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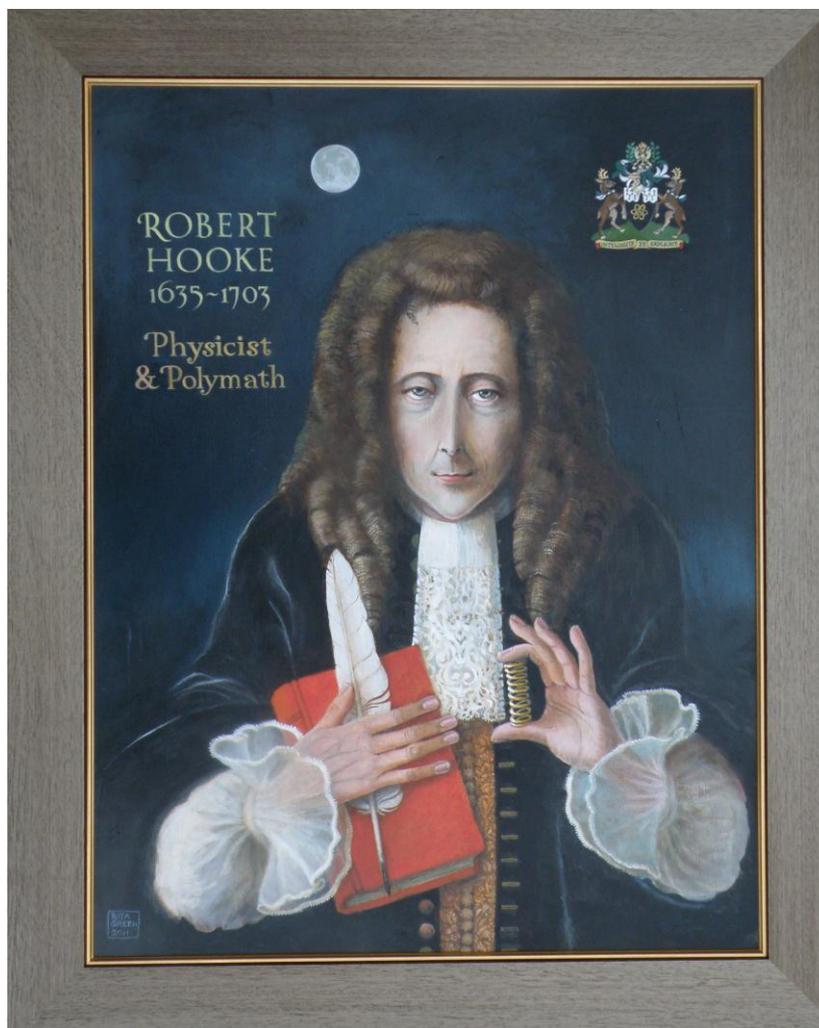
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New portrait to mark Hooke's place in history



Chroniclers of his time called him 'despicable', 'mistrustful' and 'jealous', and a rivalrous Isaac Newton might have had the only surviving portrait of him burnt, but, three centuries on, Robert Hooke is now regarded as one of the great Enlightenment scientists. Now, thanks to Rita Greer, a history painter, who has undertaken a project to memorialize Hooke, a portrait of the scientist was hung at the Institute of Physics in London on 12 January 2012

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It was Hooke's dispute with Isaac Newton over credit for Newton's work on gravity that tainted more than two hundred years of historical writing about Hooke, as it is chronicled that he fought for greater credit than Newton offered for the guiding principles which were later detailed in Newton's Principia. Despite the folklore, however, there is now no doubt that Hooke had a profound influence on the history of physics, not least through the law of elasticity which he drew up while working as Robert Boyle's assistant in 1660; a law of physics that now bears his name.

Following Hooke's death in the early 1700s, Newton was appointed President of the Royal Society and it was during his time in this capacity that, it is thought, the only portrait of Hooke was destroyed – it is unclear whether the portrait was destroyed on Newton's command or simply left to perish.

