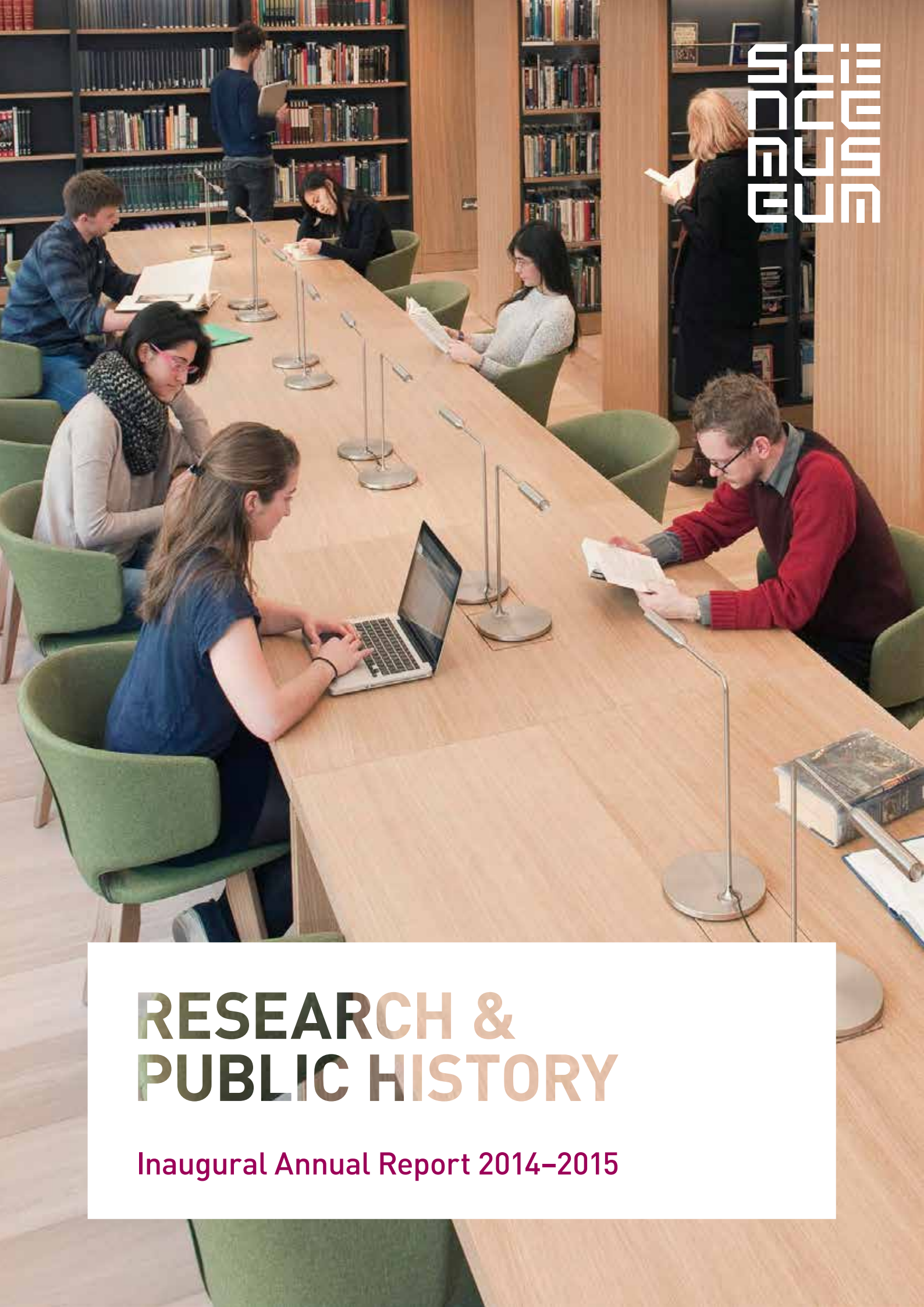


RESEARCH & PUBLIC HISTORY

Inaugural Annual Report 2014–2015

Contents

Research lies at the very heart of the Science Museum Group's work and identity. It enables us to understand and care for objects, to interpret them for diverse audiences, and to grasp their significance by placing them in context.

Foreword

LUDMILLA JORDANOVA
TRUSTEE AND FOUNDING CHAIR, COLLECTIONS
AND RESEARCH COMMITTEE

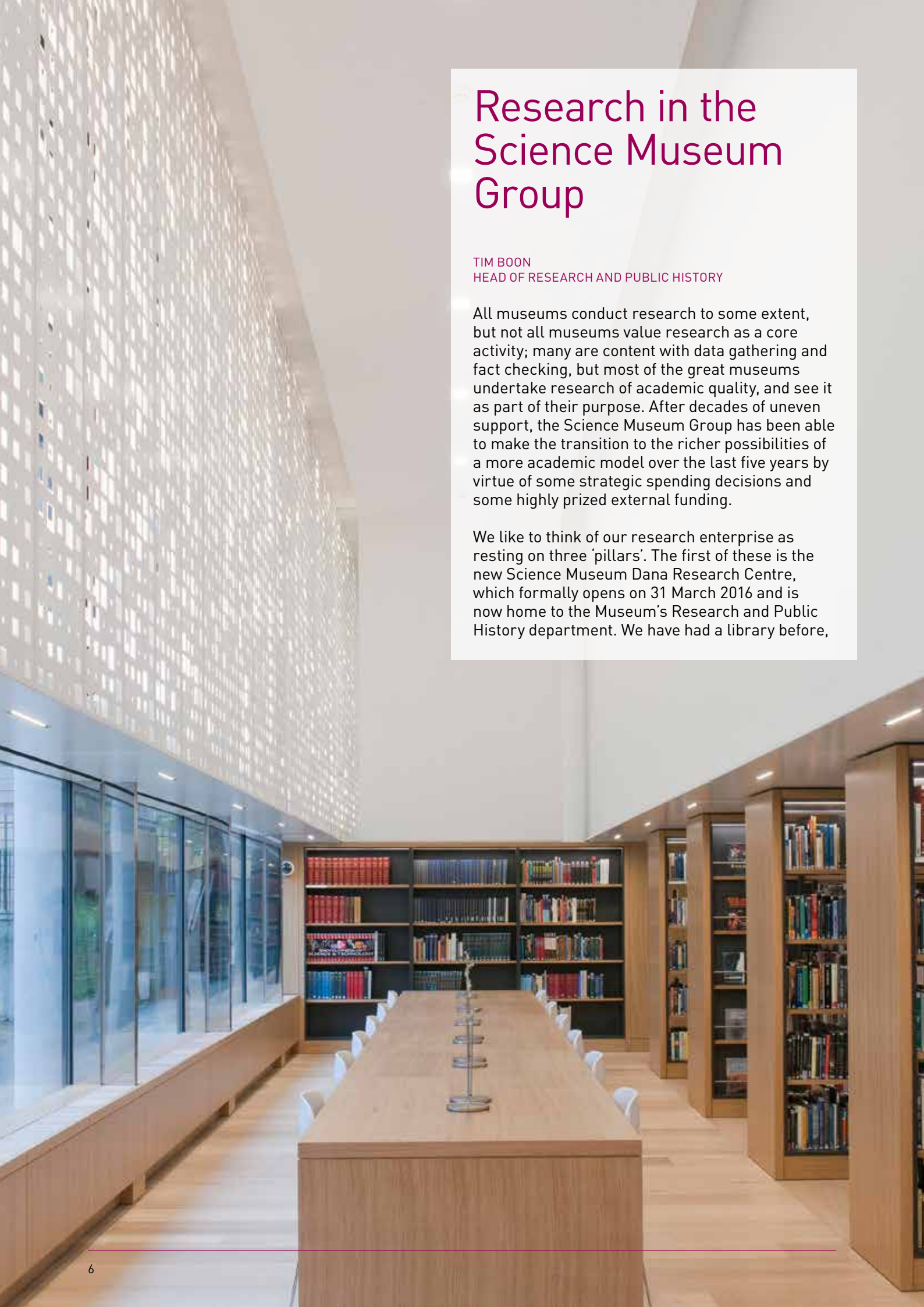
Research lies at the very heart of the Science Museum Group's work and identity. It enables us to understand and care for objects, to interpret them for diverse audiences, and to grasp their significance by placing them in context. Such research is fundamental in the world of museums as we now know it, and it makes heavy demands on all the staff. Research, in the generous sense I am deploying it here, involves explainers and interpreters, curators and managers, designers, conservators and architects, as well as those who raise funds and those who spend them. Knowledge needs to be re-presented and shared as widely as possible. These are challenging tasks for museums with many thousands of diverse objects in their collections. Successful museum-based research benefits many individuals, groups and institutions and deserves to be celebrated. Collaboration is increasingly a feature of museums, with curators, for example, working with schools and universities, focus groups and specialists of many kinds.

All these features make it appropriate that SMG should publish an annual report dedicated to its research, which explains these activities to the widest possible readership. The Group's Collections and Research Committee currently meets three times a year to discuss this central aspect of its work. We are conscious of the complex responsibilities that come with being custodians of a national collection and the prime one is bringing high-quality knowledge to the public. This is an appropriate occasion to thank all the members of this committee, especially the external ones – Jeff Hughes (University of Manchester) and Philippe Garner (Christie's) for their generosity in giving us their time and wise counsel. I also offer my warm gratitude to the Group's staff for their enthusiasm, expertise and collaborative spirit.

While research is undertaken by many individuals and in a range of settings within SMG, there are also technical tasks – preparing applications for research funding, for instance – that are best done by a specialist team. Hence the importance of having a department to coordinate, support and nurture research activities. It is in this department that the Group's new electronic journal is located. With the first issue appearing in 2014, this has been a very significant development for the Group, providing it with a focus not only for the publication of its own research activities, but a mechanism for joining together researchers across the world whose interests are in any aspect of scientific, medical and technological artefacts, including their interpretation, conservation and display. Such research takes many different forms, as this report demonstrates.

The collections of SMG are not only vast, but they pose special challenges with respect to their care, storage, presentation and mediation to the public. Interpretation involves the presentation of difficult ideas to a range of constituencies, from pre-school children to international scholarly communities. Research, in other words, brings people together, and is best seen as a form of collaboration, above all with the audiences who visit SMG whether virtually or in person. It is therefore fitting that so much research is done in the Group on the key questions of the nature of audiences, how learning takes place in our museums and with what implications.

By its very nature, an annual report provides only a glimpse of what goes on in a complex organisation. It is designed to indicate the depth and strength of research activities, and to invite others to work with us on the remarkable collections SMG has the privilege to care for.



Research in the Science Museum Group

TIM BOON
HEAD OF RESEARCH AND PUBLIC HISTORY

All museums conduct research to some extent, but not all museums value research as a core activity; many are content with data gathering and fact checking, but most of the great museums undertake research of academic quality, and see it as part of their purpose. After decades of uneven support, the Science Museum Group has been able to make the transition to the richer possibilities of a more academic model over the last five years by virtue of some strategic spending decisions and some highly prized external funding.

We like to think of our research enterprise as resting on three 'pillars'. The first of these is the new Science Museum Dana Research Centre, which formally opens on 31 March 2016 and is now home to the Museum's Research and Public History department. We have had a library before,

of course, but the new Centre combines a beautiful and congenial reading room with office space for the researchers who work with us, in the expectation that this research will fertilise our future programmes, rendering them significantly richer and more intelligent than would otherwise be possible. Some of these researchers are our collaborative doctoral partnership PhD students, who form the second supporting 'pillar' of our research activity. In autumn 2016 we welcome the first students in the second three-year AHRC-funded tranche of doctoral candidates. The third 'pillar' is the *Science Museum Group Journal*, our peer-reviewed, free, open access e-journal, which publishes articles from scholars, curators and educators across the world who are interested in the same kinds of things that interest us.

Academic research in science museums will often have a different balance from that conducted in the universities; its distinctive characteristics include a concern with material and visual culture, a focus on how museum display achieves its effects and becomes engrossing and pleasurable for audiences, and an emphasis on how science can most effectively function within broader public culture. Necessarily too, as the custodians of collections, we seek to understand the history of our practice just as we pursue the history and meanings of the objects we care for.

Three 'meta themes'

We have given consideration to the areas in which we hope to excel; our formulation is that after ten years we hope to be known for the quality of our work in three main areas: the material culture of science, its public culture, and its relationship with the arts. In all these areas we intend a broad definition of 'science', taken as a portmanteau term to include innovation, science, technology, engineering, medicine, transport, media and industry.

Our work on material culture ranges from pressing on the evidential value of our collections to research into the enhancement of their storage and the means to conserve them for the future. Projects range in scope from exhaustive 'archaeologies' of individual objects to analyses of whole collections. As is also the case with many of our fellow science and technical museums, the SMG collections have not been researched to the extent and in the detail that is common for the great art and archaeological museums and galleries. We feel that this provides a magnificent opportunity both for our own researchers and for colleagues in the universities prompted by the 'material turn' to want to work with objects and collections to enhance the richness of their research.

The public culture of science is a forum in which the Science Museum has been a key player for over a century. We are therefore interested in our own history, and that of other organisations, and the ways in which museums have influenced how people think about science (in its portmanteau sense). We feel the need to understand how the curator's craft of display in three dimensions relates to, and differs from, the communication of science in print and in moving-image media. We want not simply to do audience research, but to improve our game, thinking critically about how our visitors experience our displays so that we can help their encounters with our displays and programmes to become more fulfilling. And we want to do more than simply wonder whether their experience is different from that of their forebears. We need to synthesise traditions in audience research, science communication and in public history so that we can properly support the Museum's core work of presenting our historical collections.

Then again, science museums have a complex relationship to the arts: Janus-like, on the one hand they function just like any arts-based museum or gallery, whilst on the other they embrace the technical, sometimes difficult, and often remote worlds of science and technology. All this gives science museums a very distinctive relationship with the arts. In a series of projects on science, technology and music, for example, we have explored the close historical interrelationships between new ways of studying sound and of making music. Equally, the research behind several Media Space exhibitions has revealed not just the relationships of specific chemical processes to artistic creativity, but also how new photography is practised in dynamic interplay with the photography of the past.

In all the areas we research we are keen to understand our own collections and practice better, but we are also hungry to know the comparative stories that arise in different institutions with different collections, because we believe that only by understanding our purposes in comparative light may we properly develop our own practice.

As will be evident from the other sections of this report, to achieve our research ambitions it is not only a pleasure, but also a necessity, to work in collaboration with other scholars, curators and educators. In laying out our research ambitions, programme and experience in this report, we also make an invitation to you to join with us in our research enterprise.

Science Museum Group Journal – the story so far

RICHARD NICHOLLS
EDITORIAL ASSISTANT, *SCIENCE MUSEUM GROUP JOURNAL*

Launch
Issue 01 of the *Science Museum Group Journal* launched as planned on 25 March 2014. A launch party was held that evening in the Smith Centre at the Science Museum, attended by 77 people. Guests were treated to champagne, speeches by the Director and Head of Research, and music from a string quartet. The e-journal was available to view on a large screen and a series of tablets, and was very well received.

Newsletters
Following the launch, a newsletter was sent out to a list of 240 academics and professionals compiled by the e-journal's internal board and senior academic staff. The illustrated newsletter gave the main highlights of issue 01, a link to the site and invited recipients to subscribe to the e-journal to receive future newsletters.

