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Editorial

This issue brings an article by Jamil Ragep on a topic that provoked debate in the *TLS*. It looks at the prejudices that many have regarding the history of Islamic science, which test both historical and political preconceptions.

BSHS matters are reported on in accounts by those involved in the role-playing exercise on plague in York, brought to the British Association meeting by the BSHS Strolling Players. The Outreach and Education Committee introduce their next competition, as we take a look at the runner-up of last year's image competition.

Being the first issue of the year, our regular list of forthcoming anniversaries (for 2009) is included - a longer list being available on the website. Other regulars include reviews and reports of meetings. In honour of the forthcoming Three Societies Meeting, the subject of The Questionnaire is the HSS's own Jay Malone.

Contributions to the next issue should be sent to newsletter@bshs.org.uk by 14 April 2008.

Rebekah Higgitt, Editor

When did Islamic science die (and who cares)?

Jamil Ragep on the historical and contemporary significance of Islamic science after the 12th century.

Imagine waking up one day and finding out that a Nobel Laureate has declared that the subject of your life's work doesn't amount to a hill of beans (or in less Bogeyesque terms, isn't worth mentioning). Such was the jolt I received from the hallowed pages of the *Times Literary Supplement*, when I read Steven Weinberg's review of Richard Dawkins's *The God Delusion* (17 Jan 2007). Weinberg had held forth that 'After al-Ghazzali [d. 1111], there was no more science worth mentioning in Islamic countries'. Since my colleagues and I have certainly found a lot to mention, I sent a letter to the editor listing a number of accomplishments by Islamic scientists post-Ghazali (24 Jan 2007).

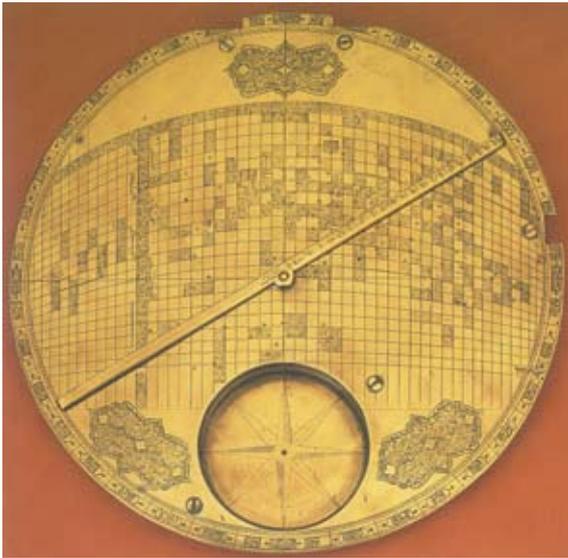
To my surprise, Professor Weinberg's response conceded little, compounding his earlier statement with long-discredited claims about the lack of influence and significance of late medieval Islamic science (31 Jan 2007). One always finds oneself in an odd position when challenged by someone with no credentials in one's field, and in general the response should be to ignore the uninformed. But because Weinberg's views have larger implications beyond our narrow scholarly concerns, I will attempt to explain in what follows why

they are indeed incorrect, why these views have had a remarkable persistence, and why this debate matters in the hypercharged post-9/11 political environment.

First the facts. During the past half century or so, an ever-increasing body of scholarly work has shown that science in Islam not only continued after al-Ghazali but in fact flourished for centuries thereafter. One has the obvious example of what has been called 'Spanish Aristotelianism', which flourished in



Astronomers at work in the Istanbul Observatory (1577-1580). From Shahanshahi-nama, Istanbul University Library MS F-1404, f. 57a. (Courtesy of Istanbul University Library.)



A world-map centred on Mecca. This remarkable brass plate, one of two recently discovered that likely date from 17th-century Safavid Iran, is probably based on a sophisticated projection that preserves both distance and direction. (From David A. King, *World-Maps for Finding the Direction and Distance to Mecca: Innovation and Tradition in Islamic Science* (Brill, *The Netherlands*, 1999), p. 199; courtesy of David A. King.)

the second half of the 12th century and included such luminaries as Ibn Bajja, Ibn Tufayl, Ibn Rushd (Averroes), Maimonides, and al-Bitruji, all well-known in Europe.

Of more interest is the 13th-century revival of Islamic scientific and philosophical traditions that took place in eastern Islam in the shadow, and eventually under the umbrella, of the Mongol invaders. For example, the great Maragha observatory, arguably the first large-scale observatory ever built, was commissioned by the Mongol ruler Hulagu Khan and became a model for observatories in East, Central, and South Asia, the Middle East, and Europe over the next several centuries. It was during this time as well that earlier scientific and philosophical texts were ‘recovered’ through recensions, commentaries, and exegeses. Over the next five centuries or so, one can document the production of thousands of scientific and philosophical texts in both the eastern and western Islamic world that are attested by tens of thousands of extant manuscripts.¹

One might contend that most of these works were mere commentaries, with little that was new or original. Or that observatories were built mainly for the purpose of religious ritual, not true science. (Weinberg claims they were ‘used largely for predicting prayer times and the Muslim lunar months.’) Research has revealed otherwise. We now know that the great observatories, such as at Maragha and later in Samarqand, were associated with remarkable creative activity in both the theoretical and practical domains. The enormous Samarqand meridian sextant with a radius of some forty meters reveals considerable skill and was used, among other things, for revamping Ptolemy’s star catalogue.

These observatories were also associated with libraries and schools that had sizeable numbers of teachers and students who dealt with a range of theoretical matters. The most

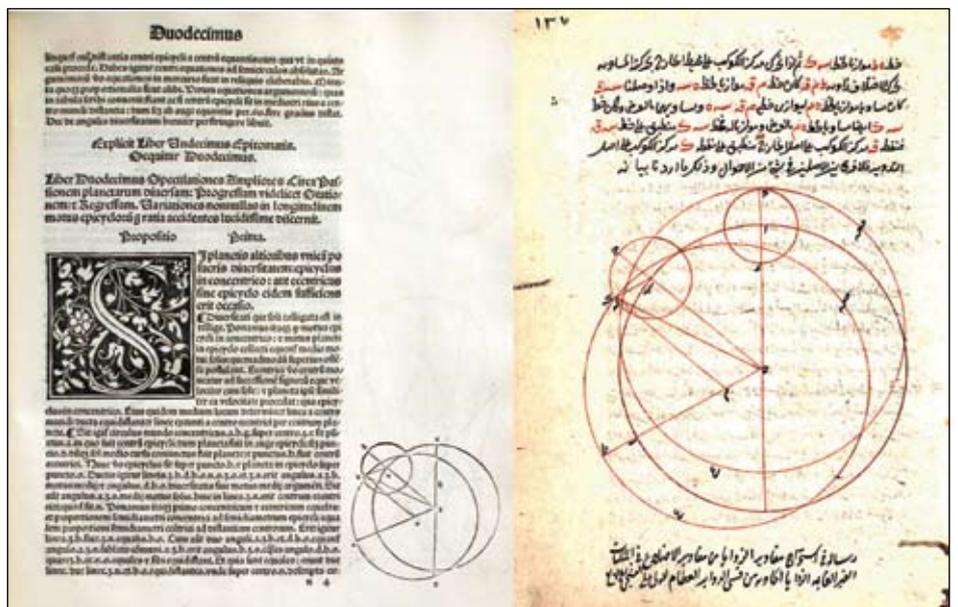
famous of these is the work done to reform Ptolemy’s planetary theories, an effort that resulted in a range of new models. And the overwhelming evidence is that many of these models found their way into the writings of Nicholas Copernicus. (Weinberg, who claims Copernicus got nothing from later Islamic astronomy, would seem to dismiss research by E. S. Kennedy, Otto Neugebauer, Noel Swerdlow, and others.) Even more remarkable than the models, one of Copernicus’s arguments for the Earth’s motion and the proposition he uses to make the transformation from a geocentric to heliocentric system have Islamic precedents.²

Despite an appalling lack of research, we

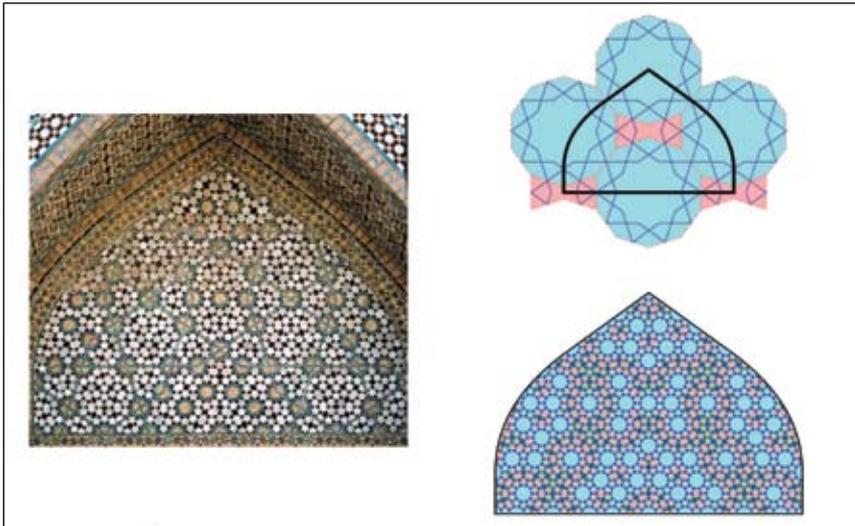
know of other noteworthy advances during this post-Ghazali period, including the discovery of the pulmonary transit (of blood from the heart to the lungs and back), precise determinations (up to fifteen decimal places) for π and $\sin 1^\circ$, and map-projection techniques of remarkable accuracy and sophistication. And just this past year, it has been shown that the Darb-i Imam shrine in Isfahan exhibits quasi-crystalline Penrose patterns, five centuries before their discovery in the West. Given that less than 5% of the available material has been studied, it would seem that future research will bring to light many other discoveries.