With no visual sources for reference, Greer has used written sources – including the chronicles of both John Aubrey and Richard Waller – to create a likeness of Hooke with details fitting to his position in the history of science.

The history artist Rita Greer says, "Robert Hooke, brilliant, ingenious seventeenth century scientist was brushed under the carpet of history by Sir Isaac Newton and his cronies. When he had his Tercentenary there wasn't a single memorial to him anywhere. I thought it disgraceful as Hooke did many wonderful things for science".

Sir Arnold Wolfendale FRS, a former President of the IOP and former Astronomer Royal, says, "Robert Hooke was a brilliant man of many parts of which one was physics. He was also remarkable for many advances and discoveries for which he did not receive adequate credit.

Physics-related credits to his name, include the construction of the vacuum pumps used in Boyle's gas law experiments, building some of the earliest Gregorian telescopes and observing the rotations of Mars and Jupiter, and deducing the wave theory of light

Hooke was probably best known in his own lifetime for a publication called Micrographia in which is printed Hooke's drawings from observations using a microscope, the most famous of which is a drawing of a flea.

Joe Winters IOP Senior Press Officer

IOP Chief Executive Set To Retire.



The Chief Executive of the Institute of Physics, Bob Kirby-Harris, will be away from the office for some time to allow for a period of recovery due to an operation. He has decided to retire as CEO of IOP from this June when he becomes 60.

Bob Kirby-Harris has been an energetic and enthusiastic advocate for physics in his seven years as CEO at the IOP. He will not be cutting all his ties with physics and the Institute, as he will remain Secretary General of the International Union of Pure and Applied Physics, and will continue to receive support in this role from colleagues at IOP.

We wish Bob Kirby-Harris the very best for a good recovery, and would like to record our appreciation for his significant contribution to developing IOP over the past seven successful years as CEO.

Peter Knight, President IOP

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REMS At Home – Science in the Late 17th Century

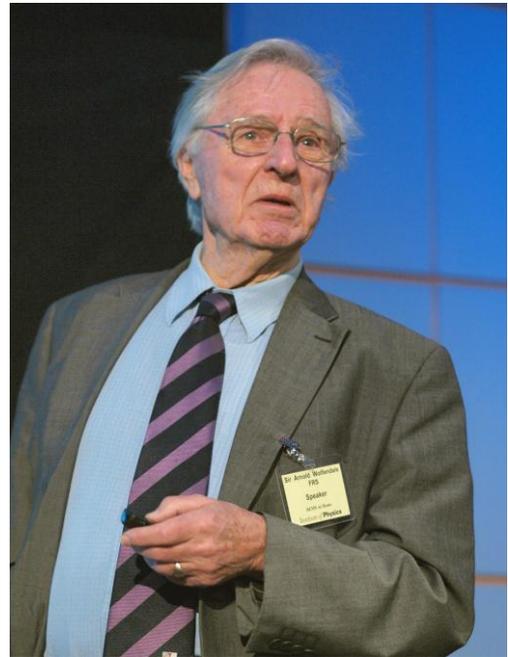
On 12 January 2012 77 Retired Members (REMS) of the Institute of Physics and their friends were educated and entertained by 6 distinguished and knowledgeable speakers on the exploits and achievements of a number of natural philosophers active at the time of the founding of the Royal Society and the Royal Observatory



The day began before anyone arrived, because two of our speakers, Rita Greer and Allan Chapman, were interviewed on the BBC “Today” programme about Rita’s new portrait of Robert Hooke which was to be unveiled during our symposium and about Hooke himself. REMS Secretary, John Belling, (above), chaired the event, which was organised by George Freeman.

Robert Hooke and the Scientific Environment.

Sir Arnold Wolfendale (below) was speaking on Hooke’s career. He covered the early years on the Isle of Wight, being apprenticed to the painter Sir Peter Lely, and spending his inheritance on an education at Westminster School under the headmaster Dr Busby.