The editorial team's strategy is to send out newsletters to subscribers around four times per year. Newsletters alert readers to the publication of new issues and update them with any other research or e-journal news. The intention is to keep these activities 'alive' in our audiences' minds.

Review of issues 01, 02 and 03

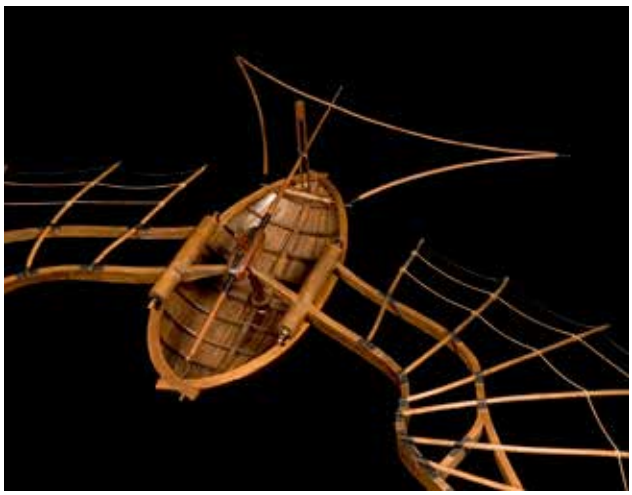
The e-journal site
Overall we are pleased with the design and functionality of the site. We feel it succeeds in focusing on content, setting high academic standards, and featuring an intuitive design and functionality. The site design also makes it easy to publish images, video and audio material. The contractors are using us to flag their credentials to other clients and have been employed to work on other Museum projects. The content management system (Umbraco) is easy to use, and we have established a workable process of review, revision and uploading of content without the need for additional software. Since the editorial team are in full control of the content we are also able to quickly remove any errata.

The editorial process
The editorial process is broadly working well. As with all journals there are some issues with late delivery of articles and peer reviews. The Editor is developing strategies to manage this, for example by booking in reviews based on early article summaries, creating time buffers for deadlines, and engaging a separate copy-editor to manage bottlenecks. A strong line is taken on refusing articles that the reviewers and Editor deem not to be of high enough quality. This is especially vital in the early stages of reputation building.

Content review
- There is a fairly stable *number* of articles within each issue, and within each category of article: 9–10 articles in total, divided into 5–6 research articles, 1–2 discussion pieces and 2–3 reviews.
- There is an even spread between internal and external authors, but it should be noted that in early issues the majority of long research articles were from internal authors, with shorter discussion papers and reviews by external authors. There was a better balance in issue 03, but there is a continuing need to encourage external academics to publish original research in an as yet unrecognised title.
- The ambition to publish a large number of high-quality images is being realised. Authors are responding well to the opportunity, and this provides a distinctive identity for the e-journal. We are encouraging use of video and audio.
- So far, curators based at the Museum in London have produced most of the articles, but contributions are also beginning to flow from the northern members of the Group. An active commissioning policy is being followed, and the Editor is talking with Heads of Collections and Group Directors to encourage research publication.

Future content
The use of a theme for issue 03 – communications – was well received. It allowed us to reflect on our own new *Information Age* gallery, while encouraging external authors through a public call for papers. However, there is room to identify further external contributions, especially in the area of science communication.

Issue 05 will be published in early March 2016 and is intended to complement the newly opened Research Centre's inaugural conference at the beginning of April. The issue will therefore include papers submitted by a number of academics and practitioners who have agreed to speak at the conference.



Looking back at Science Museum research

TIM BOON
HEAD OF RESEARCH AND PUBLIC HISTORY

Above: South Kensington Museum (predecessor of Science Museum), remains of the 'Brompton Boilers' exhibition buildings.

Opposite: Frank Sherwood Taylor, historian-director of the Science Museum, 1950-6.

This is an annual report on the research activities of the Science Museum Group, but it is also the first such report, and so it makes sense to look back on what has been achieved in research over the longer term. If a significant proportion of our current research is historical, looking into the histories of our collections and how they stand for the worlds of science and technology from which they originate, then it is also true that there is an – as yet unwritten – history of research at the Science Museum and its sister museums. When I arrived at the Museum as a graduate in history and philosophy of science, I came with the understanding that there are different ways to tell the history of science; that different eras, different circumstances and different sections of society have variant stories to tell about how people have understood nature, and how they have fashioned new machines and instruments in the past. I also came with the assumption that some accounts were better than others, and especially that understanding science and technology as the products of past societies and cultures is superior to believing that they are a separate realm, governed by some internal clock of progress. I still think that, but I have acquired a fascination, and indeed a respect for, our predecessor curators who made the best sense they could of their worlds in transition, as we do of ours.

That is to say, in the part of the Science Museum's activity that has always been concerned with collections of historical things, curators (whether or not they had that title) have made concrete their views of the past in the objects they have acquired, and in how they have (sometimes) written about them. This is true of Bennet Woodcroft, 19th-century founder of the Patent Office Museum, where some of the Museum's most significant industrial relics were first gathered together. It is true of H W Dickinson, engineer-curator, who served the Museum between 1895 and 1930, and wrote a standard work on *James Watt and the Steam Engine*. And it is true of today's curators too.

One of the most sustained expressions of the kinds of research that curators used to undertake is the catalogue series, which began to be published in the interwar period. Each covered an individual collection – such as bicycles or industrial chemistry – and they most often reflected the structure of the gallery where the collection in question was displayed. These catalogues often

simply reproduced the objects' descriptive gallery labels, but later they were routinely complemented by handbooks that provided narrative technical histories of the particular class of objects. Our curatorial forebears before the Second World War wrote in a world where technological evolution seemed as obviously true as its natural counterpart, and where the workings of that evolution could be seen in the close workings of mechanical improvements to earlier machines.

Frank Sherwood Taylor, Director between 1950 and 1956, was rare among senior staff in bringing with him a reputation – and publishing record – in specifically historical research. Editor for nearly 20 years of *Ambix*, the journal of the Society for the History of Alchemy and Chemistry, he also brought a historical sensibility to the Museum's displays, including a temporary exhibition of alchemical books. But it was a generation later that historical research began to be a more regular part of the Museum's activities. The roots of this change can be found in the ways that broader social, economic and cultural changes impinged on museums in general, as well as in the Museum's major coup of acquiring the Wellcome Collection on permanent loan during the 1970s. In the first place, a decisive shift towards specifically social history can be identified across the museum sector, as indicated by the foundation of the Social History Curators' Group in the early 1980s, a period of recession that brought significant numbers of humanities graduates into junior posts at the Science Museum, as elsewhere. At the same time, the Wellcome medical collection – equal in size to all the other Science Museum collections put together – represented aspects of human experience that lent themselves more obviously to a more social account than had been common with the established technical museum collections of instruments and machines. In the 1990s, these trends combined with a decision to choose doctoral training as a means to professionalise curatorial expertise to create a small cohort of historically trained curators who began to apply their research skills to museum work including gallery production and collecting as well as academic publication and performance.

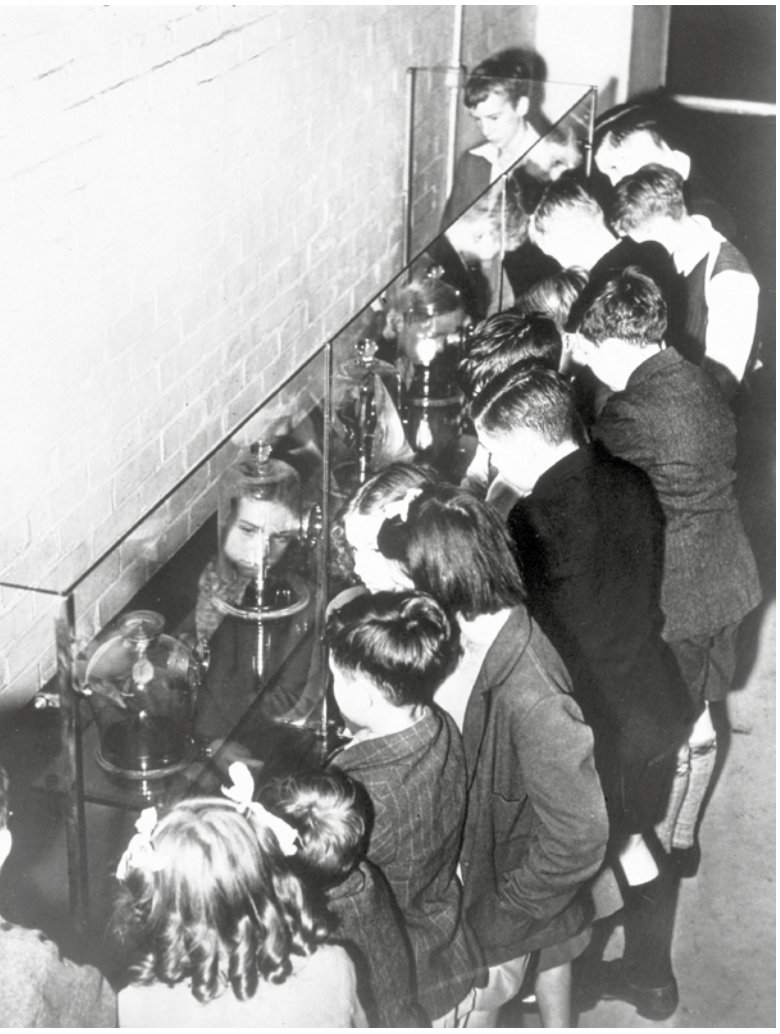
One institution that expressed this new concern with research is the Artefacts collaboration. This collaboration between science museums – initially the Science Museum, Deutsches Museum (Munich) and National Museum of American History (Washington), but now also many others across the world – is dedicated to promoting high-quality academic research into science museum objects. Every year since 1996, Artefacts has convened a group of curators and scholars in a different museum across Europe and North America around a specific theme relevant to the consortium's broad concerns. In around 50% of cases a volume of essays has followed a few years after the meeting, often enriched with additional contributions; these books have covered subjects as diverse as medicine, space and music.

The same decade that saw the start of Artefacts also witnessed the establishment of the Science Museum's permanent audience research department. This was another echo down the years of Sherwood Taylor's research-led approach to museum practice; he had commissioned a 'Committee on the provision for the needs of children in the Museum' in 1951, under which the psychologist Philip Vernon had conducted a pioneering study into the Museum's effect on visitors. The initiative in the 1990s was an aspect of Director Neil Cossons' drive to make the Museum more responsive to the needs of visitors, an urge that also saw close involvement in the establishment of the discipline of science communication studies in the person of John Durant, who established the course at Imperial College whilst leading a Museum division devoted to this new approach to the public understanding of science. Today, the initial practical focus of our audience research – where it has for years helped the shaping of gallery and exhibition content and helped us understand the impact of displays on visitors – is flowering in an academic environment too, with the Enterprising Science and Building Bridges collaborative projects based at King's College and University College London respectively. At the same time, our interests in public understanding have gained a historical edge in our public history programme, which is concerned with researching how our visitors think about the past of science and technology, and with investigating the Museum's historical role in the public culture of science. This last strand produced, for our centenary, the volume of essays *Science for the Nation* (2010), which for the first time applied modern historical research methods to our own history.

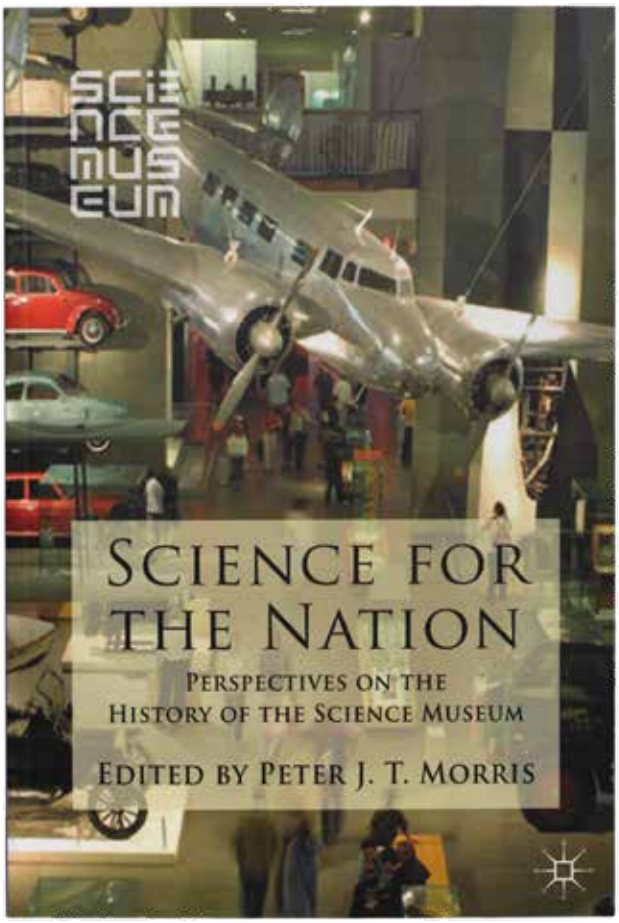
Our collaborative doctoral programme, taking advantage of funding from the ESRC and AHRC, took its first steps in 2003, a sign that the Science Museum was beginning to become known as a

place where serious research might be pursued. From 2013 we were able to award studentships to a cohort of projects and students under the first round of the AHRC's Collaborative Doctoral Partnership scheme. These students are beginning to infuse the work of all the museums in the Science Museum Group (and BT Archives) with the spirit of sustained research, and providing glimpses of the academic possibilities of the collections to the curators and other staff who supervise them in partnership with university colleagues.

Since 2009 we have enjoyed Independent Research Organisation status with AHRC and ESRC. This has enabled the funding of a string of research projects described elsewhere in this report. These projects have enabled us to strengthen our ties with the universities, learn more about our own history, and have provided the means for us to develop our 'research personality' as an institution.



In the Children's gallery, 1949.
Children were the subject of a pioneering study in 1951.



For us today, the past may well seem more complex than it did to the Museum's workers before the war. We are acutely self-aware of the labour we expend in constructing new stories about the past, not only when we create a new gallery on a subject – as in the case of 2016's new gallery on mathematics – but also when we engage in more academic research on the past of science and technology. And it is this turn to more recognisable academic forms and modes of activity – even as the universities are themselves looking towards public engagement – that marks our newly invigorated research activity in the Science Museum Group as appropriate to our age and to the Museum's enduring purposes.

The Science Museum Library and Archives: a new beginning

NICK WYATT
HEAD OF LIBRARY AND ARCHIVES, SCIENCE MUSEUM

The Science Museum opened its splendid new Dana Research Centre and Library to researchers and the public in November 2015. This marked the culmination of over two and a half years of work to create a world-class library facility in the Museum's Wellcome Wolfson Building on Queen's Gate. In a beautiful design by Coffey Architects, the new Centre provides a relaxing and inspirational atmosphere for visitors to use our collections for learning and research.

This is the latest stage in the shifting fortunes of the Science Museum's Library and Archives. In my history of the Science Museum Library first published in 2009 in Science for the Nation as 'Waves of change: how the Science Museum's library rose, fell and rose again', I recounted how the Museum's policies for the Library had fluctuated over the years. Since then, the Library has come under renewed pressure, and in 2014 the Museum and Imperial College agreed that the remaining library collections and services based in Imperial College should move out and that the Museum would build a new facility nearby.

