

Contents

Main feature	1
Science on screen	
BSHS grants report	3
Jeff Hughes: President	4
Newton online	5
Reports of Meetings	6
Three Societies 2008	
Styles & Ways of Knowing	
Scientific Instrument Soc.	
Scientific Voyaging	
'Designing Darwin'	10
Views: Science after Al-Ghazali	10
Reviews	12
The Questionnaire	14
Listings	15
BJHS, Viewpoint details	16

Editorial

This is my last issue as Editor of *Viewpoint*. It has been a privilege to have steered the newsletter into its new format, and I would like to thank everyone who has contributed to its success over the last three years, especially Rosemary Wall who will be taking over as Editor in 2009.

I am finishing with a packed issue. Tim Boon writes in the feature article about the importance of considering film and television when writing about 20th-century history of science and technology. The incoming BSHS President, Jeff Hughes reflects on the current BSHS and sets his agenda for the coming two years. John Young convincingly argues that high scholarly standards that can be achieved on the internet.

There is a full Reports of Meetings section, headed by reflections on the Three Societies Meeting in Oxford. In a nod to this event, the interviewee for this issue's Questionnaire is the Canadian Society's former President Gordon McOuat.

Contributions to the next issue should be sent to Rosemary Wall at newsletter@bshs.org.uk by 15 December 2008.

Rebekah Higgitt, Editor

Science on Screen and the History of Science

Tim Boon calls for historians of science to explore film and television.

Most of us grew up in the age of television, in the period extending for over half a century now, when the normal domestic pattern has included this once novel technology. It is probable that, slightly behind their experiences at school, it is television that most significantly moulds peoples' knowledge of, and attitudes to, science and technology. You might think, then, that the study of science in televisual and other moving image media would be naturally attractive to historians of science. But in fact very little has been published on science films and television, especially on non-fiction genres. This says something about the self-definition of our discipline, which has come of age more recently even than television. This was borne out recently when I organised some scientific film sessions for a film history conference. The response was good, but it may be significant that overwhelmingly the papers offered were on medical subjects, not science or technology.

The scholars pursuing STM in film seem either to be historians of medicine exploring visual aspects of medical historical themes, or else film scholars – often located in English and Communications faculties – who have become interested in the specific issues raised by scientific and medical case studies. In other words, most of us historians of science, even those that work on the last century, leave the study of this crucial technology to others. Does this matter?

If we are alert to the contingent nature of science, surely we should also pay attention to the forces that shape our own discipline, and explicitly seek out the areas that have been omitted from study. After all, the badge of excellence in the humanities is finding new questions to ask, territory that is uniquely ours to explore. The tendencies, exemplified by the Edinburgh School, that focused on the social construction of scientific ideas also drove our concerns back towards the private spaces of



Singing Chemist from Paul Rotha's *New Worlds for Old* (1938). Picture courtesy of National Grid.

esoteric scientific knowledge and away from the play of science in general culture. The history of science that I was taught was still self-consciously in flight from the internalism of the scientist-historians who had dominated earlier phases of writing. But in many ways, those types of history of science that are closest to the laboratory have invented a new type of internalism; one that is alert to the social nature of the scientific enterprise, but still concerned with science qua science. But science considered without the broader culture is as meaningless as a world of forms without the Platonist to worry about its existence.

So we also need to recognise the corollary type of externalism that explores what happens in the fabulously ambiguous territory where lay people, carrying many kinds of scientific, technical and natural knowledge, encounter highly mediated versions of professional science. For different periods we need to study and understand the vehicles that have been implicated in those exchanges, as Steve Shapin argued in his still useful article in the *Leeds Companion to the History of Modern Science*. Such studies have, very fruitfully in the last decade in projects such as SciPer, explored the social and cultural space of science, but they have tended to focus most strongly on publications and on the written word, despite the efforts of scholars including Ludmilla

Jordanova. And words have, for history of science as much as for most branches of history, become the accepted media not only of research, but of analysis and exchange. It seems that, for the moment, studying non-literary sources is something that we mainly leave other disciplines to do; we have our esoterica and they have theirs. But do we need to?

Both History of Science and Film Studies were products of the same postwar academic moment – both, in a sense, Robbins-era innovations – but crucially also reactions to previous practice. HSTM was a new professional historical discipline with its own mores, departments and rules of engagement defined in reaction to the practitioner-histories of these fields written by (often retired) scientists and doctors. Similarly, Film Studies was in part a response to older practitioner and connoisseurial traditions in film criticism. Once again it involved the creation of a new professional discipline with its own mores, argot, departments and rules of engagement defined in response to what had gone before. In both cases, the new practitioners believed that there was a need for a new scepticism, a new critical rigour, new questions to be asked and new answers to be found. These were disciplines formed in new interdisciplinary areas – between science and history; and between the apparatus of film production/consumption and the Academy,

if you like. But even disciplines with interdisciplinary origins may tend to become calcified, hardened around particular theoretical assumptions and an artificially reduced set of subjects. Today we have the opportunity to reach a rapprochement between these two disciplines to their mutual advantage.

If it is unfamiliarity that prevents us from studying non-literary sources, we may reflect that there is nothing more intrinsically difficult in the conceptual tools of media studies or art history than in the science we study, or indeed in the approaches we are accustomed to employ, whether they derive from Donald Mackenzie or Michel Foucault, for example. Furthermore, my experience of studying scientific and medical films and television over nearly twenty years is

that the mores and techniques of a historian of science do very good service in researching cinematic and televisual representation of science, technology and medicine. In studying moving images, we don't need to do anything different from what we would otherwise do as historians of science, but our colleagues in film and media studies certainly do have new tricks to teach us, and the engagement with their categories can be very stimulating. For example, Tom Gunning's idea of the 'cinema of attractions', which describes early film's place in the spectacular entertainment culture of the Edwardian era, can help situate popular science in general as much as it does the first science films. Equally, applying a conventional art historical iconographic approach to British documentaries can help set aside the entrenched biographical and institutional conventions of many established accounts. Looking at these films for what they convey about their time and context revealed their makers to me not as exceptional individuals, but as the members of a roundly Modernistic coterie entranced by the transformative potential of science and technology.

It is not sufficient to leave the history of scientific moving images to media studies scholars because historians of cinema will not ask the same questions of scientific films as we do. For example, in researching *Films of Fact*, I found that I was asking different questions about pre-World War Two nature films than film historians had; not so much 'what kind of film is this?' As 'what kind of science is this?' The conclusion I reached was that these films do not represent a popularisation of élite science, but an authentic lay science, a successor for the age of the clerks to the proletarian botanists in Anne Secord's work.

At Leeds in the 1980s, absorbing the mores of the history of science, I learned the historiographical manners that typify our discipline. I learned to look at a historical account and to ask whether it was the only possible story, or whether a different question might elicit a different narrative that would tell us something new about the subject. My experience has shown me that films can be the most fantastic goad to asking new questions about science, technology and medicine. Like museum objects, films are the very particular products of specific times and places. But films and television programmes, especially non-fiction examples, are in many ways a much easier proposition for study by the historian of science than museum objects because of the indexical relationship to the world they represent. They are rich texts that can be 'read' as closely as the historian may care, potentially creating a microhistory to rival Roger Silverstone's book-length ethnography of a single issue of *Horizon*. In studying them, the similarities to museum objects extend to the tools of historical practice, the paper archives



Percy Smith, *doyen of interwar nature filmmakers, undertaking some garden microcinematography. Picture courtesy of the Science Museum.*



Ken Campbell in Windfall Films' 1994 quantum physics series *Reality on the Rocks*. Picture courtesy of Windfall Films.

that support their study. These are often fragmentary and scattered, although the historian of television is very well served in comparison with the scholar of older films, particularly of those made outside state sponsorship.

Visitors to the Science Museum can currently sample a selection of non-fiction scientific films in a special exhibition devoted to this subject. For any passing historian tempted to study these media, there are many more films and television programmes awaiting study than have yet received any scrutiny at all. And increasing numbers of films are being made available online or on DVD by the British Film Institute and others. Most studies of science films so far have been at the case study level. My *Films of Fact* is a first attempt to build on such examples to generalise about non-fiction science films, as Christopher Frayling and David Skal have done for fiction. But there is much more to be done. For example, the 54 year career of BBC's *Horizon* has produced more than a thousand editions; there were more than 1300 editions of *Tomorrow's World*. Yet there is no sustained account of science on television, or of either of these highly significant programmes. For myself, I realised that a year's sabbatical could not hope to enable safe generalisations about what in many ways has been the most influential period for science on screen. Instead, I speculated on the fate of the genres whose construction in particular historical circumstances is the main concern of the book.

Curating the *Films of Fact* exhibition demanded that I test and reconceptualise the material one more time. Exhibitions always drive a heuristic because the extreme brevity of text imposes a haiku-like clarity. At the Science Museum we usually seek to bring home the contemporary implications of historical

subjects. With this exhibition I asked what the implications for the present are of the four major kinds of science on screen developed between 1903 and 1965 that the exhibition presents. This led to the conclusion that all were products of a medium in its infancy: nature films derive from the earliest years of cinema; documentaries promoting both the transformative power of technology and the social duty of science were products of the period when inexperienced filmmakers invented the British documentary form; and television science was formed in the crucible of the 1950s, when producers struggled to invent new forms to serve the new mass audience. If this generalisation is secure, it has implications for science on television now, when scientific and technological issues demand major democratic engagement. Perhaps television, struggling to reinvent itself within inherited genres and formats will be superseded by the new technology of the internet as the site of interpretive innovation. And perhaps there is also an implication for our discipline too, that constraint within inherited categories and approaches may not be able to guarantee the relevance that the newly social HSTM had in the Cold War. Perhaps it really is time to embrace greater interdisciplinarity once again.