At Christ Church College Oxford he was influenced by Christopher Wren, John Wilkins and Robert Boyle and later worked with them. The Civil War had been going on and the Cromwells, father and son, were in charge of England while he was working on clock escapement and spring controlled balance wheel mechanisms. At about the same time, in 1658, he perfected the air pump, a development which led to him and Boyle formulating Boyle’s Law. Later he was probably the first to describe Newton’s Rings of interference colours. He was annoyed by losing out on precedence claims, eg gravity, the earth’s oblate spheroidal shape and the precession of the earth’s axis, to Newton.

One thing he didn’t have was financial clout. He was earning £30 a year as the first paid scientific research worker. Sir Arnold sympathised over this small stipend, although the word “science” had yet to be devised. Even as Gresham Professor of Geometry and Curator of Experiments to the Royal Society he only earned £80 p.a.

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A College for the Promoting of Physico-Mathematical Experimental Learning: Early days of the Royal Society



Felicity Henderson (left) spoke about the early days of the Royal Society, which was formed after a lecture by Christopher Wren at Gresham College to enable experimental philosophy to be carried out collectively by those interested. By witnessing the experiments and discussing the results on the spot, more weight could be given to the conclusions. Robert Hooke and Robert Boyle used the former's air pump to see and demonstrate what happened when various substances and living creatures were subjected to a lack of air. Dissections were carried out. Also "curiosities" were examined and collected. Observations were written up and reported in *Philosophical Transactions* and in correspondence as before. This was all organised by Henry Oldenburg, the Society's Secretary.

One of the most prolific correspondents was Antony van Leeuwenhoek who, although working alone in the Netherlands, obtained confirmation of his microscopical observations from local people. All his letters were in Dutch and had to be translated. He was appointed Fellow of the Royal Society.

Among the curiosities was a collection of Chinese ear pickers and no doubt things like that led to lampooning of the Society in plays written by Thomas Shadwell. Felicity hinted that *Gulliver's Travellers* were partly based on the Society's research programme. Boyle's wish list looks very similar to one that might be written today. First on the list is the prolongation of life.

Hooke's Portrait



Rita Greer (left) explained how she was inspired by Rachel Chapman's drawing of Hooke and Allan Chapman's article in the *Daily Telegraph* of 24 February 2003 about Hooke to make good the lack of a contemporary portrait by painting one, guided by the written descriptions of Hooke by John Aubrey and Richard Waller. She explained that there were 14 portraits of Newton, but none of Hooke. She is well on the way to her goal of 20 portraits of Hooke and showed some of them in her talk.

Unveiling of Rita Greer's portrait of Robert Hooke



Left to right are: Rebekah Higgitt, Felicity Henderson, Sir Arnold Wolfendale, Rita Greer, Robert Woodward, Allan Chapman and Michael Cooper.

The Institute of Physics commissioned the portrait for the Hooke Room, but Sir Arnold performed the unveiling in the Rutherford lecture room to save us all walking up 2 floors. We did that at the end of the day

Many discussions took place over lunch including the one between Sir Arnold and Allan Chapman. (Right)



The role of the Astronomer Royal in the early days of the Royal Observatory, Greenwich

Rebekah Higgitt (left), explained the circumstances of the setting up of the Observatory and the difficulties of the first Astronomer Royal, John Flamsteed. One problem was his title, Astronomical Observer. He preferred Regius Professor of Astronomy. Another was that he had to figure out what his job was. He corresponded with other astronomers like Hevelius, Mayor of Danzig, and was well aware of Kepler's work. The king provided no money, but he was sponsored by the Board of Ordnance through Jonas Moore, who provided Flamsteed personally with telescopes and chronometers.

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The second Astronomer Royal found that the observatory was bare, when he took over, because Flamsteed's widow had sold all the instruments. There was some animosity between the Royal Society and Flamsteed, who had the data that Newton wanted. Flamsteed was determined to insure that his star chart was accurate. It was far better than that of his hero Tycho Brahé, partly because he was able to use telescopic sights. Having determined the latitude of Greenwich, he set the longitude through his observatory, so that the coordinates of 3000 stars had absolute values. In answer to a question about the meridian for GPS, Sir Arnold mischievously informed us that Flamsteed's 00 longitude passes through an area now marked "rubbish", but then he was 14th Astronomer Royal and should know.

