



BSHS Postgraduate Conference

University of Brighton, 5-6 January 2006

Day 1: Thursday, 5 January 2006

Session 1: 9.00 AM – 10.30 AM

Chair: *Melanie Keene – University of Cambridge*

1. Chiara Ambrosio – University College London

Creativity across the boundaries : The art and science of Picasso's *Guernica*.

My research focuses on the development of Picasso's art from the Cubist years (1907 – 1914) through *Guernica* (1937). My aim is to examine the interplay of factors at the basis of his creative processes. My hypothesis is that Picasso's work offers the possibility to answer more general questions: how should we understand creativity? What are the requirements for a satisfactory model of creative processes?

I will explore the influence of science and technology on Picasso's creativity through two complementary theoretical devices: Charles Sanders Peirce's philosophical notion of iconicity and Arthur I. Miller's cognitive model of network thinking. Iconicity will illuminate the formal elements of Picasso's creativity, while network thinking will shed some light on the process of discovery that led the artist to novel results.

I will argue that the preconditions to Picasso's masterpiece, *Guernica*, are found in his formative years, in which he developed Cubism. Picasso's Cubist experience is inevitably related to the Parisian cultural life at the beginning of the 20th century. The reconstruction of Picasso's Cubist experience serves a twofold purpose: to evaluate the relationship between art, science and technology since the beginning of the 20th Century and to state a direct correspondence between certain scientific, technological and psychological issues (non-Euclidean geometries, psychology of form, the development of camouflage techniques in modern warfare and the debates about the nature of space and time, among others) and the problem solving activity that allowed the creation of *Guernica*.

Finally, I will suggest a cognitive model for creativity based on the complementary role of iconicity and network thinking. This will offer the possibility to investigate the productive combination of conscious/unconscious representations at the basis of creativity: in painting *Guernica*, Picasso retrieved some of the Cubist heuristics from long-term memory and adapted them to a new context. This process brought about unexpected and unpredictable relations, which made *Guernica* a universal cry against the crimes of war and a masterpiece for all times.

2. Alice Bell – Imperial College

What Albert Did Next: The maturing image of scientists in 20th century juvenile literature.

My research examines children's science literature, including the images of scientists these books communicate. In trying to understand the culture influencing a particular

author's definition of science, I not only examine the characters of scientists themselves but also those outside the boundary of scientific expertise and sometimes controversially on the edge of it (Thomas Gieryn, 1995). Examples include housekeepers, aliens, detectives and other "experts" such as historians and priests. Key to my interest of the relationship between young people and science, are the characters of children; this includes readers themselves, expressed through constructions of the "implied reader" Norman Hunter's "Professor Branestawm" is a particularly interesting case study considering images of scientists over time. The first set of Branestawm stories were published in the 1930s, but the writer returned to the character during his retirement in the 1960s and 1970s.

One of the most striking aspects of the series is the way the characters change through the decades from childishness to more adult modes of behaviour. The characters of the 1930s Branestawm stories are extremely child like, as if they are small children play-acting grown up roles. The illustrations show them wearing over-sized clothes (like children dressing up) with their heads often looking down to their feet. Branestawm and his friends find it difficult to relate to society, showing deep lack of social understanding, a topic often utilised for humour in the books. Branestawm is also extremely shy. By the 1970s, these characters "mature" demonstrating the more confident posture and style of dress of an adult. Branestawm's best friend even complains about paying tax, not often a consideration in most children's make-believe.

I argue that although the character of the shy scientist is a recurring one (Roslynn Haynes, 1994), an image that the views problems with the social world – sometimes to the point of autism – as a price for scientific genius, it is also a part of the experience and image of childhood. I will argue that Hunter's 1930s association of Branestawm with childhood provide the image of the scientists with a romantic innocence, emphasising inductive epistemologies that consider nature readable by a clear and unsullied mind (following Jacqueline Rose's research into the romantic views of Peter Pan, 1984). However, although post-war Branestawm may still be an outsider, he is now a professionalized character who the disassociation with childhood and innocence provides a new authority; that of expertise, knowledge and social power.

3. Meg Greenberg – University of Cambridge

The electro-magnetic 'Telegraphic style'.

The correlation between the advent of the wireless telegraph and Filippo T. Marinetti's poetics is not a new topic to scholars in the field of futurist studies. Generally speaking, critics tend to combine the names Michael Faraday, Guglielmo Marconi, Henri Bergson with the conceptual terms (wireless) telegraph, electromagnetism, and force-lines. They do not always provide a roadmap explaining how these three men helped to shape the history of electricity in ways that would fundamentally alter the perception of time and space by the turn of the twentieth century. The aim of this paper is to demonstrate how practical scientific experimentation in the field of electricity was absorbed as part of the methodology of the futurist literary program to escape temporal and spatial limitations. The first section will offer a summary of the history of the science of wireless telegraphy and its impact on the philosopher Henri Berson's and subsequently Marinetti's formulation of force-lines. The second section will consider the way in which Marinetti harnessed typographical innovation in order to present his fragmented telegraphic style as outlined in *Manifesto tecnico della letteratura futurista* (Technical Manifesto of

Futurist Literature, 11 May 1912), *Risposte alle obiezioni* (Responses to Objections, 11 August 1912), *Distruzione della sintassi Immaginazione senza fili Parole in libertà* (Destruction of syntax Imagination without Wires Words in Freedom, 11 May 1913), and *Lo splendore geometrico e meccanico e la sensibilità numerica* (Geometric and Mechanical Splendor and Numerical Sensibility, 18 March 1914). The words on the page will be studied as material objects that exist in relation to the body of the reader who Marinetti envisions within the space of the page as a center of the lines of force of the electro-magnetic field. The final section will examine Marinetti's telegraphic work, *Zang Tumb Tuuum*, for his employment of Bergson's force-lines in the creation of an explosive device whose center is created and occupied by both reader and writer.

Session 2: 11.00 AM – 12.15 PM

Chair: *Fern Elsdon-Baker – University of Brighton*

4. Melanie Keene – University of Cambridge

'Eyes and no eyes': Gideon Mantell and the art of seeing pebbles.

