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Editorial

This issue is dedicated to all things digital and computer-y, in honour of the awarding of our first ever Ayrton Prize. We feature the inside information on the shortlisted projects from the people who created them (1-7). If you're feeling inspired to try for the next Ayrton Prize, information on applying for the prize is provided (2). As well as awarding Ayrton, the BSHS have been busy online in other ways - we highlight how you can engage with us on your computer, and introduce Web Editor, Jia Ou Song (11).

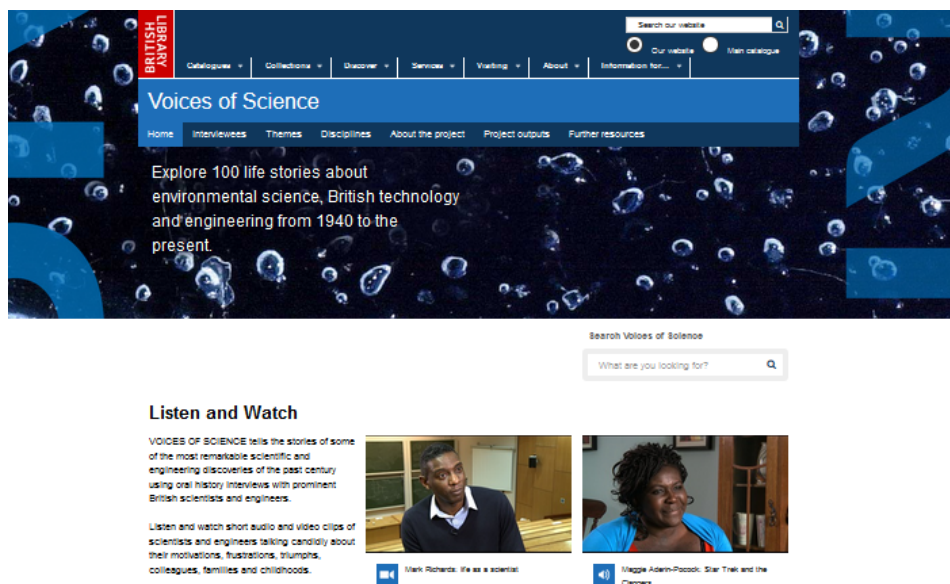
An ancient device, the Antikythera Mechanism, is the topic of a feature article by Michael Edmunds (10-11). He discusses the potentially ancient origins of the idea of a mechanical universe. Steve Fuller brings us up-to-date with a discussion of a much more recent phenomenon, Wikipedia (12-13), and how this digital giant shapes the history of pseudoscience. And of course, no Ayrton special would be complete without a feature article on the woman herself (8-9); Graeme Gooday discusses the life and works of Hertha Ayrton and husband William.

Contributions to the next issue should be sent to viewpoint@bshs.org.uk by 15 April 2016.

Alice White, Editor

Ayrton Prize Issue: Digital Delights Voices of Science is Victorious

www.bl.uk/voices-of-science presents a selection of audio and video clips selected from more than 100 interviews with scientists and engineers, as well as photographs and biographical information. Interview transcripts are also available, allowing visitors to get a first-hand insight into the lives of notable scientists from a range of disciplines.



Above: the *Voices of Science* webpage, showing two of the many interviews that the team have conducted and made available online.

Our favourite thing about the *Voices of Science* project was that it provided the opportunity to present a more rounded picture of the life and work of scientists that moves away from the flimsy stereotypes that are so prevalent in popular culture.

The website is an outcome of *An Oral History of British Science*, a major National Life Stories project to collect life story interviews with British scientists, funded by Arcadia and based at the British Library. Full interviews were made available on the British Library Sounds portal as they were completed, but from the outset we intended to complement these with a website that would showcase edited extracts and act as a gateway for researchers to access the interviews in full.

Digital methods versus traditional tools of the historian is rapidly becoming a false dichotomy as digital methods become integral to historical research of all types. Our

website provides historians of science with an introduction to the content of the longer interviews, but its format makes it useful for teaching and research in its own right. These interviews are unique in containing detailed information about the lives and work of scientists that is not available in other kinds of sources, and generally not in other interviews carried out with scientists. We have also used the website to provide information about the process for selecting interviewees and the nature of the interview encounter, to help historians using the interviews in their own research. In addition, the website draws attention to interviews with scientists that were collected by National Life Stories prior to this project.

Interviewing for *An Oral History of British Science* started in 2009 and by mid-2011, with a substantial number of interviews complete, we began to develop ideas for the website. We

had a great variety of material and stories to tell with it, but few of our interviewees' names are familiar to a public audience even if their ideas and innovations are, so we had to put much effort into navigation and structure. An early brainstorming session led by Mary Stewart helped to identify the various different audiences for the site, accommodating their different needs into the design and planning for different user journeys. We also identified categories and sub-themes that the interview extracts might be used to highlight, as project interviewers Thomas Lean and Paul Merchant started cutting suitable clips. This was a time-consuming task because of the need for clips to stand on their own, shorn of the contextual information contained in a longer interview. Along with Sally Horrocks, they also began to generate text to accompany the clips.



The Voices website includes short videos explaining the process of interviewing and creating the website. Above is a still from an interview recording, with (L-R): Matt Caswell, videographer, Paul Merchant, interviewer and Richard West, interviewee.

The project was fortunate at this stage to be

"It breaks new ground in charting the lives of practising scientists and opens a gateway to a new generation of research and engagement. The site itself is well-crafted and slick. Amongst a really excellent shortlist which included other innovative and engaging projects, Voices of Science is a worthy winner."

Jamie Stark, BSHS Outreach & Education Committee Chair

selected as a pilot for the British Library website re-development, which meant that significant resources became available to develop it to the next stage (user testing of the 'wire frames' in September 2012). This was a sobering experience for us all; a website you think is designed in a clear and logical way seems anything but to actual users. We made substantial changes afterwards, reducing the number of

themes and the amount of text on the higher level pages since no-one bothered to read it.

One thing greatly underestimated was the number of images needed to make the website visually appealing. Website co-ordinator Steph Baxter, along with Elspeth Millar, Emily Hewitt and Hayley Moyse, took on the mighty task of sourcing images from interviewees and cataloguing the site content. Rob Perks, project director, persuaded the project team to record videos to feature in an 'About the project' section

that would help to contextualise the oral history recordings and reflect on how they were created. Throughout we benefited from the guidance of our advisors, particularly Jon Agar and John Lynch.

The site went live in November 2013 after 18 months of hard work, and we've updated it with more material since. We plan to continue to add extracts from existing interviews and are trying to secure funding to continue the interviewing programme to include those areas of science not yet covered.

We were delighted when we found out that we'd been shortlisted for the Ayrton Prize, not least because this provided an opportunity to promote the website and the wider OHBS project to the history of science community.

An Oral History of British Science Team
National Life Stories, British Library

What is the BSHS Ayrton Prize?

The Ayrton Prize is a new prize recognising outstanding web projects and digital engagement in the history of science, technology and medicine (HSTM). The prize name was chosen by members of the BSHS from a shortlist to recognize the major contributions of Hertha Ayrton (1854-1923) to numerous scientific fields (for more on Ayrton herself, see Graeme Gooday's article on pp. 8 - 9).

The prize is organised by the BSHS Outreach & Education Committee. They considered all of the entries and compiled a shortlist. BSHS members then logged on and voted online for the overall winner.

To be eligible to be considered for the Ayrton Prize, it was decided that entries must:

- Be a self-contained website (including blogs and other web-based projects), available in English, whose overall content is in HSTM, or a distinct HSTM subsection of a website, such as an online exhibition section of a museum website.
- Have been created or updated with substantial new content within the last 2 years.
- Communicate HSTM to a non-specialist audience and/or make new resources available for the study of HSTM.
- Reflect current best practice in the discipline.
- Make effective use of the medium.

More information on the Ayrton Prize and all other BSHS prizes can be found on: www.bsbs.org.uk/prizes



Also on the 2015 Shortlist...

Digital Stories from the Wellcome Collection

digitalstories.wellcomecollection.org is an immersive, scrolling experience. It includes galleries, interactives and video that tells stories based on digitised material from the Wellcome Library's collections and archives. Two virtual exhibitions provide journeys into mesmerism and scientific collection, integrating digital objects into storytelling in new ways.



Digital Stories began as a web project by Wellcome Collection to accompany the physical redevelopment of our building during 2013-15. As part of the redevelopment we had set about transforming Wellcome Library's Reading Room from a traditional academic study area into a more open and interactive space for the public, drawing casually curious visitors closer to a deeper engagement with the library's collections. Initially, we thought of making some kind of mobile guide to the content of the room itself. We soon thought better of that, and set about making a digital product that would do the same thing as the Reading Room, but for a geographically wider online audience.

We worked with award-winning Brighton-based design agency Clearleft on product development, settling on a format inspired by the new wave of interactive 'longform' journalism typified by the *New York Times'* Snow Fall. We then set up a small in-house production team that worked together with Clearleft's team of designers, together with freelance writers developing the stories. We developed two complete stories: *Mindcraft*, an alternative history of hypnotism and mind control that ultimately arrives on



Film and infographics help to bring the stories to life online.