It is often maintained (as also by Weinberg) that these discoveries are simply by a few talented individuals who somehow stand outside the repressive environment of Islamic civilization. But this is difficult to square with the reports of hundreds of students at madrasas such as at Samarqand or the thousands of extant manuscripts of scientific textbooks (many copiously annotated) that date from this late period or the often sophisticated discussion of scientific matters in religious texts.

If one accepts my argument regarding the significance and dimensions of this scientific tradition, one is faced with the inevitable question: How did it escape the keen eye of orientalists and historians of science for almost 200 years? And despite considerable research over the past fifty years that has falsified the view that there was no science after Ghazali, why has it continued to be so persistent, in the scholarly secondary literature of both Islamic studies and history of science as



Figures used by Regiomontanus and Ali Qushji illustrating how to convert the epicyclic models of Venus and Mercury into eccentric ones. The underlying proposition, a key element in the mathematical transformation from a geocentric to heliocentric cosmology, was probably first developed in Samarqand around 1430 and then made its way to Constantinople and central Europe. (Courtesy of the University of Oklahoma Libraries, Norman, and the Süleymaniye Library, Istanbul.)



Tiling at the Darb-i Imam Shrine at Isfahan, Iran, showing what the authors argue is 'nearly perfect quasi-crystalline tiling', first described in modern times by Roger Penrose in the 1970s. (P.J. Lu and P.J. Steinhardt, 'Decagonal and Quasicrystalline Tilings in Medieval Islamic Architecture,' Science 315, no. 5815 (23 Feb 2007), pp. 1106-10. Photograph by K. Dudley and M. Elliff; reconstructions by Peter J. Lu; courtesy of Peter J. Lu.)

well as in popular accounts?

Here one sees the remarkable effects of received 'wisdom', preconceived views, and political spin. If one is told that something does not exist, it takes a foolhardy, not to say reckless, graduate student (or textbook writer or journalist) to go in search of it. And no view has been more entrenched in western thinking than the idea that Islam long ago turned its back on rationality and science, the prerequisites for modernity. This was codified with particular force by Ernst Renan in his famous lecture, 'L'Islamisme et la science', delivered at the Sorbonne on the 29th of March, 1883. While grudgingly acknowledging that there was outstanding philosophy and science for at least 500 years ('cette supériorité momentanée'), this occurred in spite of Islam. Just as we should not claim Galileo for Catholicism, we should not claim Avicenna, Averroes et al. for Islam.

Reading this work today, one is struck by the almost humorous ignorance displayed by Renan, who among other things claims that the early Abbasid caliphs, some of whom supported science and philosophy, were hardly Muslims ('à peine musulmans', p. 7). In the 19th and early 20th centuries, these views were often combined with racial considerations. Pierre Duhem, for example, claimed that Semites, and Arabs in particular, were incapable of abstract thought not tied to physical reality, i.e. instrumentalism, which was a crucial component of his Christian positivism.

After World War II, the racial dichotomization of Semites and Indo-Europeans went out of fashion, but what remained, as far as Islamic science was concerned, were the beliefs that its decline after 1200 was precipi-

tous and could be attributed to religious fanaticism and a lack of social and institutional support. This conveniently absolved a generation or two of European medievalists and early modernists from dealing with Islamic science except in its earlier manifestation, which had to some degree been Europeanized as a result of the 12th-century translation movement from Arabic into Latin. Ironically, the interest in Islamic science manifested by such figures as George Sarton and Marshall Clagett, both of whom felt the need to learn Arabic, has been much less manifest in their students and grand-students, who have tended to promote a more Eurocentric history of science.

One might attribute such tendencies not so much to ill-will toward non-Europeans but rather to the increasing specialization, and consequent compartmentalization, of knowledge that has overtaken many historians in the recent past. (There are only so many hours in the day, we are often heard to lament.) The situation as exemplified by Weinberg seems to me somewhat different. Rather than benign neglect, what we have instead is an active antipathy toward Islam and its civilizational manifestation that is couched in blatantly political terms. Weinberg in his review of Dawkins makes an explicit point that Dawkins and others are spending too much time worrying about a few ineffectual Christian fundamentalists who try to ban Darwin; the real danger is Islam, and not only its more fundamentalist version.

This, I think, helps us understand all the commotion about Ghazali. For if a single individual could stop Islamic science in its tracks, then the problem must ultimately be

somehow inherent in Islam itself. An alternative view would hold that Islamic science, like all scientific traditions, made its accommodations with the social, political, and religious contexts in which it found itself, and continued on long after Ghazali. In fact, one might contend, as I have, that Ghazali's arguments against Aristotelian natural philosophy that Weinberg finds so appalling (one might ask what he thinks of the anti-Aristotelianism of Galileo, Descartes, and Hume) were an important factor in stimulating alternative cosmologies explored by various Islamic scientists. This includes Ali Qushji (15th c.), who seems to have had a decisive impact on Copernicus and other early modern Europeans. Exactly why these alternative cosmologies took off in Europe and not in the Islamic world is an interesting question and certainly open to numerous interpretations. But possible factors, such as European exceptionalism, imperialism, economic demise, institutional disarray, or the inherent conservatism of entrenched scientific traditions, are clearly contingent.

An essentialist explanation, drawing upon Islam's inherent antipathy toward rational thought, would need to explain how rational traditions in science, philosophy, theology, and law lasted well into modern times. Here, I think, the strident insistence that Islam turned away from science a millennium ago, thus closing the door on any hope of 'modernism', becomes more comprehensible. For then the prospects for internal reform become bleak at best, and one is free to propose radical transformation (say, in the Atatürk mould) or outside intervention (in the Bush-Cheney mould). Perhaps these are viable alternatives. But basing oneself on this imagined history leaves out the possibility that Muslims might, as they have so often in the past, draw upon their own traditions to transform what is admittedly a depressing situation at present. But however one comes down politically in this or other matters, intellectuals risk much more than losing an argument by distorting history for a political agenda; they risk devaluing knowledge itself.

Notes

1. For recent listings, see B. A. Rosenfeld and E. Ihsanoglu. *Mathematicians, Astronomers, and Other Scholars of Islamic Civilization and Their Works (7th–19th c.)* (Istanbul, 2003) and the various works on Ottoman science produced by E. Ihsanoglu and his colleagues.

2. For recent summaries of the literature and new evidence, see F. Jamil Ragep, 'Copernicus and His Islamic Predecessors: Some Historical Remarks,' *History of Science* 45 (2007): 65–81 and George Saliba, *Islamic Science and the Making of the European Renaissance* (Cambridge MA, 2007).

Early modern anatomy in the Herzog August Bibliothek Wolfenbüttel

BSHS Research Grant recipient, **Sebastian Pranghofer**, reports. For further details of the grants schemes go to www.bsbs.org.uk/bsbs/grants.

With the support from a BSHS research grant, I was able to carry out further research for my PhD project on the visual representation of early modern anatomy. I spent last August at the Herzog August Bibliothek Wolfenbüttel (HAB), which is a unique research institution for early modern history. The library's holdings truly represent the European knowledge in all areas during the early modern period. Its collections are not focused on a particular country or field, but cover theology and law as well as natural history and medicine.

Already in the early modern period, books from all across Europe were collected systematically at Wolfenbüttel. The library was founded in 1572 by Duke Julius of Braunschweig-Lüneburg (1528-1589). However, major acquisitions were made by Duke August the Younger (1579-1666), who was a well educated man and passionate bibliophile. He employed agents in major European printing places who bought the books for him and sent them to Wolfenbüttel. By his death the library of Duke August the Younger held 135,000 titles in 35,000 volumes.

In the early modern period Wolfenbüttel and the library were an important place for learning and attracted men such as Gottfried Wilhelm Leibniz (1646-1716) and Gotthold Ephraim Lessing (1729-1781), who were librarians at the HAB. Over the years the holdings grew continuously through the donations of private libraries and further acquisitions. Today the library holds more than 900,000 books, of which 350,000 are from the fifteenth to the eighteenth century. Today the HAB is also an important centre for early modern studies with its own research programme, and international research fellows visiting the library throughout the year.

The outstanding collections of the HAB are not only accessible through the usual alphabetical and online catalogues. For many areas further systematic catalogues exist, and for my purposes the *Verzeichnis medizinischer und naturwissenschaftlicher Drucke 1472-1830* (Index of medical and scientific prints 1472-1830) was important. This catalogue lists more than 14,000 titles in four different parts alphabetically, chronologically, by place and according to the 'Prussian system' a 19th-century bibliographic system for cataloguing books according to fields and disciplines.



The Augusteerkirche inside the Augusta. Courtesy of Herzog August Bibliothek.

The support from the BSHS enabled me to finish the research for my PhD. The collection of early modern anatomical literature in the HAB is outstanding. Also, the broad and easily accessible collections make it easy to explore neighbouring areas of knowledge and study early modern anatomical discourses in a wider cultural context. Furthermore, the library holds an excellent collection of research literature on early modern history of science and medicine.

The grant also allowed me to finish a paper on the early modern representations of the *rete mirabile*. This anatomical structure was in Galenic anatomy an important organ at the base of the brain, where it extracted the animal spirit from the blood. Its existence was denied by Andreas Vesalius (1514-1564) in his famous book *De humani corporis fabrica* (1543). However, the question of the existence and function of the *rete mirabile* in human anatomy was a matter of debate among anatomists well into the eighteenth century. My paper on the *rete mirabile* deals with the question of how parts of the human anatomy become obsolete and whether they are rather 'dissolved' in the anatomical discourse, rather than being suddenly excluded from it by empirical research and new discover-

ies. Thereby it gives deeper insights into the relation between old and new methods and knowledge in the anatomical discourse.