Timothy Boon

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Tim is author of *Films of Fact* (Wallflower Press, 2008) and curator of the Science Museum's temporary exhibition of the same name (closes 8 Feb 2009).

Grant Report

Tobias Lovell reports on his BSHS supported MSc studies

As an MSc student at the London Centre for the History of Science, Medicine and Technology, I have had the opportunity to look not just into the history of the sciences and their applications, but also into my own assumptions about science, my beliefs, and my world view. The course has given me the chance to study science in a way that has brought a real shift in perspective on how we look at the world and everything in it.

The MSc core course traces a path from the earliest examples of science, technology, and medicine to the twentieth century and beyond. We asked ourselves what constituted science in the ancient world - a world so full of myth, magic, and alchemy, that the distinctions that we so readily apply to contemporary science were blurred.

We immersed ourselves in the scientific revolution of the 17th century, an epoch so rich in social history, to attempt an understanding of the relationship between science and religion, and to see how political, philosophical, and scientific discourse became inseparable aspects of the same vital processes that instigated and galvanised social change.

The twentieth century provided huge social transformation, the atomic program, and an unprecedented growth in technology, particularly via computers and the internet. The study of these concepts provided a dynamic and continually changing view of science that reflected the diversity of applications, consequences, desires, and power relations that have governed the development of civilization in the last one hundred years.

The dissertation is also a significant element of the course. I am writing about Heraclitus, an ancient Greek thinker, situated at the cusp of what I believe to be the beginning of science. Heraclitus, responding to earlier attempts to explain the cosmos and the underlying matter that composed the universe, sought to understand the world in terms of the *logos*, a term that means a measure, a reckoning, or a proportion. A manifestation of this reckoning process is fire, an ephemeral, almost incorporeal substance that continually moves. I hope to understand ancient science more deeply, hopefully drawing more lucid conclusions concerning the origins of scientific thought.

I would like to thank the BSHS for their award of a bursary and I hope to use this knowledge to help me communicate scientific ideas in my future career.

Tobias Lovell

From the President: Jeff Hughes



New BSBS president, Jeff Hughes leads the tune....

During my year as Vice-President I have been very impressed with the enthusiasm and commitment evident in the Society's organisation. I've also learned a great deal from working with my predecessor, Frank James. Frank has contributed an enormous amount to the Society, not just as an exemplary President, but over many years on Council as Newsletter Editor. I would like to thank him wholeheartedly for all his work on behalf of the Society and the discipline.

One of Frank's major achievements as President was undoubtedly also the highlight of the last year for BSBS: the hugely successful 3 Societies meeting at Oxford. Attendance exceeded all expectations, the programme was outstanding and the atmosphere was socially and intellectually vibrant. It was a great triumph, a tribute to the hard work put in over many months by Frank and the Programme Committee, especially its Chair, Sally Horrocks. Many thanks to them and to our new Executive Secretary, Lucy Tetlow, for making this meeting such a success.

The next few years will see both opportunities and challenges for BSBS. In keeping with our principal aims of supporting scholarship in the history of science, technology and medicine and promoting the subject more generally, Council and its committees have ambitious plans for developing the Society's activities. A dynamic meetings programme is a sign of a healthy field, and our Programmes Committee will be planning the 2009 annual meeting at Leicester and thinking ahead to 2010 and beyond, as

well as supporting other meetings, either as BSBS events or through appropriate financial assistance.

The Outreach and Education Committee has been doing excellent work to promote our subject to wide audiences. The BSBS Strolling Players continue to entertain and educate, and OEC's events for children and teachers have been very enthusiastically received. The results of the Darwin poster competition suggest ways in which we might reach out to new audiences to bring the subject and the Society to wider notice.

The Communications Coordination Committee also plays a key role in the Society's interface with its members and with the wider world. Viewpoint is now an established success, and we are exploring ways of extending its circulation as a way of advertising the Society and promoting the subject. CCC is also working to develop BSBS's media presence, and web editor Mike Hawkins is planning further developments for our website.

Our Committees have their own budgets and substantial autonomy, and are powerful drivers of innovation both within BSBS and in the way the Society engages with broader audiences. Of course, all this activity requires a sound financial base from which to operate. Our finances are in a healthy state, and we are currently able to channel funds into the work of the committees and into a range of grants intended to help promote scholarship. BSBS now offers support for small research projects, student travel and conference care arrangements, as

well as Master's bursaries for HSTM students. Details of all these schemes are on our website (www.bsbs.org.uk), and I encourage anyone eligible to apply.

The Dingle, Singer and Slade prizes are an important part of our scholarly activity. I hope that there will be a strong field for this year's Singer Prize, reflecting the excellence of our postgraduate community. The BSBS Postgraduate Conference goes from strength to strength, and this year included for the first time a well-received workshop on grant applications. I am sure we will see more of this kind of professional development work in future. We are also exploring the role of 'independent scholars' within BSBS, and ways in which we can do more to help them.

Following last year's publication of a new and very successful BSBS Monograph, our new Wheeler Librarian and Monograph Series Editor, Joe Cain, will be exploring ways of developing both the library and Monograph Series to provide useful electronic resources for BSBS members. The *British Journal for the History of Science* has maintained the highest standards under Simon Schaffer, and BSBS members are now able to access it via Cambridge Journals Online.

As this range of activities shows, BSBS is flourishing. But we also face challenges as a Society and as a community. We are in currently in discussion with the Royal Society over the future of its history of science funding. Changes to the Arts and Humanities Research Council's organisation of postgraduate funding may have unfortunate consequences for history of science, and we will shortly be conducting a review of current AHRC support for the field so that we can monitor impacts and make evidence-based representations if necessary. Declining membership is also a significant issue for the Society, and we need to find ways to reverse this trend.

BSBS is hugely fortunate in being able to draw on a community of committed, energetic and talented people. We need the active support of our members, and I strongly encourage anyone who has ideas for development or suggestions for improvement to get in touch and, better still, get involved. I'm looking forward to working with my fellow Officers, Council, our various committees and BSBS members more broadly to develop our activities and to meet the challenges that face our Society and our field.

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Completing the Works: Newton online

John T. Young reflects on the benefits and challenges of publishing Newton's manuscripts electronically.

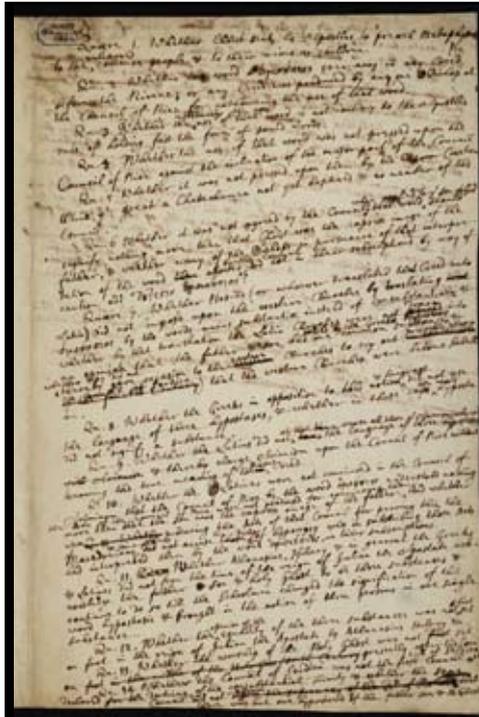
The treatment of Isaac Newton's manuscript legacy since his death can be seen as a barometer of changing perceptions and priorities in the history of science. The President of the Royal Society and internationally renowned pioneer of 'mathematical philosophy' died on 20/31 March 1727. Two months later, it took Thomas Pellet FRS just three days to inspect the several million words of handwritten text Newton had left behind and declare almost all of it 'not fit to be printed'.

From the perspective of print culture, Pellet's assessment is understandable. Apart from late drafts of works that had been published during Newton's lifetime, most of these texts were indeed not 'fit to be printed', in the sense of 'fit to be sent to the printer'. A few bundles could, without undue editorial labour, have been put into a form that would not completely bamboozle an eighteenth-century typesetter. But most of these either concerned Newton's long-standing interest in alchemy or trumpeted his vehement Antitrinitarianism and his highly unorthodox exegeses of Biblical prophecy.

This was not the Newton that his Enlightenment admirers wished to commemorate. The only publications that ensued were of Newton's uncharacteristically anodyne *Observations on the Prophecies of Daniel and St John* (1728) and a late draft of Book Three of the *Principia*, re-entitled *De systemate mundi* (1733). Samuel Horsley's 1779-85 edition of 'all Isaac Newton's surviving works' (*Opera Isaaci Newtoni quae exstant omnia*) was little more than a reprint of previously published material, revealing nothing of the manuscript legacy.