The agreement with Imperial College also led to the Museum acquiring its own library management system to manage its catalogue, loans and other services. The Library's catalogue records were edited and extracted from the Imperial system and added to the new Science Museum Library catalogue, now accessible on the web. In parallel, the Archives have become more accessible via the new SMG-wide Archives catalogue, providing in-depth records of these collections for the first time and access to the digitised images from the Babbage and other collections.

The new Library is transforming access to its collections stored at Wroughton, near Swindon, and visitors can now order small numbers of rare books, items from the archives and other printed material for consultation in London – collections that had been usable only in Wroughton for the past ten years. The Wroughton facility remains open for researchers to access large quantities of material, which cannot be transported to London.

But the Research Centre fulfils more than the needs of the Library, as it creates a home for the Science Museum's Research & Public History department and its cohort of collaborative doctoral partnership students. Its staff and researchers share an office with the Library team, which has increased communication between these groups. Library staff can provide advice on avenues worth considering for further research, leading to greater use of the Library and Archives collections and the Science Museum's electronic resources. Academics and students have already benefited from use of some of these collections, such as student Noeme Santana's research on the business and photographic archive of the British civil engineering company S Pearson & Son.

The Library and Archives collections have significant potential for further research. For example the Trade Literature collection is a largely untapped resource of interest to historians of technology, design and commerce. A dedicated band of volunteers have been listing its content and the records will be added to the new catalogue. Its complementary collection, the Chelmsford collection of mid- to late-20th-century consumer technology instruction and service manuals, has not been studied at all. The printed and archival collections are complemented by large collections of microfilms and microfiche, including the only microfilm copy in the country of The Archive for the History of Quantum Physics. This is now stored in the new Library, where access has been transformed by the purchase of a digital micro reader.

The Library and Archives complement the Museum's object collections and research into these is enhanced by reference to printed and manuscript sources. Objects in the collections usually have an associated Museum file, containing acquisition details and relevant material including trade literature or offprints of related articles. Museum files may also be consulted in the Research Centre, in conjunction with books, journals or other material.

The Library and Archives continue to collect new books on the history and biography of science, technology and medicine, many of which are shelved in the Research Centre and can be browsed without prior arrangement. The archives are growing too, and recent acquisitions include the archives of James Lovelock and Sir Patrick Moore, both largely untapped resources for researchers of the future.

The Library and Archives are now at the heart of the Science Museum's intellectual endeavour and their importance as one of Britain's great collections of science and engineering can be celebrated in a contemporary and stimulating setting.

Research and Public History at the National Railway Museum 2014/15

ED BARTHOLOMEW
SENIOR CURATOR, RAILWAYS & RESEARCH, NATIONAL RAILWAY MUSEUM

The NRM continues to concentrate its research on the Museum's major themes, including exploring the origins of the railways and the science and technology behind their development; the impact of railways on people's lives; and how railways have shaped our world and culture.

The past year has seen the relaunch of the Institute of Railway Studies (IRS) partnership between the NRM and the University of York. This has strengthened and deepened the relationship, which now encompasses a broader range of disciplines. Initially focused on the History department, the partnership has been extended to include History of Art, English, Sociology, Archaeology and the School of Management, with the potential for new and exciting collaborations in fields that will broaden our understanding of railway studies. The two institutions have continued to work together on areas of joint research and mutual interest, and are now planning to share expertise and training. A Railway Studies Forum has also been created to strengthen academic research for both staff and students, while the IRS seminar programme has recommenced, beginning with a series of talks by the Museum's collaborative doctoral researchers.

The NRM now has four collaborative doctoral students undertaking research focused on the Museum's collections and its key themes, with the Museum's curators acting as co-supervisors. Thomas Spain continues his research on 'Food miles: the imaginings, politics and practices of food distribution in the UK, c. 1920–75' in partnership with the IRS. Hannah Reeves's 'Women and the "railway family", 1900–48' is a partnership with Keele University, while Tanya Kenny is researching 'Britain's railways in the Great War' in partnership with the University of Aberdeen.

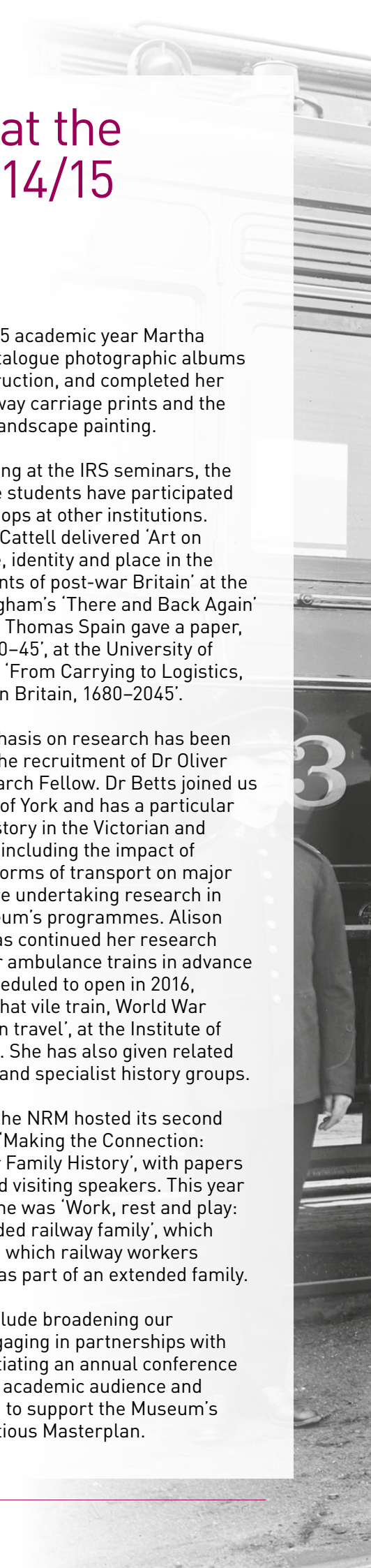
The Museum also continues to sponsor an MA partnership student in association with the University of York's History of Art department. In 2013/14 Charlotte Hancock completed her dissertation on printmakers' fascination with tunnels in the early years of the railways, and while volunteering at the Museum undertook a survey of the Museum's collection of railway prints. In the 2014/15 academic year Martha Cattell helped to catalogue photographic albums documenting construction, and completed her dissertation on railway carriage prints and the British tradition of landscape painting.

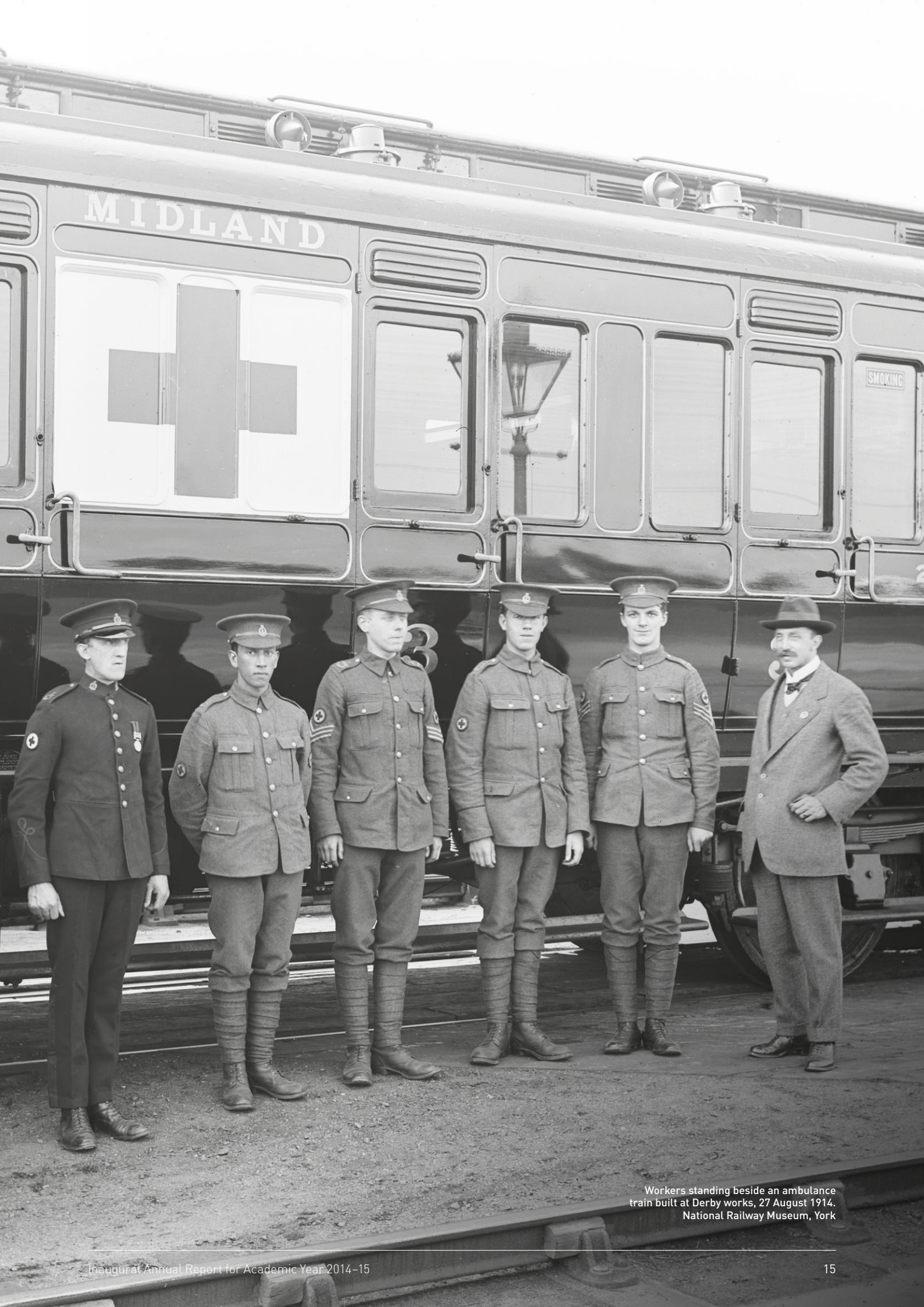
In addition to speaking at the IRS seminars, the NRM's collaborative students have participated in academic workshops at other institutions. MA student Martha Cattell delivered 'Art on the lines: landscape, identity and place in the railway carriage prints of post-war Britain' at the University of Nottingham's 'There and Back Again' workshop on travel. Thomas Spain gave a paper, 'Milk transport, 1920–45', at the University of Reading conference 'From Carrying to Logistics, Distributing Goods in Britain, 1680–2045'.

The Museum's emphasis on research has been strengthened with the recruitment of Dr Oliver Betts as NRM Research Fellow. Dr Betts joined us from the University of York and has a particular interest in urban history in the Victorian and Edwardian periods, including the impact of railways and other forms of transport on major cities. Other staff are undertaking research in support of the Museum's programmes. Alison Kay, for example, has continued her research into First World War ambulance trains in advance of the exhibition scheduled to open in 2016, and gave a paper, 'That vile train, World War One ambulance train travel', at the Institute of Historical Research. She has also given related talks to community and specialist history groups.

In September 2014 the NRM hosted its second annual conference, 'Making the Connection: Railway Records for Family History', with papers by Museum staff and visiting speakers. This year the conference theme was 'Work, rest and play: exploring the extended railway family', which investigated ways in which railway workers viewed themselves as part of an extended family.

Our future plans include broadening our collaboration by engaging in partnerships with new institutions, initiating an annual conference aimed directly at an academic audience and continuing research to support the Museum's emerging and ambitious Masterplan.





Workers standing beside an ambulance train built at Derby works, 27 August 1914. National Railway Museum, York

Research and Public History at the National Media Museum, 2014/15

MICHAEL TERWEY
HEAD OF COLLECTIONS AND EXHIBITIONS,
NATIONAL MEDIA MUSEUM

Spooner's Protean Views No.5: The Magic Lantern, Science Museum

The National Media Museum is home to nationally recognised and internationally significant collections in the fields of photography, photographic technology, cinematography and broadcasting. These include many of the earliest examples of technology in these areas, including cameras used by William Henry Fox Talbot and the worlds' earliest surviving negative, the first movie camera invented by Louis Le Prince and frames from the films he shot with it, and John Logie Baird's experimental television apparatus.

The collections are large and diverse, including over 3 million photographs, and are an incredibly valuable resource for researchers across a range of academic disciplines. Research into the collections has helped us to understand how the very first photographic images were made, how the pioneers of cinema developed early colour film processes, and how the still and moving image have shaped visual culture. Our research priorities include understanding the science and technology of photography, film and broadcasting, the transformative effects of digital technology in these areas, and how museums can work with their communities.

The 2014/15 year has been a good one for research at the Museum, with a major international conference, significant progress on our doctoral and collaborative research projects, and contributions from our curators to a number of conferences and articles.

In November 2014 we hosted a major conference, 'Archives 2.0: Saving the Past, Anticipating the Future', which explored the challenges and opportunities around the acquisition and management of visual archives by cultural institutions. The conference brought together academics, archivists and curators across film, photography and television, all with an interest in the ways in which digital technologies are changing archival practices, and the implications for institutions and researchers. There were keynote presentations from Denise Gose, Associate Director at the Center for Creative Photography at the University of Arizona; Jessica McDonald, Curator of Photography at the Harry Ransom Center, University of Texas at Austin; and Dr Ulrich Pohlmann, Curator of Photography, Münchner Stadtmuseum. Other speakers included Dr Sunil Manghani (University of Southampton), Simon Popple (University of Leeds), Keishi Mitsui (Tokyo Metropolitan Museum of Photography), Bill Thompson (Head of Partnership Development, BBC Archives) and Dr Sarah Atkinson (University of Brighton).

The Museum hosts three students completing collaborative doctoral projects across a range of the collections, which have made excellent progress, and we have been successful in our proposal for a fourth project. Leeds University student Ceri Pitches' work on 'Live interpretation in the UK science museum: performance perspectives on the role and development of the Explainer' is in the writing-up phase, tracing the roots of science museum interpretation, and exploring the ways that approaches drawn from the study of theatre and performance can help to inform the ways we communicate with visitors to all our museums. Emily Marsden, whose project is co-supervised at Durham University, continues her research into photography in the First World War, drawing on the Museum's diverse collections including press, snapshot and art photography. Philip Roberts has made a fine start on his exploration of 'Magic lantern culture in Britain, 1850–1920: exhibition, reception and mixed-media landscapes', bringing new insights to one of our large but under-used collections. And in autumn 2015 Rebecca Smith will begin her project on the Daily Herald Archive, co-supervised by Professor Elizabeth Edwards of De Montfort University, the focus of which is how understanding the systems and cultures of photography through the archive can help us to explore the historical significance of this unique collection.

The Daily Herald Archive also featured heavily this year in Leeds University's Pararchive project (more on which can be read elsewhere in this review). The team made selections from the archive, which show the ceramic and cotton industries of Manchester and Stoke-on-Trent respectively, for digitisation. These selections were then added to an experimental web tool, developed by the team, which enables community groups in Stoke and Manchester to use the images as part of their own online exhibitions. This in itself brings the collections to new audiences, but it also brings new local knowledge to the collections; Simon Popple writes more about this project elsewhere in this report.

Our future plans include developing a research theme based around the extraordinary resource of the Daily Herald Archive. This will include the culture, technologies and practices of 20th-century press photography as well as the popular visual culture of the period more generally, and the implications of the changes to digital technology for the processes of recording and archiving newspaper picture libraries. We aim to host a conference exploring some of these areas in November 2016. We are also developing ideas for a research project inspired by the 70th anniversary of the partition of India in 2017. Here there is an opportunity to explore how the Museum and its collections can play a role in the ways that the legacies of partition are experienced and understood in Bradford today.