During my stay at Wolfenbüttel, I was also able to go through the finding aids of the Niedersächsische Staatsarchiv Wolfenbüttel (State Archive of Lower Saxony Wolfenbüttel) for the files from the University of Helmstedt (1576-1810). These files document the history of the university in such detail as can hardly be found for any other early modern university. At the Herzog August Bibliothek a project on the history of the University of Helmstedt is currently cataloguing the university calendars, and the rich collections in the state archive could form the basis for further research on early modern anatomical knowledge beyond my current PhD project.

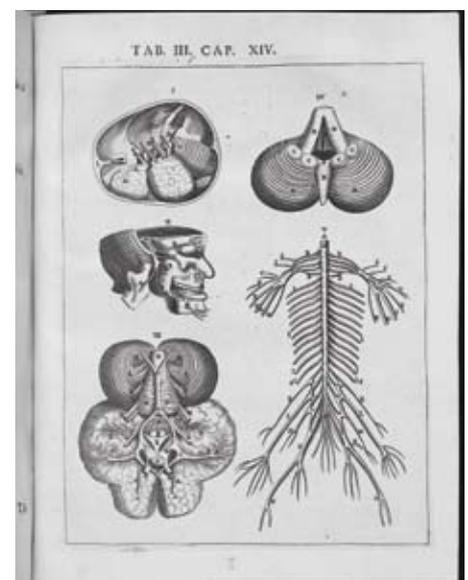
I want to thank the society for its generous support of my research.

www.hab.de

www.dur.ac.uk/chmd/pranghofer/phdproject/

Sebastian Pranghofer
Durham University

sebastian.pranghofer@durham.ac.uk



J. Vesling, Syntagma anatomicum (1647). The rete mirabile is indexed with the letter P (bottom left). Herzog August Bibliothek Wolfenbüttel, A: 1.2 Quod. (2).

Anniversaries for 2009

No one can have failed to notice the up-coming Darwin anniversaries, but who else might be remembered in 2009? **Rebekah Higgitt**, **Rosemary Wall** and **Catharine Haines** trawled the indexes to find out. A fuller list will be available at www.bsbs.org.uk/bsbs/publications/newsletter.

500 years

Telesio, Bernardino	1509-1588	Natural philosophy
Turner, William	1509-1568	Natural history

400 years

Galileo Galilei built his first telescope.	1609	
Crollius, Oswald	c.1560-1609	Medicine, chymistry
Dee, John	1527-1609	Mathematics, astrology
Duchesne, Joseph (Josephus Quercetanus)	c.1544-1609	Medicine, chymistry
Keckermann, Bart.	c.1571-1609	Geography
L'Écluse, Charles de	1526-1609	Medicine, botany

300 years

Gabriel Davhhid Fahrenheit constructs an alcohol thermometer.	1709	
Glanville, Eleanor	1654-1709	Entomology
Lhuyd (Lhwyd), Edward	1659?-1709	Natural history
Mounsey, James	1709-1773	Medicine, nat. history
Steller, Georg Wilhelm	1709-1746	Botany, zoology

200 years

Publication of Jean-Baptiste Lamarck's <i>Philosophie Zoologique</i> .	1809	
Auenbrugger, Joseph Leopold	1722-1809	Medicine
Bunbury, Charles James Fox	1809-1886	Natural history
Cavallo, Tiberius	1749-1809	Natural philosophy
Darwin, Charles Robert	1809-1882	Nat. hist., geology
Engelmann, George	1809-1884	Botany
Forbes, James David	1809-1868	Physics, geology
Fourcroy, Antoine François	1755-1809	Chemistry
Gatty, Margaret	1809-1873	Nat. hist. writing
Grassman, Hermann	1809-1877	Mathematics
Hitchins, Malachy	c.1741-1809	Astronomy
Jeffreys, John Gywn	1809-1885	Conchology
Liouville, Joseph	1809-1882	Mathematics

Mann, Theodore Augustine	1735-1809	Natural philosophy
Menabrea, Luigi Federico	1809-1896	Maths, engineering
Quenstedt, Friedrich	1809-1889	Mineralogy, palaeont.
Redtenbacher, Ferdinand Jakob	1809-1863	Mech. engineering
Saunders, William Wilson	1809-1879	Entomology, botany
Sigorgne, Pierre	1719-1809	Natural philosophy
Wright, Thomas	1809-1884	Medicine, palaeont.

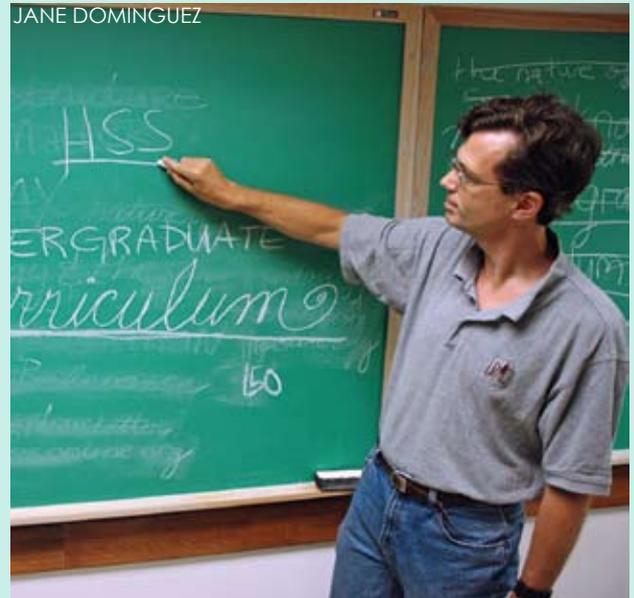
100 years

Abercrombie, Jane	1909-1984	Zoology, education
Ayton, William Alexander	1816-1909	Alchemy
Bhabha, Homi Jehangir	1909-1966	Theoretical physics
Blackwood, Margaret	1909-1986	Genetics
Dohrn, Felix Anton	1840-1909	Zoology
Ducker, Margaret	1809-2004	Botany
Engelmann, Theodor Wilhelm	1843-1909	Botany, physiology
Gaskell, Holbrook	1813-1909	Chemical manufacture
Haimendorf, Christoph von Fürer-	1909-1995	Anthropology
Hansen, Emil Christian	1842-1909	Botany, mycology
Hudleston, Wilfrid	1828-1909	Natural history, geol.
King, George	1840-1909	Botany
Minkowski, Hermann	1864-1909	Mathematics
Mitchell, Joseph Stanley	1909-1987	Physics, radiotherapy
Mond, Ludwig	1839-1909	Chemistry
Newcomb, Simon	1835-1909	Astronomy, maths
Penney, William George	1909-1991	Mathematical physics
Perey, Marguerite	1909-1975	Nuclear physics
Ritz, Walter	1878-1909	Physics
Seeley, Harry Govier	1839-1909	Palaeontology, geol.
Smith, (James) Eric	1909-1990	Marine biology
Taylor, James Haward	1909-1968	Geology
Thomsen, Hans Peter Jörgen Julius	1826-1909	Chemistry
Tonolli, Livia	1909-1985	Limnology
Vailati, Giovanni	1863-1909	Mathematics, hist. sci
Yoshida, Yoyoi	1909-1980	Nuclear physics

HSTM People: The Questionnaire

Interview by **Melanie Keene**.

Robert Jay Malone is in his tenth year as Executive Director of the History of Science Society (HSS). When not balancing the banquet budget, or checking global currency markets, he also teaches and researches the history of science in the Southern US.



Who or what first turned you towards the History of Science, Technology and Medicine (HSTM)?

I wrote an undergraduate essay on Copernicus, and the professor asked me if that meant I was interested in the history of science. 'What's that?' I asked. I went on to complete an MA in the history of geology, and a PhD in the history of science in the American South at the University of Florida with Fred Gregory and Bertram Wyatt-Brown. Since I was born and raised in the South, the research very much became a process of self-discovery and self-recognition. That's what made doing history meaningful to me.

What has been your best career moment?

The rewards of administrative work can be difficult to see, but the greatest benefit is working with such bright and committed members and volunteers: smart, kind, motivated people who want to see the spread of the history of science. It is also gratifying to help people connect with others in the field, such as introducing new attendees to more senior academics whose work they admire; to help deepen intellectual relationships and foster that crucial sense of community.

And worst?

A big part of my job is to orchestrate the annual HSS meeting. One year I remember needing to look up what wine I'd ordered for our prize-winners' reception, which was taking place in a few hours. I discovered

that not only had I forgotten to order the wine, I had forgotten to order the entire reception. Another time I had arranged for buses to take many of our 800+ conference delegates to the Harvard Natural History Museum. So we're all waiting outside for the coaches to turn up. One small bus arrives, and 30 people get on. Gradually it dawns on me that no others are coming. Everyone turns to look at me to see what I'm going to do about it! Thankfully, both occasions turned out ok, but there are always a few hair-raising moments!

Which historical person would you most like to meet?

From all the many anecdotes about him, it seems as though meeting the 19th-century geologist William Buckland, or watching him lecture, would have been a great experience. My favourite story is when, confronted with a supposedly weeping statue of the Madonna, he dropped to his knees, promptly tasted the puddle of tears, and triumphantly exclaimed 'bat urine!'

What should every 16-year-old know about HSTM?

16 seems to be an age of intense insecurity coupled with a great curiosity about the world. I'd like to tell all those 16-year-olds about the unsure, stumbling, and curious people who have helped shape the history of science. That it's not a glorious and confident progress. I'd like to tell them how the history of science helps understand that curiosity. Many young people seem to lose

interest in the sciences in middle school (12-14), and maybe we can help re-engage them through our historical work.

What are your favourite HSTM books?