Indeed, a palpable embarrassment about Newton's intense engagement with theology and alchemy continued to inhibit systematic publication of his work in these fields until the end of the twentieth century. Though Newton's first major biographer, David Brewster, writing in 1855, felt reluctantly obliged to reveal Newton's interest in these subjects, and to publish some of his less chaotic writings on them, his disclosures sparked remarkably little interest.¹ When the vast collection of Newton's non-'scientific' writings was auctioned in 1936, it fetched a grand total of little more than £9,000 - a rather dramatic contrast with the \$467,200 realised by just one eight-page alchemical manuscript when it was re-auctioned in 2004.²

The 1960s and 1970s saw excellent multi-volume print editions of Newton's correspondence and mathematical works.³ There have also been scholarly editions, of varying quality, of selected scientific, theological and alchemical manuscripts.⁴ But the sheer abun-



A page (f.1r) from Keynes 11, '23 queries regarding the word omoousios'. By kind permission of the Provost and Scholars of King's College, Cambridge.

dance and inchoateness of most of Newton's papers rendered them impervious to publication in print format.

The advent of electronic publication, however, made it possible to conceive of a 'Complete Works' far more complete than Newton or any of his executors could have imagined - or, perhaps, wanted. The Newton Project, launched in 1998 and currently based at the University of Sussex (www.newtonproject.sussex.ac.uk), has as its goal the freely accessible online release of Newton's entire legacy. A key partner in this is the US-based 'The chymistry of Isaac Newton' (<http://webapp1.dlib.indiana.edu/newton/index.jsp>), which brings highly specialised transcriptional and editorial expertise to bear on Newton's 'chymical' papers.

The new modes of representation facilitated by XML text-encoding and online diffusion make it possible for texts understandably dismissed by Pellet as unfit for publication to be presented in hitherto unimaginable detail, complete with all the deletions, insertions and other manuscript revisions Newton made to his obsessively reworked drafts. The project has also pioneered the development of an interface that enables users to choose exactly how much of Newton's reworking they wish to have made explicit in the display.

This is not merely a case of waving a digital magic wand over Newton's manuscripts. Deciphering Newton's handwriting remains a highly skilled activity, especially in the frequent cases where the text is riddled with deletions and interlineations and/or written in a jumble of English, Latin, Greek and Hebrew. Establishing norms for encoding manuscript features, and devising means of displaying the encoded information in human-readable form, is an academic discipline in itself. But the electronic medium is free of the three great constraints that beset print publication and made the dissemination of work such as Newton's so problematic. There is no limit on the amount of data (whether source text or editorial apparatus) that can be recorded; work can be revised or expanded on after its initial release, and the display of the encoded data can be continuously enhanced.

For all these reasons, the dawn of the digital age has been a rosy one for historians of science, and, indeed, for textual historians of any discipline. There is a perception in some quarters that electronic publication leads to a 'dumbing-down' of editorial standards, but it can just as well be argued that such publication, if done with rigour and honesty, encourages both editors and users to 'wise up'. It is true that the Web is a happy hunting-ground for myths, misconceptions and unsubstantiated conjectures: Newton was a Freemason; Newton was left-handed; Newton was gay; Newton invented the cat-flap; Newton predicted that the world would end in 2060AD. But this, to paraphrase Francis Bacon, is not to be remedied by making no more websites, but by making more good websites.⁵

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1. D. Brewster, *Memoirs of the Life, Writings, and Discoveries of Sir Isaac Newton* (2 vols, Edinburgh, 1855).

2. Lot 509 at the Sotheby sale in New York, 3 December 2004, sold to an unknown buyer. In 1936 it had gone for £10.10s.

3. H.W. Turnbull et al., *The correspondence of Isaac Newton* (7 vols., Cambridge, 1959-81); D.T. Whiteside, *The mathematical papers of Isaac Newton* (8 vols., Cambridge, 1967-81).

4. E.g. H.J. McLachlan, *Isaac Newton. Theological Manuscripts* (Liverpool, 1950); A.R. and M.B. Hall, *Unpublished Scientific Papers of Isaac Newton* (Cambridge, 1962); numerous publications by B.J.T. Dobbs, especially *The Foundations of Newton's Alchemy or 'the Hunting of the Greene Lyon'* (Cambridge, 1975); M. Mamiani, *Isaac Newton, Trattato sull'Apocalisse* (Torino, 1994); Ciriaca Morano, *Isaac Newton: el Templo de Salomón* (Madrid, 1996). This list is far from comprehensive.

5. Cf. F. Bacon, *The Advancement of Learning* (1605), Preface to Book Two, paragraph 14.

Reports of Meetings

Three Societies 2008: Connecting Disciplines 6th Joint Meeting of the BSHS, CSHPS and HSS, 4-6 July 2008

Katrina Boulding reports on the largest History of Science conference ever held in the UK.

The theme for this year's 3 Societies, hosted by Keble College, Oxford, was connecting disciplines – how different disciplines can interact with history of science, technology, and medicine. As a PhD student in communication and science studies, I only recently discovered an interest in how history can inform my work and was excited at the opportunity to see how scholars in other disciplines productively gave tools to and borrowed tools from history to support their research. I was not disappointed by what I found at the conference.

Scholars attended the conference from history, philosophy, sociology, communication, cultural studies, museum studies, art history, to name a few. Session topics included classification practices in astronomy, emergence of the ecological movement, science education in secondary schools, physical and theoretical structures of museums, the intersection between lay and expert scientists, gender issues in science, and representational practices. Within a single session I could find papers on the relationship between local industry and the science of geology, the cross-grafting of paleontological terms and popular rhetoric, and the interconnectedness of politics, literature, and science.

More than one of the papers I saw carried the conference theme throughout their specific project. A panel I attended on lay

participation in the history of scientific observation exemplified the importance of the cultural exchanges between discourses. In this panel, Brita Brenna explored the connection between naturalists and priests in 18th century Norway and resulting practices in natural history. Jenny Beckman offered a history of school education and its relationship to how biologists take field notes. Jeremy Vetter topped it off with a discussion of the network and questions of expert knowledge that formed at the turn of the century between Kansas residents, telegraph technology, and meteorologists. At the centre of each paper were new knowledges and questions that arose as a result of exchange between different ways of knowing the world.

As an outsider to the field of history I was originally concerned I would come to the meeting with only a minimal amount of interests to share with other participants. I was very pleasantly surprised at the openness – in fact eagerness – of the participants to explore what connecting disciplines can mean and what such collaborations and intersections could offer their respective fields. Very few people I met worked with a single method, discipline, or topic. It seems that crossing disciplines is something that is lived on a daily basis and was readily demonstrated by the conference.

A few overarching trends appeared in the types of research questions explored in the individual papers at the conference, regardless of disciplinary background. For instance, there was the role of classification systems: catalogue vs. display, material object vs. dis-

course, knowledge vs. organisation, theory vs. practice, worker vs. thinker. Another common set of questions was related to scale: where should we look – specific, practical, general, abstract – and how can we look at multiple scales at once. Also woven throughout many talks was the relationship between different types of knowledges, such as lay and expert or dispersed and centralized.

I wonder if this mix of people, ideas, disciplines, and projects is the result not just of crossing disciplinary boundaries but continental boundaries. I've noticed this in the past: what is a discipline – or at least common degree programs in Europe – would be considered interdisciplinary in the United States, and vice versa. This exchange between different national research traditions enhanced the exchange between disciplines and made for an even greater opportunity for conversation and growth.

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The Outreach and Education Committee organised a day of events on Saturday 5th July. **Sarah Lloyd and Christopher Parkin** report on two sessions.

Hunting for the Evidence

'Learning here is more practical and you get to make up your own mind.'

'In school everything is given to you but in our visit we had to go and find things out and make our own decision.'

These are the words of 13- and 14-year-olds visiting Oxford University Museum of Natural History to find out more about the theory of evolution and how it was developed and presented more than 150 years ago.

As a Museum educator there is a challenge to tie collections to the curriculum. This is important when trying to persuade secondary teachers to bring their classes to a Museum.

Oxford University Museum of Natural His-



REBEKAH HIGGITT

tory has four collections: zoology, entomology, geology and mineralogy. Each subject area forms a tiny part of the science curriculum at secondary school. Fortunately 'how science works' is a key theme for secondary school science. It's a theme that is difficult to deliver as science 'works' in as many ways as there are scientists. It varies with field, cultural background and personality.

During a recent study nine scientists from a variety of backgrounds and working at a number of levels, were questioned about the way in which they worked and more specifically about the way in which they developed ideas. As might be expected there were a variety of responses but common threads emerged.

Scientists talked about the importance of curiosity, imagination and creativity. They stressed the importance of expertise, collaboration, competition, fairness, courage, reputation and self-belief.

It's not clear how fundamental these qualities and activities are to the scientific process, but it is reasonable to believe they play a part in many areas of research and have for a considerable length of time. It is possible to emphasise this using the collections and the history of the Museum.

As part of the current programme offered to secondary schools, students visit the Museum for a programme of activities about evolution. Students are taken into the room where hundreds gathered for the great evolution debate of 1860. They are told the story of collaboration between Alfred Russell Wallace and Charles Darwin, the rivalry between Thomas Henry Huxley and Richard Owen. They are shown controversial finds such as a cast of *Archaeopteryx lithographica* and fossil casts of other finds that partially reveal a prehistoric world. They compare fossil evidence for evolution with that of present day animals.

