr Jones's proposal was eventually approved by the NSF, albeit with caveats: she was to put together an all-female team, and the women were to be based in the remote field, far from the nearest station (lest they mix too much the opposite sex). The team understood that if they failed, it would jeopardise women's future access to the continent.

With the successful completion of the expedition in 1970, Dr Jones and her team broke the 'ice ceiling' for generations of women and changed the way scientists thought about chemical weathering in the Antarctic Dry Valleys.

One of the reasons you are unlikely to have heard of Dr Jones is that after the expedition she never conducted Antarctic fieldwork again. After several years at the University of Georgia, where tenure

appeared to be out-of-reach for a woman in her all-male department, she spent most of her career at an oil company. She did excellent work, but not the sort that draws the attention of historians of science.

Dr Jones died in 2000, before her time and without close family. She left behind only one substantial interview and no oral history. She wrote no autobiography, and aside from a slide collection, she did not leave her personal records to an archive. In fact, most accounts of her role in Antarctic history have been narrated by men, one of whom, the director of her research institute, claimed to have 'liberated the continent for women' in 1969. However tongue-in-cheek his sentiment may have been, his became the authoritative perspective, leaving any agency on the part of Dr Jones unspoken.

We are left to wonder: what did it take for the young female scientist to gain access to this all-male space? Did she have to beat down the door, or was it opened from within? Why did she not return, as many of her male colleagues would have done? And why, after displaying such passionate commitment to her Antarctic research, did she leave the field for an industry lab?

The historian's hunch suggests we could learn much about how Antarctic science became more gender inclusive if only we knew the lost stories of women like Dr Jones.

Last year, BSHS generously awarded me a grant to travel to the Ohio State University (OSU), where Dr Jones based most of her Antarctic research. After a year of searching, I was resigned to the fact that surviving materials about Dr Jones's contributions are mainly preserved in the archives of male administrators, so at OSU I planned to sift through the records of men who had overseen her research. But I also kept tracing leads, hoping to find a different, more personal perspective on her – ideally an autobiographical one.

A TRIP TO OHIO

Persistence paid off. On 31 March, I found myself in the suburbs of Columbus, Ohio, sitting in the sunroom of one of Dr Jones's lifelong friends. With us were three of her daughters (Dr Jones was 'Auntie Lois') and a family friend. These five women reminisced for hours about Lois, sharing anecdotes and photographs of the brilliant, funny, generous woman they so loved. Lois was the prankster in her lab; Lois took young female scientists under her wing; Lois donated huge sums to fund a scholarship at OSU; Lois bequeathed her home to her housekeeper.

And then, they discussed the records Lois left behind. They shared boxes of papers, personal records, and objects belonging to Lois, much of which had been sitting in their basements for years. My historian's heart skipped a beat. We spoke about the significance of these materials and agreed they were worthy of an archive. I put the women in touch with the Byrd Polar Archives at OSU; at least one has already begun the archiving process. This contribution to the historical record of Antarctic science, and to my PhD thesis on the subject, would not have been possible without the generous support of BSHS. I am truly grateful, and I look forward to publishing the results of my research soon.

The day after my sunroom chat with Lois's family-of-friends, I drove to the cemetery where most of Lois's ashes are buried. I left flowers and delighted in a story the women had shared: Lois, ever fun-loving, was buried there beneath her tombstone, in a coffee carafe shaped like a penguin. Lois may not have returned to 'the ice' as a scientist, but Antarctica never left her. •

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The Viewpoint Interview



Martha Fleming is a historian of science, curator, and artist with an interdisciplinary career spanning several decades. She is currently a Senior Researcher at the British Museum.

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

I have always been interested in methodologies – how they emerge and evolve and how they are valued; their assumptions and blind spots. Knowledge producing processes of all kinds, regardless of discipline or practice, interest me, and in that regard I think my form of history of science is more in line with its continental incarnation, *Wissenschaftsgeschichte*, which incorporates humanities, collecting practices, and cultural productions such as visual and other arts into its remit.