"One of those rare websites to be experienced rather than browsed. A rich montage of images, audio, animation, and interactive elements, combined in innovative fashion to create engaging stories.

Tom Lean, BSHS Outreach & Education Committee

Freud's healing couch, and *The Collectors*, the tales of six knowledge-seeker who amassed objects as part of their search for truth.

There were moments of great inspiration, but it wasn't always plain sailing. As a completely new project, there was no template for anything, so we developed the form of the interactives, wrote the stories and researched the content simultaneously. One of the most enlightening parts of the process was to see the tension between what looked good on screen and what was 'authentic'. We opted for compelling visuals without sacrificing accuracy.

Though we didn't quite know what we would end up with when we started out, one thread that ran through the project from beginning to end was the desire to tell stories from the history of science and medicine that began with the stories and used collections to tell them, rather than attempting to tell the stories of the collections themselves. Perhaps the most interesting thing that this allowed us to do was to commission new work, in the form of short films and infographics, that helped tell the stories, without being tied to only using collections material. It was a particular pleasure to

commission Leo Bridle to make a film about James Tilly Matthews and the mysterious Air Loom that controlled him and his thoughts. Collaborations like this were essential to the finished product: we could never have made this by ourselves.

Since launching both *Mindcraft* and *The Collectors*, we've done some evaluation, looking at everything from the production process to usability issues. We've been gratified to learn that there was a real thirst for the kind of stories that we were telling and how we were telling them; understandably in a project of this size there were also some

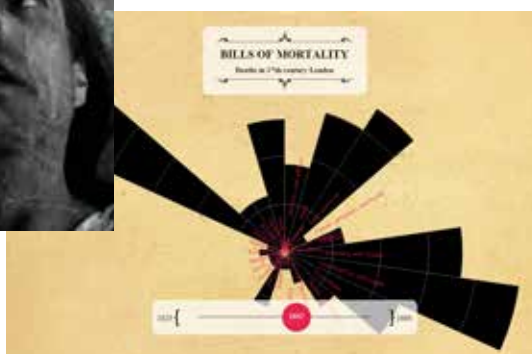
areas in which we'd failed to understand just what would hit home with audiences. We're now looking at both the framework we developed and the storytelling method, to find ways of taking them forward. We're particularly

interested in talking to anyone else thinking about similar forms of 'big' or 'slow' digital storytelling, not just to share what we've learned, but to learn from others.

We were very pleased indeed to be short-listed for the first Ayrton Prize, and looking at other projects it feels like prestigious company to be in. Though Digital Stories was firmly focused on engagement with a curious public audience rather than an academic one, we made lots of use of embedded original sources from paintings to whole books, using Wellcome Library's player software. We're increasingly interested in the overlapping territory between what's 'playful' for researchers but 'serious' for the public. It feels like the Ayrton Prize is rewarding just this kind of emergent practice.

Danny Birchall

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Equatorie of the Planetis

The text showcased on cudl.lib.cam.ac.uk/view/MS-PETERHOUSE-00075-00001 dates from the 14th century, and describes an instrument for calculating the position of the planets. The website has detailed explanatory notes, and an innovative virtual model, complete with instructions, which lets you use the equatorium just like a medieval scholar would have done.

The project was the brainchild of Scott Mandelbrote, Fellow and Perne Librarian of Peterhouse, who saw an opportunity to kick-start the digitisation of the College's manuscripts. *The Equatorie of the Planetis* was a relatively well known manuscript in need of further study, and Scott had the idea of creating a physical reconstruction and virtual model. He suggested a collaboration with the Whipple Museum. I was looking for a project for PhD research, and Director and Curator Liba Taub brought me into the project. At an early stage Scott also involved staff from the Cambridge Digital Library, and Professors Rod Thomson and Kari Anne Rand, experts in medieval libraries in general and this manuscript in particular. He was also able to recruit a very generous donor, Professor Joe Pesce, whose support enabled us to hire an expert programmer, Ben Blundell.

The project had several parts, each with its own challenges. Decisions had to be made concerning whether the manuscript should be disbound or if conservation work needed to be carried out; once digital images were obtained, the presentation and accessibility of these needed careful planning. The detailed explanatory text, written by Kari Anne Rand and me, which covers the historical and personal context, linguistic and palaeographical details and technical content of the manuscript, came out of our own research. Care was taken to ensure that this text was fully linked with the images of the manuscript. A fully searchable transcription and translation was also produced.

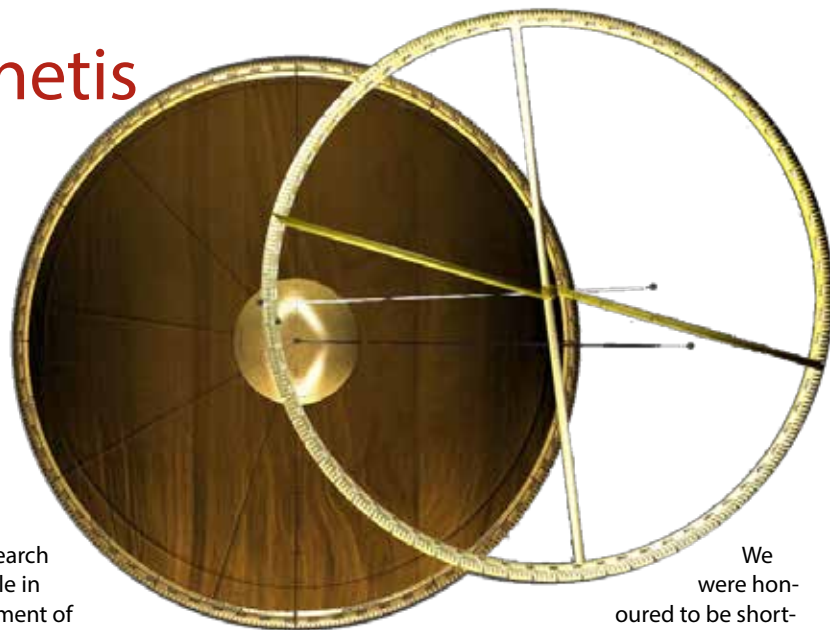
Early in the project, the physical reconstruction made for the manuscript's first editor Derek Price in Cambridge's Cavendish Laboratory was rediscovered in the Whipple Museum stores, which made it unnecessary to produce a new reconstruction, but provided an oppor-

tunity for research into Price's role in the establishment of the discipline of history of science in the UK in the 1950s.

The heart of the project was the virtual equatorium, a collaboration between Ben Blundell and me. The challenge for me was to identify and isolate the key features of the instrument, breaking down the process of its use into discrete steps that could be shown on a virtual model, and to explain these to Ben. In turn, Ben had the challenge of coding a tactile model and a physical process. He found that some of the problems he faced were the same as the physical version, such as working at an appropriate scale. Others, such as simulating the movement of the equatorium's silk threads, required innovative programming skills. And of course a virtual equatorium that would work for any date in the past

or future, but based on fourteenth-century tables, needed to transition seamlessly between the Julian and Gregorian calendars!

We are really happy with how the virtual equatorium allows visitors to the website to get a feel for how these medieval instruments would have worked – and it's beautiful, too. We're also especially happy with how well the whole concept is integrated within the Cambridge Digital Library: in many ways it's a traditional digitisation project, simply making an important manuscript accessible to a worldwide audience, but its versatility and searchability makes the most of the digital medium. We feel the lesson of this project is what can be gained by bringing together a small team of experts in different fields who, learning from each other, can work together to provide new insights into much-studied manuscripts and archives.



We were honoured to be short-listed for the Ayrton Prize alongside such attractive and innovative projects. We hope that the publicity will encourage people to visit the site and play with the equatorium – we've already had great feedback from both scholars and teachers using it in their classes.

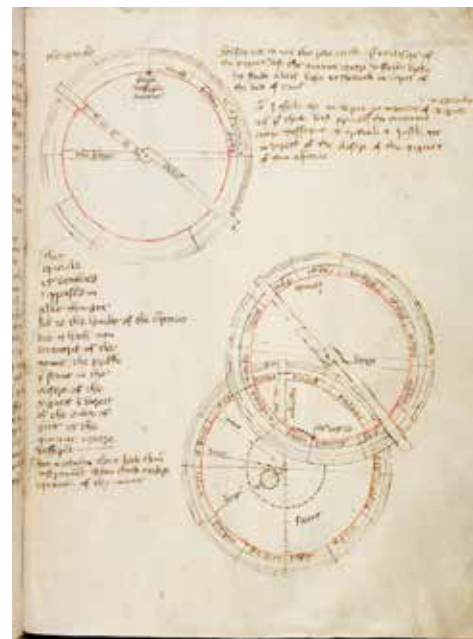
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“Equatorie beautifully shows how digital media can help to bring scientific text and instrument alive. The inclusion of the digital model of the related equatorium allows for a combined study rarely possible in physical collections.”