The nineteenth-century palaeontologist Gideon Mantell grew up not far from Brighton, in the historic town of Lewes. Thus it was near to this very location that he experienced his first introduction to the earth sciences, discovering an ammonite by the side of a brook. Mantell revisited this remembered geological induction in *Thoughts on a Pebble* (1836), a children's book which rewrote the finding of a fossilised stone for a new generation. In the text Mantell provided a close-up, detailed description of a single object that brought both the subject and knowledge of geology closer to his reader. Using a present-tense, personalised narration, Mantell created a guide to the pebble and the world from which it had travelled, using literary techniques he would later employ in writings about the Isle of Wight and Lewes itself. As a child, Mantell had read the popular tale, 'Eyes and No Eyes', first published in the 1790s, and from it gleaned the strategy of using small, everyday objects found on a walk to open children's minds to the mysteries of nature. Unlike many other contemporaries attempting to educate new audiences in geology, Mantell did not employ panoramic spectacles, or rely on the modelled resurrection of prehistoric monsters to engage his audience's interest. Rather, he urged the need to look at actual fossil remains when attempting to conjure up the vistas of vanished lands, even if the fossil itself could be cupped in his palm. The magnification in size and importance of the seemingly trivial in nature was made more explicit in later additions of *Thoughts on a Pebble*, which appended 'More Thoughts', a microscopical investigation of the interior of the stone, and in Mantell's companion-piece, *Thoughts on Animalcules* (1846). This paper demonstrates how Mantell miniaturised and visualised geological phenomena, rendering them accessible to audiences beginning their education in and practice of the sciences. Moreover, by imparting skills of observation, attention, and reasoning, he taught the art of seeing pebbles.

5. Leucha Veneer – University of Leeds

Polite science or applied science?: English provincial geology in the early 19th century.

In nineteenth-century Britain, there was no state intervention in geology and its applications until the foundation of the Geological Survey in 1835, followed by the Mining Records Office in 1840 and the Royal School of Mines in 1851. However, many professional and amateur men of science had been suggesting that geology

could be of great utility to the mining industry and to agriculture since the late 18th century. The Geological Society of London also emphasized the general utility of geology, though in practice the activities of its members were seldom motivated by notions of the practical applications of their work.

Many provincial geological societies were also keen to make their activities useful, particularly in their local area. There have been many studies of provincial scientific societies, though these societies are often considered in isolation. Looking at provincial geological societies across England, I shall consider how these societies aimed to encourage the practical application of geology, and how successful they were seen to be.

This project thus requires reconsideration of some of the ideas behind literature on “metropolis and province”, particularly in the light of Secord’s recent notion of “knowledge in transit”. As part of the analysis of the activities and motivations of provincial geological societies, I examine their links with the Geological Society of London and with other local organizations, as well as with geological societies in other parts of the country.

Many social and cultural distinctions are found in the metropolis-province literature between the concerns of those in London and those in Literary & Philosophical Societies across the country, but I am not convinced that this is so readily applied to other more specialized societies. The Literary & Philosophical Societies, though having interests in the advancement of useful and practical knowledge, were generally culturally oriented institutions, mostly interested in polite science and literature. As more specialized societies began to appear in the early nineteenth century, they moved towards placing a greater emphasis on the direct practical and economic benefits of their work. Further, since much current metropolis-province oriented literature comprises individual studies of small societies or of London-based groups, difference and distinction are emphasized, without providing relationships and connections, and presenting difficulties in analysing knowledge in transit.

6. Louise Thorn – Imperial College

Combing Modern Historiography and Museology.

In this paper I will introduce my work on the interface between recent historiography and innovative ways of presenting this scholarship to a public audience through museum exhibitions. An initial historiographical review of science museums in Britain will examine how the history of science has been presented in a variety of forms, from grand Victorian displays of industrial strength and national identity to immersive heritage parks and today's museums, many of which have shifted in emphasis from presenting history to promoting the learning of basic science principles through interactives and workshops.

At the Science Museum in London curators are formulating a new gallery that aims to present a more sophisticated view of the history of science and make esoteric topical academic work more accessible and relevant to both adults and children. While museum visitors may expect a gallery to focus on particular discoveries or personalities in the history of science, this new approach will feature episodes that had a profound impact both on scientific research and everyday life, such as post-Revolution French metrification or cybernetics and information theory after the Second World War. Case studies based on the themes of belief, power and trust will be contextualised with the 'voices' of the people involved such as scientists, politicians and the public. A review of the situation before and after these events will also highlight their historical significance. Combined with aspects of museology and

material culture, this new interface between academia and the public will hopefully promote greater visitor awareness of the complex relationship between science and society in the past, present and future.

Session 3: 12.15 PM – 1.30 PM

Chair: *Josipa Petronic – University of Edinburgh*

7. Alexi Shannon Baker – University of Oxford

An ‘ingenious and profitable trade’: Instrument making and selling in London from 1700 – 1750.

The trade in optical, mathematical and philosophical instruments burgeoned in London during the late seventeenth century. Its lucrative position within the pre-industrial city was then consolidated during the early 1700s. A wide array of private and governmental institutions in addition to individual professionals, researchers and dilettantes fuelled the demand for instruments of measurement, observation and education. These instruments facilitated pursuits including navigation, microscopy, astronomy, surveying, drawing, mathematics, the military arts, and weights and measures. Authors such as Eva Taylor, Joyce Brown and Gloria Clifton have catalogued many of the individuals and workshops involved in the trade during this period. However, no one has yet produced an extensive analysis of the dynamics between early instrument makers and sellers and the social, economic and geographical landscape of London. How did their choices and experiences resemble, and differ from, those of their contemporaries? How might these similarities and differences have shaped the instrumental nature of early modern science?

