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NEWSLETTER OF THE BRITISH SOCIETY FOR THE HISTORY OF SCIENCE

Contents

Editorial

Welcome to 2007, the 60th anniversary year of the BSHS. In keeping with this retrospective theme, this issue contains the list of Anniversaries for 2008 and a reminiscence of 50 years in the history of science by Maurice Crosland. Another former president of the BSHS, David Knight, is the subject of this issue's Questionnaire.

The main feature article by Tal Bolton, however, is particularly topical, giving historical perspective to an issue that recently hit the headlines: the payment of volunteers for experiments.

The Outreach and Education Committee's activities are represented by Michal Meyer's winning answer to the question 'Why should anyone need to know about the history of science?' and an announcement of their new project on 'Objects telling their own stories'.

Also included is a description of HoS at the National Maritime Museum, Reports of Meetings, letters, news and listings. Contributions to the next issue should be sent to newsletter[a]bshs.org.uk by 16 April 2007.

Rebekah Higgitt, Editor

'What's in it for you?'

Tal Bolton takes an historical perspective of the payment of volunteers for human experiments.

'We need three volunteers' requested a presenter at the annual BSHS conference, held at the University of Kent in July. Following a short pause, three female participants came forward but noticing the gender inequality, an unsuspecting male sat at the front found himself 'volunteered'. The 'experiment', creating rock formation models using bread, cheese and jam, was quite harmless (and no academics were injured in the course of it). But how often do we volunteer, or volunteer others, without thinking of the possible inconvenience, or sense of obligation, which we or those we volunteer might experience? And supposing a sum of money were offered – would that change the reluctant volunteered into a willing volunteer, and to what extent would the volunteer feel more obligated to fulfil their role?

In March 2006, clinical trials became the subject of media attention following the adverse reactions experienced by six volunteers in a trial of the drug TGN1412, a monoclonal anti-body designed to treat rheumatoid arthritis, multiple sclerosis and leukaemia; *The Guardian* reported that the volunteers were paid up to £1,000 to take part. This has aroused fresh debates on the use of human subjects in trials and the particular issues of informed consent and payments made to participants. These debates may be fresh but they are not new. From a British historical perspective, the payment of volunteers to take part in experiments has raised similar concerns within both military and civilian research which engaged human subjects.

The principle of informed consent, as defined in medical ethics codes such as the Nuremberg Code from 1947 and the Declaration of Helsinki (I) 1964, was based on the consent of a participant being freely obtained without coercion or inducement. The Nuremberg Code set out that consent should be obtained without 'force, fraud, deceit, duress or other form of constraint or coercion' and that the subject should be fully informed of the nature and risks of the procedure. While less detailed, the Declaration of Helsinki advocated fully informed 'free' consent. Even before these codifications of medical ethics, the Medical Research Council (MRC) was advising its unit directors that informed consent was a prerequisite to any experiment involving human subjects. The difficulty therefore with paying volunteers to take part in trials has been that of defining whether the payment was substantial enough to be considered an inducement and thus would call into question the valid consent of the research subject. In both military and civilian research settings, there was an awareness of the dilemma that paying subjects created in relation to their position

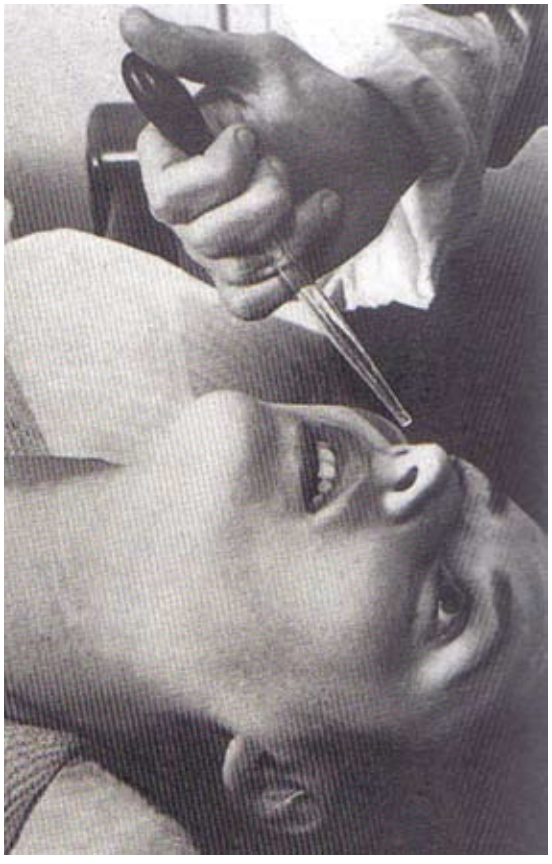

Fig 1: Administration of nose drops at the Common Cold Research Unit, D. Tyrrell and M. Fielder, Cold Wars *(2002, OUP).*

as volunteers in human experiments.

Historically, in research programmes conducted within civilian establishments, the payment of volunteers has followed a cautionary note. The MRC advised that payments should not be so great as to influence the individual to take part, but rather should reflect their out of pocket expenses. The use of certain sections of society, such as homeless people, was, moreover, considered 'unethical' because any sum of money made available would be a direct inducement. However, in military research conducted on service personnel at the Chemical Defence Experimental Establishment, Porton Down, the payments were on occasions referred to as 'inducement pay'. While studies conducted on service volunteers recruited between 1960 and 1966 showed that financial gain was not the primary reason why volunteers attended, it was recognised that the extra money they acquired strongly reinforced their main reason for volunteering and therefore was significant in securing the required service personnel for tests involving chemical agents (see Fig. 2).

So it might appear that experimenters working in civilian contexts tended to be more cautious with paying volunteers, while scientists working in military research paid less regard to the implications for valid consent when volunteers were offered inducements. Yet it is significant to note that the advice given by the MRC was just that, advice, and to what extent this was followed is highlighted by one researcher's response to his query in 1964. Having been advised by the MRC that any payment made to a volunteer to take part in a drug trial should reflect only 'the trouble to which the patient was put' and therefore the 'good sum of money' the researcher wanted the drug company to pay the subject would have been inappropriate, the researcher's response was that of amusement. He wrote that 'the moment I try to get a proper payment … I find myself in trouble' and that his solution to this dilemma was to be 'slightly dishonest' and increase the patient's expenses.

Somewhat contrary to this advice, an MRC headquarters member advised another researcher in 1967, regarding his proposed experiments on the physiological effects of changes in temperature involving placing subjects in a climatic chamber, that providing there was no harm to the subject, 'small incentives which seem desirable in the interests of getting the volunteers to carry out effectively' what was required of them was perfectly acceptable. However it was warned that such payments should not be 'sufficient to influence acceptance of exposure to seriously adverse conditions'. The MRC were cautious to avoid payments to volunteers being commensurate with risk and distinguished between therapeutic and non-therapeutic trials. The climatic trial was non-therapeutic, of no direct benefit to the subjects, and it was considered acceptable to offer incentives, whereas the drug trial involved the use of a patient as a volunteer so was potentially therapeutic and therefore payment, other than expenses, was deemed to be unnecessary.

In the context of Porton, financial reward may have been acknowledged as an inducement, but this did not mean that some researchers were not aware of the ethical implications. In a test devised to assess service volunteers' motivation for attending Porton conducted in 1966, men were 'financially induced' to remain in a chamber filled with CS gas with the offer of a shilling for each minute that they endured. In the report of this trial, it was noted that the 'prevailing policy' of Porton meant that the amount which could be offered was limited to a total of ten shillings, and moreover that if the payments were of any substance then 'the ethical question of removing "voluntary consent" by the inducements' was raised. None of the tests conducted at Porton were therapeutic – they were all designed to ascertain the medical and physiological effects of chemical agents in warfare – and therefore the payments given to volunteers at Porton for each test they took part in was consistent with the advice given by the MRC to its directors, that financial rewards should be limited to avoid the ethical problem of invalidating the subject's consent. However, as has been highlighted, policy did not always equate with practice and using a system of rewards did not necessarily mean that cash payments were the only inducements offered to subjects. The balance between using payments to volunteers taking part as subjects in experiments to make it more attractive and not contravening established ethical conduct was apparently not easy to reconcile in either military or civilian contexts.

Fig 2: Volunteer testing a NBC suit. DSTL, Porton.

Both the Chemical Defence Experimental Establishment, Porton Down, and the MRC's Common Cold Research Unit (CCRU), Salisbury, conducted long-term programmes of tests on human subjects over many decades which included financial reward, but there were also other 'attractions' to potential volunteers. Advertised as a '10 day free holiday' with all expenses paid, pocket money and even a pint of beer a day, the CCRU promoted itself as an opportunity for rest and relaxation with the minor inconvenience of nose drops being administered (see Fig. 1). Likewise Porton focused on the recreational and leisure facilities available in the 'Servicemen's Club' at Porton, including darts, billiards and a bar, and the free time in the evenings and weekends during which they could go into Salisbury. Being free from fatigues, or chores, Porton was represented as a break from military routine in return for taking part in chemical warfare tests. Where the direct financial gain may not have been a considerable inducement, the additional attractions promoted by these institutions may have acted upon individuals in the same way.

