This striking diagram illustrates, in a highly schematic and exaggerated form, the use of a simple spectroscope to disperse starlight into its constituent spectrum. Note the prominent absorption lines shown in the stellar spectrum; these lines have proved a powerful and effective tool for determining the chemical composition and physical characteristics of the stars. The cozy domestic setting recalls that many of the early astronomical spectroscopists, at least in the UK, worked in the ‘grand amateur’ tradition (though there is artistic licence in using a spectroscope through the window of a study rather than attached to a telescope).

The early development of astronomical spectroscopy was the subject of last year’s SHA Spring Conference, held at the Institute of Astronomy, Cambridge in May. A report of this meeting, and much other material, appears inside. The illustration originally appeared in The Outline of Science, volume one, edited by Prof. J. Arthur Thomson, published by George Newnes Ltd of London. No publication date is given, but 1921 seems likely.

Right: Frontispiece to The Outline of Science.
Welcome to the first issue of the SHA Bulletin. The Bulletin complements the Society’s eNews and together these two publications replace the earlier Newsletter. The eNews is published monthly and distributed entirely electronically. It allows information about the Society, particularly its events, to be distributed to members more rapidly than was possible hitherto. Most members will already be receiving the eNews. If you are not and you have an e-mail account then please contact its Editor, Stuart Williams (contact details are on the back page). Less-timely material, which constituted the bulk of the Newsletter, will now appear in the Bulletin. We appreciate that not all members have access to e-mail (though most do), so the Bulletin will continue to carry news of the Society and its events, albeit in a somewhat abbreviated form (see pp49-51). The Bulletin will be published twice per year, in the spring and in the autumn, augmented by the occasional ‘special’ issue. In order to emphasise continuity its issue numbers will continue the sequence of the Newsletter. We hope that you will find the new arrangements convenient and useful. We are, of course, always pleased to receive feedback and suggestions for improvements.

THREE figures appear above this editorial. On the left is the Titan Mnemosyne, the personification of memory and mother of the nine muses. To her right are two of her daughters, Urania the muse of astronomy and Clio the muse of history. Together they seem to embody much of the spirit of the SHA, whose purpose is to record and study the history of astronomy.

IT is with the greatest regret that in this issue we must report the deaths of SHA Treasurer Mr Kenneth Goward and SHA member Dr Mary Brück. We publish an obituary for Dr Brück on p42. A brief note about Mr Goward appears on p3 and an obituary is in preparation for the autumn issue. In very different ways both individuals made great contributions to our Society and our subject. It was a pleasure to have known them. They will both be greatly missed. Ave atque vale.
Kenneth J. Goward

Clive Davenhall

It is with the greatest regret that we report the death of the Society’s Treasurer, Kenneth Goward, on 26 February 2009. Ken had longstanding heart problems and had been fitted with a pacemaker earlier in the year. Following this procedure he seemed to be making a recovery and his death was sudden and unexpected.

Kenneth John Goward, of Tuddenham St Martin, near Ipswich, Suffolk, had been a police officer earlier in life. He had been interested in astronomy and its history for many years, and was a member and officer of Orwell Astronomical Society. Ken was involved with the SHA from the beginning, taking part in the discussions that lead to the Founding. He served as the Society’s first Treasurer and de facto membership secretary, duties which he discharged with exemplary efficiency. He contributed enormously to the Society in many ways, far beyond the notional duties of the office that he held. However, it is not just for his efforts on behalf of the SHA that he will be missed, but also for his unfailing sense of humour and good companionship.

We extend every sympathy and condolence to his wife Lorraine and children Maggie, Matthew and Daniel. A full obituary will appear in the autumn issue of the Bulletin. Stuart Williams has set up an online book of condolence at URL http://www.freewebs.com/sochistastro/apps/guestbook/.

News

Compiled by Clive Davenhall

Webb-SHARE update

Previous reports of this Heritage Lottery funded project have appeared in Newsletters 14 (October 2007, pp4-5), 16 (July 2008, pp7-8) and 17 (October 2008, pp5-6). One-third of the 331 Webb-Ranyard letters have now been transcribed by Webb-Share volunteers. These letters are part of correspondence between A.C. Ranyard and the Revd T.W. Webb. The next Bulletin will report several new discoveries!

On 11 November 2008 a re-enactment of a ‘star party’ originally held in November 1865 was successfully held at the former home of Revd Henry Cooper and Mrs Ellen Arabella Key. Entitled ‘Heavens Above thro’ Victorian Eyes’ the former Stretton Rectory (now The Priory Hotel) welcomed over forty guests to an unusual meeting of three Victorian astronomers, Revd T.W. Webb, G.H. With and Revd H.C. Key, and their families. The arrival from London of special guest Arthur Ranyard provided additional excitement for the actor volunteers led by Nick Waller (The Play Supply). Prior to the evening performance the actors spent the day filming with Matt Biggs and Paul.
Haley (The Share Initiative) and initial results can be seen on the Webb-SHARE Web site: http://www.heavensabove-film.co.uk

January 2009 proved an amazing month for discoveries about Henry Cooper Key. Email queries sent out on 1 January to Clive Davenhall and Robert Argyle resulted in confirmation of the location of Key's 18-inch silvered-glass speculum and photocopies of letters he sent to David Gill (with thanks to Sarah Strong, Archives Officer at the Royal Geographical Society) and Charles Piazzi Smyth (with thanks to Karen Moran, Librarian at the Royal Observatory Edinburgh). Then Key’s observing notebook for the years 1837-73 was located in Cambridge, untouched since it was donated by W.H. Steavenson in 1961! With the kind assistance of Mark Hurn of astronomy. Astro-Cymru will run for two years and is funded by Heritage Lottery Wales. The aims of the project are to encourage communities across Mid and South Wales to celebrate their astronomical heritage; to inspire learners of all ages and abilities to engage with the International Year of Astronomy 2009 and its legacy and to further develop the Welsh tradition for science communication by increasing opportunities for learning about heritage.

Activities will include school workshops, cataloguing resources, heritage loan boxes, family events, research, exhibitions, heritage trail, online observatory, translation work and a DVD. A range of partners have supported the development phase of the project, including: the Penllergare Trust, University of Glamorgan, Swansea Astronomical Society, Powysland Museum and Penmaes School. These and other organisations are now being invited to participate in the delivery phase of the project starting on 1 April 2009.

Astro-Cymru: Celebrating 400 years of Welsh Astronomy
The Share Initiative is pleased to announce the launch of Astro-Cymru, another education and research initiative in the history of astronomy.
years to December 2010. SHA member Paul Haley (contact details above) would be pleased to hear from anyone interested in online research of Welsh astronomers; you don’t have to live in Wales to be involved! (Contributed by Paul Haley.)

Copernicus’ remains identified

A team led by Jerzy Gassowski, head of the Institute of Archaeology and Anthropology in Pultusk, central Poland, believe that they have positively identified the remains of Copernicus. Nicholas Copernicus (1473-1543) spent most of his life as a canon of Frombork Cathedral in Poland. He is known to have been buried in the cathedral precincts, but the precise location of his grave was lost. In 2005 Gassowski’s team found remains which, on the basis of a facial reconstruction and other evidence, they believed to be those of Copernicus. Nicholas Copernicus (1473-1543) spent most of his life as a canon of Frombork Cathedral in Poland. He is known to have been buried in the cathedral precincts, but the precise location of his grave was lost. In 2005 Gassowski’s team found remains which, on the basis of a facial reconstruction and other evidence, they believed to be those of Copernicus. (see Newsletter 9, December 2005, p5). This identification has now been confirmed by DNA evidence.

Dr Marie Allen of the Rudbeck Laboratory, Genetics and Pathology Department, Uppsala University compared DNA taken from a tooth and femur bone of the remains with that of two hairs found in a copy of Johannes Stoeffler’s Calendarium Romanum Magnum (1518) which Copernicus owned for many years. The two sets of DNA were found to match, confirming the identification. The copy the Calendarium Romanum Magnum has been in the Library of Uppsala University since the Polish-Swedish wars of the seventeenth century.

Following the identification, the Bishop of Frombork, Jacek Jezierski, plans to re-inter the remains in a tomb worthy of Copernicus.

Further reading

For the DNA matching see, for example: http://www.cathnews.com/article.aspx?aeid=10295.

For a report of the original excavation see http://www.archeologia.ah.edu.pl/Frombork_eng.html

In the last issue we reported plans to exhume Tycho Brahe (1546-1601) from his grave in Prague (Newsletter 17, October 2008, p7). In a new development another theory has been proposed about how he died. Earlier analyses of hairs from his moustache (which is preserved in the Prague National Museum) revealed anomalous levels of mercury, leading to suggestions that he had been poisoned.

Peter Andersen, Professor of German Studies at the University of Strasbourg, has identified a new suspect for the poisoner: Count Erik Brahe, a distant Swedish cousin of Tycho. Prof. Andersen found Erik Brahe’s diary in the Royal Library in Stockholm and he claims that ‘it contains the details of the attack and, indirectly, the murderer’s confession.’