Towards the end of the session students are asked to choose a piece of evidence that they

would have brought to the debate if they were putting forward a case for evolution.

Students enjoy handling the fossils, casts, preserved specimens and living animals. Some choose the object that grabs their attention or the one they understand best. The more able evaluate evidence and choose the one that makes a strong case for the ideas put forward by Darwin and his supporters 150 years ago.

They appreciate how scientists in the past made observations and used their imagination and creativity to make sense of them. They understand how some scientists of the day rode on their reputation and went along with the prevailing views whilst others were driven by their conviction and had the courage and support of collaborators to put forward new controversial ideas. The qualities and activities of historic scientists are equally relevant today and students understand this in the context of a good story.

Sarah Lloyd

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Objects of Travel

This year's Three Societies' conference provided an unusual opportunity for the Museum of the History of Science to participate in both the exchange of expertise and the facilitation of social intercourse that makes for the most rounded and fulfilling conference experience. Indeed the museum provided a particularly appropriate venue since, when it was established in the late seventeenth century, it housed not only of the original Ashmolean museum but an experimental laboratory along with a school of natural philosophy providing a place of communication, demonstration and debate amongst a community of likeminded enthusiasts.

The Museum has a unique collection of historic scientific instruments which for the most part are displayed in the traditional display cases. This highlights the extraordinary level of detail and craftsmanship that graces many of the objects, but it leaves some visitors with an unsatisfied curiosity about precisely how the instruments were used. In a thriving programme of events



involving public engagement, the museum has developed a number of different strategies for addressing this problem including 'table talks' for adults, and workshops for family audiences. On this occasion, however, as part of a programme of events organised by the Outreach and Education Committee of the BSHS, the irresistibly high concentration of expertise converging on Oxford during the conference presented the ideal opportunity both to offer delegates a chance to experience first-hand engagement with visitors and an opportunity for the museum to stage an object handling event. The event, 'Objects of Travel', featured a collection of instruments that visitors were invited to handle for themselves related to a theme of travel and, in particular, techniques of navigation.

So what exactly does it feel like to use a cross-staff and what were the problems its users faced? And how do you read the precision scale on an eighteenth century octant? Could one really stand on a heaving deck and make an accurate measurement with a sextant? And why was the mariner's astrolabe so weighty? These were some of the more particular questions that surfaced in discussion during a four hour event which attracted more than seventy visitors. Facilitated by full-time staff at the museum aided by a team of enthusiastic volunteers and at least three expert delegates who braved the crossfire of questions, the event soon gained momentum and was buzzing with activity for most of the afternoon. A final surge of interest was occasioned by the arrival of a group of delegates on the Outreach and Education bursary programme.

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Reports of Meetings

Styles and Ways of Knowing

Mark A. Ulett reports on this BSHS-supported meeting in London.

On the 20th of June, University College London hosted the Third Annual UK Integrated History and Philosophy of Science Workshop, with Grant Fisher as the principal organizer. The thrust of this yearly gathering is on the fusion of historical and philosophical approaches to understanding the structure and transition of scientific theory and practice. Specifically, the design of this workshop is to bring together students and academics from UCL, University of Leeds, and University of Durham, three institutions committed to usefully incorporating the H and the P in HPS. The continued purpose of these meetings is to discuss whether HPS is an arranged marriage of departmental convenience, or whether integrated HPS is an independently justifiable approach to analysing science. As such, this workshop aims to bring historians and philosophers together to discuss common subject matter in a spirit of unity, rather than specificity. Presently, the main difficulty regarding the successful utilization of historical and philosophical aspects of science studies remains methodological, but the underlying ideological commitments of these disciplines are similarly problematic for any integrated study.

As the workshop title suggests, the papers and discussions this year centred on 'Ways of Knowing' and 'Styles of Scientific Thinking' as technical concepts that provide authors with useful contexts for integrated analyses of science. John Pickstone, the keynote speaker this year, started the afternoon off with a description of his three 'genres' of science, and how they relate to the elemental forms of knowledge, as well as studies of science, technology and medicine. Hasok Chang, Greg Radick, and Robin Hendry then each provided critical responses to these concepts, comparing the relative utility of 'ways' as opposed to the more numerous 'styles' proposed by Alistair Crombie. Criticisms did not attack the validity of the 'ways' as epistemological categories, but rather raised several examples where historico-philosophic studies of science extend outside the contextual support provided by Pickstone's approach. The broad conclusion was that 'styles of thinking', or 'subways of knowing' (tip of the hat to Chang for that one!), provide more concrete contexts in which to develop many focused studies. Nevertheless, the task of articulating and

categorizing the entire history and philosophy of science is no easy feat; any discipline-independent categorization will necessarily leave out-liers.

After tea and biscuits, the focus of the afternoon shifted to specific papers. Topics ranged widely, including: Feyerabend (Ian Kidd); expected utility functions (David Teira); typological thinking (Mark Ulett); interdisciplinary teaching (Chiara Ambrosio); SSK and scientific realism (Jouni-Matti Kuukkanen); as well as a revealing presentation by Sam Schindler on the inherent methodological difficulties for integrated HPS.

The broad conclusion that I came to after attending the workshop was that integrated HPS is somewhat analogous to Jazz-Rock Fusion. The product can be better than the sum of the parts, if done well. But the best technique for mixing the historical and philosophical elements remains more of an art than a science. Fusion may produce methodological cacophony, or blissful harmony. Integrationists will meet again next year in Durham to continue the exchange ideas and further discuss the best tools for fusion.

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Instruments and the Guilds

Liz Gatti on the July conference, organised by the Worshipful Company of Scientific Instrument Makers and the Scientific Instrument Society.

This year's Scientific Instrument Society AGM was a celebration not only of the society's 25th anniversary but also of its burgeoning relationship with the Worshipful Company of Scientific Instrument Makers. Day one of the two-day event on Friday the 4th and Saturday 5th July, held at the beautiful Glaziers Hall, reminded everyone present of the rich heritage of their craft through a series of lectures looking back at instruments and the guilds. The meeting was an ideal forum for those with personal and professional interests in instrumentation to get together and share their studies and experiences in a very friendly, relaxed environment. The celebrations began early with the presentation of a copy of Gloria Clifton's book to the Master of the Instrument Makers by the Society's Chairman, who was in turn presented with a loving cup, which was then ceremoniously dressed, much to the satisfaction of those concerned.

Introductions were made by the day's host, David Smith, Master, and Ron Bristow, outgoing Chairman of the Society, who gave a brief history of each organisation which reiterated their fundamental shared purposes. Keith Hinde began proceedings with a detailed and insightful look at London's guild and livery systems, examining their evolution and taking us right up to the modern day. Keith was followed by David Wallis who gave us a fascinating and humorous account of his life in instrument making and revealed a discriminating eye for optical business opportunities. The morning was concluded with an excellent lunch overlooking the Thames from the elegant River Room.

Gloria Clifton treated the assembled to an insight into her current research concerning instrument makers in the London Guilds 1840-1914. She successfully averted her audience from the dreaded after-lunch slump by engaging them with a very effective, detailed and comprehensive PowerPoint presentation. Neil Handley then proceeded with his enlightening paper which discussed the Worshipful Company of Spectacle Makers and investigated



David Smith, Master of the Worshipful Company of Scientific Instrument Makers, 'dresses the quiffe'. Courtesy of Ron Bristow.

the interrelationship between them and the Instrument Makers. The day ended with a tour of the wonderful Clockmakers' museum in the Guildhall Library by its Keeper, Sir George White; a fascinating and fitting end to a thoroughly enjoyable day.

Day two constituted the annual conference and AGM of the SIS, held in King's College, Strand. Alan Mills launched the day by very generously giving all attendees their very own scientific instrument with which to conduct an experiment during his talk. The fact that this constituted some card and a pin did not deter any of the participants and our resulting inverted vision was quite astounding. David Bryden then discussed the patience required in the pursuit of acquiring a patent and the dilemma faced by instrument makers deciding whether to risk the promise of financial security for the glory of Royal Society recognition. The morning was rounded off by a talk from Joanna Migdal, a modern instrument maker who creates marvellous sculptural dials which begin their lives as models made of card, though I'm not sure about pins... On a more serious note, her emotive images of the memorial to the 7/7 victims which she created cannot have failed to bring a lump to the throat of anyone present.

A marvellous lunch in the second River Room of the conference was followed by the Presidential keynote address; Paolo Brenni celebrated the achievements of the first 25 years of the society and the huge advances in the study of scientific instruments that have been made over this relatively short period of time. Huge thanks were also given to Ron Bristow, outgoing Chairman, for his hard work and dedication to the Society over the years and congratulations given to Patrick Mill, the new Chairman. The society's new loving cup was also honoured at its inaugural AGM, to the great enjoyment of all involved!

Liz Gatti
British Museum

Scientific Voyaging: Histories and Comparisons

Innes Keighren reports on a conference hosted by the National Maritime Museum and Royal Society, 8-10 July.