The early instrument trade, while relatively diffuse, is still comprehensible because of its common markets and methods and its extensive networks of blood and business. Unlike most previous authors, I am able to draw upon new resources including digital collections, computer mapping, and computer data storage and analysis in my examination of it. Early modern historians and historical geographers are increasingly employing these tools as well to complement traditional sources. I am applying them to a sample group of 306 individuals and 24 partnerships that are known to have belonged to the London instrument trade during the first half of the eighteenth century. Although my sample excludes the sellers and producers of scales, hourglasses, and surgical instruments, the group that remains is still large. I will therefore employ three complementary types of analysis: computer mapping; statistical analysis and relationship mapping with the aid of a database; and enrichment of the resulting picture with individual biographies and information from traditional and electronic contemporary sources. I will discuss the trends which I have discovered to date through the first two approaches, including patterns of settlement based upon factors from guild membership to job specialty, and socioeconomic statistics that illuminate the 'life cycles' of the early London instrument maker and seller.

8. Charlotte Nicklas – University of Brighton

Transforming worthless substances into fashionable luxuries: Aniline dyes in the mid-nineteenth century.

In 1856, while trying to synthesize the anti-malarial drug quinine from coal tar, the English chemist William Perkin (1838-1907) accidentally discovered how to manufacture aniline purple, or mauve, the first aniline dye. A colour of hitherto unknown intensity, Perkin's mauve eventually created a new industry of inexpensive, easy-to-produce dyes. In this paper, this innovation will be examined in the interwoven histories of dress, chemistry, and popular science. Early aniline dyes such as mauve, magenta, and the early purples captured the attention of the fashion world and the public largely because of the novelty, brightness, and historic expense of the colours they produced. The discovery and development of aniline dyes also constituted a major episode in the history of nineteenth-century chemistry. This interdisciplinary approach helps to illuminate the importance of these new dyes in Great Britain and the United States in the 1850s and 1860s, revealing many reasons for the appeal they held for the middle-class public.

The appearance of mauve did not create the fashion for shades of purple, which already enjoyed popularity in the mid-1850s. Shades of purple had always been difficult and expensive to attain with natural dyes, so their popularity was all but guaranteed as they became more widely available.

In the mid-nineteenth century, the fields of chemistry and dyeing were closely connected, as training in chemistry had become crucial to the skilled profession of dyeing. New dye colours satisfied the continued demand for novelty by an ever-growing market. In its chemical composition and manufacture, mauve represented a departure from previous understanding of and research in chemistry and dye manufacture. As recent historians of chemistry show, however, Perkin's discovery has been frequently mythologized and presented out of context. His finding and successful manufacture of mauve certainly deserve recognition, but other dyemakers working in Britain and Europe also contributed significantly to new dye developments.

The production of mauve dye from coal tar captured the attention of the scientific community and the public. In the 1860s, the general interest magazine *Leisure Hour* published an article entitled "Colour in the Coal-Scuttle" and the woman's periodical *Godey's Lady's Book* included one titled "The Uses of Petroleum." William Crookes, the chemistry editor of the *Popular Science Review*, noted that "it is a striking characteristic of the chemistry of the present day that it converts substances, apparently the most worthless, into commercial utilities, and even fashionable luxuries." These useful and beautiful aniline dyes epitomized the faith of many contemporaries in improvement through science.

9. Benjamin Wardhaugh – University of Oxford

Frets and compasses: instruments in late-seventeenth century harmonics.

The quadrivial discipline of 'harmonics' was in its final phase in the seventeenth century. Despite its apparent connection with musical performance, it is a rare example of a mixed science which struggled to make fruitful use of experimental methods, by contrast with other disciplines of the experimental philosophy. I will describe four instruments from late-seventeenth-century harmonics.

1) The 'musical compass'. This paper instrument, for use in musical calculations, was designed in the 1680s by Thomas Salmon, a would-be reformer of musical notation and tuning. I will demonstrate a modern replica: it displays a tuning theory dividing the octave into thirty-one equal parts. It illustrates the conception of harmonics as a mathematical art, whose proper skills and practices are mathematical ones.

2) Long vibrating strings. In 1664 the Royal Society set up a 136-foot brass wire under tension, to investigate the frequency of its vibrations. The vibrating string had provided the standard way to investigate, describe and display theories of tuning since antiquity. But long strings, in which the vibrations are sufficiently slow to be counted, were not investigated until the seventeenth century, beginning with Mersenne. The case of the Royal Society illustrates their growing scepticism about the ear's usefulness as a source of knowledge.

3) Toothed wheels. If a toothed wheel is made to strike a fixed metal plate as it rotates, it can be used to produce a sound of accurately known frequency. This provides a way to determine the frequency of musical pitches, more accurately than the long string. Unlike the string, it derives from no musical instrument, and musical skill and judgement are almost completely absent from its use. Robert Hooke produced the first examples, but I will focus on similar work done by Brooke Taylor in 1704.

4) Modified viols. Returning to Thomas Salmon: in 1704 he produced a set of viols with special fingerboards, producing frequencies in mathematically perfect ratios. The Royal Society hosted a demonstration performance, judged to be musically 'excellent'. This illustrates Salmon's rather idiosyncratic concern to find a role for 'experiment' in musical science, experiments which did not produce knowledge but, like the 'compass', displayed a mathematical theory. This contrasts with both the long-string and toothed-wheel experiments, although Salmon's lutes were as much descendants of the traditional mathematically divided string as the 136-foot wire had been.

Session 4: 2.30 PM – 4.00 PM

Chair: *David Tyfeild – University of Exeter*

10. Igor Abdrakhmanov – University of Hamburg

Nucleic acid, Lysenko and Soviet Scientific Journals: Debate in 1950-1956.

The early history of molecular biology includes the history of genetics during the dark chapter of the Stalin era and Lysenkoism. Traces of these deformations can even be perceived in modern Russian science and society.

However, the history of Soviet molecular biology was written from geneticists' perspective and based upon stereotypes. One of them was that Lysenko and his supporters were unaware of the nucleic acid debate for long time, which granted the opportunity to develop nucleic acid research.

Even before Watson and Crick's discovery of DNA's structure and function, this subject had already become highly topical also in Soviet science. The aim of this article is to describe the public debate in the Soviet scientific journal and try to show its "non-public" background.

11. Gaël Lancelot – University of Manchester

Redefining 'Life Sciences': The reorganisation of biology in Manchester.