Research and Public History at the Museum of Science and Industry, 2014/15

JACK KIRBY
GROUP HEAD OF COLLECTIONS SERVICES,
MUSEUM OF SCIENCE AND INDUSTRY

Activity in Manchester has developed around collaborative doctoral research, expanding links with universities, and contributing to scientific research through citizen science projects.

Collaborative doctoral award student Erin Beeston and her supervisor James Sumner led a tour of the Museum and surrounding area at the Manchester Science Festival. The event was tweeted live, bringing Erin's research to an even wider audience. Her research has contributed directly to the development of the Museum's plans to reinterpret its historic Liverpool Road station site. The project has uncovered new information about the site's history through both archival research and oral history interviews with people connected with the station.

Building capacity and confidence for research within the department remains a key objective. This is being delivered through broadening the range of academic relationships and attendance and presentations at conferences, seminars and other events. Work is also taking place to encourage a wider range of researchers to make use of the collections by raising awareness of the range and quality of material held.

The close relationship with the Centre for the History of Science, Technology and Medicine (CHSTM) at the University of Manchester developed further, with Assistant Curator Sarah Baines presenting a seminar on curating industrial Manchester using personal memories. A taught session about using objects as sources was delivered to CHSTM students, while those studying museology at the university received a session about collecting policy and practice.

Re-examining the Museum's collections from new perspectives is a central principle of both research and interpretation at MSI. This year Paul Coleman joined the department, studying the development of megavolt electricity in a collaborative doctorate with the University of Leeds. Paul's research draws on – and will help to illuminate – the Museum's electricity archive collections, which are national in both scope and significance but relatively little known.

MSI has developed expertise in 'citizen science' projects in which audiences both in the Museum and online contribute data to scientific research. This year's project was a collaboration with the University of Amsterdam which, through a game based around catchy tunes called Hooked on Music, collected data to help to understand what makes music memorable.

Launched at the Manchester Science Festival, the project is web based, but has also used participation in 'silent discos' to gather data from visitors at both MSI and as part of the Science Museum's Lates events in London.

It is hoped that the outcomes of the Hooked on Music project could aid future research into Alzheimer's disease by devising methods of triggering memories and providing therapeutic benefits. A second phase will take place in 2015/16.

In order to better reflect regional scientific research in the collection in future, the Museum held a workshop with an invited group of academics and others. Delegates stressed that science is global and that the Museum should reflect the regional part being played in global research projects. This principle will be incorporated into the forthcoming revision of the Museum's collecting policy.

Learning research projects and audience research

KAREN DAVIES
HEAD OF LEARNING RESEARCH AND RESOURCES

JANE RAYNER
AUDIENCE RESEARCH MANAGER

Academic research is demonstrating its relevance in developing our understanding of audiences and of the factors that determine how they learn about science in the informal settings of museums. Building on the approach to audience research that has been at the heart of the Science Museum Group's philosophy for two decades, two externally funded SMG projects are significantly influencing our Museum and building evidence for the role of museums and science centres in the wider learning landscape. Both projects, taking place over several years, have university partners, which enables findings to be placed within the broader context of education research. Both are informed by audience research and both work with school students, teachers and families.

Since 2013, SMG has been a partner in the Enterprising Science project with King's College London and BP, which supports secondary schools and other professionals to engage more young people with science. This five-year nationwide research and development project uses the concept of 'science capital', derived from Pierre Bourdieu's concept of social capital. This theory enables the research to explore how and why young people engage with science, or indeed fail to. Science capital is composed of *what you know, how you think, what you do and who you know*. The project involves collaboration between schools, young people and their families, museums and science centres. Strands of activity so far have included research with teachers and families, professional development programmes with teachers and museum educators, and resource development.

Research by our colleagues at King's College shows that the more science capital young people have, the more likely they are to study science post-16 and to see science as 'for me'. Yet 27% of

all 11- to 17-year-olds have low science capital, particularly those from disadvantaged schools and communities. In our observations of families in informal science settings, we have seen that those who have higher science capital and can access family science knowledge and experiences are better prepared to benefit from opportunities for science learning in the Museum. And, even though a visit may still be fun for those with low science capital, we found that much more needs to be done to help diverse visitors to connect with the science in museums.

Building on research from KCL's ASPIRES project and over 20 years of SMG's audience research, combined with practical expertise in delivering engaging learning experiences, we are seeking to understand how 'science capital' can lead us to develop our practice and deepen our influence on our audiences. Science capital offers us a lens for understanding the differences in our visitors' engagement with science – why some people do or do not take part in the science engagement experiences we offer. We can use it to reflect on our work as practitioners and, by embedding the concept within our practice, it will help us identify our successes and give validation to the approach and experiences we offer, as well as challenge us to be more inclusive. **The Museum is translating this research into practice by focusing on how science centres and other informal science learning environments can best utilise their collections, booked visits and outreach to build levels of science capital in all young people. To this end, the science capital approach is now built into our formal learning strategy.**

Building Bridges is a partnership between the Science Museum and the BG Group. It aims to engage and inspire young people from diverse backgrounds in STEM and help them make sense of the science that shapes their lives. The programme targets a class of Year 7 students in each school in our five London partner boroughs and in Reading, over one academic year. It combines formal learning in the classroom with informal learning at the Museum and at home. Building Bridges is built around the development of a set of student skills, emphasised in programme resources and in face-to-face sessions with Museum staff. These are: asking questions, sharing knowledge and ideas, creative problem-solving, finding and using evidence, and being a team player. It is a multimodal intervention – that is, it takes place over an extended period of time and has numerous points of contact with students. It involves outreach visits to the school, student visits to the Science Museum, a family event at the Museum, and classroom resources for use before, during and after the visits. There is also a booklet that students can complete at home.

Phase I of the project (2012–15), working with academic partner Sheffield Hallam University, provided evidence that a multimodal intervention can have a longer-lasting impact on student attitudes to science than simpler, single-node ones (for example a science festival). Phase II is in partnership with University College London. This study will build on Phase I and include findings from wider family studies. It will focus on families and family culture and their role in shaping children's motivation and aspirations towards science. It aims to make a better connection between students and teachers, the curriculum and informal learning settings such as the Science Museum. The research questions have been designed to explore the practice or culture of all the stakeholders involved in this project, starting with family culture, since this is an under-researched area. They are also designed to help us gain insights that will help practitioners – including teachers and museum educators – further develop and extend their practice.

Science in the public sphere:

understanding the meanings of 'applied science' in the era of war, industrial research and modernism, 1900–39

ROBERT BUD
KEEPER OF RESEARCH, SCIENCE MUSEUM

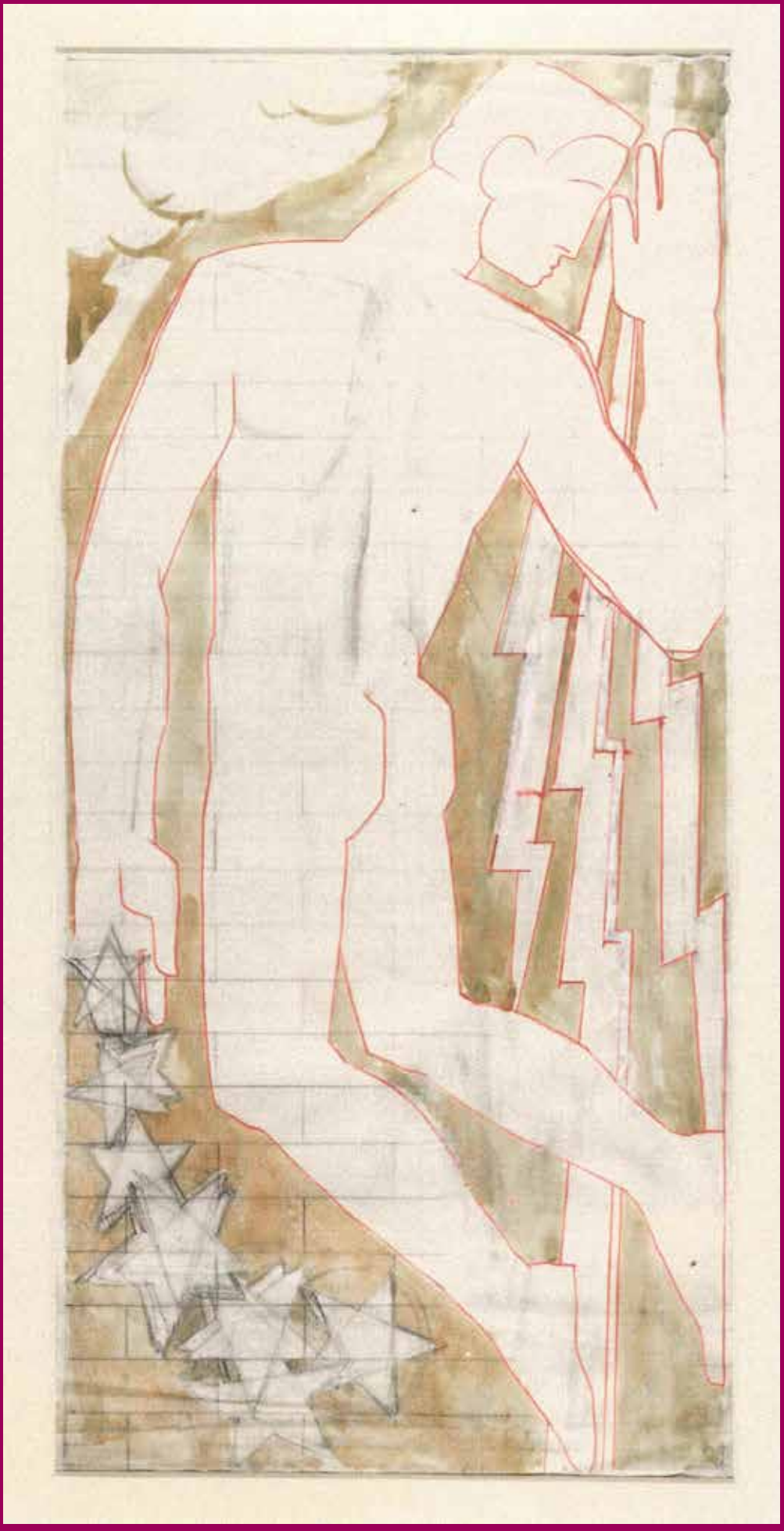
As Research Keeper, I hold a leadership fellowship funded by the Arts and Humanities Research Council (AHRC) to explore both the term and the concept 'applied science', as they were deployed in the period 1900–39, in the public sphere and in institutional negotiations. The term was then the dominant means of interpreting the relations between science and practice, and is important to the Science Museum in particular. Across literature and the mass media of the early 20th century, it was used to interpret startling challenges, fears and opportunities for the future, and the resources of the past. At the opening of the new building of the Science Museum in 1928, the *Manchester Guardian* was effusive about the new 'cathedral of applied science'. The Museum's linkage of esoteric scientific apparatus to steam engines and domestic appliances is testimony to the power of the concept to create a unity out of apparent diversity. Yet the meaning of this important element of culture is generally left as self-explanatory, and the term is often silently translated today as 'technology'. By making explicit the expectations and assumptions around applied science early in the 20th century, we could better understand modern attitudes toward technology and the ancestry of the social processes that sustain them.

This study is important then for a reinterpretation of the past in its own terms, and contextualises contemporary striving to interpret our own modernity. Narratives about applied science were often used to voice the value of individual innovations, considered particularly bad or good, such as poison gas or the light bulb; sometimes they were told around the research process, and could also be told around the entire modern way of life. Thus in *Ulysses*, published in February 1922, Joyce asked and then answered over two pages, 'What proofs did Bloom adduce to prove that his tendency was towards applied, rather than towards pure, science?' A contemporary *Daily Mirror* article, headlined 'Destructive Science', pointed out that 'it is applied science that matters to the average man. He may never have heard the names of last century's pioneer investigators. He sees and knows about electric light.'

The phrase circulated between discourse in the public sphere and private debates about institutional development, in which it served as a technical term for scientists. Both terminology and the desirability of the products to which it could refer were subject to vigorous disputes, such as over new government funding of research. This study explores how talk of applied science assembled associations and aspirations, defining both statements of achievements of past civilisation and hopes and fears for the future, and how these ensembles were contested in societal and institutional accounts. It is concerned with the nature and importance of the stories about the modern age which established these meanings and competition between them in discussions of the nature of modern culture and society. It also deals with the narratives and organisation of particular institutions, and funding of research in both private and public contexts.

At the heart of many of the disagreements lay the problematic relationships of applied science with other knowledge, and its importance to progress today and in the past. The uses of related terms such as applied research, industrial research and technology were not completely separate and their shifting appeal is a challenge for this project. This study addresses therefore three fundamental questions: (1) How were the identities of applied science described, embodied, transmitted and changed? Which works expressed dominant views and to what aims were their creation and dissemination directed? (2) How did particular issues and life experiences serve as nuclei around which discourse deploying applied science was crystallised? (3) What was the relation between the concepts and uses of applied science, and other related categories in Britain, and how did these interact with overseas usages? Addressing these questions, research examines three of the term's historical contexts of use: (1) the press and the wireless, (2) exhibitions as argument and as a major means of communication at the time, and (3) the writings of influential individuals and institutional deliberations. Geographically, the importance of local British political and social issues also suggests a focus on a single national context, while acknowledging the influence of institutional models and terminology from, and conceptual trade with, the USA, Germany and France.

This project, funded by the AHRC, will yield a variety of publications but, following previous support for a study of the concept's 19th-century usage, it is also a building block towards a larger study of the concept of applied science across the period from the French Revolution to the fall of the Berlin Wall two centuries later.



A J Ayres, ìPrometheusî carved brick design for Hornsey Electric Company, by kind permission of Mr James Ayres

Changing to electric, South London, 22 December 1968.
© Daily Herald Archive/National Media Museum / Science & Society Picture Library

Material Cultures of Energy: an AHRC-funded research project

DR HIROKI SHIN
CO-INVESTIGATOR, MATERIAL CULTURES OF ENERGY

PROFESSOR FRANK TRENTMANN
PRINCIPAL INVESTIGATOR,
MATERIAL CULTURES OF ENERGY

The project examines how energy has transformed daily life in the 20th century.

The Science Museum has been collaborating with a major research project, Material Cultures of Energy: Transition, Disruption and Everyday Life in the Twentieth Century (MCE), funded by the Arts and Humanities Research Council (AHRC), since April 2014. As part of the AHRC's Care for the Future: Thinking Forward through the Past initiative, the project examines how energy has transformed daily life in the 20th century. The MCE project seeks to inform discussion about sustainable use of energy by deepening our understanding of past experiences of energy use, an aim that the Science Museum has also been keen to incorporate in its Energy – Fuelling the Future gallery. MCE's research has benefited from access to the collections of the Science Museum and MSI related to household appliances, energy supply technology and historical records including the Electricity Board papers held at MSI.

In the first year of the MCE project (April 2014 – March 2015) collaboration has focused on identifying sources, facilitating research and planning for future events and outreach. Dr Tim Boon, SMG Head of Research and Public History, serves on the advisory board of the project, along with eight other representatives from Defra, the BBC, BFI, World Energy Council, EDF and several universities. MCE's five researchers have already made a number of visits to the Science Museum and MSI, and have started to explore and exploit the Museums' collections in academic papers, presentations and publicity material. The MCE website (www.bbk.ac.uk/mce) features several images from the Museums' collections.