However, altruistic volunteers who claimed to have attended research establishments solely to serve medical science have often been treated by scientists with a degree of suspicion and if some kind of remuneration was not made available then rather than inducement, it would be questioned as exploitation. To what extent the receipt of money in return for tests gave the scientists greater opportunity to exploit the subjects would be another article in itself, but without offering some kind of 'package' which potential volunteers found attractive, regular recruitment would have dried up altogether. The difference between the CCRU and Porton in the recruitment of volunteers was that the CCRU engaged with the general public through the media and secured volunteers based on goodwill, whereas the necessity for secrecy in the research at Porton meant that the service volunteers were not fully informed prior to attending and were more passive in their role within the establishment. CCRU volunteers were consistently consulted on how the unit operated but there is scant evidence that the same negotiations took place at Porton.

Indeed, the military presence of officers engaged in defence-related research meant that military authority was maintained and the relationship between the subject and the scientist would have been affected by the co-existence of the relationship between officer and regular serviceman.

The historical debate over the payment of volunteers for tests, whether drug trials or other clinical experimental procedures, cannot rest on the ethics of financial gain when 'payment in kind' has been shown to be significant to the volunteers' motivation to take part. It is also clear that while attempts to standardise practice in relationship to medical ethics have been made, the particularity of the individual establishments using human subjects often dictated the climate for ethical practice according to their own interpretation. The scientific community of the MRC, in the main, rejected the attempted imposition of medical ethics standards in the early 1950s, demonstrating how the autonomy of researchers and the trust placed upon them to 'do no harm' was considered to be a safeguard in itself, and the MRC continued to act in its advisory role with the publication of ethical guidelines in 1954. It was not until the late 1960s that ethical committees started to be formed and even then, they appeared to be somewhat misguided in their purpose, with few independent committee members but rather an internal panel without external adjudication.

This very brief overview of the history of paying volunteers to take part in clinical trials and experiments demonstrates that medical science has been grappling with the issue for decades. Payment of volunteers has been accepted as necessary to secure 'bodies' and yet remains highly contentious ethically. Still ethicists and social scientists have problems reconciling the principle of free, informed consent with volunteering for experiments. Just as Porton and the Common Cold Research Unit advertised their leisure facilities and the opportunity for financial gain, websites which recruit volunteers today use similar 'hooks', including the one which ran the trial of TGN1412 in which the six volunteers experienced adverse reactions. Under the caption 'What's in it for you?', one website lists free food, relaxation, video games and getting 'paid for your time and inconvenience', underscored by photos of pool tables and a cheque. So what has changed? Very little, so it would seem.

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Acknowledgements: The presenters and volunteers of the 'Bone Trail' session at the Annual Conference for their unintentional inspiration. Material used in this article was obtained from the records of the War Office and the Medical Research Council at The National Archives.

Web Essay Competition

In last June's *Viewpoint* the Outreach and Education Committee announced a prize for the best 500-word answer to this question: Why should anyone need to know about the history of science? First prize went to Michal Meyer, whose essay also appears at http://www.bshs.org.uk/bshs/outreach/essay_competition/.

The world we take for granted is built on science. Both the material products of civilization – electricity, atom bombs, cars, computers, the decoded human genome – and the way we think about the world and ourselves lie on foundations laid by science. We are homo scientificus, the makers and the made of this world of science.

It wasn't always so. How did we get this way? And who and what made us this way? Just as that illustration in biology textbooks showing our hairy hunched-over ancestors gradually straightening, striding out and suffering hair loss gives us a sense of our biological origins, history of science gives us the origins of our ideas and understandings of the natural world. And it does more, it tells us how these ideas changed the way we view the world and allowed us to change the world and ourselves.

Our ever-changing understanding of nature has always interacted with and affected the nature of our society. A machine philosophy helped generate the industrial revolution; the middle class that rose on the back of that revolution created our modern consumer society. The needs of an empire to communicate with itself advanced our understanding of electricity and its manipulation, and built the world-wide web of telegraph cables that knitted the British Empire together in the 19th century. Our understanding of the physical microworld combined with the urgencies of war created the atomic bomb of the 20th century, which in turn led to the new politics of the Cold War.

But as science remade the world around it, it also remade us. The very idea of progress is tightly entwined with the origins of modern science in the 17th century. When we talk of controlling the environment – when we build huge dams or create an agricultural revolution to feed the planet's growing population – we draw on ideas developed during that time, for better and for worse. In the 19th century, with Darwin's theory of evolution, science reshaped the very concept of what it means to be human. That shaping continues to this day.

Today, we often think of science as the final arbiter of what is true and what is false, and as the epitome of reason. The history of science puts science back in the messy contingent world of human beings and their desires and limitations. Choices made and decisions taken in the past make up our present. Understanding the how and why of our scientific world, and the effort – both scientific and non-scientific – it took to fashion that world, offers the best hope of understanding the issues facing us. Issues from global warming to space exploration; from the very nature of progress to what it means to be human.

Just like science itself, the history of science is knowledge for knowledge's sake and a tool for prying open the world. In a very real sense, the history of science tells us of the world we created and the idea-creating creatures who inhabit it.

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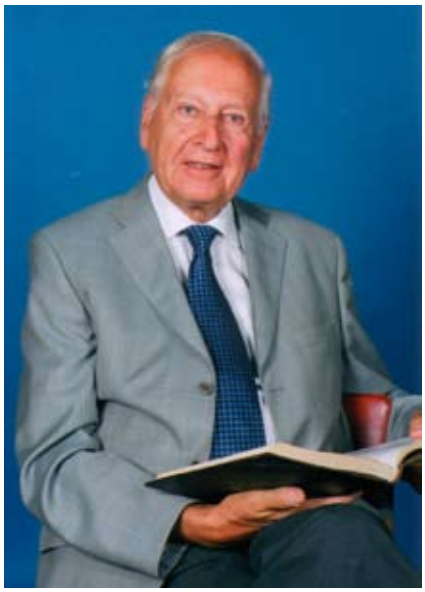
Winner Michal Meyer (left) receives the prize from BSHS Website Editor James Sumner.

Fifty Years On

Former BSHS President Maurice Crosland looks back at 50 years involvement with history of science.



Maurice P. Crosland gained a BSc in Chemistry (1951) and an MSc in history and philosophy of science from University College London (1953). He was a teacher (1955-1963) while working part-time on his PhD at UCL (completed 1959). He lectured in the department of History and Philosophy of Science at Leeds (1963-1974) and in 1974 became the first director of the Unit for the History, Philosophy and Social Relations of Science at the University of Kent. He was *BJHS* Editor 1965-1971 and BSHS President 1974-1976.

After some fifty years involvement in the history of science (including many years helping in the running of the British Society), it is tempting to look back. I might even be permitted a few reflections.

My interest in the history of science was first aroused by a stark account given by the physics master of my North-London school of the 'martyrdom' of Galileo. A copy of Sherwood Taylor's *Galileo and Freedom of Thought* from the public library provided a more nuanced account and a sixth-form friend lent me a copy of Dampier's *History of Science*, which I found fascinating. Later, as a graduate working in London, I had access to the postgraduate programme at UCL, including evening lectures on the History of Science. I completed my MSc and PhD on a part time basis and was fortunate that my thesis, *Historical Studies in the Language of Chemistry* (1962), was accepted for publication. Meanwhile I taught in a London school and later in Peterborough, where houses were cheap and it was still possible to use the London libraries.

So far history of science had been a hobby but it seemed that a few lucky people could actually make a career by working in this field. Having a young family, I was not in a position to seek a temporary position or look abroad, but I eventually learned that the History of Science group at the University of Leeds was looking for a historian of chemistry. Even if the Leeds chemistry students did not always benefit much from learning about ancient ideas, it was good for them to appreciate that science was not a static body of knowledge and that it was possible for intelligent people to interpret experimental evidence in different ways. Also it is good for science students to learn to write essays – another arguable pedagogical function for History of Science.

The History of Science group at Leeds, founded by the philosopher Stephen Toulmin, was located on a 'bridge' between the Arts block and the main building, leading to the Science departments. Some colleagues wondered if this was symbolic of the academic function of the subject. I have always thought myself particularly fortunate to have been a member of the group at that time, where I was exposed to new interpretations of natural philosophy, which I later incorporated into undergraduate teaching. There was also the 'Northern Seminar', which met alternately in Leeds and Manchester. The Manchester focus on technology may have helped to give our subject a wider perspective.

At Leeds there was a course called 'The development of European science' which had the merit of looking beyond a purely British perspective. My thesis had already involved some study of French sources and, always a keen researcher, I soon became engrossed in French science, where the archives were plentiful and the native workers few. How fortunate to find a field where there was so much waiting to be done!