The so-called "molecular revolution" has taken over many parts of biology over the past thirty years, accompanied by the shifting of ever-more selective funding from governmental and industrial sources. But the actual translation of these trends in universities has barely been studied until now.

The University of Manchester is one of the oldest provincial universities of the UK, and its departments concerned with life sciences illustrate well the traditional means of dividing biology, as well as the tremendous changes these underwent in the past thirty years. The separation of "scientific" and "pre-clinical" biology, the department

as the basic unit of structure and power, and the power of Chairs are the main elements of a structure that became increasingly challenged.

Changes in the administrative structure between 1960 and 1980 represent ad hoc modifications in order to respond to changing trends in research (such as the creation of a Genetics and Cell Biology group without a Department distinction). After the stringent financial difficulties of the early 1980s, however, a radical reorganisation of life sciences took place, ordered by the central administration of the University but designed largely by representatives of the pre-clinical departments. It gave rise to a re-shuffling of personnel and a re-alignment of the interests of the University towards molecular biology. More importantly, it was designed with the specific goal of increasing research potential, and placed reformers at all key political positions. In 1992, the reorganisation was completed fully by eliminating all departmental boundaries, separating teaching and research structures, and all but eliminating biology concerned with structures larger than the cell matrix.

This talk explores the role of funding as a stimulus for change and the appropriation of such a stimulus by specific individuals. It examines the changing relationships between biology and medicine, and showcases the very nature of the department as a fundamental unit being challenged. It also discusses the symbolic value of molecular biology as modern, profit-generating and prestigious. Finally, it takes a look at the role of new modes of assessment of what constitutes "good science" emerging during the 1980s in changing the political and social structure of academia at its most basic level.

12. Chris Renwick – University of Leeds

What Should the Science of Society Be? The debate at the BASS, 1876-78.

For most of the nineteenth century British social science largely meant one thing: political economy. However, the centenary of the publication of Adam Smith's *Wealth of Nations* was accompanied by a set of debates in Britain which dramatically altered the agenda for those interested in a science of society. Political economists' claims that their subject was a complete and mature discipline was widely questioned and the content and aims of social science became open to debate. In this paper I focus on a largely forgotten series of contests at the BAAS in the late 1870s in which Francis Galton - amongst other figures well known to history of science - participated. I argue that these events were crucial in defining the agenda for everyone concerned with the social sciences in late nineteenth century Britain and that from this the disciplinary boundaries with which we are now familiar would eventually emerge. Specifically, I assert that sociology - as a science distinguished from political economy - was placed into mainstream British debate about the form a science of society should take. Within this context the content, methods and aims of sociology would be argued over for the next quarter of a century, when the first institutions for the subject were established. The issues at stake at the BAAS in the 1870s played a crucial part, therefore, in the consequential but often overlooked history of sociology in Britain.

13., David Baneke – Utrecht University

The 'Bankruptcy of Science' debate in the Netherlands.

The period around 1900 is often described as the 'second golden age' of Dutch science, featuring scientific heroes such as Lorentz, Zeeman and Van der Waals (after the 'first golden age' of Huygens and Van Leeuwenhoek). In this view there seems to be no place for a "bankruptcy of science" debate. However, such a debate did take

place, although not as violently as in France. The claims of science were criticised in many public lectures and publications. Over the following decades the discussion persisted, although it changed character a few times/ different views on the foundations of science became entangled with discussions on several social issues, especially on education.

In my paper, I will analyse these changes by looking at some of the main contributors to the debate. These may not be the most famous scientists, but they provide an insight to the intellectual discourse of the period.

Session 5: 4.30 PM – 6.00 PM

Chair: *Sebastian Pranghofer - University of Durham*

14. Andrew Campbell – University College London

The Glass Bead Game: Reconstructing the knowledge of an unconventional Copernican.

On 5 March 1616 a decree was published by the Vatican in which several works were placed on the Index of Forbidden Books. Copernicus's *On the revolutions* (1543), which outlined his heliocentric system that was to form the bedrock of the so-called Scientific Revolution, was prohibited pending correction. In the decree another work that advocated a heliocentric cosmos was also prohibited, but in this case prohibited absolutely, without pending correction: Paolo Antonio Foscarini's *Letter Concerning the Opinion of the Pythagoreans and Copernicus About the Mobility of the Earth and the Stability of the Sun* (published in Naples in 1615). Paolo Antonio Foscarini (c. 1565-1616) was a Carmelite friar and theologian who wrote various works on a wide range of topics, from predicting changes in the weather in the *Treatise on Natural Cosmological Divination* to attempting to reconcile the Copernican hypothesis with the Scriptures in the aforementioned *Letter*.

While Foscarini's *Letter* and his contact with many of Galileo's circle, such as Federico Cesi and Benedetto Castelli, have been the focus of several studies in the past twenty years, the early part of his life has never been studied in any detail simply because of the lack of information available. We know very little apart from that Foscarini taught Theology at the Carmelite convent in Naples and in Messina around the turn of the century. However, a recently-discovered document in the Vatican archive has shed new light on Foscarini's intellectual activity in this period. The document is an inventory of books that Foscarini had borrowed from the convent library up to and including February 1600, and this paper will present my preliminary findings regarding the document. The inventory chiefly consists of works that one would expect a Renaissance theologian to possess, such as the complete works of Aristotle and numerous commentaries by Thomas Aquinas. However, there are some unexpected inclusions, in particular works by Giambattista Della Porta, Levinus Lemnius and Girolamo Fracastoro, the importance of which this paper will examine. The inventory also enables us to reconstruct Foscarini's knowledge of astronomy at that time, which would prove crucial in his later encounter with the Inquisition. Finally, this paper will highlight how Foscarini's intellectual interests at that time would shape his later blueprint for an encyclopedic study of the liberal arts, the *Institution of All Learning* (1613).

15. Neil Tarrant – Imperial College

Patterns of censorship in late sixteenth century Italy: The case of natural philosophy.