The Science Museum has also been cooperating with the MCE project's outreach programmes. In March 2015 the Museum hosted a group of high-school students from Saijo City, Japan – a partner of the MCE project – as part of the school's study tour in the UK. The students attended a lecture on the history of energy in the UK and then toured the Museum to compare the historical development of household technology with that of Japan.

In September 2016 the Science Museum and the MCE project are planning a joint workshop on the material culture of energy. The workshop will examine the material aspects of energy, in the sense of technology and practice and in shaping our views of what energy is and does. The materiality of energy also highlights how energy-using objects – and their histories – are presented and communicated in public. One aim of the workshop will be to facilitate an exchange about methods and approaches between museum curators, historians and scholars of material culture. This interdisciplinary discussion will feed into later public events and a small exhibition by the MCE project in 2017.

David Toop from the University of the Arts London speaking at the Silence and Noise Workshop at the Royal College of Music.

Music, Noise and Silence: an AHRC-funded research network project

February–April 2015

ALEKS KOLKOWSKI
SCIENCE MUSEUM RESEARCH ASSOCIATE AND
THE PROJECT'S PRINCIPAL INVESTIGATOR

In February, March and April 2015 the Science Museum, in partnership with the Royal College of Music and Nottingham University, organised three two-day workshops bringing together 53 researchers, writers, musicians and acousticians from across the UK, Europe and North America.

Richly varied discussions took place that examined music and sound in relation to science and technology within the context of sonic modernity. The three AHRC funded workshops were complemented by four specially programmed concerts, a micro exhibition, visits to view the Science Museum sound collections at Blythe House and an anechoic chamber at South Bank University, a sound installation and other events. Each workshop included publicly accessible concerts and talks by high-profile speakers. The workshop series also celebrated the 80th anniversary of the Science Museum's *Noise Abatement* exhibition, instigated by the Anti-Noise League in 1935, which saw noise as a by-product of industrial modernity that needed to be tackled, not least by new silent technologies and measuring devices.

Our aim was to explore the structure and outline of a new touring exhibition around the theme of science and music, using discussion, activities and performance events, with the 1935 exhibition as a point of reference. Together, we examined how the cultural and historical categories of music, noise and silence could be used to structure the proposed exhibition, in the light of recent work with sound studies, musicology and history of science and technology. The involvement of leading researchers and practitioners in the development of content and narrative for the proposed exhibition ensured up-to-date, rigorous thought and enquiry, relevant to its subject matter, while the extensive use of action research techniques in our workshops, mainly through provocations rather than presentations, along with activities and events, also helped generate group discussions that teased out numerous and insightful implications for the exhibition.

The first workshop took place in February at the Royal College of Music and explored silence and music, starting from the idea that silence is the 'absolute zero' of both music and the science of acoustics. James Saunders, David Toop and Hillel Schwartz were among those who contributed provocations, which ranged from an examination of compositions that rebalance the relationship between performed sounds and their absence (or 'silence'), to the use of an 18th-century painting to explore the barely audible noises depicted in art and literature, progressing to modern molecular biology via sonocytology. Through discussion, listening to performances and the experience of an anechoic chamber, participants were acclimatised to think sonically, rather than from a purely museological perspective. The workshop also brought to attention the environmental sounds surrounding things, which cannot be shown – a curatorial conundrum that would become a more dominant theme as the workshop series continued.

The second workshop, at Nottingham University, focused on the relationship between noise and silence. Here, the 1935 *Noise Abatement* exhibition was brought to the fore and provocateurs, including Max Dixon, Karin Bijsterveld, James Mooney and Shelley Trower placed this interwar exhibition into perspective. Participants discussed historical and present-day problems of environmental and antisocial noise and their detrimental physiological and psychological effects, as well as examples of sonic retaliation, artistic interventions and public strategies for coping with noise. The workshop ended with a discussion, prompted by David Hendy, concerning the world's supply of unwanted sound, which, like most commodities, is very unevenly

These nineteenth century tuning forks made by R. Koenig were amongst the objects demonstrated by Myles Jackson at the final workshop.

distributed between the rich and poor. It was proposed that the cause of social justice – of who benefits and who suffers from the relationship between noise and silence – should be a vital component of the curatorial strategy behind the Science Museum's proposed exhibition on sound. Events included a display of printed material from the 1935 exhibition, a sound installation by the group Audialsense exploring acoustic phenomena in a huge tunnel walkway, and a silent disco made in conjunction with university students.

The final workshop in the series focused on the relationship between music and noise, convening at two Museum locations: Blythe House and the Science Museum itself. It brought the potential difficulties related to the confluence of sound, objects and museum display to the forefront of the discussion. On the workshop's first day, participants were given a tour of Blythe House's sound-related collections. A subsequent display of objects from the Acoustics collection was gathered for the day's main provocation by Myles Jackson, who explored relationships between musical and scientific instruments. The evening concert also featured historical objects and sounds, namely antique cylinder phonographs, obsolete machine noises, an analogue synthesiser, and culminated in a clog-dance performance presented as early industrial music.

The following day, participants were given a crash course in hardware hacking. Small groups built and operated their own light-sensitive theremins. There was consensus that this activity should become part of the proposed exhibition – an idea further advocated by Trevor Pinch in his talk on circuit bending. Provocations included discourses on connections between futurism and industrial music, and on audiophilia and the loudness war within the digital mastering community, among other topics. Sally Jane Norman, in her closing talk, focused on different modes of listening. She asked if, in an exhibition context, the Museum would prefer to create something where visitors feel a sense of connection with the objects they are listening to, or instead present a self-focused exhibition? Norman argued that perhaps a Science Museum exhibition on sound should focus on counterpoint, embracing its soundscape's own *sharawadgi* – its unexplainable beauty through complexity.

Norman's presentation provoked a group discussion that fittingly concluded the workshop series. The notion of new forms of material culture as potential museum exhibits was discussed in terms of an exhibition designed to offer a more immersive or multi-sensory experience, as well as the emergence of new modes of listening within our current culture. A museum exhibition about sound, which is inherently ephemeral, presents a new series of problems within an institution that is traditionally based in material culture. It was proffered that visitors should be confronted with a room filled only with sound, with absolutely nothing to look at or read, in order to force them to change their relationship with sound and the museum experience simultaneously; yet this also led to questions about why such an experience would need to occur in a museum rather than on the radio or in a concert hall. Historical narrative is a logical reason to have a museum display, as museums are experts at presenting material within a historical context. Museums tend to be resistant to presenting material in an open or undefined way, yet it was suggested that this might be the exact method necessary in order to successfully present such an exhibition. The workshop ended with consensus that the importance of listening must be stressed in the proposed exhibition, in whatever form it may eventually take.

Comparing the role of museums and television in the public culture of science

DR JEAN-BAPTISTE GOUYON
RESEARCH ASSOCIATE

TIM BOON
HEAD OF RESEARCH AND PUBLIC HISTORY

Richard Dimbleby presenting an issue of the BBC's current affairs programme *Panorama* from the Science Museum, 14 May 1962. He is standing in front of the Friendship 7 space capsule.

Between the end of the Second World War and the coming of the internet, television was probably the most influential medium in science communication. That was the starting assumption of Intermedial Science, our 2012 AHRC-funded exploratory project that placed developments in science on television in comparison with the ways in which the Science Museum displayed science and technology in the 1950s and 1960s. The aim of this six-month investigation was, in part, to experiment with intermedial comparison, and to test the strength of archives, especially those of the Museum, for the writing of richly textured cultural history. Taking the main example of space exploration, but also looking into nuclear power, the project researcher Jean-Baptiste Gouyon made some surprising findings. First of all, he discovered that the Museum was home in the 1950s to very sophisticated and reflective work on how exhibitions were expected to work for the public. Second, it became clear that, despite differences of medium, there was much in common between the Museum's and BBC TV's coverage of space travel, including an emphasis on homely, everyday aspects of the subject.

The outcomes of the project are visible via several publications, including one in the Science Museum Group Journal. In the run-up to the 50th anniversary of BBC TV's flagship science programme, Horizon, we were able to build on the contacts made in the initial project, when Dr Gouyon oversaw a series of oral history video interviews with 16 of the programme's editors and producers. This project, conducted in collaboration with BBC History and Heritage, is visible via a series of excerpts and blogs on the BBC's website; the full interviews will be made available via the Science Museum's new Dana Research Centre and Library. This strand of work into the public culture of science is a growth point for the Museum's research department, and we plan to build on the initial project's confirmation of the richness of our archives in further studies.

We continue to seek research partners among community heritage groups and university-based colleagues to continue this strand of research

Participant in Enfield Exchange project in 2012, demonstrating how she used to use the switchboard.

Our public history programme

TIM BOON
HEAD OF RESEARCH AND PUBLIC HISTORY

ALISON HESS
RESEARCH AND PUBLIC HISTORY MANAGER

The presence of the term 'public history' in the title of our department, Research and Public History, signifies a commitment to a special strand of research work that is of particular value to science and technology museums. Two decades ago the Science Museum was an important player in the establishment of *science* communication studies, and much of our effort in audience research has also been focused on the Museum's effectiveness in communicating science. But our interest in public history signals a research concern not so much with the clarity of science communication as with how visitors and the public at large think about the *past* of science and technology. When so much discourse on science is future-focused, what sense does the lay public make of its history, and how do they relate the past of science to history more generally? This is a significantly under-researched area, but one that demands attention if science museums are to produce fully engaging displays and programming using their historical collections. Our starting point all along has been the approach taken in constructivist learning theory and by some authors of studies of cultural consumption. Such authors stress the importance of the ways in which lay people already think, and what they already know, before they enter a museum – whether that derives from formal education, personal enthusiasms or life experience more generally.

Such concerns fuelled 'Co-Curation and the Public History of Science', the conference in autumn 2010 that launched our enterprise; a special section of the journal *Curator* in the following year published some of the key papers. This was followed in 2012/13 by three AHRC-funded workshops, in which we worked with the universities of Leeds and York to explore the ideas and issues around the public history of science, technology, engineering and medicine (PHoSTEM). More practically, the link between co-curation and public history has been pursued via strands of work addressing three kinds of amateur historian or lay expert. A series of articles in *Family Tree* magazine brought the Museum's collections of the tools of trades and professions to the attention of

family historians. We also made two short family history films, which are available on our website. The Enfield Exchange, an AHRC-funded research project in 2012, was envisaged as an exploration of the local meanings of an object in our collections – a 1920s manual telephone switchboard that had been collected from the north London suburb in 1960. And in our 2011 *Oramics to Electronica* exhibition project, we worked with subject enthusiasts and original participants to tell *their* stories about the history of electronic music in Britain.

Public history has continued to be an area of interest within our research projects. In 2013 the Science Museum was the only cultural institution to receive funding under the AHRC's All Our Stories scheme. The project supported community groups in receipt of Heritage Lottery Fund grants that were interested in accessing and researching Science Museum Group collections. While the project focused on community-driven research, it also created space to explore the motivations to pursue history as a leisure activity and the preconceptions individuals bring to researching history. These were particularly drawn out in a workshop that brought together community groups past and present to discuss 'why we do research'. Later in 2013 the Science Museum partnered on the Leeds University-led project Pararchive: Open Access Community Storytelling and the Digital Archive, funded by AHRC under the Connected Communities and Digital Transformations themes. This project co-produced a digital platform that facilitates communities and individuals to tell their own stories using museum collections. Again this research project provoked discussions about who owns history, what stories are not being told, and what is the relationship of 'the public' to the history presented in museums and other cultural institutions? A parallel co-produced project also with Leeds University, How Should Heritage Decisions be Made?, explored the ways that museums, as well as other kinds of historical practice such as city history and buildings preservation, may be opened up to more democratic involvement. This incorporated a strand of research at the Museum where subject enthusiasts made propositions about what kinds of music technology devices might be added to the collections. All three projects have provided examples of the interrelationship between public history concerns and participatory research methodologies.

A reoccurring concern has been how to tie community-generated content to a museum's reserve collections. In 2014 an EPSRC small grant explored this issue, and the role that mobile digital technologies could play. At the end of 2014 the AHRC funded a 12-month project called Who Cares? Interventions in 'Unloved' Collections, which further interrogated the motivations of individuals' and communities' involvement in historical practice. The Science Museum strand worked with the Locks and Fastenings collection, and sought to understand why collectors were so passionate about these objects. This project finished at the end of 2015 with a conference in the Dana Research Centre and Library, bringing together speakers from across the UK to discuss themes around emotion, material culture and enthusiasm. As the conference demonstrated, public history questions are still very much part of live discussions within museums today. In 2016 the Science Museum continues to explore 'the public's' relationship with the history of technology and medicine through an AHRC-funded Follow-on Funding project called Digital Tools in the Service of Difficult Heritage: How Recent Research Can Benefit Museums and their Audiences, in partnership with the University of Leeds.

We continue to seek research partners among community heritage groups and university-based colleagues to continue this strand of research into the lay historical imagination, as we believe that these public historical questions lie at the root of rendering our collections relevant to future generations.

Manual telephone switchboard operator, Enfield, 1960.

Who Cares? Interventions in 'unloved' museum collections

ALISON HESS
RESEARCH AND PUBLIC HISTORY MANAGER

THE WHO CARES? PROJECT IS SUPPORTED BY THE AHRC CARE FOR THE FUTURE THEME'S EARLY CAREER RESEARCH FUNDING STRAND.

The Who Cares? project was set up to consider new ways of working with 'unloved collections': stored museum objects that are not regarded as suitable for display because of their technical focus, bulky nature or lack of aesthetic appeal. The project aims to explore who cares about these collections and how that emotional connection can be used to make these collections interesting and accessible to new audiences. It focuses on practical interventions, drawing on the help of a creative writer and a designer/maker to find new, imaginative ways into the stories behind the collections.

The project is a collaboration between two universities and three museums: King's College London and the University of Reading, and the Science Museum, Museum of English Rural Life (MERL) and Ironbridge Gorge Museums Trust.

Each museum volunteered a different collection: the Science Museum its Locks and Fastenings collection, Ironbridge the National Slag collection, and MERL its hand tool collection. Like many museum collections, each of these could be accused of being dull, mundane or repetitive. With each case study the project has taken a slightly different approach, designed to best engage with key stakeholders.

The National Slag collection is made up of geological samples left over from industrial processes. To the untrained eye they look like lumps of, possibly volcanic, rock. However, groups such as the Historic Metallurgy Society can use these materials to reveal the places and times of industrial activity in the UK. Taken together the slags can help us map the Industrial Revolution. The Who Cares? project brought together members of the Historic Metallurgy Society and members of the Young Archaeologists' Club at Ironbridge. The children learned how to identify slags and what it meant to collect them, finally producing their own imaginative labels for the collection.

The hand tools collection at MERL represents a way of life that has now largely disappeared. Hand tools were often passed down through families, and the signs of wear and tear on the objects tell rich material histories. The MERL case study explored how these items ended up in the museum's collection, interviewing collectors and working with young people to design an event that would bring out these stories.