Erik Brahe was a ne’er do well, always short of money and involved in various clandestine activities. Andersen suggests that he was working at the instigation

Dr Marie Allen presents her results confirming the identification of Copernicus’ remains at a press conference. Above her is a facial reconstruction of the remains.

Something rotten in the state of Denmark?

Erik Brahe (1552-1614).
of King Christian IV of Denmark, who had previously dispossessed Tycho of his estates. The source of Christian’s antipathy is a mystery, though he may have suspected Tycho of having had an illicit involvement with his mother, Queen Sophie.

In any event, Erik Brahe travelled to Prague in 1601 and inveigled himself into Tycho’s household shortly before his death. He is thought to have poisoned Tycho at the banquet where the latter initially fell ill. However, the dose was not lethal and Tycho began to recover. A second, larger does was then administered and this proved fatal.

The exhumation, planned for later this year, may resolve some of the questions. However, in an unrelated development the Catholic authorities in Prague are reported to be unenthusiastic about allowing it to proceed.

Further reading

Spiegel International has an interesting article (in English) about Peter Andersen’s theory: http://www.spiegel.de/international/europe/0,1518,601729,00.html

For the Church’s attitude to the exhumation see: http://aktualne.centrum.cz/czechnews/clanek.phtml?id=627672

Secret of the Silent Planet?

C.S. Lewis’ children’s fantasy novels The Chronicles of Narnia have been popular since they were first published between 1949 and 1954, selling over a hundred million copies in over forty languages. They were specifically written to introduce Christian ideas to younger readers.

Now the Revd Dr Michael Ward believes that he has found an unexpected, not to say unlikely, theme in the series. He suggests that each of the seven books is based on one of the seven planets of Mediaeval cosmology (the five naked eye planets plus the Sun and Moon). He presents these ideas in his book Planet Narnia: The Seven Heavens in the Imagination of C.S. Lewis (2008, Oxford Univ. Press) and they were discussed in the BBC documentary The Narnia Code broadcast on BBC One on 16 April (for details of both book and documentary see http://www.narnia-code.com/).

The BBC seems to have an ambivalent attitude to C.S. Lewis. A 1962 report, which would eventually lead to the television series Dr Who, contained thumbnail assessments of various authors who might contribute to the putative series. It deemed Lewis ‘clumsy and old-fashioned in his use of the SF apparatus, there is a sense of condescension in his tone, and his special religious preoccupation’s are boring and platitudinous.’ But it also described Sir Arthur Clarke as ‘a modest writer’, so at least he was in good company. Brian Aldiss got off more lightly as ‘not a crank’ (Donald Bull, Science Fiction, available at http://www.bbc.co.uk/archive/doctorwho/dr6400_4.shtml?doc=6400).

Statue of Venus Urania discovered

A 14-inch statue of Venus Urania, an allegory of astronomy, by the Renaissance sculptor Giambologna or Jean de Boulogne (1529-1608), has recently been discovered. Giambologna was the most influential sculptor in late sixteenth century Europe and his work was in great demand. The statue depicts Venus Urania with the familiar astronomer’s tools, including a compass, ruler and celestial sphere. It is thought to date from 1585-95.

The statue was found in a private collection in France by the Tomasso Brothers, fine art dealers based in Leeds. Only two other casts of the statue are known. One is in the Kunsthistorisches Museum, Vienna, and the other in the Schönborn Collection in Pommersfelden, Germany. The newly-discovered example is almost identical to the latter. The statue was exhibited at the Moretti Irving Gallery, New York during the autumn last year.

Further reading

For further details see, for example: http://www.theartnewspaper.com/article.asp?id=16292

The recently-discovered statue of Venus Urania by Giambologna.
The 2008 SHA Spring Conference and AGM was held on 17 May at the Institute of Astronomy (IoA), Cambridge and had the theme William Huggins and the Development of Astronomical Spectroscopy. The Chairman, Gilbert Satterthwaite, opened the meeting by welcoming members and guests. He thanked the IoA for hosting the event and also thanked Mark Hurn, the IoA Librarian, for organising the day. He introduced the conference by reminding the audience that astronomical spectroscopy, especially the contribution made by the Hugginses, provided much of the initial impetus for the ‘new’ astrophysics which now dominates astronomy.

The opening talk was given by Dr David Dewhurst, a former member of staff of the IoA on My Use of Huggins’ Instruments in the Early 1950s. In the 1850s William Huggins was in his early thirties. His father had recently died, enabling William to leave the family business and pursue his interest in astronomy. He was comfortably off, and was able to build an observatory in the garden of his house in Tulse Hill, South London. In 1865 the Royal Society commissioned a 15-inch refractor and an 18-inch reflector from the firm of Grubb in Dublin, and in 1868 placed them on long-term loan to Huggins. These instruments turned out to be a sound investment, being the mainstay of William and his wife Margaret’s research for forty years.

The 15-inch refractor (f12 focal length) was used by William and Margaret for visual observation of the spectra of bright stars, and the 18-inch reflector with Cassegrain focus for photography and spectroscopy. The two instruments were on one single German equatorial mounting, one instrument counterbalancing the other on a long declination axis. The mirrors of the reflector were made of speculum metal. Early photographic plates were sensitive only to short wavelengths so photographic work was done mainly in the blue and ultra violet parts of the spectrum. Crystal calcite was used in the auxiliary optics, and crystal quartz in the dispersing prisms. Both were costly and difficult to work.

The twin telescopes were not linked optically; indeed they could not be used together. The single mounting was merely an economic consideration, as the cost of installing and running the observatory was already high.

As William neared his eightieth year, he had to give up night work and negotiations took place with the Royal Society to transfer the instruments to the Cambridge Observatory. The dome housing them at Cambridge was renamed ‘The Huggins dome’, and a bronze plaque commemorating the Hugginses’ work between 1870 and 1908 is still on display at the Institute today.

At Cambridge, the Hugginses’ instruments were used for forty years, though the 18-inch speculum reflector became out-of-date and was replaced by a counter-weight. Dr Dewhirst worked only with the 15-inch refractor, having been appointed Junior Assistant Observer in 1950. His first job was as part of a team of observers in a long-term programme of stellar photoelectric photometry under the direction of Professor Redman. The team was working on the North Polar Sequence and was linked to observers of the southern skies in Pretoria.

As the dome was needed for the newly acquired Schmidt camera, the telescope was demolished in the 1950s. The bearings were worn out after almost 100 years’ use and extensive restoration work would have been required to bring the instrument up to standard. Some parts of both telescopes still exist; the 15-inch object glass (which is very fine) was kept, and some of the old speculum mirrors and spec-
trographs went to the Whipple Museum for the History of Science in Cambridge, where they are on permanent display.

In response to a question inquiring whether the objective of the 15-inch refractor was cemented or not, Dr Dewhirst replied that it was not. Cemented crown and flint glass was not practicable for larger lenses. He added that Grubbs made telescopes of quite a short focal length; the 15-inch was f12, for example.

The second talk was by Peter Hingley and was called The Place of the Hugginses in the Development of Stellar Astrophysics. Mr Hingley opened by emphasising that both Hugginses, William and Margaret, were part of the story, which was one of shared human endeavour. There was an amazing amateur contribution to the development of astrophysics.

William Huggins was born in London in 1824 and died at Tulse Hill in 1910. He came from a non-conformist family and never attended university, working in the family business until his father died in 1856. He was then able to sell the business and devote himself full-time to astronomy, his major interest and passion in life. He moved to Tulse Hill in South London and built a house and observatory there, aided, amongst others, by Revd W.R. Dawes. He bought an 8-inch objective glass made by Alvan Clarke in America and mounted by Cooke of York.

In 1859 Kirchoff and Bunsen in Germany announced an interpretation of the dark lines in the solar spectrum first seen by Fraunhofer, and Huggins was smitten. He had been looking for a new direction for his work and he at once seized the opportunity to extend this spectroscopic work to other celestial bodies. In 1862 he attended a meeting of the Pharmaceutical Society where his friend and neighbour William Alan Miller, Professor of Chemistry at King’s College, London, was lecturing on spectral analysis. Miller subsequently supplied Huggins with practical and analytical aid in the chemical aspect of his work, and the two collaborated together for many years.

Huggins was most famous for his work on stellar spectroscopy, but he also...

an amazing range of other things, including the spectral analysis of several comets. Starting in 1863, and working with Dr Miller, he commenced an extensive study of stellar spectra, which resulted in the identification of lines originating in various metals. He was still doing purely visual spectroscopy, using adjustable prisms attached to his spectroscope. In 1864 he started his investigation into the spectra of nebulae, and in 1867 he and Dr Miller were jointly awarded the Gold Medal of the Royal Astronomical Society for this work. In 1865 he was elected a Fellow of the Royal Society, and refined and developed spectroscopes that operated at non-visual wavelengths. In 1866 he took the first spectrum of a nova, T Coronae Borealis, and in 1866 viewed solar prominences outside of an eclipse by use of a slit. His chemical analysis of meteors was less successful, as was his attempt to use a thermopile to measure the heat reaching the Earth from the Moon. In 1867 he started measuring the motion of stars in the line of sight, encouraged by James Clerk Maxwell, though he was able only to measure the brightest stars with the instrumentation available. This work was the first attempt to measure astronomical doppler shifts. The Royal Society subsequently provided £2000 to fund equipment which it permanently loaned to Huggins, including a larger dome, a 15-inch refractor and an 18-inch Cassegrain reflector by Grubb of Dublin. These instruments were ready for use in 1871. Aware of the responsibility of using this equipment, William increased his workload considerably, although he was already in his fifties. The house and observatory were destroyed by a flying bomb in 1942.