Perhaps the most remarkable achievement of the dozen or so scientific voyages which



'HMS Assistance in the ice (1850-51)' by Thomas Sewell Robins (National Maritime Museum Neg: BHC4239)

came under the purview of this three-day interdisciplinary conference, hosted jointly by the National Maritime Museum and the Royal Society, was that they succeeded at all in securing reliable knowledge. The bodily perils of illness and of extraordinary physical strife, together with the unpredictability of weather and of marine conditions, were daily obstacles to the pursuit of science at sea. The practical challenges of doing science on the move were, in that respect, materially and epistemically distinct from those associated with the production of knowledge in the immobile and regulated space of the laboratory. For Joyce Chaplin, whose keynote address introduced the conference, the often arduous and politically fractious nature of these scientific voyages unsettled, rather than reinforced, Europe's "proprietary confidence", which conflated scientific rationality and moral superiority in order to justify imperial ambitions. Scientific voyages during the eighteenth and nineteenth centuries were implicit, however, in strengthening the view that what was beyond Europe geographically, was also, in developmental terms, behind it.

In an effort to move beyond a focus on the commonplace archetypes of scientific voyaging—namely Cook and Humboldt—the conference offered a wide biographical scope, attending to, among other travellers and scientists, Nicolas Baudin, François Péron, Joseph Dalton Hooker, Samuel Hearne, Franz Boas, José Celestino Mutis, and Alexander Hamilton Rice. In so doing, the conference's contributors demonstrated that the motivations for, and practical approaches to, scientific travel were multiple and disparate. These scientific voyages were, however, linked by a number of common concerns: they depended upon the ability of their participants to demonstrate their credibility to, and to secure the trust of, geographically distant audiences; they employed an array of inscriptive techniques (both textual and visual) to facilitate the circulation of their knowledge from the sites of its collection to the venues of its presentation and analysis; and they struggled to resolve the often conflicting motivations of science, imperialism, and commerce.

The particular importance of visual representations of knowledge—whether in the form of the terrestrial map, marine chart, anthropological sketch, botanical illustration, or photograph—was elucidated in each of the conference's papers. These visual inscriptions, what Bruno Latour has called "immutable and combinable mobiles", effectively collapsed the distance between the field and the (usually European and metropolitan) sites where the results of scientific voyages were scrutinised. These visual representations, together with the textual accounts of scientific travels, made it possible for sedentary scientists—Georges Cuvier being one famous example—to become, within the confines of their studies, metaphorical voyagers. Scientific voyaging was, as the conference made clear, more than simply science at sea: it altered the meaning of scientific discovery, helped to unsettle Eurocentric conceptions of core and periphery, and was a prompt to the disciplining of science at the turn of the nineteenth century.

Given its historical promotion of scientific voyaging, particularly during the Presidency of Sir Joseph Banks, the Royal Society was a singularly appropriate venue for this conference. The Society's library, in which the papers were delivered, became a miniature "centre of calculation", where knowledge from half-a-dozen countries, and from as many disciplines, was brought together in comparison. The substantive richness and theoretical sophistication of these papers was such that the most enlightening discussion of them occurred not in the too-brief question-and-answer sessions which immediately followed them, but (in a parallel which any historian of eighteenth-century-science will recognize) later, at leisure, over coffee. It is perhaps to be regretted, then, that not more than half an hour was allocated at the close of the conference for a general discussion of its findings and potential implications.

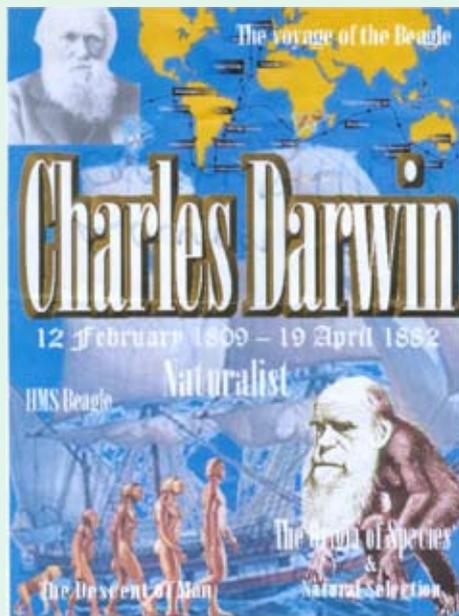
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'Designing Darwin' Winners

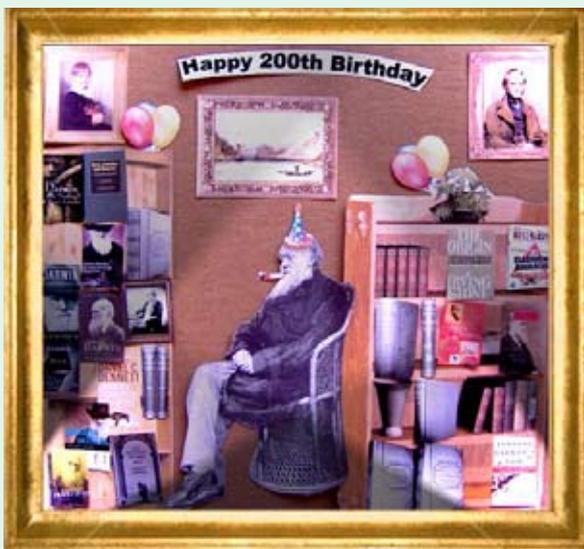
The Outreach and Education Committee is pleased to announce the winners of its 2008 competition 'Designing Darwin'. This prize was awarded in three age categories for original designs that best illustrate the significance of Charles Darwin's birth bicentenary and the 150th birthday of his most famous work, *On the Origin of Species* in 2009. For details of runners up, please visit http://bshs.org.uk/bshs/outreach/competitions/2008/designing_darwin_winners/index.html.



Age Category 19+
Winner: Simon Crowhurst,
Cambridge



Age Category 11-14
Winner: Laura Crosby,
Middlesbrough



Age Category 15-18
Winner: Paroma Guha,
St Albans

Readers' views Is Al-Ghazali (really) the Halagu of science in Islam?

Jamil Ragep's article in *Viewpoint* 85 prompted this response from Muhammad Sabieh Anwar.

It is generally agreed that the Arabs enjoyed a remarkable ascendancy in science for about five centuries. This supremacy was unrivalled by any contemporary civilization. However, equally strong is the perception that the Muslim scientists were mere outcasts living at the fringes of a society that was under the grip of the 'mullahs' who shunned and resisted scientific thought. This line of thought has now become a fashionable premise for squarely blaming the Islamic orthodoxy as the major cause behind the current state of intellectual and scientific atrophy in the Muslim world.

Not surprisingly, these acquisitions gain more credence when they come from the world's leading scientists. For example, the Nobel Laureate and physicist, Steven Weinberg in his book review pronounced quite comfortably, 'After Al-Ghazali, there was no more science worth mentioning in Islamic countries [emphasis added].'¹

Jamil Ragep has criticized this position in *Viewpoint* (Feb 2008), recounting the illustrious scientific tradition that flourished well after Al-Ghazali. I would like to add to this, drawing upon Al-Ghazali's own writings. I have come to recognize that far from strangulating the spirit of free, scientific inquiry, this great theologian, in fact promoted the learning of exact sciences.

For example, in numerous places, Al-Ghazali makes it very clear that his task is not to question the established truths in the natural order. Disputing these facts of nature, far from being a disservice to the scientific method, will be a disservice to religion itself. An instructive example is provided in the second introduction to his monumental *Tahafat-ul-Falasifa* (Incoherence of the Philosophers), where Al-Ghazali discusses the solar and lunar eclipses.² After stating the 'scientific' facts that the solar eclipse results from the moon intervening the sun and the earth and the lunar eclipse from the earth coming in between the sun and the moon, he writes, 'Whosoever thinks that to engage in a disputation for refuting such a theory is a religious duty harms religion and weakens it. For these matters rest on demonstrations, geometrical and arithmetical, that

leave no room for doubt’.

According to Al-Ghazali, mathematics and arithmetic are ‘exact’ sciences with no connection with metaphysical or religious principles. Therefore using mathematics to prove religious beliefs is, at best, absurd. These sciences are based on demonstrative proofs and their implications cannot be denied or affirmed in any religious connotation. In his autobiography, the *Deliverance from Error*, Al-Ghazali states, ‘A grievous crime indeed against religion has been committed by the man who imagines that Islam is defended by the denial of the mathematical sciences, seeing that there is nothing in revealed truth opposed to these sciences by way of either negation or affirmation, and nothing in these sciences opposed to the truth of religion.’³

The theologian also claims that metaphysics and religion are not in need of mathematics, just as poetry is not in need of mathematics, or philology or grammar can be mastered by anyone who is totally ignorant of the mathematical sciences.