Traditionally Italy in the late sixteenth century has been portrayed as a uniquely hostile environment for the practice of natural philosophy. Historians of science have presented stories about the condemnations of individual philosophers and their works as indicative of a deep seated shift in the Catholic Churches attitude toward philosophy. They have argued that as the century progressed the Church used its twin censorial organs to regulate the boundaries of philosophical discourse to a hitherto unprecedented extent. This change was triggered by the conservative and authoritarian tendencies created by the Church's reaction to the religious upheavals of the first half of the century. In this paper I analyse three Indexes of Forbidden Books published during the course of the sixteenth century, in order to reveal patterns of censorship of philosophy in this period. With this information I challenge traditional conceptions of the scale of censorship, and their relationship with the Catholic Reformation. I instead suggest that the changing patterns of censorship I expose can be best understood by paying close attention to the institutional history of the Inquisition and Index.

16. Michelle Di Meo – University of Warwick

The scientific community of Katherine Jones, Lady Ranelagh, as evidenced by Her Manuscript receipt books.

Traditional historical accounts of Katherine Jones, better known as Lady Ranelagh (1614-1691), have depicted her simply as the supportive sister of her famous scientist brother, Robert Boyle (1627-1691). While the recent works of scholars such as Betsey Taylor and Sarah Hutton have begun to correct Lady Ranelagh's incomplete biography by attesting to her strong political influence, it is only her extant letters that are used for primary sources. The two extant manuscript receipt books attributed to Lady Ranelagh, currently held at the British Library and Wellcome Library, are almost always neglected. When viewed in collaboration, these two manuscripts offer the most intimate view into Lady Ranelagh's scientific experimentation and demonstrate her as an active participant in a community of leading intellectuals in seventeenth-century England. In addition to evidencing Lady Ranelagh's sophisticated knowledge of iatrochemistry, these receipt books are highly important for recreating the network of intellectuals with whom she exchanged information. By studying the host of sources listed within these receipt books in relation to the personal connections established in her extant letters, I will begin to piece together Lady Ranelagh's scientific community. With receipts attributed to people as diverse as accredited male physicians to female lay practitioners, these manuscripts demonstrate a transaction of knowledge with no obvious distinction between the class or gender of the sources. It is my hope that this paper will both exhibit the necessity for scholars to treat receipt books as valuable primary sources for recreating scientific communities, as well as demonstrate Lady Ranelagh as a highly regarded intellectual in her own right.

Day 2: Friday, 6 January 2006

Session 6: 9.30 AM – 10.45 AM

Chair: *Benjamin Wardhaugh – University of Oxford*

17. Josipa Petrunic – University of Edinburgh

Clifford's Quaternion: Bent space and relativism in British mathematics, 1860-1880.

For a mathematician in Britain in the 1860s, making any "absolute" claims based upon a *a priori* axioms was a risky endeavour. The introduction of non-Euclidean geometries to Britain, through the work of Hermann von Helmholtz and William Kingdon Clifford (1845-1879), rattled mathematicians, physicists and metaphysicians alike. In this talk I will focus on the life and work of Clifford, looking at the reasons why, and the manner in which, he constructed those obscure mathematical entities we know as "bi-quaternions".

In a technical sense, a "bi-quaternion" is a mathematical operator that causes bodies to rotate in space. In a sociological and historical sense, bi-quaternions are a synthesis of two "radical" forms of mathematics: non-commutative algebra, and non-Euclidean geometry. A radical himself, Clifford was all too willing to adopt those mathematically revisionist approaches to space and "forces". In the process, he berated all those institutions (from the Church to Cambridge) that laid claim to any sort of a prior truth. Although he died young, at the age of 33, Clifford was respected at the time for having redefined geometry (indeed, all mathematics) to be fundamentally empirical in nature, and for having dethroned the deity of Euclid and the God of Newton. In this paper, I will argue Clifford created "bi-quaternions" as a direct reply to those efforts being made by various British mathematicians in the 1860s, and 1870s, to save the *a priori* truth status of mathematics and the Euclidean-Newtonian world.

18. Laura Bujalance - Universidad Autonoma de Madrid

Faraday's interpretation of Newton's gravity.

When studying how an object can act upon another (electrical objects in this case), Faraday takes Newton's notion of gravity as a paradigmatic explanation. The purpose of this choice is double: on one hand, to illustrate and explain the principle of the conservation of force; on the other hand, to make use of the authority of Newton to support his own intention of the non-existence of actions-at-a-distance.

My project is focussed on how Faraday interprets Newton's conceptions of gravity and on how Faraday introduced his own ideas in explaining gravitational effects.

19. Eleanor Sheppard – University of Oxford

Egnazio Danti's mathematical sciences.

In sixteenth century Italy the status of mathematics was contested. Mathematicians at the universities did not command the high status and the salaries that their counterparts in natural philosophy received, and practical mathematicians working outside of the universities were considered no more than skilled artisans. So, many turned away from the universities, and tried to secure positions for themselves at the princely courts, constructing beautiful mathematical instruments for their princes, dedicating mathematical treatises to them, and teaching their children. One such mathematician was Egnazio Danti, Ducal Cosmographer to the first Grand Duke of Tuscany, Cosimo I de' Medici, who, once secure in his post, dedicated much of his time to writing mathematical treatises in Italian, so that he could bring mathematics to those outside the university who could not read Latin. In 1577 he published the *Scienze matematiche ridotte in tavole*, a series of tables showing the place of mathematics within the scheme of human knowledge, and the interdependencies between mathematics and all other sciences and practical arts. In this paper I wish to examine Danti's attitude towards the

mathematical sciences, as evidenced by this work: his beliefs regarding the status and importance of mathematics and what he saw as the interrelation between mathematics and the practical arts. Danti was greatly interested in mathematical education, both for its own sake, and because of the perfection that could be brought to practical arts by the application of mathematical theory. His *Scienze matematiche* makes this link clear, and may even have served as propaganda for the teaching of mathematics to artisans and craftsmen. I will also look at whether Danti's attitudes reflected those of a wider community of Florentine mathematicians likewise struggling to make a career for themselves in mathematics outside of the universities, and similarly interested in bringing mathematics to the practitioners of the "mathematical" arts. Furthermore, looking at the *Scienze matematiche* in the context of Danti's other mathematical treatises, I hope to demonstrate how it contributed to Danti's attempts to maintain his position at the Medici court. Again, I will compare this to the strategies of other mathematicians in the wider Florentine community.