Scientific and Civic Measurements: Hooke, Boyle and the Citizens of London

Michael Cooper (below) described Hooke and Boyle's experiments on the "Spring of the Air" and their defence of their results, which led to Boyle's Law. Following objections lodged by Francis Linus Boyle and Hooke published their results in great detail, so that anyone could repeat them.



They showed many measurements of the position of the meniscus of the mercury trapping the volume of air in question, from which we could see that standard deviation was +/-1.6mm

Despite already being busy with Gresham College and the Royal Society, Hooke and Christopher Wren exercised their skills in sorting out London after the fire of 1666. While Wren working for the king, designed churches, Hooke, working for the City, formulated new building regulations, surveyed the damage, staked out plots for buildings, roads, some of which were widened, and spaces for markets, assessed compensation, sorted out disputes, ensuring his fellow surveyors followed his guidelines, and reporting on the suitability of various building materials. Every morning for years he was seen measuring, discussing with everyone from urchins to landlords, so that Londoners could see that something was being done and quickly. For compensation he gave generous assessments of area by assuming 2 sides of a plot were at right angles to the street and multiplying the mean by the distance along the street. He quoted the area in square feet and duodecimal fractions of a square foot so that it was easy to calculate the monetary compensation in pounds, shillings and pence. He wrote 2995 foundation certificates and 592 reports on land disputes – a busy man indeed.

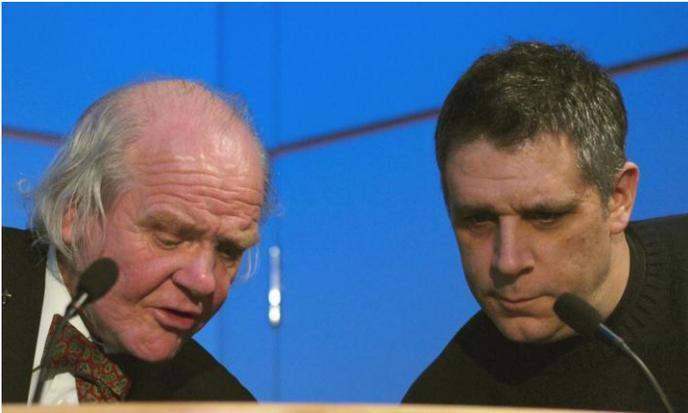
Not only did he work with Wren on designing St Paul's and other churches, he designed and supervised the building of St Benet's, Paul's Wharf, now the Welsh Church, Bedlam Hospital, the Monument, including its zenith telescope and dropping tower, and the clearing and re-canalising of the Fleet River. One of the most important things he produced was a proper large scale (1/1200) map of London.

It was interesting to learn that, although Hooke failed to find evidence for the inverse square law of gravitational attraction that he was hoping for, the experiments by Speake et al in 1990 showed actual timings of bodies falling in a 300m dropping tower versus results expected from the inverse square law in exactly the same fashion as Hooke had done in verifying Boyle's Law..

Robert Hooke was buried in St Helen's, Bishopsgate, but along with many other remains was reinterred in the City of London Cemetery, Wanstead. In addition to the memorial next to Christopher Wren's in St Paul's seen by REMS on 8 December 2008, just before it was officially unveiled, there is now another in Westminster Abbey.

Artificial Organs that strengthen the natural (R Hooke) – the impact of instrumentation

Andy our technician for the day helped several times during the day with microphones, projection of slides, spot lights and he is shown below with Allan Chapman.



Allan (above left) talked about the historical setting in the world as well as Hooke's status in society and something about his biological studies.

There has been a suggestion that Hooke was a downtrodden artisan compared with Boyle the landed gentleman. Despite being poorly paid for his science, he was the son of a clergyman, went to Westminster School and Christ Church College, Oxford and at 27 was elected FRS. Moreover he did make money from his surveying and rebuilding London. He gave his brother £4000 in ready cash to buy a property on the Isle of Wight. He left £10000, although he didn't actually make a Will. So, in fact, he was a gentleman and the equal of Wren and Boyle.