Al-Ghazali warns his readers that every discipline of study has its experts, an expert in mathematics may not be an expert in grammar and an expert in geometry may fail miserably when it comes to matters of religion. In short, Al-Ghazali’s truck is not with mathematics, but with philosophers who could potentially lead people astray in matters of pure religion. Al-Ghazali makes this very clear in the introduction to the *Tahafat-al-falasifa*: he is not contradicting philosophers on points of semantics and definitions, nor does he disagree with them on issues that have no religious significance (such as eclipses). His major disagreements pertain to questions with three fundamental theological implications: (a) has the universe existed forever, (b) does God know all particulars, and (c) is bodily resurrection possible! ‘It is in this topic and its likes, not any other, that one must show the falsity of their doctrine.’⁴

In his book, *Revival of the Religious Sciences, Chapter 1*, Al-Ghazali includes mathematics, arithmetic and medicine in the category of the praiseworthy (mamduh) sciences, regarding them as community obligations (faraid kifayah).⁵ Al-Ghazali even laments the fact that Muslims prefer a study of Islamic law over medicine and it becomes hard to find Muslim physicians even though the population was in dire need of health care. For example, according to him, an individual deciding to take up study of fiqh when there is a population in dire need of health care is someone, ‘who neglects to give his attention to the calamity which has befallen a group of thirsty Muslims [and] is like the person who devotes his time to debate while several fard kifayah duties remain neglected in town.’⁶

A major problem of Al-Ghazali’s times was that all forms of knowledge had acquired

religious significance and so, points of intellectual dispute would often slip into bitter religious disagreements, leading to brandings of unbelief, excommunication and heresy. Al-Ghazali addressed this situation by carefully proposing a classification scheme of all common forms of knowledge. He placed Islamic jurisprudence at the level of ‘worldly disciplines’, not any superior to mathematics and medicine.

Al-Ghazali was a supporter of the Ash’arites who battled with the Mu’tazilites over important metaphysical and theological questions. In present-day historiographies, the Ash’arites are generally presented as dogmatists, as the orthodoxy engaged in blind imitation of the ‘tradition’, with no latitude for the rational thought required for scientific inquiry. On the other hand, the Mu’tazilites are posed as the rationalists, upholders of Greek logic, abstract thought and hence the true heirs and modern day avatars of the scientific method.

This reductionist approach, however, requires careful analysis. Sherman Jackson in his introduction to Al-Ghazali’s text *The Decisive Criterion of Distinction Between Unbelief and Masked Infidelity* writes, ‘Meanwhile, Rationalist writings reflect a clear and sustained recognition of the authority of the Aristotelian-Neoplatonic tradition, including the propriety of following it by way of taqlid. Traditionalists, on the other hand, use reason – even aspects of Aristotelian reason – but they do not recognize the tradition of Aristotelian reason as an ultimate authority.’⁷

As far as I can see it, the real distinction between the two Mu’tazilite and the Ash’arite approaches is actually based on the Hellenophilic glorification of Aristotelian reasoning – a hellenophilia that is all the more evident in several modern accounts of the history of science.

David Pingree in no unequivocal language writes about this attitude, ‘Hellenophiles, it might be observed, are overwhelmingly Westerners, displaying the cultural myopia common in all cultures of the world but, as well, the arrogance that characterized the

medieval Christian’s recognition of his own infallibility and that has now been inherited by our modern priests of science.’⁸

Last, I come to the point of what Ragep calls ‘political spin’ or ‘preconceived views’. In my opinion these are ideological frameworks that suit our conceptions of Islam and religion. The biased treatment Al-Ghazali has received over the many years now reminds one of ethnocentric modernization theories. These theories are based upon the conjecture that societies seeking inspiration from tradition, culture and religion are bound to remain underdeveloped. For example in my own country, the physicist Pervez Hoodbhoy echoes the same sentiments. In his latest article on the subject published in *Physics Today*, he preaches, ‘The faithful must participate in five daily congregational prayers, endure a month of fasting that taxes the body, recite daily from the Quran, and more. Although such duties orient believers admirably towards success in the life hereafter, they make worldly success less likely. A more balanced approach will be needed.’⁹

Remember that this sermon is also a strict piece of advice to all practising Christians, Buddhists, Hindus and Jews who desire worldly success in their scientific careers!

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1. S. Weinberg, ‘The deadly certitude’, *TLS*, 17 Jan 2007.
2. Al-Ghazali, *Incoherence of the Philosophers* (tr. Tahafat-ul-Falasifa, tr: M.E. Marmura) (Lahore, 2005), p. 6.
3. Al-Ghazali, *Deliverance from Error*, (translation of Munqidh Min-al-Dalal, tr: W.M. Watt in *The Faith and Practice of Al-Ghazali*), (London, 1953), pp. 34-35.
4. *Incoherence of the Philosophers*, op. cit., p. 7.
5. N.A. Farris, *Revival of the Religious Sciences*, Bk 1, (Delhi, 1962), p. 30.
6. *Ibid.*, p. 105.
7. S.A. Jackson, ‘On the boundaries of theological tolerance in Islam’, *Abu Hamid al-Ghazali’s Faysal al-Tafriqa*, ed: S. N. Haq (Oxford, 2002).
8. D. Pingree, ‘Hellenophilia Versus the History of Science’, *Isis*, 83 (1992), pp. 554-563.
9. P.A. Hoodbhoy, ‘Science and the Islamic world: quest for rapprochement’, *Physics Today* (August 2007), p. 49.

BSHS Grants

This photograph shows three recipients of BSHS care grants (l-r: Rebekah Higgitt, with Jack, Aileen Fyfe, with Lucy, and Emily Winterburn, with Sam). See www.bsbs.org.uk/grants for more information about this scheme and other BSHS conference, care and research grants.



Reviews

Book and Television

Mark Bostridge, *Florence Nightingale: The Woman and Her Legend* (London, Viking, 2008, 647 pages).

Florence Nightingale (BBC1),
Sunday 1 June 2008, 7-8pm.

Ahead of the centenary of her death in 2010, this year, Florence Nightingale has received attention from a prominent biographer, and an hour long BBC drama. Both of these forms of media bring the broader story of Florence Nightingale to a general audience. Mark Bostridge especially brings a balanced, readable account of Nightingale using a wealth of primary sources to counter both the hagiographical and attacking portrayals of the latter half of the twentieth century.

Popularly known as the founder of modern nursing and of the Nightingale School at St. Thomas' Hospital, Nightingale was also a well-connected pioneer of statistics, hospital design and the reform of the health of the army. She probably invented the pie-chart with her coxcomb diagrams of mortality in the Crimea. Bostridge's story of her work with statistics isn't new, repeated in many stories of Nightingale, and also in I.B. Cohen's *Triumph of Numbers*, but he contextualises this in Nightingale's growing interest in mathematics and science, from being absorbed in logarithms from an early age, and tabulation of information on hospitals in Europe, to her attendance at meetings of the British Association for the Advancement of Science in Southampton in 1846, and Oxford in 1847. Bostridge quotes Florence's experiences in Southampton attending the astronomical section, 'Our brain pans are so much enlarged that we've been obliged to have new bonnets'. The BBC drama also covers her interest in statistics. However, with William Farr bringing them to her and being present at all times in the drama as she looks over them, her relationship with Farr and statistics appears more passive than it was, rather than an interest which had developed well before her work in Scutari.

In addition to the stories of reforming nurses and hospitals and using statistics, also of interest to historians of science and medicine is Bostridge's analysis of the much-repeated idea that Nightingale opposed germ theory. He situates her comments against the specificity and the organisms of disease in a period when many members of the medical profession believed in a sanitarian's approach to disease, and considered that

her mind was changed in 1882, by no means at a late stage with Pasteur and Koch's ideas only proven in the late 1870s, and with more diseases being found to be attributable to organisms in the early 1880s.

The book and drama evoke a balance of fear and sympathy with Nightingale, portraying her as both domineering and vulnerable. Both show her depression and agitation before and after the Crimean War, but the drama points to her depression as stemming from her realisation that the statistics from the hospitals treating the wounded and sick soldiers from the Crimea showed that mortality had been highest in the hospital in which she was superintendent of nurses. Bostridge indicates that she was accepting of this and that further change came when sanitation was investigated more rigorously, and situates her depression and physical inactivity in later life in the retrospective diagnosis by David Young of the disease of brucellosis contracted in the Crimea.

The biography and the programme also examine the popular reception of Nightingale which idolised her, with music hall skits interspersed with the story in the programme, and



Laura Fraser as Florence Nightingale, courtesy of 1A Productions.

the desire for portraiture and figurines, songs, poetry and biography, as well as a charitable fund in Bostridge's account. Bostridge calls this 'Florence Nightingale mania.' Bostridge also analyses the biographies, plays, films and operas which have represented Nightingale in various ways since her death.

Although the programme only examines a year or so of Florence's life as a focus, flashbacks are used, and text at the end explaining her future work. In examining her work in an hour there are bound to be pitfalls with the formation of her character and her relationship with her family greatly simplified. The periodic concentration on her religious motives and confusion also dominate this short programme, but clearly

this was an aim with the programme being situated in the genre of BBC Religion and in a Sunday evening slot. Bostridge writes a great deal about Florence's work following the Crimea, but the second half of her life does not receive the same detail as the earlier half, with Bostridge clearly very interested in the formation of Florence's interests and mentality. However, the Collected Works of Nightingale's writings edited by Lynn MacDonald amply cover these later activities in more detail so a student of Nightingale in the 21st century has a great deal more material in the form of biography, dramatic representation and primary sources easily at hand than ever before which will provide for a more balanced account of this extraordinary lady. Also, contrary to Bostridge's account, the direct descendant of the Nightingale School still exists within the eponymous Florence Nightingale School of Nursing and Midwifery at King's College London as the result of several mergers, and is very proud of its legacy!

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Radio

In Our Time (BBC Radio 4), UK,
and How to Think About Science (CBC, Radio One), Canada.