In 1875 William married Margaret Lindsay Murray (1848-1915), a well-educated Dublin woman. The story goes that they met through the Grubbs in Dublin. The two began a famous partnership that has long been recognised as one of the best husband and wife collaborations in the history of astronomy. Margaret was an expert in photography, and their marriage gave William’s work a new energy, focus and direction. They worked in the new field of photographic spectroscopy and jointly wrote many papers. They used dry plates rather than the old and cumbersome wet collodion process.

By the end of the nineteenth century William was getting old and he stopped observational work. The two telescopes were dismantled and eventually came to Cambridge, but were later mostly destroyed. Mark Hurn, the Librarian at the IoA, had recently found one of Huggins’ objectives, which was now on display. William died in 1910, having received many honours, and having served as President of the Royal Society. He was knighted in 1897 and was one of the first recipients of the Order of Merit. William appears to have been a somewhat shy and grumpy bache-
lor until he met Margaret, and their marriage seems to have been a very happy one. She was obviously his muse, with her distinctive short hair, cut it is said to prevent it getting entangled in scientific equipment. Margaret was also passionately interested in the arts; the Arts and Crafts movement of the time emphasised personal creativity, which the pair certainly had.

Mr Hingley concluded by noting that he would like the SHA to undertake more commemorative work; the only commemoration of the Huggineses was in Westminster Abbey. No full biography of them has ever been written, though Barbara Becker was hoping to write up her PhD thesis as a full biography, emphasising their joint, collaborative work.

Dr Derek Jones gave the final talk of the morning session which was entitled Stellar Spectra. Dr Jones opened his talk by showing the apparatus used by Fraunhofer. The most conspicuous of the solar absorption lines were seen by William Wollaston in 1802. However it was Fraunhofer who noted the presence of a considerable number throughout the solar spectrum. Fraunhofer was an optician rather than an astronomer and was primarily interested in using the lines to calibrate optical instruments. He introduced an empirical nomenclature using capital letters. For example, A and B are telluric oxygen lines, C is Hα, and H & K are prominent lines of ionised calcium.

From the 1860s Father Angelo Secchi SJ (1818-78) pioneered the use of spectroscopy to study the physical characteristics of stars using the techniques of Bunsen and Kirchoff. He classified the spectra of over 4000 stars using a scheme with four distinct types (a rare fifth type was later introduced).
based on the colour and the presence of various absorption lines.

The introduction of Bunsen and Kirchoff’s techniques caused a ferment in astronomy, ultimately leading to the rise of the new astrophysics. Many of its proponents were not classical astronomers; Bunsen and Kirchoff were physicists, and Secchi was primarily a meteorologist. The spectrum of the recurrent nova T Cr Bor had been obtained in 1866. The spectrum of planetary nebula NGC 6543 showed unidentified lines which were thought to represent a new element, dubbed nebulium, but which were later shown to be forbidden ionised oxygen lines, not reproducible in the laboratory. Helium was another element first observed spectroscopically, in the Sun’s chromosphere; ‘coronium’, found in the Sun’s corona, turned out to be highly ionised iron.

The American amateur astronomer Henry Draper (1837-82) was another early proponent of spectroscopy and photography, for example taking the first photograph of the Orion nebula in 1880. However, he is best known for the catalogue of stellar spectra that bears his name. Following his early death his widow bequeathed his telescopes to Harvard College observatory and endowed a fund to produce the Henry Draper Catalog. This catalogue was compiled from photographic objective prism spectra, which could be a acquired at such a rate that a team of women ‘computers’ were recruited to analyse them. This team included Wilhelmina Fleming, Antonia Maury (Draper’s niece) and Annie Cannon. Together with Edward Pickering, Director of the Harvard Observatory, they developed the Harvard spectral classification scheme (of which the familiar Morgan-Keenan system is a direct descendent).

Sir Robert Ball was more interested in touring as a popular astronomy lecturer than observing during his time at Cambridge. The Revd Shepshanks left a fortune, some of which his sister gave to Cambridge for a new transit circle (1860s). In the 1890s she gave money for a new telescope, a coudé, which could be used with photographic plates. Dr Dewhirst commented that the Shepshanks telescope had a major defect; the optical flat on the declination axis was made of glass, not quartz, and it never really worked properly. One person who did master it was Henry Norris Russell, who measured stellar parallaxes with it. Russell’s photographic parallaxes were used for his first HR diagram. The Shepshanks telescope was housed in a run-off shed.

Professor Redman got rid of all the old telescopes, to much criticism, and installed a Schmidt camera. The Sheepshanks telescope was removed in 1957. An Ordnance Survey map of 1903 showed the dome housing it. Recent archaeological excavations had found no remains on the site.

Dr Jones concluded his talk by describing the development of the Hertzsprung-Russell (HR) diagram early in the twentieth century. In this plot a measure of intrinsic stellar brightness (usually the absolute magnitude) is plotted against a measure of the surface temperature (usually either spectral type or colour index). Theories of stellar evolution need to explain the distinctive features of the plot. The HR diagram was developed independently by Enjar Hertzsprung (1873-1967) and Henry Russell (1877-1957), though they did not meet until the meeting of the International Solar Union in 1913. Interestingly Russell had done some early work on trigonometric parallaxes, which contributed to his development of the HR diagram, during a visit to Cambridge from 1902 to 1905. After the talk, Dr Dewhirst commented that measuring stellar parallaxes was very difficult, but Hertzsprung recognised that all the stars in a given star cluster were at the same distance and so in a HR plot of stars in the cluster the absolute magnitude could be substituted by the apparent one.

Following Dr Jones’ talk the meeting adjourned for lunch and a tour of the IoA telescopes. The AGM was held immediately after lunch (see p15) and the remainder of the afternoon was devoted to the Keynote Lecture by Dr Ian Elliott on The Grubbs of Dublin: Victorian Entrepreneurs. Dr Elliott began by expressing his thanks; he considered it an honour to be invited to talk on the subject. He maintained that the real expert on the Grubbs was Ian Glass, who had written a book on them, but unfortunately he was in South Africa. There was a huge story to tell and he was only able to pick out the highlights.

Thomas Grubb (1800-78) was born near Portlaw, County Waterford, Ireland. His parents, William and Eleanor, were Quakers. It is not known where he obtained his education and mechanical knowledge.

In 1826 he married Sarah Parker from Kilkenny. She was not a Quaker so Thomas was disowned on his wedding day. In 1832 he established an engineering works at Charlemont Bridge in Dublin, making machine tools and cast-iron beds for billiard tables. He was interested in astronomy and built
himself a 9-inch telescope and small observatory, for which he charged one shilling admittance fee! News of his telescope reached the Revd Thomas Romney Robinson, Director of the Armagh Observatory. Robinson had been appointed Director in 1823 and stayed for fifty-eight years. He was a great friend of William Parsons, third Earl of Rosse. He advised Edward Cooper at Markree Observatory to have a Grubb mounting made for his 13.5-inch objective refractor (itself made by Robert A. Cauchoix of Paris). The tube and equatorial mounting were of the German type, and constructed of cast-iron, which is believed to be the first time this material was used in a telescope. It is also believed to be Grubb’s first commercial venture into telescope making. All those that followed were of a similar design.

Grubb had built a 15-inch Cassegrain, the first large reflector mounted equatorially, with a clock drive. His innovation was the use of levers to spread the load over the mirror. This design was adopted by the Earl of Rosse for the Great Leviathan, which had eighty-one supports.

The British Association for the Advancement of Science met in Dublin in 1835. Grubb joined the Association and was asked to build instruments for some Dublin academicians. He was elected to the Royal Irish Academy, an extraordinary achievement for someone with no formal education. In 1840 he was appointed engineer to the Bank of Ireland, responsible for printing bank notes, which were said to be of superior quality to those from the Bank of England!

In 1864 he was elected a Fellow of the Royal Society of London. He suffered from rheumatism for many years, and died in 1878. Dr. Elliott showed a summary of his work on various telescopes, including the Sheepshanks tube and mounting, the West Point Academy tube and mounting, and the Birr eyepieces.

At the 1853 Great Exhibition at Leinster house in Dublin he exhibited his 12-inch equatorial telescope. Bearings were used in this telescope (this was before ball bearings were invented), and the polar axis was lifted to relieve the pressure. This principle was adopted in all subsequent Grubb telescope designs. The telescope was subsequently installed at the Dunsink Observatory. In 1854 he published a paper on spherical aberration in microscopes. He mentioned using graphical methods to determine the aberration of lens systems, drawing diagrams ten times the original size.