Historians of science had begun to appreciate that they did not have to focus exclusively on the technicalities of science. Indeed, if one was teaching arts students, the institutional approach might be more appropriate. Much had been written about the Royal Society, of course, but there were other less well-know groups. Inspired by the theme of patronage, I began to explore a Parisian group, the 'Society of Arcueil', which had been extraordinarily influential because of the eminence of its members and its role as a pressure group within the prestigious Academy of Sciences. This was the beginning of some thirty years of annual Easter visits to the Paris archives.

I went on to study the career of Gay-Lussac, one of the most able of the younger members of the Arcueil group. This required the exploration of provincial archives, including, on one occasion, the chateau presented by Louis XV to Madame de Pompadour. More transparently relevant was my discovery in a remote provincial outbuilding of Gay-Lussac's personal library, decaying rapidly through rain damage. A rescue mission was organised, not without considerable local embarrassment. I was later told by a French researcher: "We don't really mind you coming over and looking at our archives" – a claim which, on reflection, could hardly be taken at face value.

I also discovered a privately-owned cache of Gay-Lussac's letters and tracked down his laboratory notebooks. Here then, with archives of the Parisian institutions with which Gay-Lussac was connected, was material for a full biography. This was completed in time for the bicentenary of the scientist's birth in 1978 and the book enjoyed some thirty reviews. 1978 was also Humphry Davy's bicentenary: there was a fascinating contrast to be drawn between the characters and institutional support of these two men, representative of France and Britain respectively.

Now there was a major task waiting: a study of the central institution of 19th-century French science, the Academy of Sciences. There was already a standard work on the 18th-century Academy and the challenge was to provide a fully documented study to 1914. The task was made more onerous by the fact that researchers were prohibited from photocopying material in the Academy archives. Research involved the scrutiny of personal dossiers and the minutes of several committees, including, most intriguingly, the 'secret committee'. For the all-important elections, I found a new type of literature – the printed, annotated publication record of candidates – and a manuscript record of its reception. I learned how a defeated candidate had an improved chance when the next vacancy arose. There was little hope for those, however brilliant, who abandoned hope after one attempt. The study appeared as *Science under Control*, recently reissued in paperback.

Any long term study such as this – which, without the luxury of study leave, took twenty years to complete – would be hard to fit into the current Research Assessment timetable, which seems to encourage less ambitious projects. I had the satisfaction of knowing that one of the main pieces of future research I had submitted to the Nuffield Foundation in 1973 in the plan for founding a new group at Canterbury had been achieved. Through that Foundation, in collaboration with the University of Kent, I had also been able to appoint staff and buy books and periodicals for the library, essential at a new university.

In 1964 I was asked to edit the newly-founded *BJHS*. I accepted, provided that I had the assistance of a small editorial committee. Back then the Hon. Editor was responsible for book reviews as well as the main articles.

Because of the Society's weak financial position each issue was restricted to 96 pages, which meant that reviewers had to keep to the stipulated length. After all, it should be possible to say something informative in under 1000 words. Later, as BSHS President, my most important contribution was probably as a member of the National Committee, which met under the auspices of the Royal Society. One had to fight hard for a meaningful research grant for historians of science, which has now become well established.

In 1968 and 1971 I was invited as a visiting professor to Cornell University, Berkeley and the University of Pennsylvania. I discovered later that the idea of a history of chemistry course at Berkeley had originated from student radicals, who felt that science courses should contain a human element. At Penn, it was stimulating to teach bright graduate students again and to have access to an excellent library, including special collections.

Back home, I developed my interest in national traditions in European science. This idea was behind the 1974 BSHS conference, the papers of which were published as *The Emergence of Science in Europe*. It should be possible to approach the history of science in any number of ways and among these is a concern for communication. This brought me to the study of one of the first specialist science periodicals, the *Annales de chimie*. The journal served many purposes, not least that of helping to consolidate the scientific community, and survived as a leading forum for physical science throughout the 19th century.

Retirement provided the leisure to continue research on subjects ranging from early laboratories to the history of medicine. I even branched out in a new direction, the popularisation of science, and found a publisher willing to publish a little book on the rationalisation of language in 18th-century science.

Looking back over more than half a century, I am struck by many changes in perspective. In the 1960s the main controversy was between 'internalists' and 'externalists'. The former considered that the analysis of science of an earlier era did not require any wider perspective. This seemed unsatisfactory but, looking for some social or political context, I found myself considered a dangerous radical in some quarters. I was even once accused of being something of a sociologist! This leads me to acknowledge the powerful impact that sociology has had on the history of science at the expense of traditional philosophy of science. Clearly we now have a more mature discipline but, like many other academic disciplines, there may be a tendency to follow blindly the fashion of the moment. It is, however, a matter of satisfaction that history of science is now more clearly worthy of an honourable place in university departments of history (or philosophy), if not as an independent group.

Objects telling their own histories?

Louise Thorn describes a new project being launched by the BSHS's Outreach and Education Committee and calls for your participation.

The Outreach and Education Committee (OEC) is launching a new project based on using objects in museums and would like to appeal to *Viewpoint* readers for their input, particularly if you have been involved with a similar project.

Those of you at the BSHS Annual Conference in July 2006 may remember Graeme Gooday's paper on Charles R. Gibson's *The Autobiography of an Electron* (1911). Following a popular didactic tradition of animal and object autobiographies at the turn of the 20th century, Gibson assumed the voice of the electron to tell its own story. Inspired by this anthropomorphic approach in bringing objects to life, the OEC propose to create resource packs for teachers and their students to use when investigating historical artefacts in local museums. This activity will be targeted at students at the KS3/4 level (12-16 year-olds) and aims to encourage them to consider the life of an object through games, puzzles, stories, and creative writing including diaries and autobiographies. By adopting the perspective of the object to tell the story, students can discover how these objects shaped our world and how their design and use has changed over time.

Teachers will be able to use a multi-strand approach that incorporates many historical and social aspects of science, technology and/or medicine. For example, an old radio set in a local museum could be used in a number of ways: students can tell its story in terms of its changing technical functions, such as the transition from analogue and digital forms. Others may focus on its domestic use, from the social family gatherings of the 1940s, told against the rise of newly individualised and mobile radios of today.

So what are the benefits of using museum objects to investigate these themes? Viewing an object empathetically gives students a head start in firing their imaginations about how science and technology have shaped our lives. Depending on the resources at local museums, students may be able to handle artefacts for themselves (or at least copies of them) and learn to appreciate the excitement of understanding their history. Wider questions such as 'Where was this object made?', 'How was it used?' and even 'Why is this object in this museum?' also contribute to raising awareness about the past social contexts of science. This could prove to be particularly useful for students following the curricula for 360° Science and 21st Century Science.

The proposed timeline is to have pilot object stories in early Spring 2007 and then present the results of those trials at the BSHS Annual Conference in Manchester in late June 2007. Bursaries to attend the Outreach and Education sessions at the conference are available and any teachers, museum curators and educators who are interested in participating are invited to contact outreach[a]bshs.org.uk.

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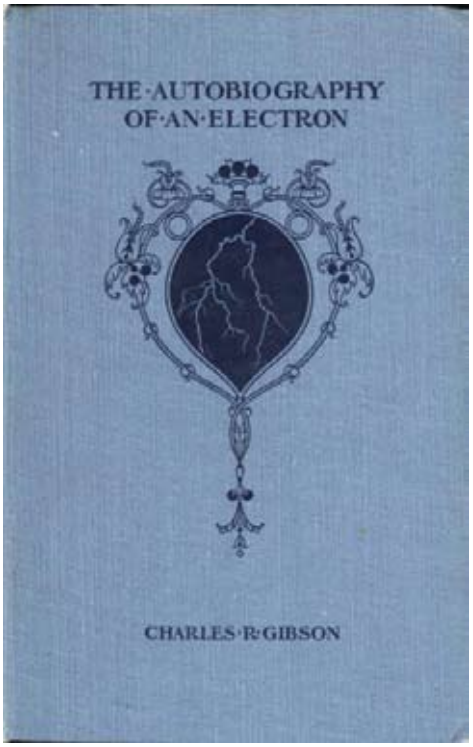
With thanks to Graeme Gooday and Alice Nicholls.



Charles R. Gibson's An Autobiography of an Electron *(1911).*

Reports of Meetings

Science and social commitment

In September, Andy Hammond attended this BSHS-sponsored conference.

2006 marked the 75th anniversary of the famous Second International Congress for the History of Science of 1931 held at the Science Museum in London. The Congress was expected to be a fairly uncontroversial affair. This was all changed by the developing economic crisis in Britain and the stir caused by the surprise attendance and intervention of a Russian delegation. The Congress became a pivotal event in changing the practice of the history of science.