For several years Melvyn Bragg's regular series 'In Our Time' on BBC Radio 4 has given scholars in the history of science rare public exposure in a forum which seeks to combine popularity with a degree of intellectual rigour. On the other side of the Atlantic, the CBC's series 'How To Think About Science' on Radio One has attempted a similar task but with a rather different approach.

Bragg's series has a format in which he plucks a topic from almost any area of intellectual enquiry and then quizzes a panel of three experts in his quest for further understanding. However, in the Canadian series each programme asks one or two historians or philosophers of science to expound their particular interest, and unlike Bragg's series the broadcasts are not live, but consist of long extracts from recorded interviews linked by passages from the presenter. The selling point is not, as in Bragg's series, the topic, but the interviewee.

Bragg's approach has the virtue of eclecticism, and as regards the History of Science he has over the past few years used 82 panellists, of whom 21 have made more than one appearance: the clear leader is Simon Schaffer with eight, followed by Patricia Fara and Ian Stewart with five each, and Lisa Jardine with four. These 82 panellists have dealt with 40 topics, the selection of which seems to reflect current concerns rather than intrinsic historical importance: fifteen programmes have been devoted to the life sciences but none at all to geology, which was the hot discipline two centuries ago. Mathematically-orientated topics are well served with eight programmes.

In any given programme, however, the panellists need to be drawn from a mix of disciplines so as to provide the breadth of approach that should be one of the series' strengths, and a failure to get this right can be unfortunate. For example, the recent programme on probability asked for trouble by enlisting three mathematicians, and desperately needed the wider perspective that could have been provided by a non-mathematician such as Ian Hacking or Lorraine Daston. A more pervasive fault is almost engineered into the structure of the programme: with three experts seeking to enlighten a layman, disagreements are discouraged, and one senses that the panellists sometimes suppress a desire to contradict one another in the interests of presenting a united front, and of allowing Bragg to 'understand' a point and move on. This is not helped by Bragg's habit of going round the table to the panellists in turn, expecting each to build upon, rather than criticise, the comments of the previous speaker.

Turning to the Canadian series, there is a clear bias towards Science Studies, with discussions on the philosophy of science and science communication such as are rarely heard in Bragg's series. Thus a platform is provided for, amongst others, Bruno Latour, Mary Midgley, Evelyn Fox Keller, Ian Hacking, Peter Galison and Rupert Sheldrake. So although within any given programme only one viewpoint is presented, the series as a whole gives a wider perspective than does Bragg's of some of the issues that underlie historical enquiry in

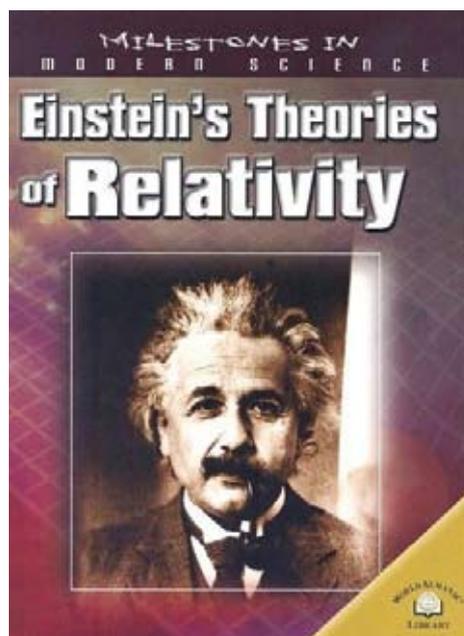
the sciences. It also offers some pleasant surprises, as when an unpromising disquisition by the veteran evolutionary biologist Richard Lewontin on 'how over-extended metaphors distort our understanding of both science and society' turned out to be unexpectedly enjoyable and compelling. This programme, along with several others in the series, could make excellent teaching material in a History of Science or Science Studies course, a claim which is more difficult to make for the rather inchoate programmes presented by Bragg.

As regards the History of Science each series succeeds on its own terms. Bragg's naive approach is that of personal exploration, hoping that his questions will have straightforward answers that experts can provide. Sometimes the experts oblige, and when they fail it is often an accurate reflection of the state of current scholarship. However, the Canadian series attempts to inculcate a deeper level of understanding that will help listeners question and debate the kind of assumptions that often lie behind the answers given by Bragg's panellists.

John Heard

Books

Series: Milestones in Modern Science (London: Evans Brothers Ltd, 2005-06).



The Dingle Prize is designed for books that present history of science to wide audiences, and so this year the judges decided not to con-

sider three submissions from this six-part series of school text-books. Here they are reviewed by a student, Nathalie Wright, who has just taken her GCSEs, in conversation with Patricia Fara.

NW: The one I liked best was called *Einstein's Theories of Relativity*, by Alan Morton. It explained his ideas in a way that I could understand, using very clear diagrams and describing how Einstein changed the way we think about the whole universe. I also quite liked Morton's other book, *Splitting the Atom*, which told me about things like quarks that we don't study at school.

PF: What were the good and bad points of those books?

NW: I enjoyed reading interesting stories about individual scientists, many of whom I'd never heard of before. The publishers had obviously put a lot of effort into making the books look attractive, but I found the separate boxes of text annoying, because they didn't relate directly to the main story. I wish the author had gone into more detail: he jumped so quickly from one thing to the next that I couldn't see how everything all tied together. Sometimes it felt like reading a list of names and discoveries: there was never a chance to get absorbed.

PF: Tell me about the third book, Guy de la Bédoyère's *The First Computers*.

NW: That one was pretty boring. I resented being told how marvellous Bill Gates is, and most of the web-site references at the end were to commercial companies. It was all about hardware. Teenagers use computers to play games or to go on the internet, but there was nothing about everyday applications of computers – Google wasn't even in the index. I enjoyed the introduction about computing's mathematical origins, especially the part about seventh-century India. However, there was nothing about women... No, I've never heard of Ada Lovelace or Grace Hopper, but I would like to have read about them.

PF: Were these books mainly about science or its history?

NW: Science. They did include pictures of 'Key People', but the captions were about their discoveries, not about them as people... Well, I suppose I might possibly buy the Einstein book with my own money, but not the other two.

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The Questionnaire

Interview by Louise Thorn.

Gordon McOuat, pictured here on Ben Nevis, teaches Sciences Studies at the University of King's College in Halifax, Nova Scotia. He has been a research fellow at Cambridge University and Senior Research Fellow at the Dibner Institute, MIT. He is also Past President of the Canadian Society for the History and Philosophy of Science. His work covers the history, philosophy and politics of classification systems, logic and natural kinds, and general work in the methodology, history, philosophy, and culture of science. He is working on a revisionist history of essentialism as well as researching the Eastern order of things. He is currently directing the Canadian 'Situating Science' Network Project (www.SituSci.ca).

What first turned you towards HPSTM?

In my youth I was earnestly interested in quantum mechanics and the problem of determinism (aren't we all?) and so enrolled as a physics student in the hope of getting the groundwork. I had no idea that there was a discipline in history and philosophy of science, but was overjoyed to discover that people actually worked on this stuff for a living. I soon changed my allegiance. My encounter with Ian Hacking and Polly Winsor convinced me that studying the situational practice of science was much more interesting than mere conceptual jugglery.

What's your best dinner-table story? Last year students in my class on 'Brewing Science: the History, Science and Culture of Beer' were given the task of recreating many recipes and experiments, including Joule's pioneering thermodynamics experiments and Pasteur's 'crucial refutation' of spontaneous generation. At the end of term we threw a huge party where we drank some of the year-long projects. The class was very popular, as you can imagine.

What has been your best career moment?

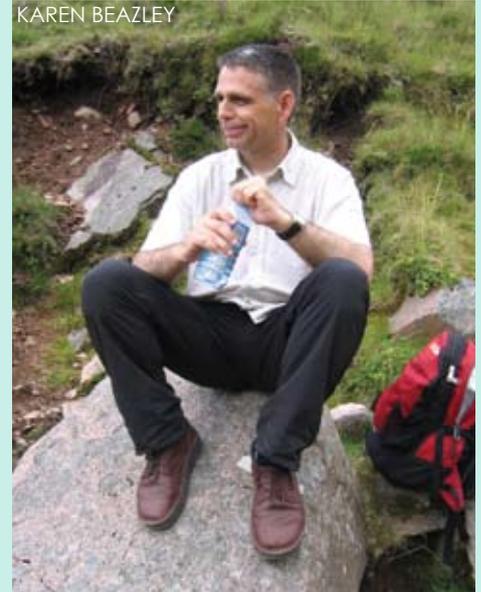
There have been many wonderful moments, hunting manuscripts with archivists and librarians, rediscovering the lost Strickland map composed for the 1843 Cork BAAS meeting (which turned quinar-ians, Cuverians and romantic naturalists decisively away from procrustean systems of classification), and interacting with scholars from widely different fields. My best career moment was taking up a position in Halifax to help establish an interdisciplinary department of science studies, political and literary theory.

And worst? Losing my entire dissertation (and all backups) after two years of research and writing. I had worked up a good head of steam on the history of species 'concepts' à la Ernst Mayr, and had to start all over again. I was ready to quit, until I received some sage advice from a wonderful 'idiot-savant' engineer friend of mine about the contingency of life. Luckily I started with an entirely different approach and the thesis benefited in the end.