Katy Barrett, BSHS OEC

Further Reading

- For programmer Ben Blundell's take on the project, see: www.section9.co.uk/posts/2014-05-28-Equatorie.html
- For more on Price and history of science, see: astrolabesandstuff.blogspot.co.uk/search/label/Derek%20de%20Solla%20Price



Top: the equatorie digital model in action. Above: folio 74r. Courtesy of the Master and Fellows of Peterhouse, Cambridge.

Historic Recipes (for Success!)

recipes.hypotheses.org/ brings old recipes to life for academics, students and the general public. Posts include anything from Babylonian recipes on tablets to literary interpretations of Chinese recipes. Regular series, such as “First Monday Library Chat”, are supplemented with special issues.

The Recipes Project emerged gradually. Its origin is in the Medicinal Receipts Research (MRR) group, which met occasionally and set up a listserv in the early 2000s. (Some of The Recipe Project’s contributors, such as Anne Stobart, were founding members of the MRR.) Then, in 2010, Elaine Leong established a website on early modern recipes at the University of Warwick; when she moved to the Max Planck Institute in Berlin, the webpage was archived and the research group lost impetus. A couple years later, Elaine Leong and I became involved in an online recipe transcription project (emroc.hypotheses.org) and thought that blogging might be a good way of reconnecting with the aims of MRR and building a much larger online community interested in recipes.

“It offers beautifully illustrated primary sources, multi-disciplinary international scholarship and lively informal comments and blogs. With real breadth of audience (from professional chefs to Wiccans to academics!) and insightful analysis, it truly offers historical food for thought.”

Jeff Hughes, BSBS Outreach & Education Committee

Elaine Leong and I have been co-editors since the autumn 2012, but we realised after about a year that it was difficult to sustain the commissioning, editing, administration, and promotion of an increasingly successful blog with only two of us. The answer? Co-editors! We brought in two more co-editors (Amanda Herbert and Laurence Totelin), a social media editor (Laura Mitchell), a First Monday Library Chat editor (Michelle diMeo) and occasional administrative assistants (Julia Jaegle, Chelsea Clark and Erin Spinney). We have also invited guest editors to organise special series, and, very occasionally, we hire postgraduate stu-



dents for a bit of extra administrative assistance. But our success really comes from the 80+ people who have written such excellent content for the blog!

The amazing community of writers and readers are the best things about the project. In creating the Recipes website, we have built a wonderful community of scholars and lay people who are interested in recipes. Our wide geographical and temporal scope also makes the project very inclusive. The blog is a place where scholars share cutting edge research and teaching practices—and it makes it very easy to keep track of the field as a whole: Who are the graduate students? Who is working on similar topics for different time periods or geographic regions? By reading each other’s posts,

contributors become aware of new ways of looking at old problems, which stimulates new thinking on recipes. This process is facilitated by the comments left by readers, and by the conversation that occurs on social media. Some posts are written in response to other(s), which pushes the debate even further.

Also... recipes are so much fun. They are deceptively simple: they encourage us to dig beneath and around a seemingly straightforward list of ingredients and directions, provoking conversations about historic foodways, linguistics, scientific praxis, conceptions of race and class, medical breakthroughs, and

religious prohibitions.

Digital methods are increasingly part of the historian’s toolkit. Who doesn’t (at the very least) regularly use online primary source collections such as *Eighteenth Century Collections Online* and dip in and out of Twitter or relevant blogs? As growing numbers of projects appear online, there are lots of databases readily available. Digital methods allow historians to sift through massive amounts of data held on various databases, or to benefit from alternative ways of visualising the data, such as network analysis or mapping. These are only tools though—the ability to assess the information gained by using the tools is still one of the basic skills of a historian.

One thing we’d say to anyone thinking about setting up a project is that when it comes to blogging and social media, it takes a while to build up an audience and group of contributors. Don’t be discouraged! Our biggest outcome is our success in gradually building a community. We have developed a large group of contributors, which includes graduate students and professors alike. And in 2015, we had over 200000 unique visitors—most of whom stopped to read several blog posts during a visit.

We were thrilled to be shortlisted for the Ayrton Prize, and especially honoured when we saw who our competition was.

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More on the Recipes project history is included in a flashback section of the website: recipes.hypotheses.org/recipes-project-flashback

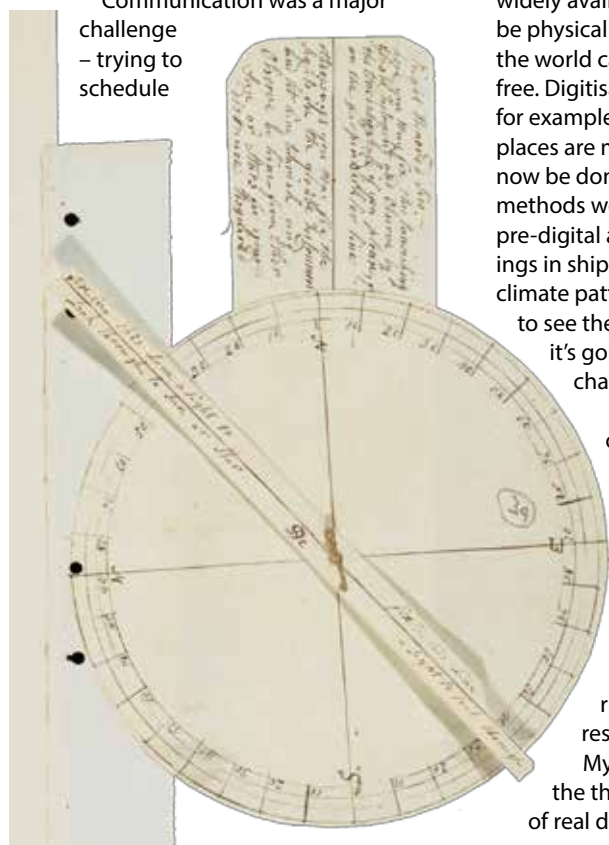
The Board of Longitude

cudl.lib.cam.ac.uk/collections/longitude is a digitised edition of the entire extant Board of Longitude archive as well as other papers, currently totalling nearly 64,000 digital images. Schools resources and archive stories give context and wider reach to this important and easy-to-use scholarly resource.

The Longitude project came about as part of a pre-existing AHRC-funded research project, a collaboration between the History and Philosophy of Science Department in Cambridge and the National Maritime Museum in Greenwich. Everything was in place for the research project and the Library to join forces and produce a sustainable and comprehensive digital resource for everyone to use. We got some money from JISC and away we went!

Collaboration has been the key to the project's success – bringing together the sometimes very different perspectives of the academic, library and museum worlds. A range of people worked on the project – researchers, archivists, curators, photographers, designers, technical staff, film makers and (very importantly) education and outreach experts. The richness and usefulness of the site is a product of the variety of skills and experience that went into its creation: it would have been impossible for any of the project partners to have achieved this on their own.

Communication was a major challenge – trying to schedule



and organise across three sites, with so many people doing so many different things. We brought the project in on time and on budget, and a major factor in this was having plenty of face-to-face meetings – email can only get you so far! In the final stages, the Education and Outreach Officer from the National Maritime Museum spent quite a lot of time “embedded” in the Library. This was invaluable, drawing all the threads together into a comprehensible whole.

Though the project had its challenges, the benefits certainly made it worthwhile work. For a start there's

the importance of the material we've made widely available. Historians no longer have to be physically in the Library – now anyone in the world can use these valuable resources for free. Digitisation also makes some tasks easier: for example generating indexes of people or places are mentioned in a large archive can now be done with a simple search. And some methods would have been impossible in the pre-digital age. For instance, using recordings in ships' log books to track 18th century climate patterns. We're only just beginning to see the results of these methods, and it's going to be exciting to see how they change the whole field.

Just as important as the content of the project is the way we've made it available – intimately linking the latest research with the archive itself is a very powerful model. Add in the hundreds of links to museum objects and search functionality across the whole collection and you start to see the primary sources in a very rich environment, producing new research questions and answers.

My favourites from the project are the three animated films. Using images of real documents and objects from the



Some of the amazing images from the collection. Above: *Marine chair*, William Chevasse. RGO 14/36: 51r and below: *Globe instrument*, Edward Chafe. RGO 14/39: 39r

digital collection, they provide introductions to important aspects of the archive. Film is a powerful way of communicating ideas, and putting them straight onto YouTube means that they have a broad audience. We learnt that it's just as important to push material out to places like YouTube, Twitter and Facebook, as it is to draw people into the site. People are

“This site provides an insight into the process and products of historical research, and sheds new light on a well-known episode from the history of science. Inclusion of material for school groups and identification of highlights and stories makes the site useful for wider audiences too.”

Melanie Keene, BSHS Outreach & Education Committee

still viewing, using and thinking about the material even if it isn't strictly on your terms.

Our statistics show that we've had over 55 thousand users, with an average time on site exceeding four and a half minutes. This indicates lots of people are looking at the material in a detailed and thorough way, consistent with teaching and research. There has also been a lot of publication on the archive since launch, and we now have a single unified site for digital content, so the end of the project does not mean that the site is frozen in time. Since the project launch we have added new material to the collection using the same workflows, and will continue to do so in the future. So for us, the project taught us a lot about how to make, open-ended digital resources, something we are continuing with current projects such as our Darwin Manuscripts and Transit of Venus digitisation.