Gosh, they're all written by Brits! Martin Rudwick (recent winner of the George Sarton medal)'s *Great Devonian Controversy* is a model of prosopography and was of enormous influence in my work. I was also immensely impressed by Janet Browne's two-volume Darwin biography. When reading Desmond and Moore's Darwin, I was truly affected by the moving chapter on the death of Darwin's daughter Annie, perhaps because my own daughter was of a similar age. I think it's through these personal relationships, when the past resonates with something about yourself, that connections are made and history comes alive.

How do you see the future shape of HSTM?

In the immediate future, I'm very much looking forward to the 3 Societies conference in Oxford, as a chance to celebrate the international community of historians of science, and forge new relationships. Groups such as the BSHS, CSHPs, and HSS can help maintain the intellectual vibrancy of the discipline, and promote the history of science as a vehicle providing a deeper understanding of how science works – both as a 'bridge discipline' between the sciences and humanities, but also among the sciences themselves.

Outreach & Education Committee Competitions

The winner of the image competition was shown in the last issue of *Viewpoint*. Second prize went to Helen-Frances Pilkington's 'Everyday Items'.



The main point of this image is to question what is scientific about a scientific instrument. The label of 'scientific' is frequently taken unquestionably and that assumption is what this image challenges. Is this an image of simply an apple and a glass of water, or of a universal body and a prism? The placing of the question mark is intended to highlight this discussion, draw the eye and literally question our assumptions.

The choice of Newton as an icon was deliberate. Most people have heard of Newton and will therefore respond to the caption. Apart from the laws of motion, the apple myth is one of the most enduring associations that people have with Newton. By linking the apple myth with the laws of motion, Newton's achievement of creating a mathematical model of nature can then be explored. The concept of a heroic experimenter, as implied by the myth, can also be looked at -- is it an accurate picture of Newton or of any scientist?

The other part to this image is that scientific instruments are, to some extent, scientific because they have been defined to be so. What is the difference between a beaker found in a chemical laboratory today and a Pyrex jug used in the kitchen? In Newton's time, prisms were regarded by some as distorting tricks from the fair, so how

could they be used for knowledge-producing enterprises? This debate is what the glass of water is intended to symbolise. Is being a scientific instrument all about perspective and definition or is there something more? Newton himself redefined prisms to be legitimate knowledge-producing instruments and argued that therefore experiments using them were valid. Can the same be said about scientific instruments today? Are they taken for granted as reliable knowledge-producing objects, or do the ideas and debates behind their existence ever come to the surface?

The final point that this image raises is that instruments encase previous experiments. Once an experiment has been accepted as true, the results can be used to create an instrument. Examples of this include the telescope (lenses and prisms) and the computer (silicon chips, various sensors). This links nicely back into the debate above concerning definitions of scientific instruments.

This image is aimed at an audience of sixth-form and above due to some of the complicated ideas involved. However, I think that able GCSE students will also find much to interest them.

Helen-Frances Pilkington
University of Cambridge

www.bsbs.org.uk/bsbs/outreach/image_competition/index.html

Prize competition 2008: Designing Darwin

The year 2009 sees both the bicentenary of Charles Darwin's birth and the 150th birthday of his most famous work, *On the Origin of Species*. In anticipation of the celebrations, the BSBS Outreach & Education Committee is offering prizes for original designs that best illustrate the significance of either (or both) of these anniversaries.

Format of the entry: entries may be submitted in one of the following electronic formats:

1. A poster up to A3 in overall size
2. An illustrated essay of 500 words
3. A PC screensaver

Entries may be submitted as jpeg files or in other standard formats including a digital photograph or a digital scan. The file size should be no more than 500kB to ensure that the winning entries can easily be downloaded from the BSBS OEC website.

There are three age categories for entrants, a prize of £100 being awarded in each category: 11-14, 15-18 and 19+ (the age of entrants under 19 on the closing date must be confirmed by a responsible adult).

The entry should be emailed by 6 May 2008 to outreachcompetition2008@bsbs.org.uk. In the body of the email you should include the name, address, and other relevant contact details for all the entrant(s) who have contributed to the submission. The winning entries will be announced at the Three Societies Conference, Keble College, Oxford, 5 July 2008.

Enquiries about this competition should be directed to outreach@bsbs.org.uk

Bringing plague to 21st-century York

Members of the BSHS Strolling Players report on their experiences of presenting the history of medicine to teenagers in York: an event organised by **Sabine Clarke**.

Each year the British Association takes its week long Festival of Science to a different city in Britain. In September 2007 this event was hosted by the City of York. In addition to the sessions organised for the main programme by the BA History of Science Section, this festival saw the first ever event specifically created for the Young People's Programme by members of the BSHS.

The event that was staged at the BA Festival of Science dealt with an outbreak of plague that affected York in 1631. The theme of the session was inspired by Paul Slack's *The Impact of Plague in Tudor and Stuart England*. Slack's book is a rich account of the experiences of English towns and villages when confronted with the many episodes of plague that occurred between the 15th and 17th centuries. As well as charting patterns of mortality, Slack's work shows the interaction between understandings of epidemic disease and its control, and political, religious, medical and social contexts. Drawing on this account, our educational aims were to show that the cause of plague was contested in the 1630s and to explore with our young audience the implications of an outbreak of this disease for the citizens of York, at all levels of society.

Underpinning our event was a desire to present an episode from the history of medicine to school-age children that did not focus on major medical turning points or heroic individuals. Through the examination of the social experience of disease we hoped to engage young people with issues that transcended the particular episode we were dealing with; issues such as the appropriate balance between individual liberty and the interventions of government. The challenge we faced was to develop an activity that was accessible to a young audience whilst at the same time successfully dealing with some complex ideas.

The approach we decided to use was that of a role-play. Role-play can work well as a pedagogical tool for engaging students with historical events because it requires pupils to imagine and inhabit the past, in a way that a lecture or presentation may not. The dramatisation of a historical episode can draw an audience in by making use of genre conventions with which participants are already familiar, in this case those of the detective story. Our event, 'Death and the City' gave the audience of students from Year 8 and 9 the



opportunity to pose questions to a series of witnesses. The premise for the role-play was a meeting of the city aldermen, in which witnesses had been invited by the city elders in order to ascertain the cause of plague in York, and the best method to contain its spread.

Three members of the BSHS 'Strolling Players' played city aldermen (and, anachronistically, alderwoman), with the audience given roles as the rest of the city corporation. We deliberately made our event open-ended – there was no obvious right answer to the dilemmas we posed. Key to the success of this event was student participation, which added to the unpredictable nature of the session. The BSHS members who took on roles, Fern Elsdon-Baker, Tom Lean, Rosie Wall, Sabine Clarke, James Sumner, Jeff Stout, Melanie Keene, Terence Banks, Elizabeth Hunter, Julia Hyland, and Mike Brown (*above*) had the task of mastering a role, learning a script and then also being ready to improvise answers when asked a question from a pupil. BSHS members were able to meet the demands of improvisation because of the deeper understanding they held of the historical context we were dealing with, which may have not been the case if professional actors had been used.

The success of the session at the BA Festival of Science can be gauged in two main ways. One was the response of the young audience during the event. The pupils asked the witnesses a series of intelligent and demanding questions and required little encouragement to make their suggestions as to the best method to contain the plague epidemic.

Their contributions indicated that they both understood and were comfortable with the premise of the role-play and were able and willing to engage with the concepts involved. Ice-breakers at the beginning of the session helped to facilitate participation and a 10 minute debrief at the end worked to make explicit the educational aims of the session.

The second way in which the session can be judged to have been successful were the enthusiastic remarks made afterwards by the teaching staff present. One strength of this particular approach to education and outreach work is that it does not require teachers to undertake any additional work. At the same time, the event gave the young people an educational experience they are unlikely to have within the day-to-day running of a classroom.

The BSHS Strolling Players are currently developing a new event to be performed at the 2008 BA Festival of Science in Liverpool. This event, 'The Business of Bodies' will explore issues related to grave-robbing in Liverpool during the 1820s and a preview of this session will be performed at the Three Societies Conference in Oxford, 4-6 July 2008.

For more information on **Death and the City** see the material at: www.bsbs.org.uk/bsbs/outreach/death_and_the_city/

Sabine Clarke
University of Oxford
sabine.clarke[a]wuhmo.ox.ac.uk

Bringing death to life: a parson's-eye view. James Sumner assails the atheistickal naturians.

Yesterday I was in Prague, discussing Cold War European software appropriation whilst dressed (I think) as myself. Today I'm dressed as – I am – a providentialist parson in the York of 1631, inveighing zealously against the idle rich and the disease contagion principle alike. Jetlag has nothing on this. I'm off my home turf thematically, sartorially and chronologically; though I'm at least tolerably fluent in four centuries (two as a native) the seventeenth is not among them.

Adding to my woes are the following circumstances for which my lecturer's training has ill prepared me:

1. I can't see. Normally I depend on a pair of visual glasses ('vulgarly called Spectacles' according to Benjamin Martin, not that he'll be born till 1704) modern enough to shatter the fragile mimesis; Specsavers were fresh out of ivory bow frames when I popped in, so I'm doing it barefaced. I'm also lit by a powerful projector beam: this apparently gives a very dramatic effect from the position of the audience, but leaves me fielding perceptive questions from a succession of amorphous blobs interspersed with clear glimpses of the back of my own retina.

2. I am on the wrong side of the hills. The upkeep of a North Yorks accent is not facilitated by a life lived largely between the Potteries and South Manchester with the complicating wildcard of four years in Leeds. At one point in rehearsal I somehow managed to crunch across in the manner of a driver missing third gear and went into broad Scouse. Drag is easier.