Which historical person would you most like to meet? Of course, we all would like to have a country walk with gentle Darwin, and I would like to ask a few questions of the now obscure botanist Bunzo Hayata about his pioneering work on 'networks' (perhaps I'd bring Bruno Latour along too). Huxley was a wonderful shit-disturber, and I would like to share in his needling. Spinoza's *Ethics* and Jonathan Israel's *Radical Enlightenment* have convinced me that a chat with that radical natural philosopher and lens-grinder would be worthwhile. I don't speak Dutch, though.

What should every 16-year-old know about HSTM? There's a strong case to be made for study of HSTM as a fundamental to our critical engagement with the world and society. In Canada we are madly trying to make it part of education at all levels. There is much wonder in that study. HSTM went through its 'debunking' phase: we absorbed that lesson well (sometimes too well) but we can't remain there. We now have to build up what George Levine calls the naturalist 're-enchantment' of the world. I see much hope in recent scholarship in HSTM on that score.

KAREN BEAZLEY



Do you have a nick name? None that anyone tells me about. But my students made a poster of me as 'Pure Energy' (after a rather vigorous and complicated lecture on thermodynamics and the state) and I've kept it on my wall to remind me that it's not all just entropy.

What are your favourite HSTM books? I'm enthralled with Stephen Gaukroger's *Descartes*: it is an example of intellectual history done right. Janet Browne's biography of Darwin is another. Everyone should read Ian Hacking's *Representing and Intervening*, for its practical turn, and the crystal clear, loaded but friendly, writing. If they have a year to plough through it, they should be awed by the ideas and styles found in Theodore Merz's *A History of European Thought in the Nineteenth Century*. The research going into each volume of the Darwin Correspondence collection is also awe-inspiring.

What would you do to strengthen our discipline? In the Post-Kuhnian world, we have done well by professionalisation, and the present level of scholarship is unmatched. The buzz-word in academic research and scholarship is 'interdisciplinarity', and older disciplines, whilst still foundational, are beginning to blur. Ours might not have enough social capital to remain isolated, nor do I think that it is in our interest to do so. We must now reach out beyond our borders, and draw in those who have normally kept HSTM at bay: political philosophers, scientists, historians, are all now drawing on developments associated with HSTM. It's time we drew them into our circle.

Listings

Conferences

History of Science Society Annual Conference
6-9 Nov 2008, Pittsburgh, Pennsylvania; 18-22 Nov 2009, Phoenix, Arizona; 4-7 Nov 2010, Montreal, Quebec. See www.hssonline.org.

Inter-Divisional Commission on History of IAGA: von Humboldt's Legacy after 150 years
Sopron, Hungary, Summer 2009.

2009 marks the 150th anniversary of the death of Alexander von Humboldt. This session of invited talks focuses on Humboldt's contributions to geomagnetism and aeronomy, as well as broader topics surrounding von Humboldt such as generalists vs. specialists in science and the evolution of a scientific reputation. Contributed talks will be given in associated poster session. Contact Edward W. Cliver (edward.cliver@hanscom.af.mil); Wilfried Schröder (Geomoppel@t-online.de).

Science and Technology in 19th-c. Ireland
Society for the Study of 19th-Century Ireland, Royal Irish Academy, Dublin, 2-3 Jul 2009. Proposals for 20 minute papers to Juliana Adelman (juliana.adelman@gmail.com) and Glenn Hooper (g.hooper@open.ac.uk) by 30 Oct 2008.

The Scottish Chemical Diaspora
Birkbeck College, University of London, Saturday 13 Dec 2008.

This meeting organised by the Society for the History of Alchemy and Chemistry will include speakers Robert Anderson, John Christie and Georgette Taylor. It will conclude with the presentation of the Partington Prize 2008. For further information see www.ambix.org or email secretary@ambix.org.

Announcements

Histories of Archaeology Research Network (HARN). The aim of this new inter-university collective of postgraduate and postdoctoral researchers is 'to begin untangling the histories and philosophies of archaeology and make them intelligible' – supplementing archival research with interviews with the people who were involved or those who knew them so as to provide a dimension that is often missing: the social side of archaeology. The research being carried out by HARN members looks at specific people, places and at institutions, policies and processes. HARN currently has twenty members and plans regular meetings, seminars and workshops.

Prix Wegmann
Martin Rudwick of the University of Cambridge has been awarded the Prix Wegmann of the Société Géologique de France.

The Society for the History of Alchemy and Chemistry would like to announce that the Partington Prize for 2008 has been awarded jointly to Jennifer Rampling of Cambridge University for "Establishing the Canon: George Ripley and his alchemical sources" and Georgette Taylor of University College London, for "Tracing Influence in Small Steps: Richard Kirwan's Quantified Affinity Theory."

Research funding

Jack D. Pressman-Burroughs Wellcome Fund
Career development award in 20th century history of medicine or science. \$1,000 is given yearly for outstanding work, as dem-

onstrated by the completion of the PhD in the last 5 years and a proposal to turn the dissertation into a publishable monograph. The application must include a CV, the dissertation abstract, a one-page summary of the proposed book; a description (up to two pages) of the work to be undertaken; and two letters of support from faculty members. The deadline is 31 Dec 2008. More information may be obtained from the AAHM Web site (www.histmed.org).

Science Museum

The Science Museum announces two new research programmes. With the generous financial support of BT's Connected Earth programme, the Science Museum has set up a two-year research programme of research fellowships and internships to promote research in the history of telecommunications, enabling scholars to combine research in BT's archives and the Science Museum's world-class collection of telecommunications-related objects. The Science Museum has also created a general programme supporting research on its extensive collections in the history of science, technology and medicine. If you have any queries please contact Peter Morris at peter.morris@nmsi.ac.uk.

SIS Small Research Grants

The Scientific Instrument Society awards small grants for research on the history of scientific instruments. Deadlines are 1 March and 1 September each year. The grants are worth up to £500, and the Society commits up to £1500 annually. Grants should enable new research and may be used to cover any research costs, including travel and photography, but not to purchase equipment or to support conference travel, unless there is a specific research dimension.

Details and application form: www.sis.org.uk/support.html.

BSHS Conferences

Posgraduate Conference: Call for Papers

Centre for the History of Science,
Technology and Medicine
University of Manchester
7-9 January 2009.

This annual event gives postgraduates an opportunity to meet, to share ideas and experiences, and to give papers in a friendly and supportive environment. It is organised entirely by postgraduates. Researchers in all areas of the history of science, technology and medicine, from Britain and overseas, are welcome to submit abstracts.

Please submit a brief abstract of up to 300 words and a short CV with contact details and year of study to the conference organisers by 07 November 2008. The abstract should outline your research questions, methodology, and material to be presented at the conference. Papers should be 20 minutes in duration and additional time will be allowed for questions. Further information about the conference and venue can be found at www.chstm.manchester.ac.uk. Enquiries can be sent to bshs2009@googlemail.com.

www.bshs.org.uk/bshs/conferences

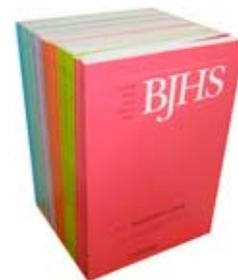
Obituary

Jim Burton of Ilkley, a member of BSHS since 1981, has died at the age of 77. A meteorologist by profession, he was one of the first intake to the Open University, and completed a doctorate in history of science. An active member of the Royal Meteorological Society History Group, his special interest was in the history of the British Meteorological Office and the part played by Robert FitzRoy in its founding. He was also a keen countryside campaigner. The last paper he presented, before Alzheimer's Disease prevented him from further work, was at Exeter University, with colleagues from the RMSHG, at a conference sponsored by the BSHS in 2004.

The British Journal for the History of Science

In December *BJHS* will contain a selection from the following, plus reviews:

- Richard Dunn, 'Material culture in the history of science: case studies from the National Maritime Museum'
- Andrew R. Holmes, 'Presbyterians and science in the north of Ireland before 1874'
- Jeffrey R. Wriglesworth, 'Bipartisan politics and practical knowledge: advertising of public science in two London newspapers, 1695–1720'
- Sophia Davis, 'Raising the aerocompass in early twentieth-century Britain'
- Sarah Dry, 'Safety networks: fishery barometers and the outsourcing of judgement at the early Meteorological Department'
- Jon Agar, 'What happened in the sixties?'



For online access follow the links from www.bshs.org.uk/bshs/publications/bjhs/

Viewpoint: the Newsletter of the BSHS

Contributions

All contributions and correspondence should be sent to the Editor, Dr Rosemary Wall, Florence Nightingale School of Nursing and Midwifery, King's College London, James Clerk Maxwell Building, 57 Waterloo Road, London SE1 8WA; newsletter@bshs.org.uk. Electronic communication is preferred. Viewpoint is issued three times a year – in February, June and October. The deadline for copy for next issue is **15th December 2008**.

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Advertisements

The Editor will consider advertisements regarding new appointments but, as a general rule, other advertisements are not printed in this publication. However, for an appropriate charge, leaflets advertising suitable events, publications etc. can be sent out with Viewpoint, subject to size and postage restrictions: full details are available from the BSHS Executive Secretary; execsec@bshs.org.uk.

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