The final case study focused on the Science Museum's Locks and Fastenings collection. This collection charts the history of lock design, from models of Egyptian locks through to genuine examples from the 16th century and into the 20th century. Recently the locks had been taken off display and are unlikely to be exhibited as a group in this way again. This case study drew on the help of the Lock Collectors Association to better understand how researchers and collectors would want to access this collection. We spent a day at Blythe House filming and interviewing the lock collectors while they identified mysteries from our collection. We discovered a way of researching that relied on touch and close looking that is not always used by traditional historians. We also learned about why people collect and how they see themselves contributing to historical research.

All these collections were brought together as part of a special event at September's Science Museum Lates. Audiences at Lates were asked to vote for their favourite collection – locks, tools or slag – on the back of volunteers' T-shirts. Handling collections helped stimulate conversations about what we collect and why, while our designer/maker asked people to contribute the names of their own collections to a 'Collection of Collections' art piece. While all of this was fun and engaging it also made an important contribution to the research project: getting the team to think about what stories are engaging and the importance of objects to these conversations.

Bramah lock with key inserted, 1800

Pararchive and the Science Museum

SIMON POPPLE, UNIVERSITY OF LEEDS

'Milk on Tap' 1982, Science Museum. From the Milk Marketing Board Archive digitised as part of the Pararchive project.

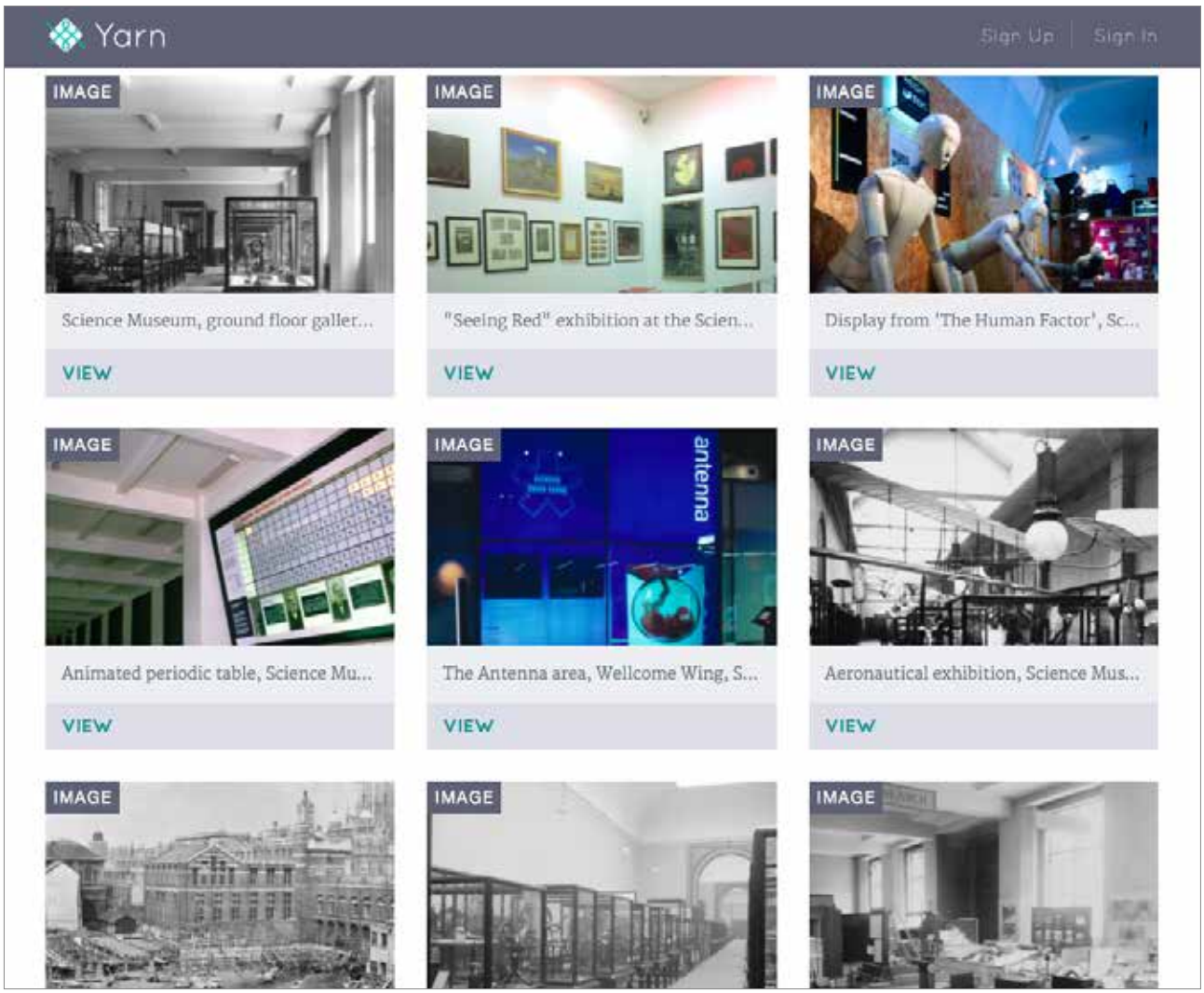
The AHRC-funded Pararchive project worked closely with staff and curators from the Science Museum Group to co-design and build an online storytelling, research and curatorial tool called Yarn (http://yarncommunity.com). The resource was designed by a range of communities working with technology developers and museum and archive professionals, and was conceived as a means through which we could explore a series of issues affecting the relationships between citizens and cultural heritage institutions. We aspired to empower citizens through encouraging the direct use of digital archives in creative work and historical research, and at the same time examine how to break down the barriers between institutional collections and the publics they serve.

The project was based at the University of Leeds, and included members from the Science Museum's research and curatorial staff, among them Dr Tim Boon and Dr Alison Hess, with Dr Gemma Angel employed as a research assistant directly attached to the Museum. Project staff and community members worked closely with the Science Museum (London), Museum of Science and Industry (Manchester) and National Media Museum (Bradford) to explore collections and issues of copyright and interpretation, with the ambition of making key parts of the collection accessible and usable by remote communities. The aim of the project was to co-produce a new 'open' digital resource that would allow users to search and collect online resources, and combine them with their own media (film, photographs and other ephemera) in order to tell their own stories, make new archives, be creative, start new projects and do their own research.

Yarn enables communities to research and document their histories via the creative linking of their own digital content with archival material from public institutions such as the Science Museum, and to work in a non-institutional space. While there are many existing websites and tools that allow people to use public archival material, they are usually either commercial or institutional, which means that they are hosted within controlled spaces that constrain what and how digital content can be used. Our aim was to explore the potential of working with communities to develop new resources from the 'bottom up' to co-produce a more open resource that functions effectively for a diverse range of users and communities, and which facilitates creative use of public archival content.

As a central strand of the project the team worked with SMG collections both to provide content for community research and also to explore central questions about the ownership of knowledge, institutional voices, collaborative public partnerships and in thinking about working spaces in which these activities can take place.

We were motivated by the desire to reach new audiences and develop models of collaborative practice that extend beyond local communities and on-site visitors. What was particularly problematic, and frustrating, was the barrier that existed between people and non-digital materials – objects and images – in a physical archival space. Collections, such as those owned by the Science Museum, were extremely attractive to communities, but they felt remote and disadvantaged. One initiative, which has



now grown into a follow-on research project of its own, saw us taking community volunteers from Stoke-on-Trent into the Science Museum archives to explore and select from one of the most valuable scientific collections in the world relating to their interest in ceramics. During this intensive weekend our community partners were given behind-the-scenes access to Blythe House, the Science Museum's object store in west London, and encouraged to explore more than 170,000 objects not on public display. Working with curators they photographed objects of interest and built a working 3D visualisation of the archive. We are now exploring the potential for using hyperlinks to allow greater access to and ownership of public collections (a prototype can be viewed at http://tomjackson.photography/interactive/blythehouse.html?html5=prefer).

The success of the project was secured and strengthened by the support of the project's institutional partners. Their provision of expertise and content not only helped enrich many of the community storytelling and historical research projects, but it also provided a model through which local communities and public cultural institutions could reconfigure the ways in which they relate to each other with a view to maintaining long-lasting collaborative partnerships. Public cultural organisations now recognise the role that differently situated local community groups and interested members of the wider public can play in adding value to historical and cultural assets in a way that ensures the ongoing relevance of such assets. This recognition of and openness to collaborative engagement has facilitated the creation of a digital space where shared community and institutional affinities and agendas are nurtured, and in which different sets of knowledge are co-produced to enhance public engagement with our common heritage. In doing so, concerns and questions often raised about power dynamics and control stacked in favour of either academic researchers or institutional partners are disproved, meaning that equitable partnerships can be achieved more often if sufficient time and effort is invested.

Further information on the project, partners and activities with the Science Museum Group can be found at **pararchive.com**.

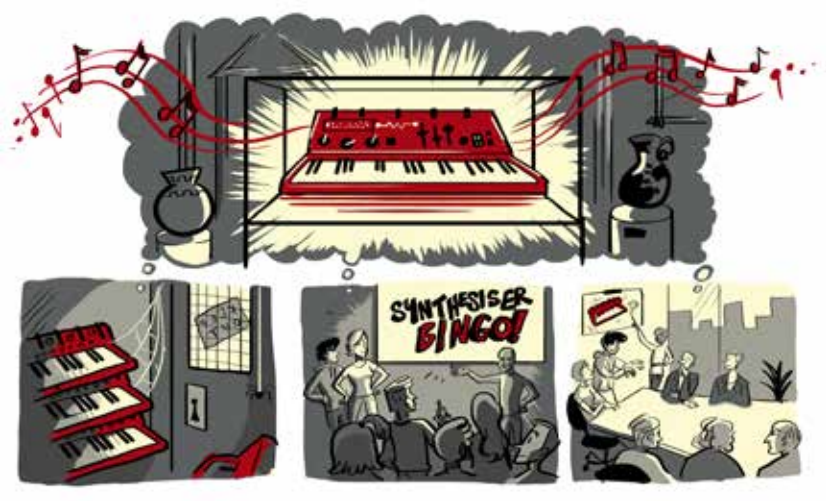
How should heritage decisions be made?

HELEN GRAHAM
UNIVERSITY OF LEEDS

PROJECT WEBSITE: HERITAGEDECISIONS.LEEDS.AC.UK
TWITTER: @HERITAGERES

'I ended up feeling very strongly that some of the objects in the Science Museum stores, particularly the rarer synthesisers, needed to be powered on again. The longer they sit in the dark with the capacitors slowly failing, the less likely they were to ever make sound again, and ultimately the less meaning could be assigned to them. It seemed that a limited project to bring them back to life, if that was possible and fundable, would be an excellent way of using the knowledge of interested communities, engaging with the objects and the general public.'

JOHN STANLEY, WRITER AND ELECTRONIC MUSICIAN



The Heritage Decisions project (February 2013 and February 2015) was funded as part of a pilot project in the Arts and Humanities Research Council's Connected Communities programme that explored how research can be designed with communities. Dr Tim Boon, SMG Head of Research and Public History, acted as Co-Investigator alongside a team consisting of people working in a range of different contexts, including policy and funding, as well as those concerned with the historic environment, and activists with an interest in their own history and heritage. The team spent the first four months designing the research project, which they have since carried out.

One of the strands of research was based at the Science Museum, exploring how a collaborative approach to collecting could be developed. Tim Boon, alongside Richard Courtney (University of Leicester) and Helen Graham (University of Leeds), worked with a group of musicians, composers, journalists and fans of electronic music – Jean-Philippe Calvin, David Robinson, John Stanley and Martin Swan – to explore questions of collaborative museum collecting, with a focus on electronic music. There were two dimensions to the research. The first involved the group making the case for specific items to be collected by the Museum. The second was to use this practical project to investigate the broader questions of how curators can recognise the expertise and knowledge that exists within fan and community networks.

The project outcomes focused on drawing out know-how to share with people who want to increase participation in decision-making. Our final project booklet developed four key ideas:

Act – make change from where you are. Do not wait for someone else to take responsibility – do-heritage-yourself.

Connect – cross boundaries and collaborate. Find people who share your passions and interests – and create networks of decision-makers, professionals, activists and communities.

Reflect – see your work through other people's eyes. Talk to other people about what you are doing – they will help you decide what to do next.

Situate – understand your work in context. If you narrow your focus too much it is hard to see how change can happen. Seeing how people, ideas and resources connect and where disconnections happen can help you take action.

'If you engage the network of geeks out there then you create a community with "a curatorial head on". They will say, "We will look for those things." You're creating a community of curators. But as soon as you stop playing them, synths start to decay. They become less and less the thing that made them worth collecting. As they become less and less viable as instruments, they also become less and less interesting to the geeks, the very people who would want to enthuse about the objects to other people. And these are also the people who could maintain them and could get them going again.'

MARTIN SWAN, MUSICIAN AND EDUCATOR

TB-303 bassline synthesizer, one of the objects proposed in the 'Synth Bingo' co-collecting project.

Conservation of tears occurring in doped-fabric aircraft

BEN REGEL
COLLABORATIVE DOCTORAL AWARD STUDENT,
SCIENCE MUSEUM

A collaborative doctoral research project was commenced in October 2014 between the Science Museum and Imperial College London to research the conservation of tears occurring in doped-fabric aircraft. Doped-fabric aircraft were primarily built during the first half of the 20th century, and were made by covering a wood or metal frame with fabric, usually linen or cotton, which would then be impregnated with a chemical compound to stiffen and weatherproof it.

The Science Museum's doped-fabric aircraft represent an important part of the collection as they relate to a number of key events in human and aviation history. These events include the first non-stop crossing of the Atlantic, which was undertaken in the Vickers Vimy currently on display in the Flight gallery, as well as aircraft setting new records and embodying major advances in technology, such as the Supermarine S6B, also in the Flight gallery.

Although appearing to be of a solid, robust construction, the doped-fabric aircraft are in reality highly susceptible to tearing both from human touching and possible environmental fluctuations. Tears, once opened moreover, lengthen rapidly and are very difficult to conserve. This is in large part because of a lack of research about the properties of materials used in doped-fabric aircraft construction, and how these react to conservation treatments over time. Indeed, it appears likely that current and previous conservation methods may inadvertently risk causing more damage in the long term than they actually prevent or repair.

Throughout 2015 the project has been primarily concerned with identifying what doped-fabric planes are actually made of. This has involved recourse to both a traditional literature and archival review, as well as a scientific analysis of the aircraft materials themselves. The literature and archival review has highlighted the vast diversity of materials used in constructing doped-fabric aircraft, and made clear that generalisations about such a group of objects must be made very cautiously. Of particular interest were records kept by the Air Ministry during the First World War, at the National Archives, Kew. These demonstrated not only the pace at which technical innovations influenced the composition and materials used in making doped-fabric aircraft, but also how more mundane factors, such as supply issues and economic concerns, were equally relevant.

Scientific analysis undertaken at Imperial College has used a range of analytical techniques, including Fourier transform infrared spectroscopy and X-ray diffraction to identify the materials used in making dopes. These have been applied to samples of material retained in the technical files when removed from the aircraft during earlier treatments. The analysis of these materials has corresponded well with expectations from the literature review, though work is still ongoing to identify certain elements.

The project is now on its next stage, working to evaluate the mechanical properties of doped fabrics, and aims to identify how strain is concentrated during tearing and can be redistributed by conservation treatments to avoid further damage.

Photography as a means of exchanging technical and business knowledge: the Pearson collection

NOEME SANTANA
COLLABORATIVE DOCTORAL AWARD STUDENT

'This academic year has been fruitful in terms of the type of research I was able to do at the Science Museum.'