Nonetheless, I – we all – somehow get through it. People seem to be pleased. A change comes over the Strolling Players of the BSHS. We are not ourselves; we have made time-travel happen, and now we are invincible. Our afternoon performance slot lacks an audience, so we sally forth to get one. Nothing has quite prepared me for the sheer psychic release involved in strutting mob-handed through a plateglass university campus under the protection of a long flappy gown and an unexpected century. Children point; crowds part. I beseech a few passing ducks to repent.

Ultimately we happen upon a room sign-posted 'VERY SENIOR PERSONS' LUNCH: DO NOT ENTER UNLESS ULTIMATELY RESPONSIBLE FOR EVERYTHING' (or some such; I hadn't on my glasses). To a gaggle of timid software historians, Wellcome postdocs and so forth, this would have been a significant barrier. In we stride, then. Alderwoman Baxter and I are swiftly collared by a gentleman named Chris, who is wearing an array of recording

equipment and large furry headphones, and comments that he must look faintly ridiculous. I pull my gown about me and change the subject. The interview eventually emerges on national radio.

We retire to give our final performance of the day to a rather small audience. I don't recognise any of them from our promenade, but then I don't recognise anything at more than arm's length from my face. At the conclusion one of the amorphous figures rises, thanks us for our work and indicates that he is the Chair of the BA Council. The Strolling Players retire collectively to the 21st century and the pub, but at least one of their number continues to muse on the ineffable workings of providence.

James Sumner
University of Manchester
james.sumner[at]manchester.ac.uk

Julia Hyland reflects on her work as a medical make-up artist.

Much of my work is bad. Some of it is truly awful. My CV is a graphic catalogue of disaster. Bruises and blisters, guts and gore are my bread and butter in a curious occupation in which I perceive a black eye as a thing of beauty, a mangled limb a work of art. In my role as Outreach Officer for the Centre for the History of Medicine at the Medical School, University of Birmingham, I spend much of my time re-creating unspeakably vile medical conditions and injuries using special effects make-up. From burns, bruises and fractures to boils, lumps and pustules of infectious disease past and present I use my artistic and ghoulish talent to educational and colourful effect, bringing to life the physical and emotional characteristics associated with sickness and injury enabling my victims to explore the effects.

I usually combine my skills with interactive talks and practical sessions to deliver a wider understanding of medical history to those with little or no knowledge of the subject, as well as delivering sessions to teachers, school pupils, students, parents and the wider community. Funded partly by the Wellcome Trust I work eighteen hours a week, pursuing freelance activities at other times – but that's another story! If you want Anthrax, Plague, Impetigo, Syphilis, Gangrene or smallpox – these are just some of the disgusting, and to me thrilling, conditions I can offer.

For 'Death and the City' I was asked to give a willing victim the plague in a role play situation. This was the first time I had had the chance to showcase my profession in this way and found it to be a fantastic opportunity to work with other 'players' from a variety of universities. It was an enjoyable way of getting to know my fellow colleagues.

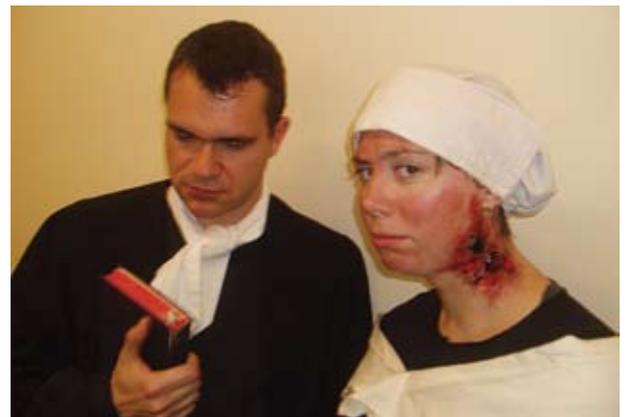
Using Melanie as a model, I plonked down my bag of tricks Mary Poppins style to produce jars and bottles containing curious ingredients such as 'skin flesh' and 'morticians wax'. I started by applying fake movie mud to her face, as a peasant woman she really would not have been very clean and I needed her to look the part, after this I glued onto her the premade latex buboes I had prepared earlier. Once these were in place I added coloured gels to create bruising and scarring before carefully layering on the final touches, 'fake sweat', 'congealed blood' and 'pustule filler' all bought ready made – the items do what they say on the tin.

Melanie seemed unperturbed to be progressively disfigured and admitted that she should have felt shock or pain, confessing 'it's odd to see something so realistic on yourself but to have no sensation with it'. Her face looked agonisingly painful and in need of urgent treatment – although if this really was the past she would have had no hope of surviving her desperate condition.

It is always interesting to see other people's reactions to my disfigurements; they certainly have the 'wow' factor. Watching people respond to the disease or verbally announce their concern is most enjoyable to me. I know I have done a good job of making my victims look particularly hideous when they move to avoid the sufferer.

We players are now working towards our next venture 'The business of bodies'. Now where did I leave my corpse?

Julia Hyland
University of Birmingham
J.M.Hyland[at]bham.ac.uk



James Sumner and Melanie Keene (with buboes). Pictures courtesy of Melanie Keene.

Reports of Meetings

HSS Annual Conference

Chris Renwick describes his first experience of a HSS Conference

It was when realised I was sharing a taxi with an employee of an arms dealer that I started to think that the 2007 History of Science Society Annual Meeting in Washington DC was going to be quite unlike any conference I'd been to before. That feeling was one confirmed at the opening reception when Jay Malone – the executive officer of the HSS – announced that there were almost one thousand delegates registered to attend over the course of three days. Indeed, the HSS seemed to be a history of science meeting reflecting many of my first impressions of all things American: it was like the British version, just a whole lot bigger.

I'd arrived in DC twenty-four hours before the meeting for two reasons. First, so that I could adjust to the time difference before I was due to give my paper and, second, so that I could visit some of the Capitol's sights. So, having taken in a variety of museums, the Supreme Court, and the White House, I made my way to the opening reception, which, to be honest, I was somewhat apprehensive about attending. The experience of suddenly being in the middle of the world's biggest history of science gathering was eased somewhat, though, by a special 'orientation' session for first-time attendees, where Jay Malone and Bernie Lightman – editor of *Isis* – took the time to chat to everyone individually. With around thirty people in the room, the

Neotechnic scale of the orientation meeting made me feel more relaxed and I quickly felt the worries that had plagued me about drinking and dining alone, as well as giving my paper to an empty room, drift away.

However, it was the next day that the serious business began. With a mind-boggling eleven parallel sessions running between 9am and 7pm, many of which lasted for two hours and forty-five minutes, a wide variety of concurrent interest group meetings, and no scheduled break for lunch, it was far busier and quite literally hungrier than any conference I'd been to before. Of course, on the upside, I never felt short of sessions to attend, which, as an historian of the social sciences, is an experience I'm not entirely familiar with. Along with Ted Porter's keynote address, 'How Science Became Technical' highlights for me included the panel on 'Social Science and the Crises of American Liberalism, 1900-1950' in which I heard papers from Thomas Stapleford, Jessica Wan, and Andrew Jewett, as well as a commentary from Porter.

What somewhat surprisingly turned out to be a real highlight for me was the epic two hour and forty-five minute long session format, which allowed for ten minutes of questions directed at each speaker and more general discussion at the end. I found this feature particular welcome when it was finally my turn to give a paper because there were issues about my research topic I'd been itching to discuss but never found the audience to do so at a conference before. Although I'd been allocated the least desirable slot – Sunday morning after the conference dinner – there was an audience far bigger than a number I'd seen at other sessions. With many of those in attendance having shared interests, the questions were sharp, the discussion

lively, and there was much for me to think about on the plane back to the UK.

Although it was quite some distance to go and proved slightly more costly than I'd anticipated, even with travel grants and favourable exchange rates, the HSS conference was a worthwhile and valuable experience. I made plenty of new acquaintances, put faces to e-mail addresses, and got to introduce and discuss my research with people I'd never have known, let alone met, if I hadn't decided to have a crack at submitting an abstract several months earlier. Yet even amongst all that activity, someone from the BSHS still managed to find me and ask me to write this review.

Chris Renwick
c.p.m.renwick03[a]leeds.ac.uk

Darwinism after Darwin

Kersten Hall takes a historical perspective of Darwinism.

Like the finches' beaks and flowering orchids which so preoccupied him, academic studies of Charles Darwin and his ideas show a rich variety of diverse forms and functions all of which converged at the 'Darwinism after Darwin' conference held at the University of Leeds in September. Hosted at the scenic Devonshire Hall in Headingley, the conference attracted delegates representing a broad range of disciplines from North America, Australia and Europe.

The conference was organised around a number of sessions exploring the influence of Darwinism on different intellectual fields. The first session, 'Histories', included papers considering the relationship between biographical studies of Darwin and his scientific ideas, scrutiny of the ambiguous phrase 'inheritance of acquired characteristics', the appropriation of Darwin by 20th century animal behaviourists, and how the use of popular Darwin myths can be used to engage the public in understanding science. 'Religion' explored the effect of Darwin on 19th-century natural theology, the influence of the 'un-heretical' clergyman Lynn Harold Hough in 1920s America, and examined the implications of the recent Intelligent Design (ID) court cases in the USA for how scientists should base their truth claims against ID. The

MATT WHITE



HSS Annual Conference book exhibit, Washington D.C.

day concluded with a packed public lecture in which Professor Richard Weikart defended his controversial book *From Darwin to Hitler: Evolutionary Ethics, Eugenics and Racism in Germany* against challenges from three critics, Jonathan Harwood, Steve Fuller and Staffan Muller-Wille before the debate was opened to a lively and receptive audience.