Among the curiosities received by the Royal Society was a rattlesnake, provided by Richard Amerike of Bristol who supplied John Cabot with the means to get to the New World in 1497. Larger ships were among the scientific instruments to enable one to see new things. In 1453 Byzantium was overrun by the Ottoman Turks, who made Constantinople their capital, but this brought new ideas and translated (from Greek) older ideas to Europe in the form of documents, astronomical instruments and mathematics.

On 26 July 1609 Thomas Harriott turned his newly

acquired telescope on the moon and made drawings of it some months before Galileo did. Telescopes improved from then on to show more and more.

In 1667 Hooke dissected a dog and showed red arterial blood contrasting with blue venous blood. He was interested in visualising the body as a machine with circulation, joints, lungs etc. He studied the flight of flies and compared the frequency of flapping wings with musical notes. He studied the weather too.

Question time brought about quite a bit of discussion with the audience



and between speakers



Then, before members of the audience repaired to the Hooke Room to inspect the newly hung portrait, Andy played a recording of the Radio 4 interview about the portrait and about Robert Hooke the man. Thus ended a most informative and memorable day.

Pages 3-7 by Mike Quinton, from notes taken by Kate Quinton.

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Bubbles Everywhere



This was a fascinating schools' lecture-demonstration given by Dr Gianluca Memoli, National Physical Laboratory on Tuesday 29 November 2011 at the University of Canterbury. The talk and demonstrations were primarily concerned with the importance of bubbles in everyday life; food and drink, Christmas puddings, marshmallows, bubble gum, champagne, soap films, bubble wrap..... Bubbles in space and the cosmos, cavitation, medical practices, bubble memories were all discussed. There was lots of audience participation. The students left 'bubbling over' with ideas and anxious to repeat the demonstrations and fill their tummies with bubbles.

Professor Sohby will be giving his lecture 'How Do We See Colour?' on 1st May at 19:30 in the Berrill Lecture Theatre, Open University, Walton Hall, Milton Keynes, MK7 6A

And
'Colour Vision' at the IOP on 13 June at 18.30.

(Book for the lecture at the IOP via londonsoutheast@physics.org)

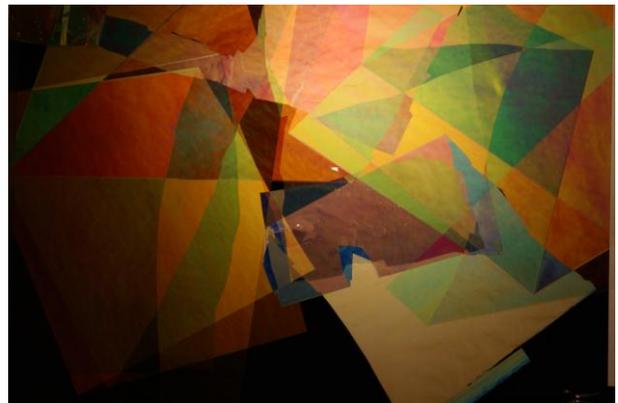
How Do We See Colour?

The lecture, which contained a wonderful galaxy of colour demonstrations, was given by given by Professor Mohamed Sobhy of the University of Kent on Wednesday 30 November 2011 in the Gulbenkian Theatre of the University of Kent,



Professor Sobhy pointed out that these were the result of the interaction of physiology, psychology and the environment. The trichromatic and the opponent theories were demonstrated which involve, respectively, the addition and subtraction of colours. He generated colours without pigments plus interference and birefringence colours. 3-D colour pictures were projected which were examined using red and green glasses by all.

He also provided notes for obtaining the materials used and appropriate web sites for information, purchases, and instructions.