The Scientists and Social Commitment conference of September 2006, also held at the Science Museum, was organised jointly by the Science Museum and the BSHS to commemorate this event. As indicated by the conference subtitle, "Historical perspectives on the philosophical, religious and political ideas and activity of scientists," the term "social commitment" was broadly construed. Subjects covered ranged from the application of Marxist philosophy to the sciences, to issues in environmental conservation, the 1931 Congress, the history of scientists' involvement in UNESCO, race and medicine, science journalism, history of science in Portugal and Brazil, creationism, ideology in medicine… and others! Presentations were generally of a high standard.

The diversity of topics presented was also reflected in the international composition of the speakers. Participants were present from France, USA, Israel, Portugal, Brazil, Italy, Austria, Germany, Australia, South Africa, Spain, Denmark, Republic of Ireland, Norway, the Netherlands, and the UK!

As is typical of BSHS organised events there was a good information pack provided for every participant. One minor point here. Can future packs please include speakers' email addresses? I can never get to speak to all the contributors I wish to, and even University e-mail addresses can be hard to find on the web.

The food and refreshments provided during the day were good and ample though I found the conference dinner a bit of a curiosity. This was a running buffet held in the atrium of the building of the Royal Society of Medicine on the Saturday evening. Although the surroundings were pleasant there was not really anywhere to sit and eat. I didn't find this conducive to striking up conversations with new people. It's much easier in a restaurant where everyone sits at tables. I suppose this problem was exacerbated by the low turnout to the dinner (only a quarter of the conference attended). With low numbers we were swamped by the size of the venue. Although it must be tempting to use such venues perhaps it would be better in future to stick to the tried and trusted book-a-restaurant method.

Finally, I suppose the litmus test of any conference is the degree to which you feel frustrated at not being able to attend every presentation you're interested in. Speaking for myself, this conference easily passed this test.

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Computers in use

James Sumner on the July conference, Computers in use: historical and social perspectives.

Electronic computing machines have existed for barely six decades, and practical desktop computers for just three. Yet the history of computing is a surprisingly mature field, buoyed by plentiful oral history work and growing interest in contemporary history. Over two days at the height of the July heatwave, an international group from various backgrounds – historians, museum professionals, librarians, social scientists – came together to address the growing focus on use and users (expert and non-expert) throughout the history of technology, and to consider how computer use is to be represented among these professional disciplines and more generally.

The meeting grew out of collaborations between the University of Manchester's Centre for the History of Science, Technology and Medicine (CHSTM) and the Museum of Science and Industry in Manchester (MSIM), with events on both sites. We began with the boundaries of the field: why are punched card machines (addressed by Tom Haigh, Wisconsin-Milwaukee) and early electronic data-processors (Marie Hicks, Duke) 'obviously' part of computer history, while analogue modelling machines (Charlie Care, Warwick) and the control devices used in factories (Mark Walker, Open) are marginal? The answer, it seems, may have more to do with users' claims about their own professional status than the nature of their technology.

Pierre Mounier-Kuhn operates an arithmometer.

Further sessions similarly aimed to widen the approach, bringing together contrasting disciplinary perspectives. Broad economic and organizational studies of time-sharing (Martin Campbell-Kelly, Warwick) and early software (Nathan Ensmenger, Pennsylvania) stood alongside the case of computerization in a small island nation (Mario Aloisio, Malta Junior College.) Bill Aspray (Indiana) looked at new software developer cultures in India, while Ian Martin (Open) presented his ethnographic work on the long-hours culture of IT professionals.

Personal computing in the home, meanwhile, is beginning to receive attention from historians. Frank Veraart (Eindhoven) discussed how European hobbyists, before the public internet, were able to distribute software by broadcast radio, while Tom Lean's (Manchester) presentation marked the twenty-fifth anniversary of a machine which rewrote the rules of computer use: not the IBM PC (unimaginably costly for most users in 1981), but Britain's Sinclair ZX-81, a tiny black box with negligible computing power but tremendous user influence.

We also devoted some time to the role of museums, libraries and archives. Short presentations by Jenny Wetton, Katrina Dean and myself, addressing the work of (respectively) MSIM, the British Library and the UK National Archive for the History of Computing, led into discussion on the best way to promote general interest in a field which often seems far from 'mainstream' historical study (but is it?) and the new challenges of preserving software and other digital data.

One promising route towards public engagement was explored at the meeting itself: a handling session at the Museum's Collections Centre allowed participants to interact directly with a wide variety of computing equipment from across the decades. Demonstrations featuring preserved or rebuilt equipment have become another popular means to re-enact the user experience, and the programme also featured a visit to the replica Manchester Baby, the room-wide assembly of shelving and circuitry which became the first electronic digital stored-program computer

in 1948.

Social activities included a drinks reception, generously sponsored by the BSHS, and an impromptu tour of Manchester by night which included a visit to the Alan Turing memorial. My thanks to all participants for their contribution to a challenging but engaging cross-disciplinary meeting, which cast new light on the recent past and gave us much to think about for the future.

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Lifting the lid on radiation risks

Alice Nicholls and Fern Elsdon-Baker report on a BSHS outreach event at the Dana Centre, London, held in September.

The invitation read, "Radioactive rain or medical miracle – what's the truth about radiation? Join us to quiz scientists and risk experts over the value and safety of nuclear technologies. Mingle with our guest speakers, and view and discuss objects from the Science Museum's collections including a 1950s x-ray machine for fitting shoes, Geiger counters and a security pass for the Alamogordo nuclear weapons test site in New Mexico". And more than forty people did take the opportunity to quiz the panel at this BSHS/Dana Centre event on Tuesday 19th September 2006.

Timed to coincide with the BSHS Scientists and Social Commitment conference (see previous page), this event aimed to take the debates to the Dana Centre audience – 18-45 year-olds with an interest in, but not necessarily employed in, science.

Four speakers were invited, representing a range of interests and positions in the debate. Keith Baverstock, formerly senior radiation advisor to the World Health Organisation and recently to the UK government's Committee on Radioactive Waste Management, explored the effects of low-dose exposure to radiation – what is the truth and who tells it? Mike Partridge, from the Department of Physics at the Institute of Cancer Research & Royal Marsden NHS Foundation Trust, explained current medical diagnostic and therapeutic uses of ionising radiation and issues of risk/benefit.

Brian Wynne, author of *Rationality and Ritual: The Windscale Inquiry and Nuclear Decisions in Britain* (BSHS, 1982), and Julian Rush, science correspondent for Channel 4 News, were sadly, at short notice, unable to attend the event. Having sought Brian's comments prior to the event, Alice Nicholls gallantly stepped in to represent his position in the debate, asking is radiation risk the primary issue in the question of whether or not we should have nuclear technology? And in what ways is it a public and not just scientific-technical question? Alice also ably interviewed the speakers and chaired the entire evening.

After a welcome and short introductions, the event began with an audience poll on four questions:

- Should scientists tell us everything they know about radiation risks?
- Should the media report everything scientists tell them about radiation risks?
- Can withholding information about radiation risks ever be justified?
- Who should make decisions about the uses of nuclear technology?

The audience were given the opportunity to undertake this poll again at the end of the evening to ascertain how, if at all, their opinions had shifted as a result of the discussions with the 'experts' (second column).

Q1. Should scientists tell us everything they know about radiation risks?

Yes	75%	77%
No	13%	16%
Maybe	10%	6%

Q2. Should the media report everything scientists tell them about radiation risks?

Yes	46%	42%
No	28%	35%
Maybe	25%	19%

Q3. Can withholding information about radiation risks ever be justified?

Yes	31%	35%
No	37%	39%
Maybe	31%	23%

Q4. Who should make decisions about the uses of nuclear technology?

Scientists	13%	10%
Government	6%	16%
Public	13%	3%
All three	65%	71%

The audience were then divided into small groups who all, in turn, got a chance to discuss the issues with each of the speakers. They also got the opportunity to view objects from the Science Museum's collections with curator, Alison Boyle, on hand to explain their use and significance. The Geiger counter proved particularly popular, with many finding it difficult to resist the urge to play with it.

The evening was relatively relaxed due to the congenial café atmosphere, though it was punctuated with lively and passionate debate on what is clearly a controversial subject. The speakers were informative, helpful and generally felt that the level of public participation in the event was of value to themselves as well as the audience. An edifying yet fun evening was had by all concerned.

During the discussion section of the evening members of the audience were also invited to give their opinion on the topic of radiation risks, scientists, the media and the public, to camera. These vox pops are now available online, in the event's archived webcast, along with a short pre-recorded interview with Keith Baverstock and Mike Partridge and their reflections on taking part in the event. Visit: http://www.danacentre.org.uk/events/2006/09/19/163.

Security pass, Alamogordo nuclear weapons test site, 1945 (Inventory no. 2006-215).

Alice Nicholls and Fern Elsdon-Baker
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Anniversaries for 2008

A fuller list of anniversaries will be available on our website at www.bshs.org.uk/bshs/publications/newsletter. Biographies and data were compiled by Rebekah Higgitt, Rosemary Wall and Catharine Haines.