Tuesday's opening session, 'Bodies', included a reappraisal of the anthropologist Franz Boas' stance on variation and types, a discussion of the study of sexual selection in animals and humans during the period 1915-1935, and how novel sociability between different disciplines helped bring about a 'Darwinization' of the study of human evolution during the 1950s. 'Society' then introduced the memorable and somewhat neglected figure of Patrick Geddes, polymath student of flatworm biology and town planning, whose influence on early British sociology was shaped by evolutionary ideas.

During this session, the social sciences were suggested as prime culprits for the creating confusion of Darwinism with ideas of progress and teleology resulting in an impassioned plea for Darwin to be rescued from the highly misleading 'Marx and Spencer' theory of evolution (a name particularly appropriate given the homonymous retail giant's origins in the host city!). The closing paper in the session, 'Giving Darwin a Decent Burial', offered the provocative suggestion that, had Darwin been able to witness contemporary lab-based molecular biology, he would have reverted to his original stance of belief in design in nature.

After lunch, a diverse range of papers explored topics such as the effect of debates on evolution and heredity on economic and military practices in the German Empire, the legacy of Ernst Haeckel's controversial embryos on more recent portrayals of animal development, how experiments on alcoholic poisoning related to eugenic fears over racial degeneration, and the reception of Darwin in postwar East Germany and Czechoslovakia. In 'The Arts', John Holmes explored some vivid examples of how poets have turned to Darwin for inspiration whilst in 'The Thinking Path', Shirley Chubb expressed Darwinian themes in a photographic montage organised around four key Darwin-related anniversaries. The day concluded with the keynote address in which Peter Bowler used a brief synopsis of troop movements at the Battle of Gettysburg to introduce a discussion about the value of counterfactual history before posing the question 'Did Darwin Make a Difference?'

On Wednesday, the final session, 'Mind', examined the implication of Darwinian models of consciousness for the practice of history, together with studies of Darwinian medicine before concluding with 'Darwin

and the Matrix', a presentation of the 'Darwin Online' project and discussion of how this online archive might affect future Darwin historiography.

As the 150th anniversary of the publication of 'The Origin' approaches in 2009, the meeting closed with a round table discussion that offered a number of challenges relating to both the past and future of this academic field. Has the historiography of Darwinism been shaped by religious structures with its very own gospels, prophets, acolytes and priests? Was the true revolution in 19th-century biology not Darwinism but rather developments in cell theory? – if so, then the suggestion that scholars approach Darwin with a little more sobriety seemed rather appropriate, given the lively conference banquet on the preceding evening. Might the celebrations of 2009 leave historians of science relegated to mere 'court lackeys to the circus of science'? Does Darwin succeed where Marx failed in offering satisfactory explanations for the human condition? And does a 'transhuman' await us all as Steve Fuller dramatically prophesied?

Delegates who did not have to dash off to catch flights then enjoyed a short train ride up into scenic lower Wharfedale on the edge of the famous Yorkshire Dales where tour guide Mike Dixon gave an excellent and informative commentary on Darwin's brief stay in the spa town of Ilkley. Physically and emotionally exhausted after the publication of the *Origin*, Darwin beat a retreat to find rest and recuperation taking the then much heralded 'water treatment' for which Ilkley had become famous. Finally another famous local feature, Ilkley Moor, provided an impressive backdrop for the few remaining stalwarts as they enjoyed a very welcome unofficial conference garden party courtesy of Greg Radick.

Kersten Hall
medkth[a]leeds.ac.uk

William Conybeare

Efram Sera Shriar and Mark A. Ulett on this Leeds meeting.

On 19 October 2007 historians of geology and scholars from related fields gathered together in Leeds to commemorate the life and times of William Daniel Conybeare (1787-1857). This one-day conference on the history of geology drew out many interesting topics related to Conybeare's prolific career as a geologist. This event was hosted by the Leeds Humanities Research Institute and organ-

ized by Leucha Veneer. Sponsors of the event included: The British Society for the History of Science, The History of Geology Group, and the University of Leeds. For those of us not actively working in the history of geology, this event, marking 150 years since Conybeare's death, fully elucidated the breadth of his influence on the development of the geological sciences.

In order of appearance the cast of presenters were as follows. Leucha Veneer (Leeds) discussed Conybeare as the university geological theorist, displacing the more practically oriented members of the Geological Society. Martin Rudwick (Cambridge) followed by describing him as a transitional figure in his geological research, examining the dichotomy between fossil-based stratigraphy and the inferential use of fossils to reconstruct past worlds. After a brief lunch a la buffet, attendees of the conference were reacquainted and discussed the papers from the first session.

The conference continued with an insightful presentation by Jack Morell (Bradford & Leeds) on Conybeare as a mentor to provincial contributors to the new science of geology. Notably, Morrell examined Conybeare's influence on Yorkshire Geology. Jon Hodge (Leeds) gave a clever account of Conybeare as the 'thinking man's Buckland,' accomplished enough to take on even Charles Lyell with his theory of a progressively calming, cooling earth. After a short break, Hugh Torrens (Keele) elaborated on the success of Conybeare as a geological author, notably as the co-author of a field manual after a long period of instability in geological publishing. Finally, Ralph O'Connor (Aberdeen) discussed Conybeare's opposition to the geology of the biblical literalists.

The floor was then opened up to a Q&A session chaired by Greg Radick (Leeds), and attendees were given time to reflexively reconsider the many faces of this significant historical actor. It was suggested that further examination of Conybeare as a husband and churchman would open the door to a more nuanced account of his life, career, and contributions to the science of geology. Afterward, we adjourned to the Brotherton Library's Special Collections at the University of Leeds. There a wine reception sponsored by the BSHS awaited the presenters and attendees of this workshop. This event was dedicated to the long and decorated career of Jack Morrell. Overall this event was a resounding success, and the single-day conference format presents a functional and efficient option for organizers considering an event of a comparable nature.

Efram Sera Shriar and Mark A. Ulett
phess[a]leeds.ac.uk; ph07mu[a]leeds.ac.uk

Reviews

Books

Jim Endersby, *A Guinea Pig's History of Biology: the Plants and Animals who Taught us the Facts of Life*, William Heinemann, 2007, 499 pp., £20.00.

Much of this wonderfully engaging and entertaining book is concerned with overthrowing the myth that modern biology was made solely by great scientists with great ideas. Jim Endersby's achievement is to show how scientific knowledge has always depended on the daily drudgery of often vast networks of researchers and other less heralded actors, without understating the remarkable transformations in our understanding of inheritance over the past 200 years, from Darwin to DNA sequencing and beyond. His account celebrates the plants and animals that made all this possible; not just the eponymous guinea pig, but passion flowers, fruit flies, zebrafish, and that most frustrating of experimental organisms, *Homo Sapiens*.

Endersby draws on the history of human interactions with twelve different organisms, chronicling not just how these plants, animals and bacteria have shaped our biological knowledge, but how we have shaped them in our gardens, greenhouses, fields and laboratories. When Thomas Hunt Morgan and his team embarked on large-scale breeding experiments with *Drosophila Melanogaster* in the early 20th century, they were soon 'head over ears' in this species of fruit fly. Years of painstaking labour cross-breeding flies with specific mutations helped them map the positions of genes on chromosomes and so establish the precise connection between chromosomes and inheritance. In the process, they were rebuilding *Drosophila* as standardized organisms that could be used as tools to investigate the genes of unknown flies.

Via the Wistar rat and the JAX mouse, which became pieces of standard equipment in biotech laboratories as familiar as the Petri dish, Endersby's story culminates in the production in 1985 of the OncoMouse®, the world's first genetically modified animal made specifically for cancer research. In a discussion of the public controversies surrounding the use of animals in medical research and the growth of GM technologies, the author draws on fascinatingly candid interviews with leading geneticists.

We learn not just of the breakthroughs and controversies, but also of the dead ends. An unusual variety of Oenothera, evening primrose, plucked from an abandoned field to the south east of Amsterdam led Hugo de

Vries to argue that new species arose by large jumps: mutations. Mutation theory had many critics and was abandoned not long after, but Endersby looks beyond both the hubris and the humiliation to show how the evening primrose helped establish that evolution could be investigated in laboratories.

Readers will be convinced that following the careers of these organisms from field to laboratory tells us much about where our knowledge of heredity and evolution came from. This approach also shows how scientific practices are embedded in broader social and cultural developments. We find Darwin observing the reproductive behaviour of orchids and passionflowers in his greenhouse, constructed from cheaply produced rolled plate glass, an innovation from the 1840s that made the cultivation of exotic plants affordable to gardeners; and the 'fly boys' at Columbia University mass-producing *Drosophila* like cars on Henry Ford's assembly line. We learn how these tiny flies made their way from south-east Asia to North America in the 16th century, and ultimately the laboratory, on bunches of bananas: cheap food for slaves. Zebrafish, now the organism of choice for most cutting-edge biologists, were among many exotic fish imported to fill the tropical aquariums of middle class Victorians.

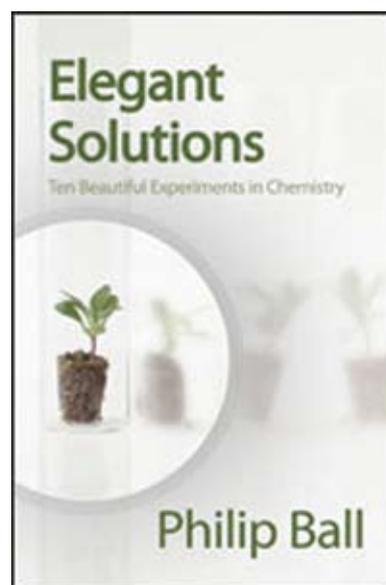
Endersby supplements these intriguing case studies with a useful bibliography offering the curious a wealth of further material, and making this book an essential resource for anyone who wants to know more not just about the history of biology, but also how science works.

Salim Al-Gailani
ssa32[a]cam.ac.uk

Philip Ball, *Elegant Solutions: Ten Beautiful Experiments in Chemistry*, Royal Society of Chemistry, 2005, viii + 212 pp., £19.95.