Session 7: 11.15 AM – 12.30 PM

Chair: *Neil Tarrant – Imperial College*

20. Morgan Clarke – University of Oxford

A Confounding of Relations: Islamic reactions to the new reproductive technologies.

The latter years of the last century saw revolutionary advances in the field of reproductive medicine, most notably the birth of the world's first 'test-tube baby' in Britain in 1978, a landmark in recent medical history. Beyond chronicling scientific endeavour *per se*, historians and sociologists of science should, I feel, also document how scientific advance is digested and utilised by wider society: certainly such 'new reproductive technologies' as in vitro fertilisation have been regarded with some ambivalence in Britain and the wider Western world. While their therapeutic possibilities have been welcomed, they have also been perceived as potentially disturbing, even revolutionising, the reproductive order. Sperm and eggs from third parties can be used to create 'novel' kinship relations. Surrogacy arrangements and gay parenting have been facilitated. These possibilities have been perceived as morally and socially challenging. These challenges are not unique to the Western world: other cultures are also facing up to them. In my own research, I examine the reactions to these technologies within Islamic, Middle Eastern society. I draw on my reading of Islamic legal texts dealing with these issues since the much publicised events of 1978 to the present day, as well as fieldwork in Lebanon, where there are a large number of centres offering such techniques, much in demand in what is a strongly pronatalist environment.

In this paper, I explain the various legal positions that Islamic authorities have taken concerning IVF and the more 'exotic' possibilities it offers, such as the use of donor gametes and surrogacy arrangements, and also describe patients' uses of them. While Islamic authorities are attempting to accommodate scientific and technological progress and avoid moral confusion, biological ideas of kinship relation do not fit happily with those of revealed law, nor wider society's concerns with sexual propriety. This then is a case study of the evolving relation between scientific, technological and moral change. The challenge of scientific and medical progress is one that Islamic thinkers feel they must meet to maintain credibility: this chapter in the global, modern history of science is thus not only fascinating in itself, but touches

on broader issues of how cultures beyond the West try to fashion alternative modernities within the contemporary scientific age.

21. Sarah Davies – Imperial College

Placing contemporary science in context: Has anything changed? (1985-2005).

Historians have shown us that publics have always been actively involved in science, whether as witnesses validating the production of authoritative knowledge (Shapin 1990; 1994) or as active consumers and users of that knowledge (Cooter and Pumfrey 1994; Desmond 1987). Similarly, there have been waves of enthusiasm within the scientific and political communities for popularising scientific knowledge (DeBoer, 1991, 2000; Jenkins, 2000; Rutherford & Alhgren, 1990).

In our proposed paper, we discuss recent developments in ‘science communication,’ which is defined here as public involvement with science and scientist involvement with the public. We note the political triggers and policy movements that have occurred over the last twenty years; we also look at the academic work that has developed around these movements. Key points are the 1985 Report by Sir Walter Bodmer and the resulting Public Understanding of Science (PUS) movement (Bodmer 1986; Miller 2001); the so-called ‘critical PUS’ academic literature which questioned many of the assumptions and practices of those involved in PUS (exemplified in Irwin and Wynne 1996); and the turn towards a reframing as Public Engagement with Science with ‘dialogue’ representing a primary means of interaction between publics, science, and government (Miller 2001). In particular we describe the vision of ‘Dialogue’ within the community set forth by a key House of Lord’s Report on Science and Society (House of Lords Select Committee 2000).

We focus on analysing this recent turn to dialogue. Whilst noting key events and triggers, such as the recent push towards ‘up-stream’ dialogue and the much criticised *GM Nation?* debate, we also examine the trends within the science communication communities committed to dialogue by analysing some of the methods used. Focussing our discussion around participatory processes run by organisations such as the BA, the Royal Society, the Science Museum, and the Natural History Museum, we examine the purposes, both implicit and explicit, of such events and look at the ‘institutional body language’ embedded within them. We also examine actual dialogue events—their structure and context (Bakhtin, 1986; Daniels, 2005; Driver, 1997; Mortimer & Scott, 2003; Piaget, 1964)—for evidence of how theory and rhetoric play out in practice. This analysis, though brief and very much a work in progress, starts to define an area so far unexamined and to describe some of the meanings and contexts of this latest wave of science communication. By returning to the 1985 formation of CoPUS (the Committee for the Public Understanding of Science) we seek to evaluate how much has really changed over the last twenty years.

22. Tom Lean – University of Manchester

Magazines and the shaping of the microcomputer.

With the advent of the 'microcomputer revolution', computing was suddenly no longer confined to offices and institutions, or to those technically gifted home users who could build their own machine. For under a hundred pounds it was possible for the 'man in the street' to buy a complete computer for their home, boxed and ready to go, with nothing more than plugging into a television and the mains required to give an 'in' on the ground floor of the microcomputer revolution. The computer was no longer just an electronic brain in a lab, or a data crunching business machine, it was an

appliance for the home. There was one question; what do you do with a home computer anyway?

The advertised possibilities for home computing were endless; it could sort out your finances, educate your children, computerise your kitchen, and according to one memorable claim, even run a nuclear power plant. Exactly how you were supposed to do all this was left rather more up in the air, beyond the manufacturer's introductory manual.

To support the computer illiterate masses in their computing endeavours the microcomputer revolution was soon joined by a publishing boom that saw dozens of different computer publications hit the shelves.

This presentation will examine the importance of computer magazines to the development of home computing in 1980's Britain. In particular it will introduce the variety of different roles that such publications could act in: as educators, advertisers, instructors and advisers. It will also highlight the importance of the computer magazine as a communications hub and forum to support a virtual community of groups connected with the computer. Taking this a step further it will be suggested how the computer magazine helped to shape the use of the computer, and how this use in turn shaped representations of the computer itself.