Guido Guidi

Guidi (aka Vidus Vidius, 1508-1569) was born into a Florentine family of physicians. He was professor of medicine at the College of France and subsequently carried out anatomical investigations in Pisa, where he was professor of philosophy and medicine. His published works supported the principles of Hippocrates and Galen. Anatomic structures named after Vidius include the Vidian nerve, artery and canal.

John Tradescant

The 400th anniversary of the birth of John Tradescant the Younger (1608-1662) will be celebrated in 2008. His father, John Tradescant the Elder, travelled far afield to find plants and opened a museum of natural history objects in London. 'The Ark' was the first scientific museum of its kind where people could learn about the world and its different cultures. Tradescant the Younger catalogued and expanded the collection, bringing back plants from trips to North America and North Africa and, like his father, became the royal gardener. On his death the museum was given to Elias Ashmole, later to become the Ashmolean Museum of the University of Oxford. Objects from 'Tradescant's Ark' are currently on display at the Museum of the History of Science, Oxford.

Thomas Beddoes

The physician and chemist Thomas Beddoes was born in Shropshire in 1760. 2008 will see the 200th anniversary of his death. He was educated at Oxford and Edinburgh as well as receiving training and experience in London and on the Continent. His political views were influenced by his presence in France in the early post-Revolutionary years. He came to believe that a reformed, chemically-informed, medicine and a reformed social order could be combined to improve the lot of man. He is best known for his work in Bristol at the Pneumatic Institute (founded in 1799) on the medical use of gases. The young Humphry Davy was briefly his assistant.

500 years

Gemma Frisius, Reiner	1508-1555	Mathematician, cartographer and instrument-maker
Guidi, Guido (Vidus Vidius)	1508-1569	Anatomy

400 years

Hans Lippershey applies for a patent on a telescope	1608	
Beale, John	1608-1683	Natural philosophy
Borelli, Giovanni Alfonso	1608-1679	Natural philosophy
Dee, John	1527-1608	Mathematics, astrology
Tradescant, John (jun.)	1608-1662	Travel, horticulture, collecting

300 years

Glasse, Hannah, née Allgood	1708-1770	Cookery writing
Gregory, David	1659-1708	Mathematics, astronomy
Perronet, Jean-Rodolphe	1708-1794	Civil engineering
Thornton, John	1641-1708	Hydrography
Tournefort, Joseph Pitton de	1656-1708	Botany, medicine

200 years

Joseph-Louis Gay-Lussac proposes the law of combining volumes of gases.	1808	
Austen, Robert Alfred Cloyne Godwin	1808-1884	Geology
Babington, (Charles) Cardale	1808-1895	Botany, archaeology
Balfour, John Hutton	1808-1884	Botany
Ball, Anne Elizabeth	1808-1872	Algology
Beddoes, Thomas	1760-1808	Chemistry and medicine
Fabricius, Johann Christian	1745-1808	Entomology
Falconer, Hugh	1808-1865	Palaeontology and nat. hist.
Gray, George Robert	1808-1872	Zoology
Hindenburg, Carl Friedrich	1741-1808	Mathematics
Kelland, Philip	1808-1879	Mathematics
Lee, John Edward	1808-1887	Geology, antiquarianism
Nasmyth, James Hall	1808-1890	Mechanical engineering

Osler, Abraham Follett	1808-1903	Meteorology
Quekett, Edwin John	1808-1847	Surgery, microscopy
Rogers, Henry Darwin	1808-1866	Geology
Sénarmont, Henri Hureau de	1808-1862	Mineralogy
Tennant, James	1808-1881	Mineralogy, geology
Tomlinson, Charles	1808-1897	Science writing
Wood, William	1745-1808	Botany

100 years

Leo Baekeland invents Bakelite.	1908	
Henry Ford begins production of the Model T.	1908	
Becquerel, (Antoine-) Henri	1852-1908	Physics
Beevor, Charles Edward	1854-1908	Anatomy, neurology
Brooks, William Keith	1848-1908	Biology, zoology
Chamberland, Charles Edouard	1851-1908	Bacteriology
Gaudry, Albert Jean	1827-1908	Geology, palaeontology
Giard, Alfred	1846-1908	Zoology
Gibbs, (Oliver) Walcott	1822-1908	Chemistry
Halicka, Antonina (née Jaroszewicz)	1908-1973	Geology
Hawker, Lillian	1908-1991	Mycology
Herbrand, Jacques	1908-1931	Mathematics
Hickling, Grace (née Watt)	1908-1986	Ornithology
Landau, Lev Davidovich	1908-1968	Physics
Leydig, Franz von	1821-1908	Zoology, comp. anatomy
Mayer, Christian Gustav Adolph	1839-1908	Mathematics
Noach, Ilse	1908-1998	Psychoanalysis
Parke, Mary W.	1908-1989	Marine biology
Petermann, Mary Locke	1908-1975	Biochemistry
Rothschild, Miriam	1908-2005	Biology, ecology
Sorby, Henry Clifton	1826-1908	Geology, metallurgy
Than, Károly	1834-1908	Medicine , chemistry
Turner, Helen	1908-1995	Genetics
Voronoy, Georgy F.	1868-1908	Mathematics
Young, Charles Augustus	1834-1908	Astronomy

John Snow

The 150th anniversary of John Snow's death is in 2008. Born in York in 1813 he was educated in medicine in London. Snow is considered one of the founders of epidemiology and is famous for identifying the cause of a cholera outbreak in London in 1854. Snow did not accept the dominant idea that cholera was transmitted by bad air (miasma), and published *On the Mode of Communication of Cholera* in 1849. By making a map showing cases of cholera in Soho in 1854, he was able to pinpoint the cause of the outbreak to a water pump on Broad Street. After he had the handle of the pump removed incidences of the disease petered out. Snow was also interested in anaesthetics and administered chloroform during the births of two of Queen Victoria's children in the 1850s.

Marie Stopes

2008 sees the 50th anniversary of the death of Marie Stopes. Born in 1880 in Edinburgh, Stopes was educated to doctoral level in botany in Munich. This was followed by a teaching career at the University of Manchester specialising in fossil plants. Stopes believed birth control would help marital relations and relieve women from excessive childbearing. With her second husband, she established the UK's first birth control clinic in 1921 in Holloway, London. The clinic provided free advice to married women, and scientific data regarding contraception was collected. Other clinics were opened around the country. Although she faced opposition, Stopes wrote on the subject of contraception and also influenced the Church of England's policy. Following World War II, she promoted birth control in East Asia. She died in Surrey in 1958. In 1999 she was voted 'Woman of the Millennium' by readers of the *Guardian*.

Miriam Rothschild

Miriam Louisa Rothschild was born in August 1908 and became a world authority on fleas, protective coloration (particularly in butterflies and moths) and chemical ecology. She was widely recognised for her support of the conservation movement. She was educated largely at home and thereafter was a researcher at the Marine Biological Association, Plymouth, the Zoological Department at Harvard, and the Royal Free Hospital. During World War II she worked as a decoder at Bletchley Park. She was the recipient of many honours, including honorary doctorates, fellowship of the Royal Society and a DBE in 1999. She died in 2005.

History of science at the National Maritime Museum

NATIONAL MARITIME MUSEUM
The Queen's House and Royal Observatory, Greenwich

Right: John Bull making observations on the Comet, caricature by Thomas Rowlandson (museum number PAF3998). [Image number PW3998] © National Maritime Museum, London.

While some readers may be surprised by the title, others will know that for years the National Maritime Museum has been a fertile resource for the history of science and technology. This is something we are hoping to build on even more over the next few years, both through the work of staff and by encouraging others to use the Museum's collections for new research.

Opened to the public in 1937, the Museum's interest in the history of science was strengthened in the 1950s, when the Royal Observatory, Greenwich was transferred to its care. Founded by Charles II in 1675, the Observatory became the home of Greenwich Mean Time and the Prime Meridian, and is one of the world's most important historic scientific sites. Since the 1960s it has become the focus for the Museum's scientific and technological collections and displays and linked research.

In order to promote further research, the Museum has set up two initiatives in recent years. In 2004 it began a history of science internship to encourage postgraduate students and final year undergraduates to undertake research on the collections. These internships of between one and three months can be on any subject relating to the object collections. Recent interns, for example, have looked at topics as diverse as the development of the compass in aircraft, the library of Nevil Maskelyne, fifth Astronomer Royal, and the invention of the octant as an example of simultaneous discovery. The specific outcomes of the projects also vary, but can include work with the exhibition, online projects and education departments. The scheme is open to applicants from any university and the application date for this year is 20 April 2007 – further details at www.nmm.ac.uk/interns.

In addition, the Sackler Short-Term Research Fellowship in the History of Astronomy and Navigational Sciences promotes research related to the Observatory's collections. The scheme is mainly intended for younger postgraduate or postdoctoral scholars, but applications from anyone who has demonstrated commitment to advanced research in the field will be considered. The next application deadline for this scheme will be 1 November 2007.