As the title indicates, this book describes ten 'beautiful' experiments in Chemistry. However, Ball makes clear that beauty is entirely subjective and often has a particular meaning in chemistry which is not necessarily apparent to non-chemists (much like the 'simplicity' physicists speak of which often looks far from it).

His ten experiments cover a long period of chemical activity: from the early 17th century to the 1990s and the conceit of ten beautiful experiments is used to a certain extent to form a scaffold for a discussion of the history of chemistry. However, several of the obvious 'milestones' of a traditional history are noticeably absent; Davy and sodium, Lavoisier and



oxygen, and Rayleigh and Ramsay and the noble gases (though the latter two cases are mentioned in passing). This is because the focus of this book really is aesthetic; it is the beauty of the experiment rather than its importance in the development of chemistry which merits its inclusion here.

This also results in some unusual inclusions such as Woodward's synthesis of vitamin B12, the chemistry of the superheavy, fleeting elements, and Van Helmont's work on the growth of the willow tree. While these experiments don't necessarily mark watersheds in the history of chemistry they do represent different facets of what chemists see as beautiful.

Not only does Ball refuse to be tied down by a strict definition of 'beauty'; he's also resistant to being shackled by a firm concept of 'experiment', pointing out that most experiments in chemistry are not at all like those espoused by philosophers of science, testing hypotheses, but rather involve creating something new, or replicating something by a novel route.

Here we start to get a feel for what I think is the most important message, or perhaps question, of this book. 'Elegant solutions' is an interesting and unusual potted history of chemistry. It is replete with stories untold and pointers to later sections as well as instructions to skip over sections if desired which could make it a frustrating read for some. However, this is necessary for its real purpose, in my view, which is to try to give the reader a feel for what chemistry really is. And it is important that this is a feel rather than a definition as Ball indicates throughout, chemistry is a sensual discipline. From its earliest days and up to the current time, its practitioners have been commenting on the sights and smells of the lab, often far from dispassionately!

So who is this book trying to convince of

chemistry's sensual character? Ball is at pains to stress that he does not presume any prior chemical knowledge and when he does go into detail or produces formulae he explains them fully in the text and advises the uninitiated to pass over them. I admire his intentions here but, while this is certainly not inaccessible for non-scientists, some background is necessary to see the beauty without being distracted by too much new information. To my mind the ideal audience for this book are GCSE students not quite sure whether they want to continue with chemistry. A dip into aesthetics and they will soon join the ranks of those of us for whom ether is as Proust's madelines, a large single crystal is worthy of admiration by an entire research group (and anyone else who happens to be passing) and a single peak in a photoelectron spectrum can be as challenging and powerful as any Damien Hirst.

Rosie Coates
r.coates@jucl.ac.uk

Elegant Solutions was the winner of
the BSHS Dingle Prize 2007.

Television

'The Relief of Belsen', 15 October 2007, Channel 4.

The story of one of the biggest relief operations in history was presented in the form of yet another docu-drama so beloved by television in recent years. Based on four personal accounts, dialogues between the cast interspersed with voiced-over personal memories, on-screen statistical figures and contemporary photographs as well as film footage give a very immediate, almost diary-like picture of the developments at the camp after the British entered it on 15 April 1945.

The film opens with the arrival of Lt. Col. M.W. Gonin, RAMC, with 11 Light Field Ambulance at the gates of the concentration camp of Bergen-Belsen. Gonin and the viewer are soon enlightened about the living conditions of the 40,000 prisoners in the camp: a typhus epidemic is raging, thousands of dead have remained unburied, there is neither food nor clean water. Over the next 23 days, while war still goes on outside the camp, the British battle against seemingly insurmountable logistical problems and an ever increasing death toll.

Focusing on a selection of officers in command, as well as nurse Jean McFarlane, Rabbi Leslie Hardman and medical student Alexander Paton, the film follows their fight against lack of knowledge, manpower and

supplies. The team under Lt. Col. Johnston, RAMC gradually learn to understand why the inmates are still dying despite being deloused and fed. When a group of medical students finally arrives from London, the unappetising Bengal famine mixture is made agreeable to Eastern European palates and on the 18th day after liberation the death rate drops to 200, even the Doubting Thomas Gonin becomes convinced that Johnston is doing the right thing.

The film's medical and historical authenticity that The Wellcome Trust wanted to achieve by funding a year's worth of historical research, is hampered by the very limited selection of events and facts that depict a rather vague and overly romanticised picture of British heroism.

Originally set up by the Germans as a POW camp, from 1941 onwards Bergen-Belsen served as a camp for Jewish prisoners. After the evacuations of tens of thousands of prisoners from the East from early 1945, the camp became overcrowded in the extreme and the death rate increased. On 15 April German officers offered a local truce to the British, using the potential death threat of the typhus epidemic as a bargaining tool to be allowed to remove to the frontline German army units stationed in part of the camp. German SS and Hungarian soldiers remained as guards. This distinction is lost in the film, which shows German officers at the entrance to the camp and in the Kommandantur building. Uninitiated viewers will not understand why there is also footage of German men and women – the SS-guards – forced to bury dead inmates by British soldiers. The arrest of the camp staff and their subsequent trial goes unmentioned.

Although Johnston makes a number of frustrated remarks about the inefficacy of the British military authorities, these are not explained and the viewers are left to believe that the British had been ignorant about the existence of Belsen. In fact, intelligence did exist about this camp as well as others, but like in so many similar cases a lack of communication between various agencies left those on the ground unprepared and in need of improvisation with what they encountered.

During the depiction of the battle against typhus, the film fails to mention that the British underestimated the extent of the epidemic, neglected quarantine within the camp and could have saved many more lives through the use of aerosol DDT. While the film portrays the ignorance and confusion about the dietary needs of the victims very well, it completely glosses over a controversial episode in the struggle against starvation. The British medical students seem to have been brought to Belsen mainly to carry out trials with hydrosalytes, skimmed milk and serum via intravenous drips and stomach tubes

under the direction of haematologist Janet Vaughan. While one scene in the documentary dramatically illustrates the victims' fear of syringes (the Germans injected 'Benzin' petrol to kill inmates), there is no mention of the problems encountered in the use of other invasive means of administering nutrients. The experiment failed dismally but neither it nor the resulting ethical issues are mentioned (see research by Paul Weindling). One cannot help but feel that all details that would distort the image of the resourceful and successful British have been omitted.

Another point of critique is the film's suggestion the medical students had been immunised against typhus and had 'watched a film' about what to expect at Belsen. Original sources suggest differently.

Further criticism is linked to the plot itself. Apart from Dr. Hadassah (Ada) Bimko, a Jewish medical doctor from Poland, none of the victims is given an individual voice. The interspersing of original photographs and acting has been handled very sensitively, and the producers have resisted any attempts to reconstruct what could only have been tasteless images, but one could have for example re-created scenes where victims gave evidence in the camp to the War Crimes Investigation Team of the British Army. The depiction of the Germans remains largely stereotypical, even that of the 'good German' – civilian nurse Lotti – who declares that even if the Germans knew nothing about the camps 'we have to bear the blame'.

Nina Staehle, University of Oxford
nina.staehle@ajgmail.com

Websites

The NASA website: www.nasa.gov/externalflash/SpaceAge/.

The NASA web site is a technological marvel but sadly lacks in historical analysis. However, don't let this deter you from visiting: it is a remarkable and educational site with a real wow factor. Videos of historical figures can be viewed and 3D models can be twisted, turned exploded and reassembled. As we might expect of NASA, the technology is smooth. The site was easy to navigate: the models moved swiftly and it is a visual delight. There was none of the clunkiness that can be found on many other sites. Even the video footage came up swiftly, a little jerkily, but far better than almost any other site. The most important thing is that kids of all ages will enjoy this site.

What is disappointing is the lack and quality of the written content. It is safe and bland,

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yet NASA historians have produced superb nuanced academic history. To search their output try starting at <http://history.nasa.gov/>. The impression is that the key requirement was to keep it simple and make it look breathtakingly good. In both they have succeeded but was this an opportunity missed? Could not the simple introductory content have led those minded to search further on the site to do so and revealed more detailed and complex historical text? Could it not have been better linked to other NASA sites? On the other hand the ability to view archive footage of, for instance, Von Braun testifying before Congress is immensely valuable. The text is duly complimentary about Korolev but a little less about NASA and a little more about the Soviet Union and Sputnik would have seemed fitting. However, the reality is that this is a site produced by the American Space Agency.

There are some tough facts about the Space race which are avoided. Werner von Braun was a German who worked on the V-2, one of the most inefficient weapons of all time. More slave labourers and concentration camp inmates died producing it than were killed by its impact on the target. Satellite launchers were originally developed with the primary purpose of being able to annihilate entire cities. Scientific enquiry and high minded ideals about exploration did go hand in hand with the drive for bigger and better weapons. The very debate about Von Braun's responsibility for war crimes is an excellent way to introduce young people to the difficulties of history.

NASA has a sprawling presence on the web but is well worth exploring. Later this year is NASA's 50th anniversary, and there is already a considerable amount of material available with more to come (www.nasa.gov/50th/home/index.html). One of the great fascinations of space are the images – try <http://grin.hq.nasa.gov/subject.html>. NASA is well aware that the schoolchildren of today are the taxpayers for the manned Mars mission and many resources are aimed at them, though you don't need to be at school to enjoy www.nasa.gov/multimedia/nasatv/index.htm.