We were so happy to find out that we'd been shortlisted for the Ayrton Prize, especially when we saw the strength of the other candidates. It's fantastic to get that kind of specialist recognition. Unfortunately we didn't win this year, but we hope to have a couple of candidates for the 2016 prize!

Science Gossip

www.sciencegossip.org/ crowdsources information about historical documents: a new approach to engaging public audiences. This site is a citizen science platform that invites participants to tag illustrations from a series of Victorian natural history periodicals, generating a rich and interactive history of science resource.

Science Gossip was born out a desire to see how a citizen science community could help both improve the accessibility of a digital resource and produce data for historians working on historical images and periodicals. The resulting community, and the data they have generated, have far outstripped our initial hopes for the project. It's now an incredibly vibrant place for the generation of new ideas and information.

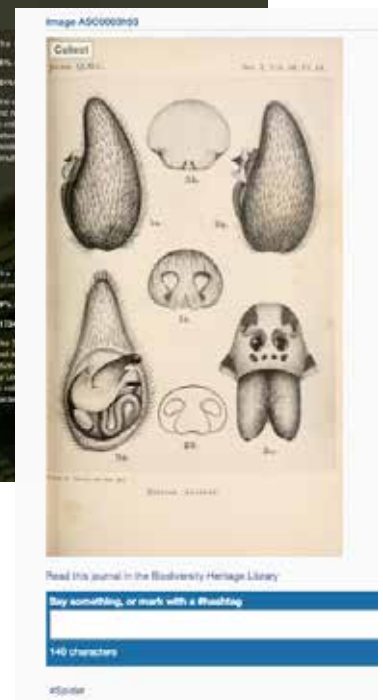
The website developed from an open call for new citizen science projects, organized by the AHRC project "Constructing Scientific Communities: Citizen Science in the 19th and 21st Centuries" (ConSciCom) and Zooniverse. Responding to this call, the Missouri Botanical Gardens – acting as a key participant in the digital library of the Biodiversity Heritage Library – proposed a project to help them identify, categorize and create metadata for a collection of images that lay within their digitized sources, but which were not easily searchable. The goals of the proposed project

Science Gossip had harnessed the technology designed for 'Zooniverse' with a project that brought together (and benefitted) contemporary scientists, historians of science and the general public. It's an excellent way for researchers to contribute to improving the accessibility of their source material."

Liz Haines, BSBS Outreach & Education Committee

fit perfectly with the research I was conducting for ConSciCom on the role of illustrations within natural history periodicals.

A huge number of people were involved in the creation of Science Gossip. Partners included Victoria Van Hyning who was then the citizen humanities lead; frontend web developer Jim O'Donnell who works on ConSciCom projects more generally; and mem-



bers of the Missouri Botanical Garden, including Trish Rose-Sandler, Mike Lichtenberg and William Ulate, who are the core content providers. The Missouri Botanical Garden will ensure that the metadata generated is openly available to researchers in due course. The real work of the website, however, is done by the thousands of citizen scientists (currently more than 8000!) who do the classification and bring new lines of historical questioning to the dataset.

Creating citizen humanities projects such as this allows us to analyse vast archives – so much a part of the 'big data' question in the history of science. We have just completed the classification of 130,000 pages from 17 Victorian periodicals, which is phenomenal! The data from this will be used to improve the image search capability of these periodicals within the Biodiversity Heritage Library. I'll also use this material for research on the use of illustration within Victorian natural history journals. In the future, we plan on continuing

to upload new periodicals, and potentially also books and other printed materials. As all of the data that comes out of Science

Gossip is made by and for public use, it is hoped that other researchers and interested parties will also use the data to answer questions they may have about Victorian illustration.

What is really fascinating about Science Gossip is that the key to generating 'big data' is in changing the role the public has to play in this research; they are no longer an audience,

but are partners in the production of history!

Our favourite aspect of the website so far is the range of really interesting illustrations and illustrating processes that the users are highlighting within the 'Talk' section (talk.sciencegossip.org). The citizen scientists are showcasing just how fascinating periodicals are for both Victorian and modern audiences. While many users are anonymous, there is an active community of participants who engage with lively discussion. The moderators of the Talk forum, @jules and @yshish, do an amazing job of both answering queries of other users and also bringing new questions to the material. For instance, recently, some of the users have become very interested in getting more information on the female contributors to the various periodicals and have started a list of female authors. The designation of female contributors is beyond the scope of what the website asks users to do. However, giving users freedom to pursue their own interests created an opportunity for them to advocate for further research into content, which will be essential to understanding the historical role of these periodicals as sites for a broad participation in 19th century science.

We were very honoured to be shortlisted for the Ayrton, especially considering the excellent company that it placed us in! What the Ayrton has shown is just how rich and wide ranging the digital resources are within HSTM.

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Oil on canvas painting of Hertha Ayrton by Helena Arsène Darmesteter. Image courtesy of The Mistress and Fellows, Girton College, Cambridge

A little more than a century ago, two well-attended lectures in London set important precedents for communicating physics and its applications. The first, on the enigmatic 'hissing' of electric arc lights, was presented at the Institution of Electrical Engineers (IEE) on March 23rd 1899. The second, at the Royal Society on June 16th 1904, explored remarkable patterns spontaneously formed in seashore sand ripples. These well-received lectures were highly topical, original and analytically acute – and delivered for the first time in these organisations histories by a woman. The lecturer in both cases was Hertha Ayrton, by then Britain's most distinguished female practitioner in applied physics. Just two months after her IEE lecture, her celebrity was sealed as the first woman to become a full IEE member; and two years after her Royal Society lecture, she received its prestigious Hughes Medal. Hertha Ayrton is thus now an iconic figure in early 20th century science, and has been an inspiration to many women (and men) ever since.

But how significant a precedent did she set? No further women were IEE members until 1958, and no other woman was awarded the

the world-famous (Mrs) Hertha Ayrton? As for so many women in the 19th century, the very limited routes into a scientific career were mediated through the contingencies of family connections and female support networks.

As the third of seven children in an impoverished Orthodox Jewish family in Portsmouth, Sarah Marks was no stranger to adversity. Her mother was a seamstress and her father a refugee from anti-semitic persecution in Poland. Never in robust health nor successful as a watchmaker-jeweller, he died when Sarah was seven years old. Her early schooling was thus organised by aunts in London: her cousin Marcus Hartog introduced her to science, and his older brother Numa (the first Jewish senior wrangler at Cambridge, appointed in 1869) taught her mathematics. Supporting her mother by teaching, at the age of 16, Sarah came into the cultural orbit of Mary Ann Evans (George Eliot). And here Sarah found a supportive network of intellectual women that both raised her aspirations and renamed her. Ottilie Blind dubbed her 'Hertha' after Swinburne's eponymous poem on the earth goddess (Erda), and the nickname rapidly stuck. With Blind's companionship in pre-

The Authoritative Hertha Ayrton

Graeme Gooday on the history of Hertha Ayrton (1854 - 1923), after whom our new digital prize was named.

Hughes medal until 2008. And despite widespread support to elect her an F.R.S., the Royal Society's lawyers claimed in 1902 that its statutes debarred her, as a married woman, from holding a Fellowship. Hertha was characteristically undeterred by this apparent snub. Indeed, up to her untimely death (from blood poisoning) in 1923, she continued researches interspersed with campaigning for women's enfranchisement, and family duties of care. How was it that she positively thrived on the many challenges that came her way? And how was it that Phoebe Sarah Marks, born without privilege in 1854, became

paratory examinations, and the patronage of Barbara Bodichon, the philanthropic activist for women's rights, in 1877 Hertha Marks commenced study of mathematics at Girton, one of two colleges then dedicated to women at the University of Cambridge.

Coached by Richard Glazebrook for the Mathematics Tripos examinations, Hertha Marks was persistently drawn to practical and educational aspects of the subject. She constructed a sphygmomanometer, and devised problems and solutions in Mathematical Questions from the Educational Times for almost two decades. After completing her studies in 1881 (Cambridge did not then award women degrees), she returned to London to earn her living by teaching. In her spare time she not only ran a club for working girls and cared for her ailing sister, but also developed and patented a line divider for upscaling drawings. The positive reception granted her device in 1884 encouraged her to pursue research. Drawn to the fast-growing field of electrical technology Hertha enrolled at Finsbury Technical College – one of only a tiny handful of women to do so. She had already made the acquaintance of the Professor of Physics there, William Ayrton, shortly after the death of his first spouse. When she arrived at Finsbury, he made special arrangements for her studies to accommodate teaching obligations - even as he moved to the new City and Guilds College at South Kensington.