By paying such attention to an under appreciated part of the history of computing, it will be highlighted how non-technical actors not only add colour to what could otherwise be a rather grey story of chips and circuit boards, but how such contextual elements are also an essential part of the history itself.

Session 8: 1.30 PM – 2.45 PM

Chair: *Gaël Lancelot – University of Manchester*

23. Victoria Blake – University of Durham

Clinical Science and Medical Professionalisation: the medical societies of Northumberland and Durham .

In recent years, medical historians have begun to explore more systematically the emergence of modern clinical research in Britain, though this aspect of medical history has been somewhat neglected for the North East of England. Through a study of several medical societies existent in the area during the nineteenth century, my overall aim is the elucidation of developments in clinical science within this 'provincial' setting, and to explore their effects upon medical 'professionalisation'.

The nineteenth century was a time of great change and reform within the generalised field of 'healing', with an increasing drive towards the elevation of status for so-called 'regular' medicine, as practised by practitioners 'qualified' by recognised medical schools and listed on the Medical Register, above that of other, 'irregular' healers. It was also a time in which the use of basic statistics became more widespread, in particular due to the availability of, and interest in, the mortality rates after the establishment of the General Register Office in 1837. In turn, the quality and quantity of research published in medical journals, both regional and national, also increased.

My paper focuses on the Newcastle and Gateshead Pathological Society, founded in 1848, and its later incarnation, from 1860, as the Northumberland and Durham Medical Society, whereupon changes were made to its constitution that reinforced its particular focus upon the shared study and discussion of pathology in medicine, and a growing interest in public health and related statistics. I argue that faith in, and use of clinical science was the common tool used by society members' attempts to progress,

and also to validate their presented findings and theories. I also argue that the kudos attached to 'science' played a vital role in the raising of their professional status vis-à-vis other healers, and also the status of the North East practitioners within the wider medical community.

24. Andrew Gardiner – University of Manchester

The canine history of diabetes mellitus.

Dogs were central to the discovery of insulin, the 'mysterious something' that turned walking skeletons suffering from the devastating disease of diabetes mellitus back into human beings. The medical history of diabetes has been extensively covered elsewhere. This paper briefly examines the role that experimental dogs played in Banting and Best's research at the University of Toronto during 1921/22, leading up to the announcement of insulin's discovery to the world and, in 1923, the Nobel Prize for Physiology or Medicine. It then looks at the history of diabetes in the somewhat parallel world of veterinary medicine. Instead of being animal models and subjects of a surgically constructed experimental disease, dogs can now be seen as animal patients suffering from a spontaneous and natural disorder.

Diabetes emerges as a useful disease with which to track the emergence of companion animal veterinary medicine, a specialism which in the 20th century grew to dominate clinical veterinary practice. The veterinary history of diabetes provides a counterpoint to the human story. It illuminates the human-animal bond, the nature of comparative medicine, and the ambivalent status of animals in society.

25. Tal Bolton – University of Kent

Exploring the 'Total Institution': A comparison of the social characteristics of the chemical defence experimental establishment, Porton Down, and the common cold research unit, Salisbury.

In 1961 Erving Goffman published *Asylums: Essays on the Social Situation of Mental Patients and Other Inmates*, in which he put forward the notion of the 'total institution' as a social establishment that created a 'barrier to social intercourse with the outside'. Based upon his sociological research conducted within a mental hospital in California, Goffman explored the worlds of both staff and inmates in their institutional settings. His analysis encompassed a wide range of institutions, from military establishments to religious retreats, which shared in common a number of totalising characteristics.

Using Goffman's notion of the total institution as a model, this paper will explore and compare the scientific institutions of the Chemical Defence Experimental Establishment (CDEE), Porton Down, and the Common Cold Research Unit (CCRU), Salisbury, both of which were actively using human beings as research subjects in the Cold War period.

It will seek to explain the peculiarities of these institutions, one which was veiled in secrecy and the other which became a household name, in comparison with Goffman's 'total institution'. Both institutions were, by Goffman's definition, 'a place of residence and work', involving 'like-situated individuals' in a 'formally administered round of life'. Likewise, their 'round of life' followed the same authority in the same place in the same company under the same routine. However, there were also clear differences between Goffman's description and these institutions. Participants resided for short periods and, within the limits of the experiments, were allowed to leave the institutions. Entry into Porton and the CCRU was deemed to be

voluntary, and recruitment drives for participants focused on the utilitarian benefits, as well as financial rewards and leisure opportunities.

Drawing upon advertisements for recruits and recruitment film from the 1950s and 1960s, this paper will demonstrate that Goffman's sociological analysis of institutions provides a solid overarching framework for exploring the CCRU and Porton in terms of the social and spatial characteristics, but it cannot give adequate guidance on the peculiarities of these unique institutions. What this paper will show is that in many ways their 'uniqueness' was their position in society, situated between the extremes of Goffman's mental asylums and religious retreats, and the novelty of their recruitment methods which subverted the focus of their roles as institutions of human experiments.

26. Chaira Beccalossi – Queen Mary University of London

William Blair Bell: Gynaecology and 'Freaks of Nature'.

Since the beginning of the nineteenth century bio-medical writers have become especially interested in the female form of the human being; her physiological functions reproductive system – gynaecology. In 1916 the prominent gynaecologist William Blair Bell – founder of the Royal College of obstetricians and Gynaecologists (1929) – revealed that femininity depended entirely on internal secretions. While all previous theories of glandular femininity had focussed on the ovaries, Blair Bell looked on every ductless gland in the female body as being of sexual importance. Blair Bell was participating in a controversy concerning the difference between man and woman, with social and legal implications. According to the gynaecologist, the 'higher type of woman' was intrinsically organised for the 'perpetuation of race'. To see the woman as sexual beings and machines for reproduction was also to see them as the reason or justification for his own profession. Social tension surrounding issues of sex and sexuality conflated with the curiosity that physicians felt towards hermaphrodites. On one hand, Blair Bell took for a clear line of distinction between femininity and the masculinity, and normal and abnormal woman. On the other, he assumed on the basis of his scientific observations that human beings were fundamentally bisexual in their bodies. Blair Bell considered that whatever the predominant sexual identity of the individual, "latent traits of the opposite sex" in various degrees of development were always present. The physician became the interpreter of the true sex in the case of ambiguous sex. In Blair Bell's opinion, to assign sex according to gonadal anatomy alone was to risk not only the happiness of the patient but social order as well.