Both schemes will hopefully lead to more research on the Museum's collections of nearly 2.5 million items, which include internationally important holdings of maritime art, cartography, manuscripts, ship models and plans, timekeepers and scientific, astronomical and navigational instruments. And the scientific material reflects not only Greenwich's historic role but also broader histories of science and technology, economic and business history, the history of production and consumption, imperial history and exploration. We always welcome researchers of all sorts who want to explore the potential of this material.

As a Museum, we also present the history of science and technology through displays, publications and the web, as well as through educational activities. Most dramatically, the £15 million Time and Space Project is currently reshaping the whole Royal Observatory site. The first part of this project, the Time Galleries, opened last year and explore how time has influenced our lives and work, including the story of the search to find longitude at sea. These galleries have been a great success and won the 2006 Dibner Award for Excellence in Museum Exhibits from the Society for the History of Technology. The second stage of the project opens this spring, with new galleries about modern astronomy, the Lloyds Register Education Centre and the newly built Peter Harrison Planetarium.

Staff at the Royal Observatory are also working on a programme of temporary dis-

Left: Telescope by Dollond, c.1815 (museum number AST0911). Belonged to Rev. George Fisher (1794-1873), astronomer to the Arctic expeditions of Buchan in 1818 and Parry in 1821-1823. [Image number F5602-2] Right: Observing the transit of Venus at the Royal Observatory, Greenwich, June 2004. [Image number F3204-19] © National Maritime Museum, London.

Readers' letters

Editor: newsletter[a]bshs.org.uk or Institute of Geography, University of Edinburgh, EH8 9XP.

plays, beginning in March with an exhibition on 100 years of British Summer Time. This will be followed by an exhibition commemorating the centenary of Lord Kelvin's death and in 2008 by a display on the history of the telescope, part of a linked programme of events also running into 2009, the International Year of Astronomy. As ever, this work will be complemented through the Museum's website, including the expanding catalogue of objects in Collections Online (www.nmm.ac.uk/collections).

In addition, the Museum runs seminars and conferences on history of science topics. In the next few months, for example, the British

Above: The Time and Longitude gallery, including a new interactive allowing visitors to explore documents relating to John Harrison's work to create the marine chronometer. [Image number F5137-8] © National Maritime Museum, London.

Maritime History seminars (run jointly with the Institute for Historical Research) are on the theme of health and medicine at sea, with a conference on 'Exploring and Being Explored: Africa in the Nineteenth Century' in March.

The Museum is always looking for more ways to broaden its activities in the history of science and technology and to encourage other researchers to use its often untapped resources. Please contact us with your thoughts, ideas or queries.

Further details, including information about conferences and research fellowships can be found at www.nmm.ac.uk/research.

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The Bone Trail

Dear Editor,

I have read with real interest the article in the October issue of *Viewpoint* – 'Outreach and Education: The Bone Trail'. I have a particular interest in the 'Edible Geology' activity, as it does seem to be the kind of project that those of us familiar with Primary School Education would recognise as typical of the work that used often to be carried out as part one of their science topics.

I say 'used to' because sadly since the various government 'initiatives' together with the pressures of SATs, league tables and the general narrowing of the primary curriculum, work of this nature is not carried out as often as it once was. Even the BSHS has either forgotten about our younger children or, as so often, it feels that such concepts should be left to the Secondary School. I speak as one of the last and I believe the only Primary member of the old BSHS Educational Committee.

It is good to see that this kind of integrated approach, using other areas of the curriculum to illustrate difficult concepts in a clear and interesting way, is still going on albeit at secondary level. It not only motivates pupils to study the subject at greater depth, but in Primary Schools we found that it helped to develop the basic skills of reading and writing. We all accept that we have a duty at this age to teach these skills, but it should be realised that this can be done in many other ways than through a simple (and often dull) 'reading scheme'.

During my primary teaching I often found that the History of Science provided opportunities to introduce children to the historical characters involved and to help them understand the science itself. I have included examples of these in recently published books, written with my colleague Nicholas Easingwood. One example describes experiments with a ramp fitted with light-sensitive cells connected to a computer (plenty of these in Primary Schools now!) which replicates to some extent Galileo's experiments on acceleration and gravity. Perhaps this is another example of primary work that our secondary colleagues would like to take up and develop.

Many thanks, John Williams.

Emm Barnes replied on behalf of the Outreach and Education Committee:

Thank you for raising the point that even within primary education the scope for interdisciplinary teaching and learning is diminishing. The outreach group hope to provide resources and support for primary as well as secondary teachers and in fact we currently have a vacancy on the committee for someone working within primary education. Those interested should contact outreach[a]bshs.org.uk.

Fleming's lysozyme: a prehistory

Dear Editor,

When trying to piece together the puzzle of the early history of lysozyme correctly we came across an article[1], dating back to the late 1970s, telling us that: 'Since the discovery of lysozyme in 1922 by Fleming[2], a great deal of effort has been devoted to the study of the physical, chemical, and biological properties of this enzyme. As a result of the bacteriolytic nature of this protein, which was first described for hen egg white by Laschtschenko in 1909, as well as the widespread occurrence of this enzyme in nature, numerous investigators have attempted to determine the possible significance of lysozyme in resistance to infection'.

A subsequent literature search on the subject revealed that, Laschtschenko's pioneering findings[3], confirmed in 1912 by Rettger and Sperry[4], were factually recognized by almost all participants of the early studies on lysozyme, including Fleming, the godfather of the enzyme, himself[5] and Salton, a chronicler of lysozyme[6], as well as doing much towards the development of this antimicrobial enzyme into a widely-used medicinal product. The fact that hen egg white has always been (and still is) the only source for industrial production of medicinal lysozyme supports the latter observation. Unfortunately, Laschtschenko's valuable contribution was forgotten in time (maybe, due to the impressiveness of Fleming's achievements in the field) and the article cited above was among the last to refer to the role Laschtschenko played in the history of an enzyme known today as 'Fleming's lysozyme'.

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Reviews

Books

C. D. Andriesse, *Huygens: The Man Behind the Principle,* Cambridge University Press, 2005, 360 pp., £55.00.

Huygens 'principle' that light is a wave phenomenon is fundamental physics – physical 'things' are of two types, particles and waves, the former spatially limited and the latter extended in space and travelling through it.

In this Huygens conflicted with Newton, who described light as particles. Huygens' deeper difference was in formulating science as principles and relationships rather than Newton's science of "laws". Newton's particle theory dominated for a century, until ~1830, while his science of laws or axioms has persisted in pedagogy, even though principles are more important in higher physics.

Andriesse's story touches on these rival fundamentals, while centring on Huygens' colourful life and work in maths and physics, making many discoveries that are commonly ascribed to Newton. This first 'complete' English-language biography does go a good way to showing Huygens' key role in the 17th century scientific revolution.

In the dynamics of collisions, he showed by experiment that momentum is conserved, then came up with the energy of motion as a second conserved quantity, arguing from Galilean relativity. This gave a pre-Newton alternative to the "laws of motion". Huygens went on to analyse bodies as a combination of small particles, whence he solved the compound pendulum and invented the cycloidal pendulum that kept time whatever the swing amplitude.

The general infinitesimal analysis he developed was a precursor of differential calculus; indeed Huygens was teacher to Leibnitz and exchanged many letters with him, though did not grasp the import of Leibnitz's new method.

Huygens' magnificent study on light started from a belief that 'light spreads in circles and not in an instant'. This predated Rømer's 1676 explanation of the timing of Jupiter's moons varying with the Earth-Jupiter distance, as due to the finite speed of light. Huygens first pictured light waves as water waves, adding together to give wave fronts, but in a 3-dimensional ether of infinitesimal and invisible particles. He derived a description of mirror reflection and of refraction at air-glass or air-water interfaces. This depended on light travelling more slowly in glass or water – as in the earlier refraction hypothesis with Fermat's principle of least time. Newton's light-particles, on the contrary, speeded up when entering the glass. Measuring the speed of light directly was not possible at that time.

Huygens' waves also explained diffraction at an edge (opposite to Newton's repulsion from an edge) and the double refraction observed in crystalline quartz (then called Iceland spa). A second "extraordinary" image is seen, depending on the crystal orientation. Huygens' ingenious explanation was in terms of elliptical rather than circular expanding waves, and he progressed to dispensing with the idea of the ether.

There was plenty to show the superiority of the wave concept over Newton's particles (see Marshall's *Wave Particle Duality in the Seventeenth Century:* http://philica.com). Thus Andriesse's biography prepares the ground for a key issue for the history of science - why did Newton's faulty physics prevail over Huygens?

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Television

Casualty 1906, 3 Dec 2006, 8pm, BBC1.

Tom Riley as Dr James Walton.
BBC/Stone City Films/ Rachel Joseph.

Set at the London Hospital in Whitechapel, 'Casualty 1906' was researched and written using real events documented in case books and ward journals. The authenticity of the programme was further enhanced by using a real 19th-century hospital building, formerly the original Liverpool Royal Infirmary, as the set. This showed the beauty of the long wards, and the pride with which they were kept which is illustrated by hospital photographic archives.