Thomas was also interested in photography; in 1853 he was making stereoscopic photographs on wax paper, some of which still exist. He became a member of the Dublin Photographic Society (later the Photographic Society of Ireland) and designed portrait lenses. In 1857 he patented an improved photographic lens.

From the 1840s there was interest in erecting a large telescope in the southern hemisphere. Specifically, the authorities in Victoria, Australia issued a call for a powerful telescope to study the southern nebulae. The project took many years to come to completion, with delay due to, amongst other things, the Crimean War. The final result, however, was the 48-inch ‘Great Melbourne Reflector’, completed in 1868.

Thomas Grubb won the contract to build this telescope and he took his son, Howard (1844-1931) out of university to complete it. It was built at the Grubb’s works at Rathmines, Dublin and was a Cassegrain reflector with a speculum metal mirror. Howard would recall casting the mirror as ‘a baptism of fire’. He built a steam-driven grinding machine to figure it. A
bed of hoops allowed the bubbles to escape during casting. The first attempt ended in failure when part of the metal ran down between the hoops and broke the chains.

The telescope was the last large reflector to have a speculum mirror; subsequent instruments used the new silver-on-glass technique. This choice was a disaster. The mirror soon tarnished in use. There were no facilities to repolish the mirror in Australia and no funds to transport it to Ireland for refurbishment. R.L.J. Ellery, the Director of the Melbourne Observatory, taught himself how to repolish it, but he had no means to check and correct the refigured surface. The telescope never performed well again and was considered a failure. This episode set back the adoption of large reflectors by twenty years, but it did establish Howard Grubb as a serious telescope maker.

The rise of astrophysics from the 1870s meant the Grubbs had plenty of work, including the building of William Huggins’ 15-inch refractor commissioned by the Royal Society of London. In 1873 he made his first silver on glass mirror, for the Royal Observatory Edinburgh. He was visited by Simon Newcomb from Lick Observatory in the USA, who was touring Europe looking for the best telescope makers for a new, planned observatory at Mount Hamilton in California. Newcomb decided Grubb was the only decent telescope maker in Europe; ‘a genius who meant business’. Howard put a lot of work into designing instruments for the Lick Observatory, but in the event, his rising floor was the only element that was used, much to his disappointment.

In 1875 the Viennese Observatory in Austria wanted a new, larger observatory, and Grubb was given the contract to build a 27-inch refractor and new domes. The cost was £8000. He rebuilt the Rathmines Works, with a 12-sided space inside the building to construct and assemble the telescope. There were delays with the glass, and first light was not achieved until 1883. Dr Elliott had visited Vienna and was pleased to report that the refractor was still in good health. A plaque in Grubb’s honour had been erected there.

Grubb understood the physics of telescope making; the tube had stiffeners and baffles with holes for the light to come through, and gaps for air to circulate. The right ascension axis was on bearings and there was a lifting mechanism to relieve the pressure. Right ascension and declination measurements could be read off by use of a periscope, and there was a clockwork mechanism to control the rotation of the drive.

Astrographic telescopes stemmed from the work of David Gill at the Cape in the 1880s. Successes photographing star fields naturally led to the idea of mapping the entire sky photographically. Such a programme would be an enormous undertaking, and to organise it an interna-
ational congress was held in Paris in April 1887 under the chairmanship of Admiral Mouchez, Director of the Paris Observatory. The Carte du Ciel, as the project became known, was a collaborative effort involving eighteen observatories in both hemispheres.

The project used standardised astrographic telescopes of a design previously used successfully by the brothers Paul and Prosper Henry. These astrographs comprised a 13-inch refractor with an 11-inch guide telescope, built to exacting standards and hence expensive. Grubb supplied seven of these instruments. Howard would often finish the lenses himself, testing them with a spherometer.

There was a total solar eclipse of the Sun in 1900 and Grubb persuaded the Royal Academy and the Royal Dublin Society to mount a joint expedition to Plasencia in Spain. He made an 8-inch coelostat specifically for the eclipse; it is adjustable in latitude and is beautifully made.

Around 1900 the market for telescopes declined and American observers were not interested in European instruments. Despite his Quaker background, Howard started making gun sights and periscopes, taking out a patent for a submarine periscope in 1901. Telescope work was halted altogether during World War I, and Howard concentrated on making periscopes. However Dublin was seen as a security risk (because of Irish Sea crossings and political instability) and the works were moved to St Albans in England. However, this move was not fully completed by the end of the War.

Grubb supplied instruments, including astrographic plates, for Eddington’s famous 1919 total solar eclipse expedition which successfully tested General Relativity by measuring the displacement of star images by the Sun’s gravitational field.

In 1876 Howard was granted an honorary master’s degree in engineering from Trinity College (he never graduated), and in 1883 he was made a Fellow of the Royal Society. In 1912 he was awarded the Boyle medal of the Royal Dublin Society. He retired to Monkstown, south of Dublin, and died there in 1931.

There was a slump after World War I and the firm of Grubb was liquidated in 1925. It was rescued by Charles Parsons, the youngest son of the Third Earl of Rosse, who established the firm of Howard Grubb, Parsons & Co. at Newcastle-upon-Tyne in England. This company made fifty large telescopes, including the Isaac Newton and William Herschel telescopes on La Palma. It traded until 1985, and Grubb telescopes are still working all round the world.

The Chairman closed the meeting by thanking Dr Elliott for his excellent talk. Summing up, he noted that we had learned much during the day not only about the science of spectroscopy but also about the people involved.

Further reading

Many of the topics discussed at this meeting are also covered in John Hearnshaw’s The Analysis of Starlight (1986, Cambridge Univ. Press). Prof. Hearnshaw has also recently published Astronomical Spectrographs and their History (2009, Cambridge Univ. Press).


[In thanks for providing the venue and facilities the SHA paid for the renovation of a book in the IoA Library. Mark Hurn describes the result of this exercise on p17 — Ed.]
AGM Report

Madeline Cox

As usual the AGM, the sixth, was held as part of the Society’s Spring Conference (see p7). The Chairman formally opened the meeting and reminded the audience that only fully paid up members of the Society were eligible to vote. He then presented a list of apologies for absence. He concluded his introduction by reading out a letter in which the Honorary President, Dr Allan Chapman, said how much he valued the work of the Society and emphasised his willingness to continue in office if the members so wished.

The minutes of the previous AGM (July 2007) were adopted and then the annual reports, which had been previously circulated, were presented by the various officers. The Secretary, Kevin Kilburn, gave his first report, having taken over from Stuart Williams the previous year. It had been a period of consolidation, the SHA performing its function of recording the history of astronomy in the UK, alongside the RAS, the BAA and other bodies. The SHA had set out to be peripatetic, though regular meetings were held in Greenwich, Cambridge and Birmingham. There was a lot of interest in the Northwest, as had been demonstrated by the joint meeting at Chetham’s Library, Manchester, in March. He asked members to consider holding meetings in their own locality, including Wales and Scotland. Such events would need to be self-financing, and would aim to attract additional members. The SHA had already been asked to exhibit at an event in Wales during the International Year of Astronomy, 2009.

The Treasurer, Ken Goward, presented his report. The main source of income was subscriptions; the figure for the year was slightly down on 2007, as some members had paid in the previous financial year. It was encouraging to note that annual turnover was now over £5000, sufficient to apply for charitable status. There had been increased expenditure on the Library to improve facilities at the BMI, which would continue in the current year. He asked members to enclose a stamped addressed envelope on all correspondence to help reduce costs.

The investment of the Cox bequest had been delayed pending formal application for charitable status. Funds remained in a healthy state. A new Treasurer was needed with investment knowledge. The accounts were accepted by the members present.

Ken Goward then delivered his membership report. Twenty-one new members had joined during the year and twelve had not renewed. Membership, now worldwide, stood at one hundred and forty six. Stuart Williams suggested investing more in publicity to increase membership, which was agreed.

Madeline Cox presented the Librarians’ report, compiled jointly with Stuart Williams. The main purchase of the year had been Thomas Hockey’s long-awaited Biographical Encyclopaedia of Astronomers, which had been added to the reference collection. Money had been allocated to upgrade facilities at the BMI, and it was planned to produce an integrated catalogue and new manual for Library users. There had been many donations, as usual, with excellent collections from the Norman Lockyer Observatory and Dr David Dewhirst. All the donors were thanked for their generosity. The uptake of Library use had been disappointing, given that opening times were now more flexible and details had been circulated to members in a special newsletter. Recordings of our conferences were now available on CD-ROM, courtesy of Mike Oates, who was thanked for his work, as were all members of the Library team.
Roger Jones introduced his Survey Report. Three or four counties had been added during the year; there were 20 in total. 120 were needed to cover the whole country. Roger asked for contributors, if only on a local scale. The Survey was being reformatted on the Web site to include a master list of names and observatories.

Mark Hurn reported that the Society Archive was now quite large but he still welcomed donations. It now included sound recordings as well as paper publications.

Dr Reg Withey gave his report on The Antiquarian Astronomer, which he and Kevin Johnson edit. The Chairman remarked that he had received many favourable comments about it. Reg emphasised that the journal was a team effort and needed the input of members if it was to succeed. More reviewers especially were needed. The last issue (number 4) had been published on time, before Christmas, and issue 5 was in preparation. At the last Council meeting it had been agreed to produce a 5-year plan for the journal. It was possible to produce additional copies of back issues if required.