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IOP Business Forum – Harwell Oxford



On February 29th the Institute of Physics (IOP) will be holding a business forum at the University of Southampton Science Park. This follows the success of the IOP's previous forum at Harwell Oxford Science and Innovation Campus back in September, where the focus was on key changes to the UK's innovation landscape. With the next meeting only weeks away, it seems like the perfect opportunity to reflect on the successes of Harwell.

The Harwell Oxford forum gave the IOP the chance to inform delegates about how the Government plans to support R&D carried out by SMEs in the future. To ensure that those present received the latest information, the Institute brought together key organisations and arranged a programme of leading experts to talk about the proposed policy changes.

Chair of the event, Dr Norman Apsley, CEO of the Northern Ireland Science Park and Vice-President of Business and Innovation at the IOP, began proceedings by highlighting the important role that the community can play in helping to rebalance the UK economy.

Next, Brian McCarthy, Relationship Manager for the Technology Strategy Board (TSB), spoke about the support that is currently available to businesses and what changes in Government policy will mean for often unaware of the help that is already out there and that raising awareness is a constant challenge.

After a short presentation from Megan Morys, Innovation Manager, Goodman, about the management of the Campus; Toby Warren, Didcot and Science Vale UK Manager, offered an insight in to the work councils are carrying out to assist local businesses. This was especially relevant as the area encompassing Harwell Oxford campus had just been declared an Enterprise Zone. This meant that those present were able to get details of how this development was likely to advantage them in the near future.

The Q&A session gave delegates the chance to question the speakers and other organisations that had come to the event. This was a real benefit to many as it gave them the chance to talk to UK Trade & Industry and HM Treasury at length about issues important to the industry. The discussion then turned to topics such as the availability of venture capital, with attendees giving the benefit of their own experiences. This was followed by a venture capitalist discussing what makes an attractive investment proposition.

By the end of the programme it was clear that those in attendance had found the topics discussed at the Forum insightful and informative. The positive feedback received since the event means that the IOP will be holding similar meetings across the UK, like the upcoming forum in Southampton. For further information please visit:

<http://www.iop.org/activity/business/index.html>

Lee Crouch
Regional officer South East.

Red Sprites at the IOP 28 March 2012



Book with the branch secretary:
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THE GENIUS OF MICHAEL FARADAY



Above: Dr Cyril Isenberg, University of Kent, Sir John Meurig Thomas, University of Cambridge, and Professor Sarah Spurgeon, Head of the School of Engineering and Digital Arts at the University of Kent.

Sir John Meurig Thomas, a former Director of The Royal Institution of Great Britain, gave his lecture at our Kent Centre on 24 January. He gave a penetrating insight into the life and work of Michael Faraday, whose life's research was carried out at The Royal Institution.

One of the questions asked was 'If Faraday had been awarded a Nobel prize for what would it have been awarded?'. Sir John replied that he would have had to receive six Nobel prizes for revolutionary innovative discoveries in six areas of physics and chemistry.

Dr C Isenberg

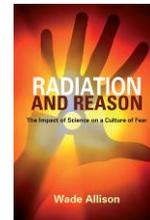
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Radiation & Reason

The Berkshire Centre's 2012 lecture programme got off to an early start with Prof Wade Allison giving his lecture Radiation & Reason. Prof Allison questioned the current thinking regarding nuclear radiation safety suggesting it is ripe for a fundamental re-examination.



Approximately 100 people turned up on 9th January to listen to Prof Allison examine data from Hiroshima, Nagasaki, and Chernobyl, the recent incident at Fukushima and radiation therapy. Current radiation guidelines are too stringent and in incidents such as Fukushima prevent people returning to their homes even though levels are perfectly safe. It was suggested that the current As Low As Reasonably Practicable (ALARP) principle be replaced with As High As Reasonably Safe (AHARS).



The Lecture was very well received but needless to say with such a drastic alteration to current dogma the topic prompted a lively discussion from the audience.

The lecture was based on Professor Allison's book "Radiation & Reason" ISBN: 9780956275615

The next lecture at our Berkshire Centre is on the 5th March and is Modern Cryptography by Richard Pinch. This lecture is being jointly held with the IMA.

David Parkes