Sexual inversion was held to be "akin to hermaphroditism". The term sexual inversion, according to Blair Bell's definition, applied to the "derangements" of "normal" feminine sexual secondary sexual characteristics. In Blair Bell's analysis, the female sexual invert was a "freak of nature", who was characterised by an internal bodily unbalance and a masculine-producing secretion" that produced changes associated with the metabolism of the "lime salts". Thus an over production of calcium explained female homosexuality in gynaecology. Almost twenty years after the first edition of Havelock Ellis's *Sexual Inversion*, medical men spoke of homosexuality as a pathological phenomenon. The old concept of degeneration was replaced by the new language of endocrinology, but sexual inversion was still a disease with specific bodily evidence.

Session 9: 3.15 PM – 5.00 PM

Chair: *Andrew Gardiner- University of Manchester*

27. Shahina Rahman – Institute of Psychiatry

History of Maudsley Hospital (1923 – 1948): An attempt to break the mould of the asylum system.

The opening of the Maudsley Hospital in 1923 as one of the first mental hospitals to allow for voluntary in-patient care was an important step towards breaking tradition with existing models of asylum systems. This was at a time when patients could only be treated in private clinics or unofficially in out-patient clinics without the need for certification. It was only with the advent of the 1930 Mental Treatment Act did these voluntary bases for treatment become acknowledged and the need for voluntary in-patient care formally addressed. Led by the medical superintendent Edward Mapother and later by other key figures such as Aubrey Lewis, the Maudsley operated under the premise that voluntary patients would be more co-operative and have a better prognosis. Mapother thus distinguished a patient population that was different from the traditional asylums which had no choice but to take in patients under section. This gave the Maudsley doctors the opportunity to select different groups of patients at a time when the range of treatments for mental illness was limited. Indeed Mapother and Lewis were sceptical of the available treatments and saw to it that detailed patient histories served the purpose of aiding the search for new and effective treatments.

This purpose is reflected in the patient records collected from the Maudsley for the selected years; 1924, 1928, 1931, 1935 and amalgamation of patient cover sheets from years 1937 and 1938. Research, using a random sample of patient records drawn from these inter-war years, is designed to uncover how patients were diagnosed, treated and to determine the general ethos of the doctors practicing at the Maudsley. Previous historical research has been apt to focus on patients, but it is also of equal importance to understand what the doctors were trying to achieve in psychiatry in the face of the limitations of their knowledge and resources. Thus the Maudsley Hospital set out to change the face of psychiatry and patient care. With their emphasis on academic psychiatry, training and research, the Maudsley enabled itself to attract funding from the Rockefeller Foundation, but it remains an answered question as to whether this translated into improved patient care and novel treatment approaches.

This paper aims to chart the history of the Maudsley from 1923-1948, detailing the objectives and aims of its doctors to how the treatment of patients developed. The patient records will serve to chronicle these developments and supplement existing archival research about the Maudsley and its contribution to psychiatry.

28. Robert Wycherley – University of Brighton

Accident, coincidence and multiple causation in historical research.

Foucault has suggested that historical change is often irrational, accidental, random, coincidental and the sum of unrelated contingencies. Two examples from my own research will be presented, in which pivotal events in lunatic asylum development appear to have arisen, in large part, accidentally.

1: Bethlem I and "Official" Insanity

In 1557, as part of a reorganisation, the small lunatic hospital of Bethlem was placed under the management of Bridewell Hospital, a prison devoted to inculcating the virtues of work into the vagrant, work-shy, petty criminal, loose-living and orphaned. Placing Bethlem and Bridewell under joint management made sense for three reasons. Both dealt with disturbers of the peace, and both incarcerated their inmates. Third, Bethlem had been bedevilled by financial problems and maladministration, and could possibly be better managed by the larger institution.

However, they never physically merged, raising the question of why Bridewell, did not simply absorb Bethlem, despite the greater economy and managerial efficiency which could have resulted?. Possible reasons will be explored, and it will be suggested that, at this point, an "official" discourse of insanity came in to being, as a result of which lunatics would, for the next 400 years, be managed by incarceration, in dedicated places outside normal society, and separate from other disturbers of the peace.

2: Building Bethlem II

By the early 1670s Bethlem I was too small, and needed major repair or replacement. The Governors decided on replacement, and the city granted a narrow site in Moorfields, on which the city ditch had flowed, and which, given its unstable nature, it may have wanted to be rid of. Robert Hooke was commissioned to build the hospital, which was to be larger, but otherwise lacked clear design criteria. The Governors rejected Hooke's first design and, for unclear reasons, determined that it should be "single pile", that is one room wide, moving the design possibilities towards a long, thin budding, which suited the site well, but was relatively uneconomic. During building the Governors appear to have been seduced by the potential of the site and setting into producing a building which glorified their charitable endeavours, against reasonable constraints of economy and architectural appropriateness. Thus, what was a radically new, and vastly influential, asylum design may have resulted from an accidental collision between a narrow, unwanted site, a setting with potential, vague design criteria, and grandiosity.

29. Sorcha O'Brien – University of Brighton

The Shannon Scheme: Technology, Modernity and National Identity in the Irish Free State.

The Shannon Scheme hydro-electric power station was the first large technological project to be undertaken by the Irish Free State government in the late 1920s and played an important symbolic place in debates about the role of technology in 'nation-building.' This paper will look at the impact that contemporary attitudes towards technology in Irish society had on the development of the Shannon Scheme project, particularly those of progress and modernity in a predominantly rural and traditionally-minded state. Using ideas from the history of technology and the social construction of technology, this paper will consider the representation of technology in the visual culture associated with the scheme, interrogating the interation of forward- and backward-looking technological ideologies.