William Ayrton came from an intellectual family that strongly supported women's rights. In 1866 he had encouraged his cousin Matilda Chaplin to train for a medical career. At the invitation of Sophia Jex-Blake, Matilda joined the 'Edinburgh Seven' group of women determined to study medicine despite vehement opposition. After becoming the first Mrs Ayrton in 1871, Matilda qualified in midwifery as a fallback career and trained a new generation of Japanese midwives when accompanying William to Japan. Eventually qualifying as M.D. in Paris and licensed in Ireland, Matilda began her practice in Sloane Street, London in 1880, and studied ophthalmology at the Royal Free Hospital. But her brief medical career was cut short upon her premature death from tuberculosis in July 1882, leaving

William to raise their child Edith. It was thus recently bereaved and seeking a new intellectually matched companion for academic and domestic life that William Ayrton thus came to know Hertha at Finsbury.

After a brief courtship that centred upon her critical proof-reading of his *Practical Electricity: a Laboratory and Lecture Course* (1887), William and Hertha were married on 6 May 1885, the new 'Mrs Ayrton' having reconciled her orthodox Jewish mother to their secular union. For the 22 years of their companionate marriage, William and Hertha each took great care to establish the independence of her achievements. Hertha maintained a part-time career in lecturing on electrical innovation, notwithstanding her variable health and care for their daughter Barbara born in 1886. Fittingly, Hertha's resources for independent research were much enhanced in 1891 by a Bodichon legacy (left by women's rights campaigner Barbara Leigh Smith Bodichon). An opportunity to use these resources soon opened up: William had planned to lecture on the arc light at the Chicago Electrical Congress of 1893, but a servant there accidentally burned his paper. Hertha agreed to replicate the research, and obtained so many new results that they agreed thereafter to make the electric arc her specialist area.

One key problem was the strange hissing and recurrent sputtering of the electric arc in street lighting. This Hertha found to result from oxidation at the positive carbon electrode. By excluding oxygen from the pair of carbon arcs, she obtained a steadier light, and formulated the 'Ayrton equation' to inter-relate arc length, pressure, and voltage. Her international reputation was established when she published her findings serially in the *Electrician* and then in her monograph *The Electric Arc* (1902), long the standard historical and textbook treatment of carbon-arc lighting. When the Admiralty commissioned William in 1903 to solve the problems of roaring and wandering in its arc-lit searchlights, it was Hertha's research that showed the solution lay (again) in oxygen-free operations and redesigned carbon arcs. The Admiralty nevertheless persisted in sending William payment for her research. Such problems of spousal attribution (and perhaps a shared Polish heritage) prompted Hertha to become a sympathetic confidante to Marie Skłodowska-Curie. Both Ayrtons had been present at the Royal Institution in June 1903



William Ayrton (1847-1908), circa 1890. Image Courtesy of the Science Museum / Science & Society Picture Library

when, owing to the Institution's prohibition of female speakers, Pierre Curie was ironically obliged to explain why Marie alone was responsible for the discovery of radium. Tragically Marie and Hertha both soon found that widowhood was a prerequisite for uncontested authorship.

Indeed by 1901, William's health was deteriorating from overwork, so the Ayrtons took to seaside convalescence at Margate. It was this fortuitous circumstance led Hertha to critique existing explanations of the regularity of sand ripples. Her analysis of the mechanisms of standing waves and vortices led to her famed Royal Society lecture of 1904. A decade later she extended this analysis to assist in repelling the poison gas attacks that appalled the world in spring 1915. The effectiveness of the Ayrton 'flapper' fan in the Great War trenches has been disputed, but not all users deployed it with Hertha's recommended techniques.

The Ayrtons joined the Women's Social and Political Union (WSPU) in 1906, and William's last public act was to ride with the WSPU's parade through Hyde Park in July 1908. In widowhood, Hertha's home hosted both her laboratory research and suffrage campaigners: in 1912-13 Mrs Pankhurst and others stayed there while recovering from hunger strikes. Efforts to secure votes for women in the UK were (partly) fulfilled in February 1918 owing to demonstrations - such as Hertha Ayrton's fan - of women's now indisputable capacities. While her researches on vortices had several potential major peacetime industrial application, Ayrton dedicated her efforts after the war to launching the International Federation of University Women in 1919 and the National Union of Scientific Workers in 1920. Hertha Ayrton's commitment to publicly engaged and useful science appropriately now lives on in the BSMS Prize named in her honour.

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If you are interested in reading more on Ayrton, you could consult Evelyn Sharp, *Hertha Ayrton: A Memoir* (London, Edward Arnold: 1926).

Thank you to Paula Gould, Sophie Forgan and the late Joan Mason for sharing their insights.

In Memory: A Personal Recollection of John Forrester

When I began to think about possible PhD topics, lecturers listened kindly to my half-baked ideas. 'That sounds a bit weird,' was the upshot of what they said; 'maybe John Forrester would supervise it'. A man whose chief quality was a willingness to supervise the slightly weird: he sounded pretty good. And so, trepidatiously, I knocked on his door.

The sunlight from the high, metal-framed windows of his office soaked through the spongy golden atmosphere of countless hand-rolled cigarettes. He was sitting behind his desk, this Buddha-faced icon of Freudian genius and subject of awed undergraduate tales of lecturing eccentricity.

John knew enough about semiotics to know which words were, and were not, needed. The same went for his supervisory skills. He would run with what you had written, and never tried to impose his own interests or narrative. He picked up on odd threads and by-comments, which in his hands would mysteriously turn out to be the trick to unravelling the whole ball of wool.

John was mischievous, philosophical, clever. He was also kind: never one of those people who needed to assert his (vast, polymathic) knowledge as superior to that of someone junior. He treated all ideas courteously, as though there were some speck of percipience in there waiting to be magnified.

In hindsight I wonder whether some of John's willingness to entertain off-centre topics had to do with his own career experience. At a time when sociologically-inspired historians of science were busy critiquing notions of truth and factuality, they were nevertheless re-treading the same paths of proper science by way of historic exemplification. They were physically perched, after all, at the periphery of the New Museums site, which belonged to the science departments. John, however, got on with psychoanalysis as though that had always belonged in a department devoted to science. He was a path-breaker for what 'counts'.

The last time I saw John was also a sunny day, an afternoon. He was talking about a new-found passion for Game of Thrones. I was, not for the first time, a little non-plussed. 'Now we have Game of Thrones we don't need Shakespeare any more,' he added with that 'I dare you to take me seriously' smile.

Thanks to John there are many of us out there, a secret society of former PhD students, who dare to take apparently silly things seriously, and supposedly weighty things not too much so. Thank you, John.

Charlotte Sleight, University of Kent

The Mechanical Universe: Calculation & Concept

Michael Edmunds

on the importance of ancient devices like the Antikythera Mechanism.

What's wrong with the following statement taken from a popular textbook on Western Civilization?

"The unique contribution of the Scientific Revolution to the making of the modern world-view lay in its new mechanical conception of nature"

I want to argue that there is good evidence that the idea of a mechanical Universe goes back a lot further in time. Most readers will have heard of the Antikythera Mechanism. This is an astronomical calculator made around 100 BCE, from a shipwreck discovered in 1900 AD near the island in the Mediterranean after which it is named. Its main functions were finally reconstructed in the early years of the 21st century. It used well over 30 gear wheels in complex and interleaved chains to drive dials showing calendrical cycles of the sun and moon, including eclipses, and a topographic display showing the position in the zodiac of the sun, moon and known planets – although the gearing for the latter is missing. It included a display of the lunar phase, and even incorporated a variable-speed mechanism to mimic some of the moon's irregular motion.

The importance of the Antikythera Mechanism is evident in three ways – firstly as a salutary lesson not to underestimate ancient Greek technology and ingenuity, secondly as the first known mechanical calculator, and thirdly as a survivor of a tradition of devices that may have profound implications for the development of scientific thought.

The subsequent development of a more general purpose mathematical calculator seems to have taken rather a long time. It is known from correspondence in 1632 that



A reconstruction of the Antikythera Mechanism. The front (L) shows the Moon, Mercury, Venus, Sun, Mars, Saturn and Jupiter in the zodiac, with a lunar phase display near the centre. The upper back spiral (R) is a 19-year lunar/solar calendar, and the lower spiral shows lunar months of the 18.2-year Saros cycle in which eclipses are likely to occur. Copyright: Hublot, with fonts from the Aristotle University of Thessaloniki.

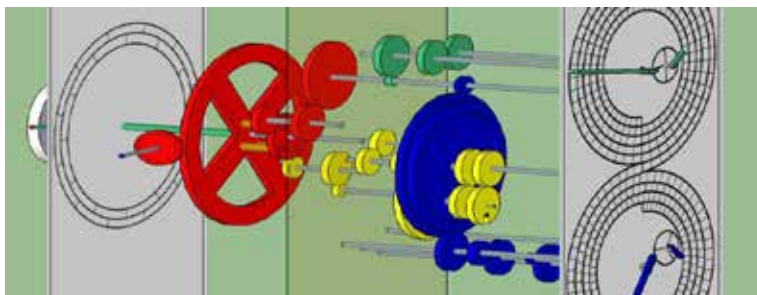
Johannes Kepler and Wilhelm Schickard discussed the construction of such a device, and practical examples were developed by Pascal in 1642 and Moorland in 1666. But it was not until the 19th century that they became extensively used, yielding to electronic devices in the second half of the 20th.