The UK also played a role in Sputnik. The recently completed radio telescope at Jodrell Bank allowed British scientists to be the first to track the orbit accurately. Jodrell Bank's visitors centre is well worth a trip, but www.jodcast.net/ is also worth a visit. 1957 saw the first of 441 launches of the British sounding rocket Skylark. For a good over-view of British developments in the 50s and 60s see www.spaceuk.org/. Coincidentally it is the 40th anniversary of Mullard Space Science Laboratory, and its involvement with Skylark can be traced at www.mssl.ucl.ac.uk/pages/heritage/index.htm.

Dave Wright, British Rocketry Oral History Programme, [broh2\[a\]aol.com](mailto:broh2[a]aol.com)

Online access to the archives of the London School of Hygiene & Tropical Medicine

© LSHTM ARCHIVES



The fascinating and diverse archive collections of the London School of Hygiene & Tropical Medicine (LSHTM) are now available online to researchers around the world. Over 24,000 items are listed including the papers of pioneers of tropical medicine and public health such as Sir Ronald Ross, Sir Patrick Manson and Sir Arthur Newsholme, as well as administrative papers of the School and the Ross Institute.

The increase in accessibility to the archives was made possible through a Wellcome Trust Research Resources in Medical History grant awarded in 2003 to preserve, re-catalogue and increase accessibility to the papers of Sir Ronald Ross and the Ross Institute. Ross's collection of 20,000 items includes correspondence, photographs, scientific notebooks, press cuttings and publications. The archive is very rich in material relating to his scientific work, including the correspondence between him and Sir Patrick Manson relating to the work before and during Ross's discovery of the mosquito transmission of malaria in 1897, and to malaria eradication and prevention in various countries including India, Sierra Leone, Gambia, Mauritius, Greece and Italy. It also contains correspondence with other leading medical and tropical medicine specialists such as Sir William Leishman, Sir David Bruce, Joseph Lister, Charles Laveran, Robert Koch and William Gorgas.

The papers also reflect Ross's other interests, such as his efforts to increase the pay of research and scientific workers, and to improve sanitation in the colonies, which involved correspondence with political figures such as J Ramsay MacDonald, Waldorf Astor, J E B Seely and Austen Chamberlain. He

was interested in mathematics and statistics, and wrote a number of publications on these topics, as well as producing fiction and poetry. Ross was a great correspondent, and there are a small number of letters between him and prominent individuals of the time including Sir Arthur Conan Doyle, Sir Henry Rider Haggard, H G Wells and Rudyard Kipling.

Other gems from the collections include:

- Sir Patrick Manson – including diaries and research papers during his time as a physician in Amoy and Formosa in the 1860s and 1870s working on diseases such as malaria and filariasis and 12,000 medical examinations for candidates going to work in the colonies and protectorates between 1898 and 1919.

- Expeditions by School staff to investigate malaria in Africa and the Far East

- Mosquito box in which malaria infected mosquitoes were sent from Rome to London for Sir Patrick Manson's experiment whereby mosquitoes were allowed to feed on two volunteers who then developed malaria.

- Geoffrey Douglas Hale Carpenter – travel diary which records his and his wife's experiences including trips to Uganda for his research on sleeping sickness, 1913-1930.

- Original plans and specifications for the School's building, opened in 1929.

Further collections will be added to the database regularly, as will new accessions that the archive receives. Further information is at: www.lshtm.ac.uk/library/archives/.

Martin Rudwick: Sarton Medallist

The Sarton Medal, the highest award of the History of Science Society, is given annually in recognition of a lifetime of scholarly achievement. That for 2007 has been awarded to Martin Rudwick, perhaps the most influential historian of the earth sciences in the past fifty years. He is the first Briton to receive the award since Geoffrey Lloyd in 1987.

Rudwick's books include *The Meaning of Fossils* (1972), *The Great Devonian Controversy* (1985), and, most recently, *Bursting the Limits of Time* (2005). His collected articles, including those on Charles Lyell, Charles Darwin, Georges Cuvier and other key figures, have recently been published by Ashgate. Rudwick has led the way in demonstrating that classification, order, and display cannot be dismissed as trivial aspects of the making of knowledge, but are important ways of understanding the natural world. Martin Rudwick has shaped the way we see some of the most widely discussed episodes in history of science. It is in recognition of his remarkable achievement that the History of Science Society has named him as the 2007 Sarton Medallist.

See www.hssonline.org/about/society_awards2007.html for the citation by Jim Secord.

Listings

Conferences

British Society for Literature and Science
27-29 Mar 2008, Keele University.

Third annual conference of the British Society for Literature and Science. Papers will address topics in the interactions of literature and science. See <http://www.arts.gla.ac.uk/BSLS/> for further details.

2nd Annual Conference of the Bulgarian Society for the Chemistry Education and History and Philosophy of Chemistry

25-27 October 2008, Plovdiv, Bulgaria.

The CE&HPC Society aims to foster interest both in chemistry education and history and philosophy of chemistry with their social and cultural dimensions and influences by providing a forum for discussion and to promote scholarly research in these fields. For citizens outside Bulgaria the membership is free. For further information, please go to <http://khimiya.org> or <http://groups.yahoo.com/group/khimiya>

The Global Governance of Infectious Disease: Risk, Surveillance and Regulation

Symposium 10-11 September 2008, Newcastle University.

Further details from Andrew Donaldson (andrew.donaldson@ncl.ac.uk) and David Murakami Wood (d.f.j.wood@ncl.ac.uk).

History of Science Society Annual Conference

Future meetings: 6-9 Nov 2008, Pittsburgh, Pennsylvania; 18-22 Nov 2009, Phoenix, Arizona. See www.hssonline.org.

The History of Science, Technology and Medicine in Ireland

Friday 14 March 2008, Trinity College, Dublin. Including a round-table discussions on how to promote and increase public awareness of the history of science in Ireland and 'what is Irish about Irish science?'

Reading and Writing Recipe Books: 1600-1800
8-9 Aug 2008, University of Warwick.

This international interdisciplinary conference will provide a much-needed environment that allows recipe book scholars to meet and discuss important issues such as comparative methodologies and periodization, thereby offering a key opportunity to shape the course of future research on this genre. See www2.warwick.ac.uk/fac/arts/english/events/recipebooks.

UK Space Conference 2008

26-29 Mar 2008, Charterhouse School, Godalming, Surrey.

This conference aims to bring together the members of the UK space community. See www.spaceconference.org.uk/ for further details.

Exhibitions

Small Worlds – the art of the invisible

Until 6 April 2008, The Museum of the History of Science in Oxford.

This exhibition of the miniature world of the microscopic is a representation of a collection of over 10,000 specimen slides in poetry and art. The cabinet of slides at the centre of the



exhibition was donated to the Museum in 2005 and its contents were collected between 1860 and 1930. The slides contain a variety of specimens, which visitors will discover in all sorts of weird and wonderful ways including microbe-patterned curtains and wallpaper, animations and audio poems.

Research funding

History of Science Collections, The University of Oklahoma

The Andrew W. Mellon Travel Fellowship Program provides support for scholars at both predoctoral and postdoctoral levels. Proposals are evaluated three times a year, with deadlines for submission in October, February and May. For information, please contact: The University of Oklahoma, The Andrew W. Mellon Travel Fellowship Program, Bizzell Library, 401 West Brooks, Room 521, Norman, OK 73019-0528. Web address: libraries.ou.edu/etc/hist-sci/mellon.asp.

Research internships in the history of science and technology 2008

National Maritime Museum and Royal Observatory, Greenwich, are offering three or four student research internships, usually for 6-8 weeks. The successful candidates will carry out a piece of research based on the Museum's collections relating to astronomy, cartography, scientific exploration, navigation and time, to be presented in a final report. An allowance is paid at the rate of £1000 per month. Full details can be found on the Museum website by typing 'internship' into the search box at the top of the home page - www.nmm.ac.uk. Deadline: 18 April 2008.

Societies

The International Society for Cultural History

This society was formed at a meeting at the end of the recent 'Varieties of Cultural History' conference in Aberdeen in July. It now has a website at <http://www.abdn.ac.uk/isch/>. This contains information on how to become a founding member (£5) and next year's conference in Ghent, 28-31 August, 2008.

BSHS Conferences



**Three Societies Meeting:
HSS, CSHPS, BSHS**

4-6 July 2008, Keble College, Oxford

The Sixth Joint Meeting of the British Society for the History of Science, the Canadian Society for the History and Philosophy of Science, and the History of Science Society.

The theme of the meeting will be Connecting Disciplines. Participants have been encouraged to respond to the diverse meanings this has for historians of science, technology and medicine and their colleagues in the wider scholarly community.

The conference will take place at Keble College, one of the largest Oxford colleges.

www.bsbs.org.uk/bsbs/conferences

The British Journal for the History of Science

In March *BJHS* will contain a selection from the following:

- Elizabeth Headrick, 'Romancing the salve: Sir Kenelm Digby and the powder of sympathy'
- Alasdair Kennedy, 'In search of the 'true prospect': making and knowing the Giant's Causeway as a field site'
- David Philip Miller, 'Principle, practice and persona in Isambard Kingdom Brunel's patent abolitionism'
- Perrin Selcer, 'Standardizing wounds: Alexis Carrel and the scientific management of life in the First World War'
- Russell Smith, 'Optical reflection and mechanical rebound: the shift from analogy to axiomatization in the seventeenth century. Part 1'



Plus reviews including the following Essay Review:

- Jamie Cohen-Cole, 'Cybernetics and the machinery of rationality'

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 Rebekah Higgitt, 14d Pyrland Road, London N5 2JD, newsletter@bshs.org.uk. Electronic communication is preferred. *Viewpoint* is issued three times a year – in February, June and October. The next issue will be in June 2008 and the deadline for copy is 14th April 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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All enquiries to the Executive Secretary, British Society for the History of Science, PO Box 3401, Norwich, NR7 7JF, UK. Tel: +44 (0)1603 516236; execsec@bshs.org.uk.

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