My first contact with history of science came when producing a large-scale collaborative art installation, 'Le Musée des Sciences' (Montreal, 1984) with my then partner, Lyne Lapointe. The project integrated epistemologies of science – mainly medical science – with institutional and representational critique and urban activism. That is when I first read Foucault, Feyerabend, Sander Gilman's *Seeing the Insane* (1982), and Donna Haraway's *Crystals, Fabrics, and Fields* (1976) among others. It was like a cloak of unknowing lifted – I found it existentially as well as intellectually profoundly nourishing.

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

My best 'dinnertables in science' is perhaps more apt – when I was Development Manager at the Royal

Society, I was able to attend the evening dinners that last the entire week of the RS Summer Exhibition. These assemble the most astonishing crosscut of actors and agents in British scientific research, industry, politics, journalism, communication, and philanthropy. Among the guests are some of the most amazing minds, and the conversations overheard are fascinating for understanding late 20th- and early 21st-century science.

What has been your best career moment?

The best career moments are always those where the collaboration is productive, exciting, and life-changing, with a high degree of knowledge exchange and interdisciplinarity. They are also often the most demanding and exhausting!

In the late 1990s, I was lucky enough to be completing my MA in History of the Book at the University of London as a Commonwealth Scholar, and concurrently creating a collection interpretation project with the Science Museum entitled 'Atomism & Animism' (1999). Colleagues and curators at the Science Museum – some now retired, but others such as Tim Boon now President-elect of the BSHS – shared so many of their skills and so much of their knowledge with me. It fully prepared me for integrated research and practice in the material culture of science and its histories. I suppose that is why I would recommend a Collaborative Doctoral Partnership award now – if you can get one, and work through the burn, you will be set up for life.

And worst?

The spasm of contraction that was the 2008 financial crisis, and the wastefulness of a decade of 'austerity Britain' in reaming out universities, museums, archives, and libraries was particularly devastating to interdisciplinary and interinstitutional research that was just getting going. The impact of the aftereffects are yet to be fully felt, especially when multiplied by the losses we can expect with Brexit. It is critically important to keep the handfast with European colleagues and I am delighted that the BSHS will be holding the European Society for the History of Science Biennial Conference 2018.

If you did not work in HSTM, what other career might you choose?

Since my career is highly interdisciplinary already, I don't really miss other

career choices. So I would turn the question on its head and state why I think researchers and practitioners from other disciplines would benefit from becoming involved in HSTM. It is the openness of the field of history of science, and the huge range of methods and research areas its community encompasses, that enabled me to feel comfortable and inspired in its fold. C'mon in!

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

I think that historians of science need more training in working with and thinking about the material culture of our field. While I was Programme Director at the Centre for Collections Based Research at the University of Reading, I co-organised (with Dr Rohan Deb Roy) an exciting BSHS-supported conference about history of science and university museums. It happened concurrently with the University Museums Group annual meeting, and brought together colleagues from across the UK and Europe, with the participants all as knowledgeable as the speakers.

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

The BSHS is developing and implementing some valuable diversity and inclusion policies, and I would like to see individual researchers taking responsibility for taking that further. We should be aiming beyond diversity in our own scholarly community and communications, and also choosing to apply our skills and methods to historical and epistemological areas which are under-researched and where there is potential for social justice to come about through our findings.

We need to develop methodologies and modes of working that are in line with the intersectional and complex transhistoric issues that we have not yet attended to with the rigour that they deserve and require – for example, in relation to climate change or decolonisation. •

This is an abridged version of Martha's interview. To read the full interview, please visit the BSHS blog at www.bshs.org.uk.

The British Journal for the History of Science

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- Kit Heintzman, 'A cabinet of the ordinary: Domesticating veterinary education, 1766–1799' (SINGER WINNER 2016)
- Fenneke Sysling, 'Science and self-assessment: Phrenological charts 1840–1940'
- Sebastián Gil-Riaño, 'Re-locating Antiracist Science: the 1950 UNESCO Statement on Race and Economic Development in the Global South'

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Viewpoint: the Magazine of the BSHS

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