My second year as an AHRC-funded collaborative doctoral award student, working in partnership with the Geography department at Royal Holloway, University of London and the Science Museum, has been a stimulating experience of both interdepartmental museum collaboration and rich archival research. My doctoral research project focuses on the business and photographic archive of the British civil engineering and oil conglomerate S Pearson & Son. The Pearson collection is housed at the Science Museum's Library and Archives store in Wroughton, and comprises (among much else) business papers, ephemera and 150 photographic albums covering Pearson's corporate and industrialist activities between 1880 and 1930. My current research questions are concerned with the role photography played in the exchange of technical and business knowledge, both within Pearson's internal corporate structure, and to external audiences such as clients, affiliate institutions and consulting petroleum and civil engineers.

During the 2014/15 academic year I spent ten months researching the full extent of the Pearson photographic collection and its relevant business papers. My research involved consulting and photographing the entirety of the photographic albums, which contain about 13,000 photographs. Owing to the physical scale of the collection, the process of investigating the albums was in many ways a collaborative interdepartmental sub-project in its own right. Working very closely with Cate Watson and John Underwood at the Museum's Library and Archives in Wroughton, and Rory Cook in Documentation, I was able to comprehensively survey the photographic albums and the business papers. This process was vital to come to grips with key aspects of the collection such as its themes, photographic styles, photographic and album authorship, and Pearson's own corporate structure. Understanding some of these features of the collection has allowed me to begin to build an argument evidencing how S Pearson & Son used photography in a myriad of ways as a means of efficiently communicating and distributing technical and business knowledge to both internal and external audiences.

The process of researching the Pearson collection, in particular the photographic albums which focus on Pearson's 17-year period of Mexican oil exploration, unearthed several questions on how oil exploration was photographically depicted during the first decades of the 20th century. This issue of oil exploration, photography, geology and industry has led me to a successful application for an AHRC International Placement Scheme award to visit the Huntington Library in California as a research fellow between September and November this year. The focus of my research proposal is on a photographic album collection compiled by an American petroleum engineer, Ralph Arnold, who also worked as a petroleum consultant for S Pearson & Son. My aim at the Huntington Library is to achieve a wider understanding of how geologists engaged with photography during geological field work conducted in southern California and South and Central America. I am also interested in possible material and visual crossovers between both collections.

This academic year has been fruitful in terms of the type of research I was able to do at the Science Museum. Through interdepartmental collaboration and support I have been able to have a wider engagement with and clearer understanding of the Pearson collection, its scope, users and dissemination.

Hempcrete research project

MARTA LESKARD
CONSERVATION AND COLLECTIONS CARE MANAGER
AND PHD STUDENT

In 2010 the Science Museum required the construction of a storage building, with approximately 1000 m^2 of total floor space, at its Wroughton storage facility in order to house collections with specific environmental needs. The Wroughton site, located on a former maintenance airfield in Wiltshire at a height of 183 metres above sea level, can be very wet for much of the year with dampness penetrating many of the storage buildings. Control of relative humidity (RH) was therefore a very important consideration in the planning of the new store. With conventional mechanical methods of controlling RH identified as both energy-hungry and non-sustainable, the Museum specified a design with low energy consumption and a limited mechanical and engineering (M&E) system, delivered by the use of hygrothermal construction materials.

Hemp–lime concrete, also known as hempcrete, was chosen for both its sustainable credentials and its excellent hygrothermal performance, as demonstrated by recent use in both commercial warehouses and residential construction. A small air handling system was designed that would circulate external air in order to raise or lower internal RH or temperature when required, with a heating system if external conditions were not suitable. No additional dehumidification or air conditioning was provided.

Monitoring of the RH once the building was completed indicated problems with the M&E system that caused excessive moisture in the storerooms; additional moisture also came from a new concrete floor. Various strategies were employed to reduce the moisture load with eventual success, however quite significant fluctuations in RH were produced throughout the drying period. It was decided that the hygroscopic capability of the hempcrete should be allowed to stabilise the building passively. This proved successful in eliminating fluctuations of RH, but moisture gain could not be prevented and further mechanical interventions have been required periodically to reduce RH levels.

Wroughton airfield from the air.

A PhD research project is using the information provided by the ongoing monitoring of the environmental conditions in the hempcrete store to establish the extent to which the hygroscopic building material can moderate levels and fluctuations of RH within the parameters set by museum needs. In the period 2014–15 a literature review was undertaken to identify and evaluate research on the hygroscopic capability of hemp–lime concrete. Monitoring data obtained has demonstrated the excellent buffering ability of hempcrete, corroborating data obtained by other researchers through simulation and laboratory-based tests. The need for further research to determine the extent to which hempcrete can moderate levels of RH has been highlighted and additional monitoring tests devised, which will be run in the next phase of research. A moisture buffer value for hempcrete specific to museum conditions will also be obtained through laboratory testing.

A review of the literature on the history and development of RH values for heritage preservation resulted in three charts being produced. Based on recommendations from current research into material deterioration, two charts delineate RH values and RH fluctuations in a red, amber, green format for ease of application. The third chart shows the development of RH values by decade from the 1920s to the present day, in order to explain the differing recommendations from conservators and scientists to architects and engineers.

Scientific playthings: artefacts, affordance, history

LINA HAKIM
RESEARCH STUDENT

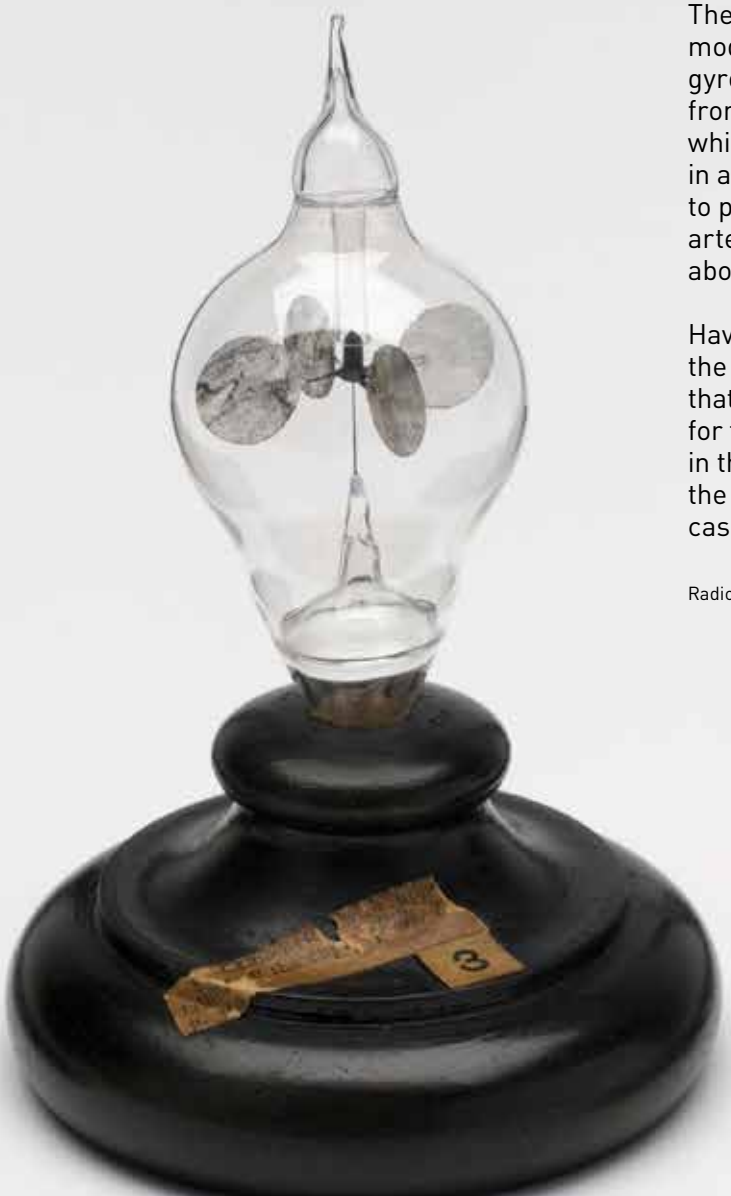
'Through detailed examination of three scientific artefacts from the Science Museum's collections as case studies, the thesis puts forward an applied philosophy and methodology for the study of things and the thinking that they allow.'

My PhD in humanities and cultural studies engages with the material cultures of science, technology and play to look at the ways in which we learn from made things and from making them. Through detailed examination of three scientific artefacts from the Science Museum's collections as case studies, the thesis puts forward an applied philosophy and methodology for the study of things and the thinking that they allow.

Within a phenomenological/ecological framework, I propose that thinking of scientific instruments as playthings puts forward their instability and mobility as artefacts, and develop the notion of 'historical affordance' to relate the evolution and variation over time in what they offer to perception, action and understanding.

The three devices studied (the string surface model, the Crookes radiometer and the gyroscope) are considered alongside objects from the fields of arts, craft and pedagogy with which they resonate – material 'declinations' in a network of objects that bring attention to particular substances and qualities of the artefacts and allow for thinking through things about the thought that dwells in things.

Having fleshed out the historical affordance of the three instruments, the thesis finally proposes that each seems to suggest a particular 'shape' for these movements of thought: a topological one in the case of the model, an atmospheric one in the case of the radiometer and a kinetic one in the case of the gyroscope.



Radiometer (No.3), Royal Society

MSc studies in conjunction with UCL

TIM BOON
HEAD OF RESEARCH AND PUBLIC HISTORY

In the spring term of 2016, the Research and Public History department is welcoming its third intake of students for the 'curating science and technology' option offered to master's students in UCL's Science and Technology Studies (STS) department. The initiative started when Professor Joe Cain of UCL approached me with the suggestion that students on the new master's programme under development for the college would benefit from gaining insights into how doing STS in a museum differs from doing it in a university. 'Just show them how curators go about their jobs; it's bound to be popular,' he said. So we set about designing a course that would do just that: an introduction to issues and themes, followed by insights from different curators, showing how different subject matter, and different generations of displays, prompt different kinds of historical work and various challenges in public communication.

Each year, we have started with a visit to Blythe House, the Museum's west London store, where students are exposed to 'collections in the raw' in a class named 'total immersion'. From that point on, they get to think and talk about how collections are built, how objects acquire meaning and value, and the approaches that scholars and curators have developed to integrate material 'stuff' into historical accounts and public displays. Curators have introduced them to the specific skills of interrogating 'brass and glass' scientific instruments, apparatus for high-energy physics, untold histories of domestic technologies and electronic music. Computers, transmitters, medicines and prostheses, and a thousand other objects are encountered along the way. At the end, the students get the chance to imagine an exhibition and draft a catalogue, or write an 'object biography', to produce a written account of their engagement in our collections, approaches and themes.

Publications, Conference Presentations and Papers

Publications

Bennett, Jim. 'The Science Museum and the Leonardo Da Vinci Quincentenary Exhibition of 1952'. *Science Museum Group E-Journal*, no. Issue 4 (Autumn 2015).

Bennett, Jim. 'James Short and John Harrison: Personal Genius and Public Knowledge'. *Science Museum Group E-Journal*, no. 2 (October 2014).

Bennett, Jim. 'Rosse, Robinson and Rambaut: Creating a Regime of Observing at Birr Castle, 1840–1850'. *Journal for the History of Astronomy* 45 (November 2014): 400–417.

Bennett, Jim. 'The Rev. Mr. Nevil Maskelyne, F.R.S. and Myself': The Story of Robert Waddington'. In *Maskelyne: Astronomer Royal*, edited by Rebekah Higgitt, 59–88. Robert Hale Ltd, 2014.

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Boon, Tim, Katy Price, and Merel Van der Vaart. 'Oramics to Electronica: Investigating Lay Understandings of the History of Technology through a Participatory Project'. *Science Museum Group E-Journal*, no. 2 (October 2014).

Boon, Tim. 'Music for Spaces: Music for Space - An Argument for Sound as a Component of Museum Experience''. *The Journal of Sonic Studies 8 - Sounds of Space* 8 (November 2014).

Boon, Tim. 'Formal Conventions in British Science Television, 1955-1965'. *Actes d'Història de La Ciència I de La Tècnica,* Vol. 7 (2014) (June 2015): 51–69.

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Bradford, Jessica. 'New Approaches to Displaying Mathematics at the Science Museum'. *Informal Learning Review*, no. September October issue 134 (1 October 2015): 9–12.

Bud, Robert, Scott H. Podolsky, Christoph Gradmann, Bård Hobaek, Claas Kirchhelle, Tore Mitvedt, María Jesús Santesmases, Ulrike Thoms, Dag Berild, and Anne Kveim Lie. 'History Teaches Us That Confronting Antibiotic Resistance Requires Stronger Global Collective Action'. *The Journal of Law, Medicine & Ethics, Special Issue: SYMPOSIUM: Antibiotic Resistance* 43, no. S3 (4 August 2015): 27–32.

Bud, Robert. 'Representing Scale: What Should Be Special about the Heritage of Mass Science?' *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 26 September 2015.

Hess, Alison, and Hilary Geoghegan. 'Object-Love at the Science Museum: Cultural Geographies of Museum Storerooms'. *Cultural Geographies*, July 2015, 445–65.

Morris, Peter. *The Matter Factory: A History of the Chemistry Laboratory*. Reaktion Books, 2015.

Rooney, David. 'The Dawn of the Time Lords: Time for Navigation in the Chronometer Age'. *Navigation News*, December 2014.

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Baines, Sarah. 'The Greater Manchester Textile Industry as Represented in the Museum of Science and Industry Collection'. Manchester Jewish Museum, Cheetham Hill Road, Manchester, 20 July 2015.

Bartholomew, Ed. 'British Railway Photography'. Center for Railroad Photography & Art's annual 'Conversations' conference. Lake Forest, Illinois, 11 April 2015.

Bartholomew, Ed. 'LNER Publicity and Advertising'. talk to London & North Eastern Railway Society, National Railway Museum, York, 9 May 2015.

Beeston, Erin. 'Liverpool Road Goods Station, the Story of a Survivor: How New Technologies Enabled the Oldest Station to Serve the Cottonopolis 1840-1900'. Science Museum, 16 June 2015.

Beeston, Erin. 'Liverpool Road Station and the Camp Field: At the Boundary of Industrial and Civic Space, 1840 to 1880'. Central European University SUN Summer School, 2 July 2015.

Beeston, Erin. 'History, Heritage and Re-Presenting Liverpool Road Station'. Faculty of Life Sciences Research Symposium (UoM), 25 September 2015.

Bennett, Jim, and Sylvia Sumira. 'Were Globes Used in the Practice of Early-Modern Astrology?' Scientific Instrument Commission, Turin, 8 September 2015.

Bennett, Jim. 'Hooke's Micrographia'. Museum of the History of Science, University of Oxford, 16 March 2015.

Bennett, Jim. 'The Use of Text and Image for Communicating Developments in Instruments in Early Volumes of the Philosophical Transactions'. Royal Society, London, 20 March 2015.

Bennett, Jim. 'Thomas Romney Robinson: Science and Public Life in Nineteenth-Century Ireland'. Belfast Natural History and Philosophical Society, 16 September 2015.

Blyth, Tilly, and Anne Prugnon. 'Storytelling and the Information Age'. Electronic Visualisation and the Arts 2015, British Computer Society, 7 July 2015.

Blyth, Tilly. 'Interpreting the Information Age: New Avenues for Research and Display'. Science Museum, 3 December 2014.