Although at times pedantic, the devices with which the 21st-century public were educated about early 20th-century emergency medical practice through the eyes of newcomers to the hospital such as a trainee nurse, a visitor from the *Daily Mail*, and patients, were very successful. Indeed, the programme serves as a useful teaching tool for school teachers and university lecturers with a wide range of topics covered, such as bacteriology, x-rays, cleanliness, the history of anaesthesia, surgery, and the importance of career for a nurse.

The docu-drama illustrated the bad and good aspects of treatment in a voluntary hospital long before the National Health Service. From issues like the problems of funding the hospital, and hazards of learning to use new X-ray apparatus, to the long history of hospital infection (in this case, erysipelas), hopefully the programme taught the public to somewhat appreciate the benefits of the NHS. The positive side of being treated at the London was also illustrated, though, by the comforts of being in hospital when contrasted with a boy's home life in the East End of London, and by the care with which nurses looked after their patients. The diversity of patients in East London was also addressed with a German patient and issues of anti-Semitism towards a Jewish patient.

Although based on real events from case books and ward journals, these were a dramatic three days for the London Hospital, and perhaps do not give an accurate picture of the average everyday life of the hospital – from the x-ray technician who lost more fingers, and the outbreak of infection on the ward, to the death of a young nurse from pneumonia, and the decision of a nurse to put her career before marriage, the drama never stopped. However, in comparison to the presentist approach of the BBC Horizon production, 'Hospital, 1922', broadcast in 1972, which similarly reconstructed the life of a hospital (Charing Cross Hospital) using case notes, 'Casualty 1906' is a well polished, non-judgemental look at medicine in the early twentieth century. For historians of medicine this programme stresses the importance of examining the real picture of what happened in the practice of medicine through sources such as case notes which has been argued by Erwin Acknerknecht, John Harley Warner and Joel D. Howell, and recently by myself.

As shown by 'Casualty 1906', records such as these bring history to life.

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Periodicals

New Scientist, 50th Anniversary Special, 18 Nov 2006 (www.newscientist.com/contents/issue/2578.html).

The *New Scientist* was 50 years old last year and this was celebrated in a special double issue. At one end of the magazine, well-known scientists and philosophers presented a series of articles that attempted to answer the current 'Big Questions' and to provide 'Predictions' for the next 50 years. Starting from the other end, the reader was treated to a series of 'Classic Stories' from the *New Scientist* archive.

These articles, plus those that can be found at www.newscientist.com/classic-articles, cover a wide range of topics in science, technology and medicine in the last 50 years. These include aviation, computing, particle physics, space travel, genetics, contraception, nuclear power, AIDS, cold fusion and climate change. The choice of topics clearly reflects typical perceptions of history's defining moments and the concerns of the current editors. It thus tells us as much about present attitudes as those of the past. However, the articles remain a useful, accessible, and sometimes surprising, resource for the history of science and science communication.

The 'Predictions' almost certainly tell us of the present and not the future. In 50 years they will be fascinating historical documents, and perhaps also a source of wry amusement.

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News

Darwin discovery

Last November a Darwin manuscript, hidden since 1909, was discovered at Christ's College. The signature that was displayed under a framed photograph of Darwin, after opening, was revealed to be the endorsement on the back of a cheque. The framed photograph and signature were part of the 1909 Darwin centenary exhibition. The c. 1855 photograph was given by Darwin to F. D. Dyster and later passed to his nephew F. H. H. Guillemard who lent, and later gave it to the College.

The Union Bank of London cheque was made out by Darwin 'to self' on 21 March 1872 for 100 pounds. Darwin and his family were just leaving London after five weeks in a rented holiday house. The cheque was probably provided by Francis Darwin in 1909 to accompany the photograph. Both photograph and cheque are now being conserved.

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Thackray Museum

Thanks to an AHRC Collaborative Doctoral Award, one of the UK's largest medical collections at the Thackray Museum in Leeds is now being studied by Claire Jones, a postgraduate student in the Division of History and Philosophy of Science, University of Leeds. Claire's PhD project on 'The Medical Instrument Trade Catalogue in Britain, 1880-1914: Its Changing Form, Role and Significance in Technologizing Healthcare' will generate both a dedicated exhibit at the Thackray Museum and online outreach materials in 2009. Details at www.hps.leeds.ac.uk/HPSNews/Technologizing-Healthcare.htm.

Scientists' archives

The latest Progress Report of the UK's National Cataloguing Unit for the Archives of Contemporary Scientists (NCUACS) includes accounts of the latest collections to be processed: those of the geneticist J.H. Renwick and a supplementary collection of papers and correspondence of Sir Richard Southwood. It also reports on the start of two major projects: the archives of Joseph Rotblat and an Arts & Humanities Research Council-funded project on the archives of 11 distinguished British physicists and mathematicians. The Report is online at www.bath.ac.uk/ncuacs.

Newton's chymistry

The Chymistry of Isaac Newton is pleased to announce the publication of a new transcription of Newton's manuscript "Of Natures obvious laws & processes in vegetation" (Smithsonian MS.Dibner 1031B). The eleven-page tract represents Newton's attempt to provide a synopsis of a physical theory that unifies and accounts for many if not most known natural phenomena. The transcription includes a short text in Latin that follows the English section, a highly significant testament of Newton's chymical philosophy that until now was unedited, un-translated, and virtually unnoticed by scholars.

This release also marks the launch of a full-text search engine built using the California Digital Library program developed eXtensible Text Framework (XTF) - a flexible indexing, querying and delivery tool that supports XML data formats.

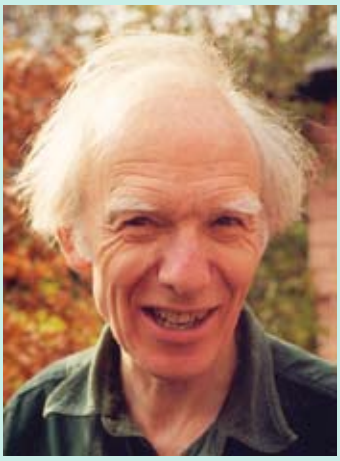
Newton wrote and transcribed about a million words on the subject of alchemy. His alchemical manuscripts are rich and diverse, including laboratory notebooks, indices of alchemical substances, and transcriptions from other sources. The Chymistry of Isaac Newton is producing a scholarly online edition as part of an integrated project that includes new research on Newton's "chymistry", a 17th-century term used to describe the sum of alchemical pursuits.

With the support of the National Science Foundation, the current project focus is to build a repository of searchable transcriptions with page images. Our ultimate goal is to provide complete annotations for each manuscript and comprehensive interactive tools for working with the texts. To date, about 700 pages have been transcribed and encoded. The Chymistry of Isaac Newton is hosted by Indiana University's Digital Library Program, and is affiliated with The Newton Project. It can be viewed at: www.dlib.indiana.edu/collections/newton.

Education prize

The History of Science Society has awarded its 2006 Joseph H. Hazen Education Prize for 'outstanding contributions to the teaching of history of science' to Graeme Gooday of the Division of History and Philosophy of Science, University of Leeds. For details of the award and access to his on-line papers on educational topics visit www.hps.leeds.ac.uk/HPSNews/Hazen-Prize.htm . Dr Gooday has recently taken over as chair of the BSHS Outreach and Education Committee.

HPSTM People: The Questionnaire



David M. Knight is professor emeritus at the Philosophy Department in the University of Durham. His research interests include science and its institutions in relation to philosophy and religion in 19th-century Britain, especially chemistry. He was President of the BSHS from 1994 to 1996.

Who/what first turned you towards HPSTM? Alistair Crombie, faced with a chemistry student with a year's research project, and no knowledge of HSTM, put me on to Sir Harold Hartley and Sir Humphry Davy: and the prospect therefore of talking to a very distinguished and very elderly engineer about what had made him (and Davy, on whom he had been working) tick. It got me hooked. Some four years later I found myself being elected to the Council of BSHS, as a new lecturer on a new subject in Durham.

What's your best dinner-table HSTM story? As a new lecturer, I tried to replicate Lord Kelvin's smoke-ring machine to illuminate the vortex atom, generating ammonium chloride in a box with a flexible back and a hole at the front. Smoke rings poured forth, the extractor fans did nobly, and after a few minutes the students and I could see each other again; but I resolved henceforward to bring old books rather than old apparatus into lectures, and am imbued with respect for the 19th-century technicians who made great men's apparatus work as planned.

What has been your best career moment? As President of BSHS, faced with demands to amend our Articles of Association and make them gender-neutral – once someone called attention to it, it clearly had to be done. The project had already aroused the ire of grammarians but, by making the EGM hilarious rather than solemn, I got the amendments through with only one dissentient voice, and felt on such a high afterwards that I put thank-you letters to the speakers at the following meeting into the wrong envelopes. There's nothing like holding an audience and making them laugh.