Clive Davenhall was unable to be present but he had submitted a Newsletter report. Peter Grego had taken over the layout from David Rayner. It had not been possible to produce the Newsletter quarterly as originally intended, and there would only be three issues in the current year. More news items and letters were requested from members.

The Chairman said Council had been considering the best way to use the Alan Cox bequest. There were three aspects to consider: financial management, commemoration of the benefactor, and future projects it might finance. It had been agreed to invest the money to produce an accessible income while protecting capital from future inflation. Council had also agreed to award an Alan Cox medal to major contributors to the history of astronomy, when suitable candidates arose. One would be awarded retrospectively to Sir Patrick Moore. The bequest would also help finance travel costs of high-calibre speakers at conferences. Any major project would have Alan Cox’s name attached. The books which Alan had bequeathed had been put into a special collection in the Library, with commemorative plates. Members were asked for suggestions, which included incorporating Alan’s name on our letterhead, publishing a series of monographs, and encouraging the work of younger historians of astronomy.

Peter Hingley updated members on the application for charitable status, which was now back on track as the Society had reached the new target of £5000 turnover per annum. He had been advised that the best investment for the Alan Cox bequest were Charibonds, which paid a good rate of interest. Tax exemption status was needed and was being sought from the Inland Revenue.

The final agenda item was the election of the 2008-2009 Council. All Council members had agreed to stand again, and were duly re-elected.

Members gather prior to the tour of the IoA telescopes.
Gill’s History restored

Mark Hurn

The SHA AGM and Summer Conference was held at the Institute of Astronomy (IoA), Cambridge in May this year (see p7). The Institute is part of the University of Cambridge and provided the conference venue free of charge. However, in return the SHA offered to make a small donation towards the repair of a book in the IoA Library.

The book chosen was Sir David Gill’s A History and Description of the Royal Observatory, Cape of Good Hope, published in London by His Majesty’s Stationery Office in 1913. It is a large book (fifteen inches high), well-illustrated with black and white photographs, maps and diagrams. The IoA Library has two copies. The first was originally received by the Cambridge Observatory and is now held in our Rare Book Room. The second was acquired from the Royal Greenwich Observatory when it closed in 1998. This latter copy was chosen for repair as its cover was badly damaged and the spine broken off. We also thought it appropriate that the SHA should sponsor a history book.

The book was repaired by The Cambridge Bookbinding Co of Gwydir Street, Cambridge at a cost of £40. The IoA is very grateful to the SHA for meeting the full cost of this repair. The book is now ‘as good as new’ and has returned to the shelves with a bookplate recording the SHA’s generosity.
THE 2008 SHA Autumn Conference was held on Saturday 4 October. As usual, the venue was the Birmingham and Midland Institute in central Birmingham. The meeting was to have been chaired by Gilbert Satterthwaite, but due to an unavoidable medical appointment he would not arrive until later in the day. Consequently SHA Secretary Kevin Kilburn chaired the morning session. He began by noting that Ken Goward and Stuart Williams, both Council Members and stalwarts of SHA meetings, could regrettably not be present.

The first speaker was Andrew Lound who presented in his inimitable and entertaining way an overview of Lunatik Astronomy. The Lunar Society was an informal society of friends with scientific and philosophical interests mostly living in and around Birmingham, that thrived in the later eighteenth and early nineteenth centuries. The group met in each other’s homes. It took its name from the timing of its meetings, which were arranged for the evening of the Monday closest to a full Moon, in order to facilitate members returning home during the hours of darkness.

Members of the group jokingly called themselves ‘lunatiks’ and regular attenders were Erasmus Darwin, Benjamin Franklin, the Revd John Michell and John Whitehurst, the clockmaker. Occasional visitors included James Watt, Joseph Priestly, Josiah Wedgwood, James Kier, William Herschel and even Horatio Nelson.

In the later eighteenth century Birmingham was a rapidly developing industrial centre with its own assay office and later its own mint. It was also a ferment for scientific (and other) ideas, regularly staging public lectures. For example, the astronomer James Ferguson gave talks in the city, demonstrating his astronomical instruments and electrical apparatus. Astronomy was a subject of great popular interest. A century earlier Sir Isaac Newton’s Principia had established universal gravitation as the mechanism underlying planetary motion, and it had been triumphantly vindicated by the return of Halley’s Comet in 1759. Throughout the century increasingly sophisticated mathematical treatments of the ‘three body problem’ improved predictions of planetary orbits.

The Lunar Society discussed all scientific matters: optics, electricity, chemistry and physics. Many
members were involved in manufacture and inevitably they considered the prospects of commercialising scientific ideas. Telescope and glass making, industrial chemistry and especially the development of steam power were regular topics.

Matthew Boulton (1728-1809) was a prominent member of the Society and it often met at his home, Soho House in Handsworth, Birmingham. Boulton was a manufacturer, initially of buckles, candlesticks and other ornamental products. He became wealthy from his business and had also inherited a fortune on marriage. He is primarily known for his partnership with James Watt from the mid-1770s, when they manufactured steam engines. However, Boulton had a wide range of interests. He collected scientific instruments and was keen to discuss the new technologies, particularly electricity and steam-powered devices.

Boulton is not usually known for his astronomy, but Mr Lound had uncovered evidence of his interest in the subject. He had considered building an astronomical observatory with telescopes provided by Jesse Ramsden. Boulton already made tubing for Ramsden’s instruments. Mr Lound had discovered plans for ‘a little round building’ that may have included transit rooms and he conjectured that the design may have been a forerunner of later circular observatories elsewhere. Although it is not known for sure if he did build an observatory, there is a circular building in the grounds of Soho House that could have been used for astronomy. Boulton’s astronomical ambitions were probably abandoned when he went into business with Watt.

In response to a question from Sir Arnold Wolfendale, Mr Lound replied that the Lunar Society apparently showed no interest in the Moon, although they often discussed volcanism and geology.

Stuart Williams was to have spoken next on Walsall Astronomers, but unfortunately he could not be present. Dr Clive Davenhall had stepped in at short notice with a report of a conference that he had attended the previous week. He emphasised that the was giving a summary of this conference, not presenting his own work. The symposium The Invention of the Dutch Telescope was held to celebrate the four hundredth anniversary of the invention of the telescope. It took place in Middelburg, Holland, where the earliest known telescopes were made in 1608.

The origins of the telescope remain a mystery. It has been suggested that telescopes were used in Elizabethan, Medieval or even Classical times, though none of these proposals are corroborated or widely accepted. They all tend to feature devices with mirrors rather than lenses. The first documented telescope occurs in Middelburg, in 1608. It was the work of Hans Lipperhey (1570-1619), an obscure spectacle maker of humble origins. Within a few months two additional claims appear: another from Middelburg and one from Alkmaar in North Holland.
In September 1608 Lipperhey travelled to The Hague to petition the Stadholder, Prince Mauritis of Orange for a patent. As part of the application a demonstration was arranged from the Stadholder’s residence, the Mauritis Tower. It was a success and Delft Church three miles away was clearly seen. By chance a peace conference was underway in The Hague to discuss a cessation of hostilities in the Dutch War of Independence from the Spanish Crown. Some delegates from the conference attended the demonstration. They immediately appreciated the military applications of the new instrument and news of it spread like wildfire.

The rest is history. The device was known in the capitals of Europe within months. In July 1609 Thomas Harriot made the first astronomical telescopic observations, of the Moon. Later the same year Galileo developed an improved design of telescope and began the series of astronomical observations that lead to the dramatic discoveries reported in the Sidererus Nuncius (1610).

In addition to the earliest documented telescopes the conference explored a number of related themes, including the evidence that telescopes were constructed in Elizabethan England, the extent of the spectacle trade, the availability of lenses and the circumstance that only the better-quality lenses were suitable for use in telescopes. A final topic was the diffusion of knowledge about the telescope (in which the Jesuits played a significant role) and its acceptance as a useful instrument.

The final speaker before the lunch break was Mr Lee Macdonald whose topic was The Isaac Newton Telescope (INT), concentrating on its early history. The INT is now a 100-inch telescope at the Roque de los Muchchos Observatory La Palma in the Canary Islands. However, it was originally sited at the then-Royal Greenwich Observatory (RGO) at Herstmonceux, in Sussex, where it had a 98-inch mirror.

The INT was originally opened in 1967 after a protracted design and construction costing £1 million. However, it was never productive in its original location because of the poor weather and seeing in Sussex compared to the mountaintop locations where such instruments are usually sited. In 1979 it was relocated to La Palma and given a new mirror. In 1983 an investigation found that it had generated only one-sixth of the scientific papers that a comparable instrument in a better location could expect to generate.

The INT originated in a post-war review conducted by several committees of the Royal Society into the reconstruction of UK science following the cessation of hostilities. One outcome was a recommendation for a large optical telescope. Since the heyday in the nineteenth century the UK had fallen behind in observational astronomy, particularly in the availability of large telescopes. America dominated this field with first the 60 and 100-inch instruments on Mount Wilson and in the immediate post-war period the
200-inch telescope on Mount Palomar. By contrast, the largest telescope in the UK was the the 36-inch Yapp reflector at Greenwich.