Bond, Sarah. 'Plague and the City: Disease, Epidemic Control and the Urban Environment'. CRASSH, Cambridge, 5 December 2014.

Bond, Sarah. 'Curator of the Future'. Annual BM National Partnerships Conference, British Museum, 13 April 2015.

Boon, Tim. 'The Cinematic Sound of Industrial Modernity: First Notes'. 'Being Modern' conference, IHR/Science Museum, Institute for Historical Research, University of London, 22 April 2015.

Boon, Tim. 'Technological Utopia in the 1930s: A Semi-Live Documentary Mash Up'. AHRC 'Utopias, Futures and Temporalities' Symposium, Bristol, 20 May 2015.

Boon, Tim. 'Mediating and Performing Science on Television'. Science & You Conference, Nancy, 2-5 June, 4 June 2015.

Boon, Tim. 'The Cinematic Sound of Industrial Modernity: First Notes'. BSHS Annual conference, Swansea, 4 July 2015.

Boon, Tim. 'The Potential of Reconstruction, Re-Enactment and Object-Stimulated Oral History for Displays in Science Museums'. Oral History Conference, RHUL Egham, 11 July 2015.

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Bradford, Jessica, and Kayte McSweeney. 'Making Objects Speak'. Ecsite Annual Conference 2015, MUSE, Trento, Italy, 11 June 2015.

Bradford, Jessica, Anne Prugnon, and Kayte McSweeney. 'The New Fusion: Real Objects in Digital Contexts'. Ecsite Annual Conference 2015, 11 June 2015.

Bradford, Jessica. 'Barrier-Free and Accessible Exhibitions'. Ecsite Annual Conference 2015, MUSE, Trento, Italy, 11 June 2015.

Bud, Robert. 'Oiling the Wheels of Coal: High Pressure and the Benefits of Science'. Society for the History Of Alchemy and Chemisty Conference, Science Museum, 11 February 2015.

Bud, Robert. 'Antibiotics Apocalypse: Historical Perspectives'. Edinburgh science festival, National Museums of Scotland, Edinburgh, 8 April 2015.

Bud, Robert. 'Framing Science as Part of the Public Sphere: Histories of Concepts of Science'. UCL STS research day, 20 May 2015.

Bud, Robert. 'Making Science Concepts in the Media: The British Story of the Early 1930s'. Stories about Science: Exploring Science Communication and Entertainment Media, CHSTM, University of Manchester, 5 June 2015.

Bud, Robert. 'Modernity and the Ambivalent Significance of Applied Science: Motors, Wireless, Telephones and Poison Gas'. Being Modern: Science and Culture in the Early 20th century, Institute of Historical Research London, 22 April 2015.

Bud, Robert. 'Round Table Discussant'. presented at the Colloque international : Les mises en scène des sciences et leurs enjeux, XIXe-XXIe siècle, l'Institut Historique Allemand, Paris, 6 May 2015.

Bud, Robert. 'Scientism as Ideology'. Conceptual approaches to science, technology and innovation, Humboldt University, Berlin, 15 June 2015.

Carpenter, Oliver. 'A Plain Substantial Piece of Workmanship: The Marine Compound Engine and the Tramp Ship in Nineteenth-Century Britain'. Science and Engineering in Cultural Context, University of Kent, 25 June 2015.

Cliff, Harry. 'Collider - Bringing the World's Largest Experiment to the Science Museum'. Physics in Public Spaces, Institute of Physics, London, 23 June 2015.

Cliff, Harry. 'Our Unlikely Universe'. TEDx Talk, Thessaloniki, Greece, 23 May 2015.

Cliff, Harry. 'Rare Decays at LHCb'. presented at the QCD@ LHC, Queen Mary University of London, 3 September 2015.

Harding, Colin. 'Drawn by Light: Exhibiting the Royal Photographic Society Collection'. Royal Photographic Society Scottish Regional Conference, Carnegie Conference Centre, Dunfermline, 17 May 2015.

Harding, Colin. 'Picturing Medicine: The National Photography Collection'. Visual Culture in Medical Humanities, Van Mildert College, Durham University, 18 June 2015.

Hess, Alison, and Angel Gemma. 'Launch Event: Pararchive Stories: The Science Museum Story'. presented at the Connecting Communities: Storytelling and the Digital Archive, Leeds University, 27 March 2015.

Hess, Alison. 'Historical Geography and the Material Culture of Technology: A Close Encounter with the BBC's 2LO Transmitter'. International Conference of Historical Geographers 2015, Royal Geographical Society, London, 10 July 2015.

Hess, Alison. 'Participatory Historical Geography: Creative Approaches and New Directions (Panel Member)'. International Conference of Historical Geographers 2015, Royal Geographical Society, London, 10 July 2015.

Hicks, Jan. 'Introduction to the Archive Collections of the Museum of Science and Industry'. Introduction for Yu-Chen Wang, Artist in Residence, Museum of Science and Industry Archive Study Area and Store, 14 April 2015.

Hicks, Jan. 'Introduction to the Electricity Collections of the Museum of Science and Industry'. presented at the Introduction for the Wellcome Trust and Bill Morrison, Museum of Science and Industry Archive Study Area and Store, 20 April 2015.

Hicks, Jan. 'Introduction to the Electricity Collections of the Museum of Science and Industry'. Introduction for the Wellcome Trust Touring Exhibitions Team, Museum of Science and Industry Archive Study Area and Store, 16 June 2015.

Hicks, Jan. 'Introduction to the Photographic Collections of the Museum of Science and Industry'. presented at the Royal Photographic Society Historical Group Annual Meeting, Museum of Science and Industry Archive Study Area and Store, 29 May 2015.

Johnson, Alexandra. 'James Lovelock'. Artefacts Conference, 26 October 2014.

Johnson, Alexandra. 'The Rubbish Collection'. presented at the Museum Ideas Conference, Museum of London, 2 October 2014.

Johnson, Alexandra. 'The Rubbish Collection'. ECSITE, Trento, Italy, 11 June 2015.

Johnson, Alexandra. 'New Perspectives on Georgian Science'. Technology and Medicine workshop, Kings College, 5 June 2015.

Kay, Alison. 'Copyright'. presented at the Northern Region section of the Archives and Records Association in Sheffield, Sheffield, 29 April 2015.

Kay, Alison. 'Insights into the Hackworth Family Archive'. presented at the AS2N Conference, 30 May 2015.

Kirby, Jack. 'How Do We Tell the History of Science in Manchester?' Science Communication Conference 2015,Manchester Metropolitan University, Manchester, 19 June 2015.

Lee, Ling. 'Communicating Controversial Science'. Science and Society, University Museums Group Conference 2015, Durham University, UK, 24 September 2015.

Lee, Ling. 'Dealing with Difficult Science: Talking About Obesity'. presented at the Food for Thought - ECSITE Annual Conference 2015, Trento, Italy, 11 June 2015.

Leskard, Marta. 'Conservation of the Aerial Tuning Coil from Rugby Radio Station'. BigStuff conference, 3 September 2015.

Millard, Doug. 'A History of UK Human Spaceflight'. UK Space Conference, Liverpool, 14 July 2015.

Pitts, Julia. 'Information Age Storyboxes - "Brace Yourself, Prepare for Immersion'. Excite Conference 2015, MUSE science centre, Trento, Italy, 12 June 2015.

Russell, Ben. 'The Invention That Changed The World: The Separate Condenser 1765'. STICK Conference, University of Glasgow, 5 June 2015.

Shearsmith, Jan. 'Early Development of the F2 Internal Combustion Turbine'. Rugby Art Gallery & Museum Willans Work at Rugby, 4 August 2015.

Our students

Name	Project	Museum	University	Start year
David Rooney	History of traffic congestion	Science Museum	Royal Holloway, University of London	2010
Alison Boyle	Modern physics in the museum	Science Museum	University College London	2011
Jane Desborough	The changing face of time: the making of the modern clock and watch dial, 1550–1770	Science Museum	University of Leeds	2011
Elizabeth Haines	Surveying in 20th-century colonial territories: aerial surveying in Africa	Science Museum	Royal Holloway, University of London	2011
Katherine Platt	From cables to computer components: Siemens in the UK, 1843–1979	Science Museum	University of Manchester	2011
Tom Richards	Oramics: precedents, technology and influence	Science Museum	Goldsmiths, University of London	2011
Helen Evenden	How were motorcars designed in the UK?	Science Museum	Royal College of Art	2012
Ceri Pitches	MediaLive: towards a sustainable live interpretation delivery model for the National Media Museum, Bradford	National Media Museum	University of Leeds	2012
Catherine Rushmore	Chemicals in the home	Science Museum	Oxford Brookes University	2012
Erin Beeston	Spaces of industrial heritage: a history of uses, perceptions and remaking of the Liverpool Road station site, Manchester	Museum of Science & Industry	University of Manchester	2013
Caitlin Doherty	Representations of flight: the 18th-century imagination and modern collections	Science Museum	University of Cambridge	2013
Alice Haigh	'To strive, too seek, to find': Post Office engineering research and the origins of Dollis Hill	Science Museum	University of Leeds	2013
Tanya Kenny	Britain's railways in the Great War, 1914–18	National Railway Museum	University of Aberdeen	2013
Marta Leskard	An investigation into the feasibility and effectiveness of innovative construction materials to produce passive environmental controls suitable for the preservation of historic objects	Science Museum	University of Bath	2013
Emily Marsden	Media in the First World War	National Media Museum	Durham University	2013
Laura Newman	Making germs real: creating, performing and learning about a dangerous invisible thing in the public sphere, c. 1860–1930	Science Museum	King's College London	2013
Noeme Santana	Building an empire: corporate vision and the global geographies of infrastructure	Science Museum	Royal Holloway, University of London	2013

Name	Project	Museum	University	Start year
Jia-Ou Song	Engaging people in physical science research since 1900 in China and the UK	Science Museum	University of Manchester	2013
Thomas Spain	Food miles: the imaginings, politics and practices of food distribution in the UK, c. 1920–75	National Railway Museum	University of York	2013
Paul Coleman	Danger – high voltage: the rise of megavolt electricity supply in 20th-century Britain	Museum of Science & Industry	University of Leeds	2014
Charlotte Connelly	Investigating the flow of electrical ideas through the instruments of their discovery, 1800–50	Science Museum	University of Cambridge	2014
Hannah Reeves	Women and the 'railway family', 1900–48	National Railway Museum	Keele University	2014
Benjamin Regal	Conserving doped fabric aircraft: historic origins; heritage outcomes	Science Museum	Imperial College London	2014
Philip Roberts	Magic lantern culture in Britain, 1850–1920: exhibition, reception and mixed-media landscapes	National Railway Museum	University of York	2014
Jacob Ward	Research transplanted and privatised: Post Office/British Telecom R&D in the digital and information era	Science Museum	University College London	2014
Rachel Boon	The research life of the established 'station' in the 'long Cold War': analogue and digital era	Science Museum	University of Manchester	2015 (January)
Gemma Almond	Correcting vision in 19th-century England: a social, cultural, medical and material history of spectacles	Science Museum	Swansea University	2015
Josh Butt	The rise and fall of the Manchester motor industry, 1896–1939	Museum of Science & Industry	Manchester Metropolitan University	2015
Frances Morgan	Electronic Music Studios in musical, commercial and international perspective	Science Museum	Royal College of Art	2015
Tom Ritchie	Meccano: the nuts and bolts of science	Science Museum	University of Kent	2015
Rebecca Smith	The Daily Herald: popular desires and managing the production of photographs	National Media Museum	De Montfort University	2015
Kevin Tracey	Calculating value: using and collecting the tools of early modern mathematics	Science Museum	Swansea University	2015
Dom Weldon	Mapping the historical growth and cultural context of the British fixed-line network	Science Museum/ BT Archives	King's College London	2015
Sophie Vohra	Railways and commemoration: anniversaries, commemorative cultures and the making of railway history	National Railway Museum	University of York	2016 (January)

Our team

Tim Boon
Head of Research & Public History

Tim is Head of Research & Public History and a historian of the public culture of science. He is responsible for developing the Museum's Research & Public History programme, which is concerned with investigating the lay historical imagination as it relates to science and technology. His exhibitions include Health Matters (1994) and Making the Modern World (2000). His first book, Films of Fact, was published in 2008, and he is co-editor (with Frode Weium) of Artefacts: Material Culture and Electronic Sound (2013).

Alison Hess
Research & Public History Manager

Alison supports a variety of activity in the department, including applying for grant funding and supporting others to do so. She also manages the Collaborative Doctoral Partnership scheme and the Science Museum's relationships with Doctoral Training Partnerships. Alison works with other research organisations to develop expertise in grant applications within the heritage sector. As well as her work to support the department, Alison also runs her own research projects.

Robert Bud
Research Keeper

Robert is Research Keeper and an Arts and Humanities Research Council Leadership Fellow. He is carrying out a major project on the history of the concept of applied science from the fall of the Bastille to the raising of the Iron Curtain. Having previously published books on the histories of antibiotics and of biotechnology, he is now developing understanding of applied science in the post-Second World War era through a new research project on the history of Britain's civil nuclear power industry.

Adam Boal
Research and Public history Coordinator

Adam is responsible for coordinating the research and Public History department, providing support for and assisting in the wide range of activities the team are involved in. He organises the programme of events held by the department such as conferences, talks and seminars. He also provides support to the collaborative doctoral students, research associates and fellows.

Kate Steiner
Editor, Science Museum Group Journal

Kate is Editor of the Science Museum Group Journal, an open-access online journal publishing peer-reviewed articles relevant to the Science Museum and the three other national UK museums within the Group. Previously Kate was Head of Audience Research at the Science Museum and has worked in Exhibitions and Learning.

Richard Nicholls
Assistant Editor, Science Museum Group Journal

Richard is the Assistant Editor for the Science Museum Group Journal, a new publication which presents the global research community with peer-reviewed papers relevant to the wide-ranging work of the Science Museum Group.

Peter Morris
Keeper Emeritus

Peter co-authored Robert Burns Woodward: Architect and Artist in the World of Molecules (Chemical Heritage Foundation, 2001), edited the Museum's official history Science for the Nation (Palgrave, 2009) and recently completed The Matter Factory: A History of the Chemistry Laboratory (Reaktion, 2015).

Opportunities to research with us

The Science Museum Group collections offer wonderful resources for your research. Across science, technology, engineering, medicine, transport, media and industry, few museum collections are as rich and deep as ours. We are keen to welcome scholars to work alongside us in exploring the historical meanings of these collections and, indeed, the Museums' research potential across their activities. In our funded research projects we employ research fellows to carry out managed programmes of research in support of the Museums' programmes of gallery and exhibition development, and the Group's research priorities more widely. Such employment opportunities are advertised on the relevant Museum's website and via appropriate electronic mailing lists when they arise.

We also work with a small number of Research Associates, scholars with interests close to those of the Museums, who undertake projects of mutual benefit, helping us to develop the Museums' research programmes at the same time as they undertake their own research. Our collaborative doctoral programme, described elsewhere in this report, also provides an annual opportunity for those of you who might like to develop a research project for a student to undertake in partnership with us; prospective students for such projects are able to apply in February or March each year. The libraries and research centres at each of our Museums are also available to anyone with a line of research to pursue using our book, serial and archive collections.

If you are interested in any of these opportunities, please contact us:
research@sciencemuseum.ac.uk

Contact

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Arts & Humanities
Research Council