The late development may have been partly due to a conceptual barrier – the meshing of gears inevitably gives rise to irregularities, and to maintain accuracy to several significant figures requires the development of discrete rather than simply analogue devices. Availability of cheap labour for computation may also have reduced the necessity of its invention for economic applications.

were common enough to be known about not just by astronomers, but also by members of the more general intelligentsia such as the medic Galen.

You might regard the hardware simply as ancient "executive toys", and indeed their actual purpose (a visible statement of knowledge? teaching devices?) is not clear. But I think there is a deeper importance in their existence which bears strongly on that "mechanical conception of nature". As a device, the Antikythera Mechanism shows several interesting properties: (i) it is causal – one gear drives the next (ii) it is deterministic – the gears turn in a pre-arranged train (iii) it is regular – cycles and motions are reproduced (iv) it can show "regular irregularity" – i.e. complex but still deterministic behaviour (v) it is operated with a single knob – i.e. a prime mover which drives all its actions. These are the principles of a rational mechanical Universe. It is not necessary to believe that the Universe is actually driven by some hidden array of gear wheels. What is important here is a sort of "proof of existence of a solution". If you can show that some mechanical construction can mimic the motions of the known Universe, then even if you do not know the form of the mechanism of the real Universe you nevertheless have a solid basis for a rational belief that such an explanation could be found. At least it stops the need for arbitrary gods to push the sun, moon and planets around – and

Without the survival of the Antikythera Mechanism we might have difficulty in accepting the reliability of references to such devices in classical literature. There are at least twenty reasonable reports between the first century BCE and the fifth century AD. The devices



An exploded schematic of the known gear trains of the Antikythera Mechanism. The red gears drive the sun pointer and the other trains. The green and blue gears drive respectively the back dial spiral displays of lunar/solar calendar (upper) and Saros eclipse cycle (lower). The yellow gears, incorporating a variable speed device, drive the moon pointer on the front dial. Copyright: Antikythera Mechanism Research Project



Wells Cathedral clock whose original mechanism was built around 1390. Like the Antikythera Mechanism, it has a moon phase indicator. Photograph by Cormullion.

the prime mover can be secular forces rather than a deity. The emergence of such views at early times was also recently proposed on other grounds in *The Mechanical Hypothesis in Ancient Greek Natural Philosophy* by Sylvia Berryman. There is even a suggestion by James Evans and Christiàn Carman that the epicyclic mathematical models developed by the Greek to explain planetary motion may themselves have been stimulated by analysing geared mechanisms, rather than vice versa.

Some sort of survival of the tradition of geared mechanical astronomical displays can be faintly traced up to the time of the invention of the clock regulator escapement around 1280 AD. The escapement led to a technological explosion in the development of gearing and to the era of the mediaeval cathedral and town clocks, many of which showed lunar/solar and astronomical information. By 1364 Giovanni de Donde in Padua had constructed the first known device – his “Astrarium” – that is more complicated than the Antikythera Mechanism. Interestingly enough, it is clear from letters that de Donde knew of the Greek mechanical astronomical devices, and there is a good chance that Copernicus had heard about, or even seen, de Donde’s Astrarium during his studies in Italy (c 1496 – 1503).

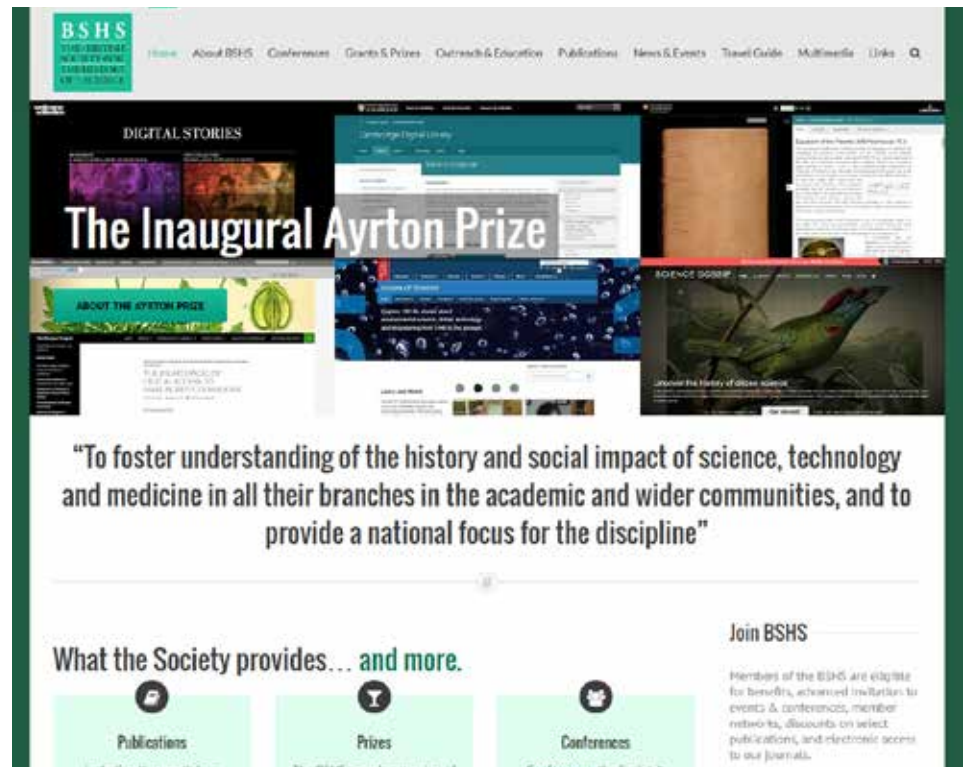
So the Antikythera Mechanism is an example of a continuous tradition that provides more than just mechanical curiosities, more even than the precursors of modern calculators and computers. It can be argued that this tradition was a crucial enabler of the whole idea of a rational, causal, deterministic Universe. An idea of course that blossomed – but did not originate – in the “Scientific Revolution”.

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To read more, see Mike’s paper: ‘The Antikythera Mechanism and the Mechanical Universe’ *Contemporary Physics*, 55, 263-285, 2014.

The BSHS Online #histsci



Above: The newly revamped BSHS website. Be sure to take a look if you haven’t already!

The BSHS has been busy online lately. You may have already engaged with us online in some form, but you may not be aware of all the different ways you can be part of the history of science community online. During 2015, our website (www.bshs.org.uk) had an overhaul: you can see the homepage above. The website features information on the society and its prizes, grants, and publications. It also has a range of extras, such as plenary lectures from our conferences, back-issues of *Viewpoint*, and the BSHS Travel Guide – short posts on places of historical and scientific interest. If you have something newsworthy to the history of science community (e.g. a scholarship, fellowship, or conference), you can have it listed on the website. Maintaining our shiny new website is our Web Officer, Jia-Ou (“jya-oh”) Song. She manages the web-related aspects of the BSHS, and has a foot in the strategic online development of the Society as a resource for all things history of science. She also moonlights as a PhD candidate at the University of Manchester, on a project examining the cultural and political influences on science museums in the UK and China. She is in charge of the “contact us” form on the website.

As well as via the remodelled website, you can interact with the BSHS on social media. Many BSHS members are #twitterstorians (historians on Twitter), and we have official BSHS accounts too: @BSHSNews reports on the latest from the society and also retweets. The handle @BHSeditor provides the latest

from the journal and @BSHSOutreach lets you know what we (and others) are up to in regard to outreach and engagement. Last but not least, @BSHSViewpoint provides previews of new issues, and lets you know the latest themes. Tweets from BSHS events are collated and curated at storify.com/bshsnews/ We are also on Facebook (www.facebook.com/TheBSHS), providing updates on news and events.

Reaching out further into the web, in July, the OEC hosted an “editathon” at the BSHS Conference in Swansea, teaching attendees the basics of how to create and edit Wikipedia articles. We then made some contributions – fortunately there is a “sandbox” to practice in before making anything public! One attendee did some much-needed updating to the BSHS Wikipedia entry (en.wikipedia.org/wiki/British_Society_for_the_History_of_Science). We also learnt about editorial policies and guidelines (some of which Steve Fuller critiques in his article on the next page). For instance, conflict of interest guidelines mean that BSHS Council should not edit the Wikipedia page – but if you have something to add and are not on Council, go ahead!

All of these digital elements of the BSHS depend on the involvement of the history of science community. They are very friendly and possess a wealth of collective knowledge, so if you are thinking of trying out something new, from attempting to create an Ayrton-worthy website to tweeting, look out for inspiration, potential collaborators, and guidance online.

Pseudoscience & Wikipedia

Steve Fuller discusses science, pseudoscience, philosophy and editorial wars of attrition on the online encyclopaedia, Wikipedia.