One of the principal proponents of a large telescope was Harry Plaskett (1893-1980), Savillian Professor of Astronomy at Oxford. He was the son of John S. Plaskett, who had masterminded the construction of the 72-inch telescope at the Dominican Observatory in Victoria, British Columbia and thus he was familiar with the advantages of large reflectors. In March 1945 he wrote to the Astronomer Royal, reiterating that much of the astronomical equipment in the UK was outdated. Plaskett expanded on his theme in his Presidential Address to the RAS in February 1946, and in the following month the RAS appointed a committee to consider the problem. In due course this committee recommended that His Majesty’s Government be requested to fund such a facility. Regarding the UK’s climate, Plaskett argued that during the nineteenth century telescopes owned by Herschel, Andrew Common and Lord Rosse, of 48, 60 and 72-inches aperture respectively, had been used successfully. He neglected the fact that these instruments had not been as productive as their owners had hoped! Plaskett suggested a 74-inch Schmidt telescope that could capture photographs with a relatively short exposure.

In a separate development, in June 1945 it was recommended that the Royal Observatory be moved out of London to darker skies. The site chosen was Herstmonceux Castle in East Sussex, where the Observatory became the Royal Greenwich Observatory. This move was to prove complex and protracted and was not completed until the late 1950s.

The putative new instrument was named the Isaac Newton Telescope and the proposal rushed through without debate in order to be announced as part of the celebrations of Newton’s tercentenary in 1946 (they was delayed a few years because of the war). The Royal Society submitted to the Treasury a proposal for a 100-inch cassegrain telescope and two ancillary Schmidt cameras. The post-war Labour Government was keen to support science and the project was quickly approved, again without discussion. Funding for the 100-inch INT was announced in the summer of 1946 but the Schmidt cameras were not funded. Prior to 1965 (when it was taken over by the new Science Research Council) the RGO was run by the Admiralty, who regarded it as a low-priority anachronism. To minimise costs a low-cost mirror was specified and Pilkington tendered a price. However, Spencer Jones learned that a 98-inch mirror blank was available from Michigan University, and they subsequently presented it as a gift to the UK. However, the blank was later found to be flawed, with some internal cracking. Nevertheless it was accepted and ground and figured by Grubb-Parsons. When the INT was moved to La Palma the original mirror was left at Herstmonceux, where it can be seen today.

There were differences of opin-
ion regarding the design of the telescope. In 1947 a hybrid system was proposed, alternating between a Cassegrain configuration and a Schmidt with an 80-inch corrector plate. The project rapidly became bogged down; the 98-inch mirror was not finished until 1954 and to accommodate the proposed (and later abandoned) Schmidt option it was ground to an f4 ratio. In 1954 all finances were postponed by the then cash-strapped Government.

Richard Woolley became Astronomer Royal in 1956. He wanted the INT located in the southern hemisphere, where he had had experience with big telescopes at Canberra, but Spencer Jones remained adamant that it would be located in the UK. The duplex system was, however, dropped. Correspondence between Woolley and Grubb-Parsons suggests that he wanted to abandon the flawed 98-inch disc in favour of a better 74-inch mirror destined for Egypt. However, this idea fell through as the Suez crisis developed, and to avoid upsetting Michigan.

There was one last niggle. Telescope domes are best painted white to minimise daytime heat build up, but because of local objections, acceded to by the Admiralty, when the telescopes removed from Greenwich were installed at Herstmonceux their copper-clad domes were left unpainted and allowed to tarnish to an acceptable green. However, astronomers were adamant that the INT dome be painted white and this was agreed in 1962.

The INT telescope was eventually completed in August 1967 and opened by HM the Queen. It was in use for only twelve years before being removed to La Palma. A number of causes had contributed to the problems with the telescope, including shortages of funds and infighting over the design. Much of the project had been overseen by Spencer Jones who was an astrometrist with little experience of large telescopes. Moreover at the same time he was also supervising the drawn-out and complicated move of the RGO. When the instrument was conceived an overseas telescope used by astronomers visiting from the UK was not practical, but by the time it was opened the development of mass air travel was rapidly making this mode of operation the norm. The Sussex-based INT was destined to obsolescence and relocation.

Following Mr Macdonald’s talk the meeting adjourned for lunch. As usual the Society’s Library was open for business during the lunch and coffee breaks. Gilbert Satterthwaite arrived during lunch and he chaired the afternoon session. This session began with a talk by John Armitage on Lord Wrottesley.

Lord John Wrottesley (1867), Second Wrottesley, left us a leg as a Peer of the Realm and as an intermediary between the public and government in the interests of the public understanding of science. His seat was at Wrottesley Hall close to the A41, not far from Wolverhampton in South Staffordshire. Following a private education at home, he went to Westminister School in 1810 and matriculation went up to Church College, Oxford, ... There he acquired his interest in astronomy from Dean Cyril Jackson and Stephen Rigaud, a Fellow of the Royal Society and later Savillian Professor of Astronomy. Wrottesley obtained a first class degree in mathematics in 1819 before going to London to train and serve as a barrister at Lincolns Inn. At around this time, he was involved in the founding of the Astronomical Society of London, later the Royal Astronomical Society.

He set up an observatory at Blackheath from 1829-1831, where he concentrated on the positional astronomy of sixth and seventh magnitude stars. For this research, in 1839, he was awarded the Gold Medal of the RAS. In 1841 he became president of the RAS and was elected a Fellow of the Royal Society. That same year his father died and he became the second Baron Wrottesley and returned to the family seat in Staffordshire. He immediately erected an observatory there with three instruments; a 7 ¾-inch
refractor fashioned by Dollond, a ¾-inch transit telescope and a transit circle made by Troughton in 1793. Their current whereabouts is unknown.

The remains of the Wrottesley Observatory are to be found within a small clump of trees on the edge of the Wrottesley estate. The site would be familiar to those SHA members attending the 2007 Summer Picnic at Pendrell Hall. The brick walls of the observatory are still visible as is the iron ring on which its dome rotated. The massive stone piers of the transit instrument are still present and the computer’s room with its small fireplace is still extant, albeit in a ruined and dilapidated condition. All was constructed by Wrottesley’s own workmen. A memorial window to Joseph Hough, Wrottesley’s observer, who died in 1924 at the age of 86, can be seen at nearby St Peter’s Church. In his latter years Hough still served as curator to the observatory but it deteriorated rapidly after his death.

Mr Armitage had been instrumental in the construction of nineteenth century-style observatories housing renovated Victorian telescopes at Pendrell Hall and at the Black Country Museum. He rounded off by noting that a prominent lunar crater near Petavius was named after Lord Wrottesley.

Before the next talk Mr Kilburn recalled that when he was assembling the programme for the meeting he had been e-mailed by a new member of the SHA asking to give a talk. How does one refuse Sir Arnold Wolfendale, fourteenth Astronomer Royal? We were all delighted to welcome him. Sir Arnold spoke on Astronomers Royal Through the Ages, describing some of the achievements of his illustrious forebears, interspersed with humorous anecdotes and incidents from his own time as Astronomer Royal. He began by modestly emphasising that his own claim was that as President of the RAS in 1981 he instigated the RAS tie, with the Herschel telescope emblazoned upon it and available in three colours!

Astronomers and astrologers had for ages held influential positions in the courts of monarchs throughout Europe and Asia. Knowledge of star positions was regarded as fundamental to navigation in the late seventeenth century and in 1675 the Royal Observatory was founded by Charles II to ‘perfect navigation’. The first Astronomer Royal was John Flamsteed (1646-1719), born near Derby. He had no formal qualifications in astronomy but was, however, a perfectionist and unwilling to publish his observations until they were as accurate as he could make them. Newton and Halley, however, wanted to use his data to test Newton’s theories of gravitation. In the ensuing bitter dispute some observations were published prematurely, but full publication only occurred after Flamsteed’s death. He had observed with his own instruments, which his widow sold, so Halley, the second Astronomer Royal, had to re-equip the observatory.

The original reason for the obser-
Babylonian times that the Earth has indeed slowed down but that the Moon has imposed a stabilising effect on the seasons. The Moon moves away from the earth at a rate of about 4 cm/year and as it recedes total solar eclipses will eventually become impossible.

Richard Woolley (1906-1986) is often remembered for dismissing space travel as ‘bilge’, but this is an unfortunate misrepresentation of an off-the-cuff remark made after a long and tiring flight.

Sir Francis Graham Smith, thirteenth Astronomer Royal, was the first radio astronomer to hold the position. When taking over from him, Sir Arnold asked him if there was a Royal Coat of Arms for the post. He replied that it was ‘early days yet’, after three hundred years! Sir Arnold approached the Office of the Queen and it was granted that a coat of arms could be commissioned. The arms were first publicly unveiled by Sir Arnold at the centenary meeting of Manchester Astronomical Society in 1993. His own research was in the field of cosmic rays and it was through this that he got into astronomy.