And worst? At a congenial conference in Frascati where I was a joint chair, finding that our Irish member had not turned up, and that therefore I would have to give the talk on 19th-century Irish chemistry in a couple of hours' time.

Which historical person would you most like to meet? John Tyndall might be more fun that most, if he'd let me get a word in now and then.

What should every 16-year-old know about HSTM? That it exists - that science isn't all timeless truths; and that it's fun to turn those names like Newton, Volta, Celsius or Avogadro into flesh and blood with real contexts. But not a million facts.

If you did not work in HSTM, what other career might you choose? I had been accepted for training as an Anglican ordinand, but like Charles Darwin never got further than that. I don't know how I'd have done as a vicar: but I have in a medieval play married Mary to Joseph, and in Much Ado failed to marry Hero to Claudio. I've also played God several times (off stage as well), Death, Reason, Prospero and Justice Shallow – but these don't seem career options.

What are your favourite HSTM books? At the outset, I delighted in Koyre's wide-ranging *From the Closed World to the Infinite Universe*, Cohen's little but uncondescending *Birth of a New Physics*, and Koestler's *Sleepwalkers* with its captivating narrative. Then, as I dug into the 19th century, I much admired Merz's *European Thought in the 19th Century* with its thematic arrangement. Kuhn's address to the 'Scientific Change' meeting in Oxford in 1961 was electrifying, but his writing I found a disappointment: good conference papers are often like that. Since then I remember especially Morrell and Thackray's *Gentlemen of Science*, with its close study of individuals as well as institutions; Rudwick's *Scenes from Deep Time* and its use of illustration; Desmond's *Huxley* (especially the first volume) which was really hard to put down, and vindicated my belief in biography; and Secord's *Victorian Sensation* for its evocation of a context. I could go on – but it gets invidious, and probably these that bob up on the river of time are quite enough!

What would you do to strengthen HSTM as a discipline? We have to be good neighbours, cultivating those involved in other disciplines and not just looking to our own concerns. As an initially solitary appointment, I had to make friends or die academically; and BSHS meetings were a great solace as the only way really to meet those with similar professional concerns. But I think it's still vital to make oneself as near indispensable as possible, so that one's post will get filled rather than frozen; and that means being a flexible friend to all sorts. We need to draw upon the expertise and methods of people outside what is always going to be the major interest of rather few people: we must be careful not to draw boundaries too tightly round ourselves.

How do you see the future shape of HSTM? We thought in the 1960s that disciplinary barriers were at last breaking down, that the narrow single honours degree would cease to be the norm, and that HPSTM (for historians were close to philosophers then) would be a wonderful way of overcoming the problems of 'two cultures'. Now we have a lot more than two; and departmental barriers seem to be as high as ever. I still think that we have an important part to play, in giving scientists historical perspective, and showing others that science is not only fascinating in itself but also deeply human – but we may need to look beyond students to get the message across, to children (all too easily vaccinated against subjects at school) and to those who buy all the books on history of science written by those who don't know much about it. That means writing for and talking to 'outsiders', avoiding display of learning and academic prose. As A.J.Balfour remarked of philosophy, if it is worth anything, there is no reason why it should be made dull.

Listings

Conferences

8th Biennial History of Astronomy Workshop
25-29 Jul 2007, University of Notre Dame, South Bend, Indiana.
Deadline for submissions: 1 Mar 2007
The workshop's principal focus is the history of telescopes, although proposals in all areas of the history of astronomy are welcomed.
Further details: www.nd.edu/~histast/.

Environment Health & History
Conference of the European Association for the History of Medicine and Health. LSHTM, 12-15 Sep 2007, Brunei Gallery, Bloomsbury, London.
Further details: http://www.lshtm.ac.uk/history/EAHMcallforpapers.html.

Geometrical Objects: Architecture and the Mathematical Sciences 1400-1800
19-20 Mar 2007, Museum of the History of Science and Worcester College, Oxford.
Attendance free but registration essential.
Further information and speakers: www.mhs.ox.ac.uk/architecture/.

History of quantum physics
2-6 July 2007, Max Planck Institute for the History of Science, Berlin.
In honor of the 60th anniversary of the death of Max Planck. See http://quantum-history.mpiwg-berlin.mpg.de.

History of Science Society
Annual Conference 2007: Arlington, VA, 1-4 Nov 2007. Annual Conference 2008: Pittsburg, PA, 6-9 Nov 2008. See www.hssonline.org.

Ninth International History, Philosophy & Science Teaching Conference
24-28 Jun 2007, University of Calgary, Alberta, Canada. Proposals due April 15, 2007. Contact programme chair: HsingChi von Bergmann (hsingchi[a]ucalgary.ca) or visit web site: www.ucalgary.ca/ihpst07.

Making Science Global: Reconsidering the Social and Intellectual Implications of the International Polar and Geophysical Years
31 Oct - 1 Nov 2007, Smithsonian Institution, Washington DC.
Pending funding, papers will examine the impact upon science, society, and culture of the International Polar Years (IPYs) of 1882-83 and 1932-33, and the International Geophysical Year of 1957-58, as well as applying this perspective to planning the IPY in 2007-2008.

Society for the History of Alchemy and Chemistry
New Chemical Elements and their Periodicity.
22 Mar 2007, Royal Society of Chemistry, Burlington House, Piccadilly, London.
A joint meeting of the Society for the History of Alchemy and Chemistry and the Royal Society of Chemistry Historical Group.
See www.ambix.org or contact Dr Anna Simmons on A.E.Simmons[a]open.ac.uk.

Society for the History of Technology (SHOT)
17-21 Oct 2007, Washington DC.
Deadline for submissions: 16 Mar 2007
Annual Meeting: "SHOT[a]50: Looking Back, Looking Beyond". Additional information at www.historyoftechnology.org/fiftieth.html.

Varieties of Cultural History: Theory and Practice in the Cultural Histories of Medicine, Science, Literature and the Arts
5-8 Jul 2007, King's College, University of Aberdeen.

Exhibitions

Museum of the History of Science, Oxford
Time and Place: English Country Clocks, 1600-1840, continues till 15 April.

Promotions

Dr Gregory Radick has been promoted to Senior Lecturer in History and Philosophy of Science, and will serve as Chair of the Division of History & Philosophy of Science at the University of Leeds for 2006-2008.

Research funding

The Bakken Library and Museum, Minneapolis
Visiting Research Fellowships (next deadline 16 Feb 2007) and Research Travel Grants (applications at any time).
For more details and application guidelines, please contact E. Ihrig, at Ihrig[a]thebakken.org or see www.thebakken.org.

Viewpoint: the Newsletter of the BSHS

Contributions
All contributions and correspondence should be sent to the Editor, Dr Rebekah Higgitt, Institute of Geography, The University of Edinburgh, Drummond Street, Edinburgh EH8 9XP; newsletter[a]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 2007 and the deadline for copy is 16th April 2007.

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The British Journal for the History of Science

The March issue of *BJHS* will contain all or a selection of the following:

- Michael Hunter, 'Robert Boyle and the early Royal Society: a reciprocal exchange in the making of Baconian science'
- James Burns, 'John Fleming and the geological deluge'
- Suman Seth, 'Crisis and the construction of modern theoretical physics'
- Matthew Stanley, 'So simple a thing as a star: the Eddington-Jeans debate over astrophysical phenomenology'
- Christer Nordlund: 'Endocrinology and expectations in 1930s America: Louis Berman's ideas on new creations in human beings'

Plus Essay Review "The Two Newtons and Beyond" by Massimo Mazzotti and 25 other reviews

www.bshs.org.uk/bjhs

2007 Conferences Supported by BSHS

Annual Conference 2007

Location: University of Manchester
Dates: 28 June - 1 July 2007

Hosted by the University of Manchester's Centre for the History of Science, Technology and Medicine (CHSTM), the 2007 Annual Conference marks the 60th anniversary of the BSHS. It will include papers and themed panels on all aspects of the history of science, technology and medicine.

Further details can be found at: www.bshs.org.uk/bshs2007

Geographies of Nineteenth-Century Science

Location: University of Edinburgh
Dates: 18-21 July 2007
Deadline for registration 18 June 2007.

An international interdisciplinary conference focusing on the following three themes:
- Production of scientific knowledge
- Mobility of scientific knowledge
- Consumption of scientific knowledge

Programme, registration and details: www.geos.ed.ac.uk/geography/geog19c

Science and Religion: Historical and Contemporary Perspectives

Location: University of Lancaster
Dates: 23-26 July 2007

This international interdisciplinary conference marks the retirement of Professor John Hedley Brooke, and will bring together leading historians, philosophers, and theologians to debate the latest research into science-religion relationships.

Further details: www.lancs.ac.uk/depts/history/news/science&religion.htm

www.bshs.org.uk/conferences

The British Society for the History of Science

All enquiries to the BSHS Executive Secretary, 5 Woodcote Green, Fleet, Hants GU51 4EY, UK. Tel: +44 (0)1252 641135; execsec[a]bshs.org.uk.

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