When considering Wikipedia as either a research tool or a living historical record, it is worth recalling that it was started only in 2001. Yet, by the time I first wrote about it six years later, Wikipedia already had nearly two million entries in English alone (the number is now over five million) and was being cited four times more in US judicial decisions than *Encyclopaedia Britannica*. Moreover, *Nature* had deemed it only slightly less accurate than that canonical reference work. Nevertheless, Wikipedia remains an object of suspicion – and perhaps rightly so. I routinely tell students to treat the entries mainly as collectively curated material on the named topic: take the links more seriously than the text.

For all its undisputed virtues of access, Wikipedia is the sort of repository of human knowledge for which the concept of a ‘second opinion’ might have been invented. It is to Wikipedia’s credit that it contains ‘Talk’ pages which recount – in lugubrious if not gory detail – the second, third and more opinions on offer in response to various entry edits. It is probably the closest that historians could ever get to seeing the global hive mind fitfully approximating a state of reflection. Nevertheless, the results can seem puzzling, especially when judged against Wikipedia’s expressed tripartite editorial policy of neutrality, verifiability and no original research.

Consider the rather detailed Wikipedia entry on ‘Pseudoscience’, which branches out into a ‘List of topics characterized as pseudoscience’. Were it not for the entry’s surface incoherence, which tends to be a feature of longer Wikipedia entries, one would never guess that ‘pseudoscience’ is largely a rhetorical device. It is deployed rarely by scientists, sometimes by philosophers and most often by self-appointed popular defenders of science. Thus, one finds the opinions of people and periodicals associated with the Southern California-based Skeptics Society carrying significant weight in Wikipedian discussions of pseudoscience.

Nevertheless, upon turning to the Talk page, one discovers that ‘Pseudoscience’ is classed as a ‘vital article in Philosophy’, which will come as news to professional philosophers of science, many – if not most – of whom believe it’s a pseudo-topic. Even the authoritative Stanford Encyclopedia of Philosophy’s entry on ‘pseudoscience’, cited by Wikipedia, is quick to deflect the issue to the more generic epistemological problem of the warranting of

belief, all the while putting a brave face on the persistent elusiveness of its named quarry.

As for the entry enumerating alleged pseudosciences, all the usual suspects, past and present, are included – with extra attention paid to psychology and medicine. Yet, three likely suspects are conspicuously absent from this otherwise thorough line-up: Social Darwinism, eugenics and sociobiology. Instead the entry makes a point of deeming ‘pseudoscientific’ non-Darwinian versions of social evolution that were common from the 18th to 20th centuries.

Even when one turns to the elaborate, useful and largely sympathetic entry on ‘Eugenics’, the only mention of ‘pseudoscience’ is in a rather apologetic vein, namely, that some people think that ‘improving the human stock’ is not a scientific idea. One would never guess that eugenics and other extensions of ‘selectionist’ thinking into the human domain such as sociobiology had been considered paradigm cases of pseudoscience in the 1970s when I first came across the idea of ‘pseudoscience’ as a student.

I make this point not because I believe that eugenics is pseudoscience. On the contrary, my own views on eugenics are rather similar to those of the Wikipedia editors – and it should already be clear that I don’t hold much store by the very idea of pseudoscience.



Phrenology is an example of Pseudoscience on the Wikipedia page. Franz Joseph Gall examining the head of a pretty young girl. Coloured lithograph by E.H., 1825. Image courtesy of the Wellcome Library, London.

However, it is striking that eugenics gets off so lightly, considering Wikipedia’s preoccupation with pseudoscience. My guess is that a difference in generational sensibility – that is, distance from the Second World War – is at play here. People schooled in my generation would have been much quicker to ferret out insidious motives and intellectual fraud in human-oriented biological research and some would go beyond ‘pseudoscience’ to call its practitioners ‘crypto-Nazis’.

But I do not wish to suggest that Wikipedians are by contrast indolent. In fact, the diligence previously deployed on selectionist topics are now deployed to ferret out insidious motives and intellectual fraud in movements such as intelligent design which try to introduce ‘supernatural’ considerations into the conduct and interpretation of science. To be sure, creationism has been always a staple of pseudoscience, but mainly because it

Conference Reports

Leibniz - scientist, Leibniz - philosopher

University of Wales, Trinity Saint David, 3 - 5 July 2015

claimed that the Bible was the ultimate source of epistemic authority, trumping even the latest science. In contrast, intelligent design may be seen as trying to achieve much the same using the tools of science against received scientific opinion.

When I first learned about pseudoscience in the 1970s, establishment thinking – not to be confused with the ‘relativists’, ‘postmodernists’ and ‘New Agers’ routinely demonized in Wikipedia – was quite receptive to the blending of science and religion in aid of some synthetic ‘humanist’ future. Two of the originators of the Neo-Darwinian synthesis, Theodosius Dobzhansky and Julian Huxley, had promoted the works of the heretical Jesuit palaeontologist Teilhard de Chardin in just this spirit. However, all of this happened before a ‘religious right’ gained ascendancy, first in Christian America but now equally seen in terms of Islamic militancy. At that point, religion became the default enemy of science, unless its knowledge claims were clearly separated from those of science.

Wikipedia editorial sensibility seems to have been formed by this relatively recent turn of events. When combined with Wikipedia’s implementation of its own norms, it can be difficult for readers to get a fair sense of the issues surrounding a hotly contested case of ‘pseudoscience’ such as intelligent design simply by focusing on the text of the entry page. One always needs to go to the cited sources, the Talk pages and then judge for oneself. As someone active in the intelligent design controversy, my own Wikipedia entry illustrates what I have in mind here.

Wikipedia’s norms provide grounds for permissible editing in the minimal sense. Thus, an entry may be written in a neutral tone, with verifiable sources and no original research, yet without representing the full range of opinion on a topic. If there is a missing opinion, it is presumed that someone will eventually provide it – and that often happens, eventually. Moreover, there is no specific commitment to providing a clear statement of a position being criticized, and certainly not in any specific proportion to the criticism published. Again, it is left for a criticized party’s defenders to make their presence felt. In practice, this means for better or worse that the treatment of controversial topics can turn out to be an editorial war of attrition, which perhaps suits a medium that does not regard Social Darwinism as pseudoscience!

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Above and below left: the beautiful location of the Leibniz conference. Right: one of the informal conference dinners, facilitating new collaborations.

These are busy and exciting days for Leibniz scholarship. In early July 2015, a 30-strong group of researchers from all around the world, some acclaimed and others at the beginning of their academic careers, all met up in Lampeter, a small university town that sits nestled in the rolling green hills in the Welsh countryside. Some of the participants had come a considerable distance, from Canada, the USA, Russia, Italy, Spain, Switzerland, and Germany. Among them was Professor Michael Kempe, from the Leibniz Archive and Research Institute in Hanover and the Academy of Sciences in Göttingen, who gave a biographical keynote talk on Leibniz as a far-sighted court advisor and international networker.

So why all the bustle and excitement? Gottfried Wilhelm Leibniz (1646-1716) was one of the 17th and 18th centuries’ leading lights during the early scientific period, and the Lampeter conference was the first of many which are due to take place everywhere throughout 2016 in honour of the tercentenary of his death. The aim of this particular conference was to celebrate the diversity of Leibniz’s vast interests in conjunction with his engagement with the sciences of his time. Accordingly, the conference program was split into four subcategories: metaphysics, math-

ematics and early science, epistemology, and finally



ethics and theology. The range of Leibniz’s contributions from the practical and mundane to the high-minded and visionary remains impressive even now.

Granted the modern category of ‘science’ as we know it did not really exist at the time, as Professor Maria Rosa Antognazza from King’s College London pointed out. Be that

as it may, it is still clear that the early modern period was witness to a crucial stage in the process from which modern science eventually emerged. “Leibniz’s position,” according to Antognazza, “marks a milestone towards a modern understanding of the distinction between philosophy and science.”

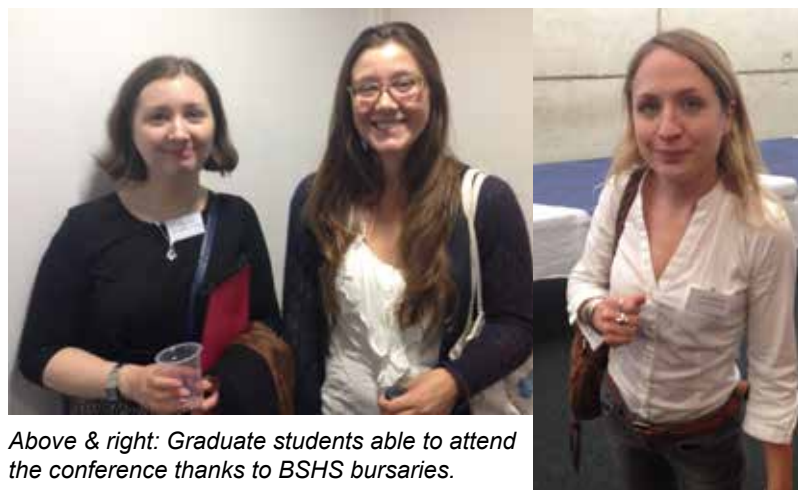
Leibniz’s intense pursuit of intellectual progress and his seemingly endless production line of writing (over 15,000 letters and papers) will perhaps never be fully understood, and the sheer volume of manuscripts he left behind will constitute a sizable challenge for the Leibniz community for decades. It may perhaps come as a surprise that Leibniz scholarship is not as cohesive as one might expect. Over the three days of the conference, a special focus was placed on nurturing the relationships between the Anglo-American groups and the German Leibniz Archive, home of the Akademie Edition, where much editorial work takes place and still a good number of original manuscripts remain in need of transcription and translation. The conference, with its remote setting and organised communal dinners, helped to promote collaboration and paved the way for future projects, hopefully strengthening relationships that otherwise may not have had a chance to flourish.