The fifteenth Astronomer Royal, Sir Martin, now Lord, Rees is an astrophysicist and president of the Royal Society. Although the Royal Observatory has closed, there is currently no indication that the appointment of Astronomer Royal will be discontinued.

Following Sir Arnold’s talk there was a welcome break for coffee. After proceedings resumed Gilbert Satterthwaite explained that when SHA member Alan Cox sadly died in August 2006, part of his legacy was left to the SHA to ensure that our young society was financially supported. It was agreed that part of the legacy should be used to finance a series of occasional Alan Cox Memorial Lectures. It was therefore a privilege to introduce the first such Lecture, to be given by Professor Nick Kanas, from the University of California, San Francisco. Prof. Kanas specialises in space psychology, doing research with NASA astronauts. He is also an amateur astronomer and avid collector and expert on star atlases, and has recently published Star Maps, which was also the title of his talk.

Prof. Kanas began by noting the star atlases and charts were highly collectable items. Nowadays the most expensive plates available to the collector were from Andreas Cellarius’s cosmological atlas, Harmonia Macrocosmica of 1660, which could sell for $15,000 apiece.

Covering three millennia and four continents, Prof. Kanas explained how our Earth-centred perspective on the night sky has been interpreted in the production of constellation charts and star maps through the ages. He extended this theme and developed it in detail with specific references to Chinese, Indian and Mediterranean astronomy and astronomical cartography from the first millennium BC down to more recent times. Greek astronomy, codified late in classical antiquity by Ptolemy, pictured an Earth-centred universe in which eccentric circles, differentials and epicycles were used to explain planetary motion. This complex and sophisticated scheme vanished from Western Europe as the Roman Empire disintegrated, but was preserved and adapted in the Middle East. It eventually re-entered Europe via Islamic Spain.

Later the invention of the printing press and new map projection methods allowed better representation of the celestial sphere.
although early star maps still followed the traditional ‘external’ view of celestial globes. The first printed star map that included a grid system was probably that by the sixteenth century Italian astronomer and cleric, Alessandro Piccolomini.

The ‘golden age’ of astronomical cartography, approximately 1600-1800 was amply covered and well-illustrated. The first major atlas was Bayer’s Uranometria of 1603. It was geocentric, with stars plotted with respect to the ecliptic and the ecliptic poles. Stars were positioned on a grid and the classical figures of the Ptolemaic constellations were lavishly depicted. The second important atlas was the Firmamentum Sobiescianum (1690) by Hevelius in Gdansk. He constructed his star catalogue from observations made using traditional methods, without the use of telescopic sights. Prof. Kanas described how volvelles were used to measure and plot positions graphically; the modern planisphere works on similar principles.

John Flamsteed’s Atlas Coelestis, compiled from his star catalogue, was published posthumously in 1729. It plotted over 3000 stars with respect to the celestial equator and became a standard atlas for nearly a century. A sinusoidal projection was used to give a better representation of the sky. A French edition by Fortin was published in 1776 in a smaller, less unwieldy, format. In 1782 Johann Bode also produced a version of the Flamsteed atlas, the Vorstellung der Gestirne. However, more famous is his Uranographia of 1801, a much bigger atlas with many more stars and new constellations, leaving it looking cluttered.

Prof. Kanas spent some time describing atlases by Johann Dopplemayr, John Bevis (the unpublished Uranographia Britannica or Atlas Celeste), and others which are perhaps less well known. During the nineteenth century atlases became more utilitarian, with the constellation figures de-emphasised or absent and lines drawn to represent the boundaries between constellations. In 1919 the first General Assembly of the IAU standardised and reduced the number of constellations and in 1930 precisely defined their boundaries in terms of equatorial co-ordinates. Twentieth-century astronomical cartography would not be complete without mention of Norton’s Star Atlas and those of

![Ursa Minor (left) and Ursa Major (right) from Alessandro Piccolomini’s De le Stelle Fisse (1579), the first printed star atlas.](image)
Bečvár and Tirion. The later is now plotted by computer and can be updated with ease. The Millenium Star Atlas was the last non-computer generated atlas and like several star atlases published for the epoch 2000 would be very collectable in future.

Prof. Kanas’ talk was very well-received. Gilbert Satterthwaite thanked him warmly, remarking that the talk would have been of great interest to Alan Cox. He then formally closed the meeting with thanks to all the speakers and organisers for making it such a memorable event.

Further reading

Two books on the Lunar Society have been published recently. Jenny Uglow has written a general account of the society, The Lunar Men (2002, Faber, London) and Andrew Lound discusses their astronomical interests in Lunatick Astronomy (2008, Odyssey DL), a copy of which is available in the Society’s Library. There is a Wikipedia entry at: http://en.wikipedia.org/wiki/Lunar_Society.

A report of the symposium The Invention of the Dutch Telescope will appear in a future issue. Proceedings are also in preparation.

Little has been published about the history of the INT. It has a Wikipedia entry (http://en.wikipedia.org/wiki/Isaac_Newton_Telescope) but this is mostly about the telescope in its current configuration on La Palma.

For Lord Wrottesley’s astronomical activities see John Armitage’s paper in The Antiquarian Astronomer (2006, 3, pp5-10). See also Newsletter 14, October 2007, pp16-18 and passim.


Scriven Bolton and his giant Two-Foot Telescope

John Armitage

THOMAS Simeon Scriven Bolton (1883-1929) is now almost forgotten, but nevertheless he was in his day a significant figure in Edwardian and early twentieth century astronomy. This was particularly so in the north of England, where he was based in the Leeds area. He was always known as Scriven (his mother’s maiden name), his first two Christian names (the names respectively of his grandfather and father) never being used.

Scriven was interested in astronomy from an early age and during his lifetime was a member of a number of astronomical societies, including the Leeds Astronomical Society, the BAA and the RAS. He published many of the results of his observations in journals, not least in the Journal and Memoirs of the BAA, particularly between 1906 and 1917, which seems to have been one of his most productive periods.

Scriven Bolton was also a gifted artist (see p30), which enabled him to illustrate his observations to good effect. He also did a good deal of commercial illustration work and had an influence on Chesley Bonnestell.

Scriven always sought the highest standards from the telescopes that he possessed, which ranged from an early acquired instrument in the form of a 4\(\frac{1}{8}\) -inch refractor; a 10\(\frac{1}{8}\)-inch With-Browning reflector which he acquired in 1905 (the same year that he was elected a Fellow of the RAS); to his giant ‘two-foot’ Newtonian reflector, which he placed in a substantial observatory in the grounds of the family home, Waterloo Lodge, at Bramley, Leeds, in 1913. The term ‘two-foot’ telescope presumes an aperture of about 24 inches, but archival information suggests that the actual diameter of the mirror was 26 \(\frac{1}{2}\) -inches. This mirror is said by some sources to have been by Calver, though others are more sceptical on this point. It seems that the drive of the Newtonian was by Calver, so it is quite likely that the mirror was also, as Calver was active and making high-quality mirrors at the time concerned.

Besides his own instruments, Scriven Bolton also seems to have made use of the 18-inch reflector at the Dumcombe Observatory of Leeds University, which begs the question: why did he need to use this 18-inch instrument when he had the ‘giant’ 26 \(\frac{1}{2}\)-inch telescope at his disposal? Was the giant telescope’s performance in some way compromised? Had the mirror been damaged in some way, or even broken?

Scriven Bolton died on Christmas Day, 1929, from complications following a bout of influenza. He bequeathed his astronomical equipment, including the ‘two-foot’ telescope, to Leeds University, but it seems that at this time the giant telescope was without its mirror, the fate of which is not known.
Scriven’s mother, Hannah, wanting to make sure that her son was remembered by a full bequest which would include a fully operational telescope, responded to this deficiency by ordering a replacement mirror from Cooke, Troughton and Simms. The replacement mirror is not 26 ½-inches in diameter as was the original, but a nominal 23 ½-inches, the cost of which was £240 and which it is said to have been ready for silvering in 1936. As this replacement mirror still does not have any trace of a surface coating, it seems likely this process never took place. The mirror is 3 inches thick, has a focal ratio of f6.8, and weighs 151 pounds (see the photograph of the mirror today).

We should now ask why the replacement mirror was of a different diameter to the original. It is possible that Cooke, Troughton and Simms had a 23 ½-inch blank to hand and that this was convenient to use. It is not known what the focal ratio of the original mirror was, but I speculate that it was probably around f6, so the replacement 23 ½-inch mirror ground to f6.8 would give a very similar focal point in the telescope tube to the original mirror at f6. The replacement mirror was tested some years ago by Mr Philip Pendred of Huddersfield, who declared it to have a very fine figure, with a wavefront accuracy of around one-twentieth wave.

Despite the fine nature of this mirror, Leeds University did not find a use for it and by the 1970s had decided to dispose of it. Initially it was offered to the Leeds Astronomical Society, but this was declined on the grounds of the cost of making it operational. In 1976, however, I was looking out for a large aperture mirror and acquired it from the University, hoping to use it for a project which never materialised. As a result, the mirror was again put into storage in Yorkshire, near Huddersfield, where it remained for quite some time. It was then transferred to Newchapel Observatory in North Staffordshire where it was again placed in storage for a while. In July 2008 the mirror was transported from Newchapel to the Pendrell Hall Observatories where it was placed on display for a while. In July 2008 the mirror was transported to the Pendrell Hall Observatories where it was placed on display in time for an eclipse event held on 1 August.