The three organisers, Lloyd Strickland (MMU and University of Wales), Erik Vynckier (independent), and Julia Weckend (Oxford, OUDCE) would like to thank the British Society for the History of Science for providing a student bursary for the event.

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Medicine of Words: Literature, Medicine and Theology in the Middle Ages

St Anne's College, Oxford. 11 - 12 September 2015



Above & right: Graduate students able to attend the conference thanks to BSHS bursaries.

To put it somewhat anachronistically, the connection between Medical Humanities and Medieval Studies is undergoing a Renaissance. There has been a resurgence in interdisciplinary work, with many medievalists exploring the complexity and sophistication of medical and scientific culture in pre-modern Europe. While there are many conferences on medical humanities topics, and many more on the diverse aspects of medieval studies, it is still uncommon to have an event that exclusively explores this kind of interdisciplinary work. As a result, the recent conference held at St Anne's College was a welcome opportunity to bring together a diverse set of scholars and experts working in this area. In attendance were medical doctors, scientists, literary scholars, art historians, and even an Anglican nun. The aim of the conference was to examine medieval views of the healing power of words, drawing on perspectives from literature, medicine and theology.

Several central themes emerged. The first was the link between literary language and medical language, and it was introduced by Mary Carruthers' plenary "Stylistic effects and bodily health in the aesthetics of the Middle Ages". Carruthers explored the important premodern connections between various medieval literary styles and medieval concepts of health and healing. She focused on key terminology in manuals of style, and highlighted the literal ways these literary terms were understood. Subsequent talks took up this theme of the literary and the bodily, and explored how similes and metaphors are employed in medical texts. The second major theme was the connection between religion and medicine in literary works. This was intro-

duced by the plenary panel of Denis Renevey and Vincent Gillespie, in their papers "In myn ere heuently sown': the Healing Power of the Name of Jesus" and "Seek, Suffer, and Trust: Ease and Disease in Julian of Norwich". Both explored the impacts of medical terms in religious texts, with specific reference to how two classic medieval spiritual writers use illness and health as central concepts in their writings. Subsequent papers explored this connection between language and health in religious texts, and looked to see how reading such material was seen as a form of treatment. This theme was complemented by the next, exemplified in John Thompson's plenary "Medieval English Healing Places of the Soul", in which he looked at the medieval library as a place of healing and at the Vernon Manuscript as a textual space for health. Corinne Saunders and Charles Fernyhough then introduced their plenary 'Reading Margery Kempe's inner voices'. Corinne described how Kempe's voice-hearing experiences fit within a tradition in European mysticism and have profound resonances for contemporary research in voice-hearing. Charles then explained how his cognitive model of inner speech has been enriched by Kempe's writings. The event was rounded off by the final plenary, Peregrine Horden's "A Healing Afterword: Conclusions and Prospects", in which he provided a synoptic overview of the main themes and issues of the conference, and the new directions research is heading towards.

Thanks to all those who attended, too many to mention all here; and to the conference committee and graduate helpers. Finally, thanks is due to the BSHS for generously supporting travel bursaries for graduate students to attend the conference.

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Exhibition Notice

Scholar, courtier, magician: the lost library of John Dee

Discover the life and legacy of John Dee: one of Tudor England's most extraordinary and enigmatic figures. Mathematician, magician, astronomer, astrologer, occultist, imperialist, alchemist and spy, Dee continues to fascinate and inspire, centuries after he entered the court of Elizabeth I. Our exhibition explores Dee through his personal library. On display for the first time are his beautifully annotated and illustrated books. Now held in the collections of the Royal College of Physicians, they reveal tantalising glimpses into the 'conjuror's' mind. Features loans from the Science Museum, the British Museum and the Wellcome Collection, including Dee's own magical mirror and crystal ball, and a commissioned film by artist Jeremy Millar. Events to include weekend opening, curator talks, lectures, walking tours of London and more.

18 January – 29 July 2016, free entry

Usual opening hours: Monday to Friday, 9am to 5pm (Please note that opening times may vary: check online before your visit).

Royal College of Physicians, 11 St Andrews Place, Regent's Park, London, NW1 4LE

www.rcplondon.ac.uk/johndee

Grant Notice

Royal Society grants available for history of science

The Royal Society would like to publicise a scheme available to provide support for research in the history of science or to assist with publication of scholarly works in the history of science.

Early career scholars are particularly encouraged to apply, but applications will also be considered from non-tenured researchers and retired scientists working in association with an eligible institution.

The scheme provides support for either research in the history of science (up to £15,000 incl. VAT) or to assist with publication of scholarly works in the history of science (up to £5,000 incl. VAT).

Applications should be submitted through the Royal Society's electronic grant application system (e-GAP). Applications are initially reviewed by two members of the Royal Society Research Grants panel and then shortlisted. The shortlisted applications are reviewed by the Panel Chair and the final decision is made.

For more information, see the webpage: royalsociety.org/grants-schemes-awards/grants/research-grants/



Keith is on the right, holding the Society's silver mace beside cameraman James Hennessy. Photograph courtesy of Brady Haran, 2015.

The Viewpoint Interview

Keith Moore is Librarian of the Royal Society. He has also worked at the Institution of Mechanical Engineers and the Wellcome Institute.

What are your favourite history of science books?

Antiquarian and association copies. Books that were used by their owners. I find grangerized books to be fascinating. For someone who spends time preserving printed and manuscript material, volumes that have been deliberately altered or enhanced are an illicit pleasure. I like the artist Kurt Schwitters for similar reasons (he'd be there with Wells, if I'm allowed two historical figures) - he worked with collage and would merrily chop up pictures, ephemera and typography to create miniature jewels of art.

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

I came to history of science by what was at that time a slightly odd route, but which is now becoming more common I suspect. My first library jobs were in the Lake District, within literary collections (The Wordsworth Library in Grasmere, The Armitage Library in Ambleside). But I was always interested in things like Samuel Taylor Coleridge's scientific reading, Humphry Davy's relationship with Romanticism, and the natural history work of Beatrix Potter and the remarkable Armitage sisters. When I left the Lake District for London, it was to work in scientific and technical collections with long histories.

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

Goodness that would be a dull dinner! I prefer history of science stories about odd eating habits and other people's dinner tables. Engineering rivals and friends Robert Stephenson and I.K. Brunel enjoying their last Christmas dinner together in Egypt in Cairo in 1858 feels eccentric and rather endearing. The digestive capabilities of Joseph Banks and Frank Buckland are probably best saved for after coffee.

What has been your best career moment?

The best thing is always the next thing!

And worst?

Leaving collections that you feel belong to you. Librarians like me spend lots of time with historians and scholars in reading rooms, but we only lend them the manuscripts, after all.

Which historical person would you most like to meet?

It's an anniversary year in 2016, so I'm going to pick H.G. Wells. I read Wells growing up and I think that his lifelong interest in popularizing science made a deep impression on me. He desperately wanted to be a Fellow of the Royal Society and I'm probably more offended than Wells was that he didn't get elected. It's nice to see that Penguin have just republished his book *The Rights of Man* (1940).

If you did not do your current job, what other career might you choose?

I'd like time for at least a couple more careers. Some marine biology would give me opportunities to indulge in more scuba diving. Something archaeological perhaps - this is a great period for human origins research.

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

A healthy injection of grant funding wouldn't hurt!

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

I think that AHRC funding streams are tending to make institutions more important players in academic history of science - I'm thinking of the Science Museum, National Maritime and others. From that point of view, I'd like to see the Royal Society getting more involved in collaborative history of science and there is a good deal of interest within the Society's Fellowship to make that happen I think. We've had quite a few successes in creating or joining very productive partnerships. Katherine Ford, our first joint PhD with Reading University, was recently awarded her doctorate - I hope there will be many more to come.

The British Journal for the History of Science

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- Sarah A. Swenson, "Morals can not be drawn from facts but guidance may be": the early life of W.D. Hamilton's theory of inclusive fitness'
- Alper Bilgili, 'An Ottoman response to Darwinism: İsmail Fennî on Islam and evolution'
- Ian Lawson, 'Bears in Eden, or, this is not the garden you're looking for: Margaret Cavendish, Robert Hooke and the limits of natural philosophy'
- Koji Yamamoto, 'Medicine, metals and empire: the survival of a chymical projector in early eighteenth-century London'
- Sheila Wille, 'The ichneumon fly and the equilibration of British natural economies in the eighteenth century'
- Jung Lee, 'Between universalism and regionalism: universal systematics from imperial Japan'

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Contributions

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