Before the end of August 2008 the mirror was transported to the Wrottesley Observatory, which is situated in the open-air site of the Black Country Museum at Tipton Road, Dudley (see Newsletter 16, July 2008, pp33-34), where it is currently on display in the transit...
The mirror will remain on display there for quite some time, but will eventually be returned to Pendrell Hall, where it will be incorporated in a new telescope.

The new telescope is intended to be developed in two distinct phases. The first phase will involve construction as a large Newtonian, similar to Scriven’s original, when it will be renamed ‘The Scriven Bolton Telescope’. The second phase will involve its conversion into Nasmyth-Cassegrain form, when it will be renamed the ‘James Nasmyth Telescope’. This will be particularly appropriate as Pendrell Hall has historic links with the Nasmyth family. We hope, in the end, to have a telescope of which Scriven Bolton would be proud.

Acknowledgements

I wish to acknowledge the assistance of and information supplied by Mr Ray Emery of the Leeds Astronomical Society. The illustrations for this article, apart from the modern photograph of the 23 ½-inch mirror, are from the archives of the Leeds Astronomical Society and are reproduced courtesy of that Society.
THOMAS Simeon Scriven Bolton (1883-1929), always known as Scriven, was an amateur astronomer from Leeds active in the early decades of the twentieth century (see p27). He was also a talented artist and his astronomical drawings became well-known, though they are little-remembered now. This short article reproduces some of this work.

Scriven Bolton’s family were originally textile manufacturers but in the late nineteenth century his father bought into a mineral oil merchant business and Scriven duly followed him into this firm, which was his main source of income. Astronomy, however, was his main interest and he set up an observatory with a 10 1/8-inch reflector adjacent to the family home. Around 1911 the family moved to Bramley, Leeds, and Scriven established another observatory, this time with a 26 ½-inch reflector (again see p27 for the history of this instrument). He also used the 18-inch reflector at Leeds University.

Scriven Bolton was a member of several astronomical societies and regularly published his observations in a variety of journals. However, he is best known for his astronomical drawings. For fifteen years he was a member of staff of the Illustrated London News, regularly contributing astronomical drawings and sketches. He also had material published in The Graphic, The Sphere, Le Journal Astronomique de France and several American papers. Some of his drawings were reproduced as book illustrations. He won numerous awards for his work and was a Fellow of the Royal Society of Arts. He had links with other astronomical artists, such as Chesley Bonestell (whose most famous work would come later) and Lucien Rudaux (the French astronomy author and artist). In addition to drawing he also painted in pastel.

Scriven Bolton produced a great

The scorched surface of Mercury, which was believed to be locked in synchronous rotation with the Sun (from The Wonder Book of Science, 1946).
Above: Saturn on 18 December 1910. This illustration was reproduced in the Leeds Astronomical Society Journal and supplied to the BAA (as was the one of Mars, overleaf).

Below, left: The Earth eclipses the Sun above the lunar mountains in this striking view.

Below, right: The Pleiades star cluster. In later years Scriven’s astronomical work turned to studies of variable stars, particularly in the Pleiades and Hyades clusters.
deal of work, of which only a few examples are reproduced here. However, much of it appeared in a wide range of non-astronomical publications and a comprehensive list has never been compiled. If you know of any examples we would be most pleased to hear from you; the Bulletin will publish suitable contributions (email newsletter@shastro.org.uk; other contact details on the back page).

I am grateful to Ray Emery of Leeds Astronomical Society for both much of the information about Scriven Bolton included here and for providing the illustrations.

Further reading

The details of Scriven Bolton’s life and work are as fragmented as his art, but the RAS published a brief obituary in the Monthly Notices (1930, 90, p359).

Left: Mars on 21 October 1909.

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The star of the dawn shines as bright as the moon when together in heaven,  
But if they part and withdraw from each other they grow paler. 

The Knight in the Panther’s Skin,  
Shota Rustaveli (floruit AD 1200).

GEORGIA in the South Caucasus on the eastern shore of the Black Sea is an ancient country, settled for over 3000 years. There is much astronomy and astronomical lore entwined in its long history, of which the above quotation is a single example. The astronomical history of Georgia has, however, hitherto been little studied. Prof. Irakli Simonia and his colleagues are attempting to rectify this situation. A recent paper explores the astronomical information in Georgian ethnographic records and literature. At the request of the authors we give a brief taste of that work here.

Georgian Ethnographic records, typically compiled during the twentieth century, and literature, including dictionaries from various periods, contain useful information about ancient astronomical knowledge systems and beliefs, with specific reference to timekeeping, the months of the year, the planets, individual stars and specific asterisms, star clusters, the Milky Way, and various kinds of astronomical instruments.

For example, the dictionary Sitkvis kona (literally ‘bunch of words’) compiled by Sulkhan Orbeliani (1658-1725) gives lists of names of months of the year in various languages. Two sets of Georgian names are included, one folkloric (and current from the

The ruins of the Nekresi Sun Temple in eastern Georgia, about 150 km from Tbilisi and dating from the second to fourth centuries AD. The eastern face of the temple is oriented to point towards the sunrise at the solstice.
fourth to the eighteenth centuries) and the other ancient and literary. Some of the folkloric names are similar to their western counterparts (marti, aprili, maisi), others refer to Christian Saints and the birth of Christ, while others reflect agricultural activities appropriate to the time of year. The literary names are more obscure but also seen to refer to agricultural activities.

A history of local manufactures, based on material gathered by I. Javakhishvili in the early twentieth century, relates how drovers and ploughmen used the appearance of certain stars or planets to regulate the movement of sheep and oxen at night and at dawn. A star called ‘Khariparia’ (‘a runaway ox’) features in the lore recorded and is tentatively identified with Vega, Deneb or Altair.

G. Bochoridze’s study of the Tusheti region of north-east Georgia includes names for some celestial objects. The Milky Way was known as the ‘Jump of Deer’. ‘Gutneuli’ and ‘Mravalai’ have been identified as Ursa Major and Minor respectively. The planets, however, are more difficult to identify.

A 1968 monograph by S. Bedukadze records the ‘Astvaglakhoba’, a cult-ceremony performed on New Year’s Eve in the mountainous Khevi region. Three archpriests observe throughout the night, dividing the sky between them. This ceremony is thought to be a remnant of ancient methodical observations.

Bedukadze also describes how in the Khevsureti region the seasons were determined by means of a group of stone columns, the so-called ‘Sun nests’ erected on peaks to the east of villages. The motion of the rising Sun, from one nest to another, functioned as a simple calendar. This system of fixing time seems to be very ancient.

Similarly, in the Svaneti area, old houses have a small east window known as the lakhvra, which was used as a primitive type of domestic sundial. An expedition to the Khevsureti or Svaneti regions to search for ancient sundials could yield much important information. Much work remains to be done in analysing ethnographic and literary sources for astronomical references and Prof. Simonia welcomes offers of collaboration in this work.

Further reading


[Anyone interested in working with Prof. Simonia can contact him by email: simon_ir@access.sanet.ge. Alternatively the Bulletin will pass on any messages received — Ed.]

A nineteenth century portrait of Shota Rustaveli based on an old Georgian manuscript. Rustaveli wrote the twelfth century epic poem The Knight in the Panther’s Skin which contains numerous astronomical references (image courtesy Wikimedia Commons).
Guided Missives

The Bulletin welcomes letters for publication which can be on any aspect of the SHA, including its activities, projects and organisation, and, more widely, any topic in the history of astronomy — Ed.

Time Gentlemen
Please

In the last Newsletter (no. 17, October 2008, p34) you asked for details of any public clocks that still tell local rather than civil time. Google tells me that the Corn Exchange clock in Bristol has an extra red minute hand indicating local time.

Roger Jones,
SHA Survey Co-ordinator,
Walsall.

Right: The clock on the Corn Exchange, Bristol has a extra minute hand showing local time.
Bristol is 2° 35’ West of Greenwich so local time lags ten minutes behind civil time.
Bunk and Bilge


Roger Jones, SHA Survey Co-ordinator, Walsall.

Information Requested

The Bulletin is always pleased to receive letters and articles for publication. The contact details are given on the back page. We would be particularly interested in information about the following:

- details of clocks keeping local time (see Newsletter 17, October 2008, p34 and Roger Jones’ letter about the Bristol Corn Exchange clock on p35),
- information on the whereabouts of any of Scriven Bolton’s space art (see p30),
- contributions for the Observatory Scrapbook series (see p46) and follow-up letters with additional details of previous entries (see Peter Hingley’s letter above).

Wigglesworth Observatory

I read with interest the first entry in the ‘Observatory Scrapbook’ series on the Wigglesworth Observatory (Newsletter no. 17, October 2008, p40). I enclose a copy of an internal photograph of this observatory from our archives. The attractive thing about this series is that enables one to highlight an item without needing to take the time to do a full length article.


Right: An interior view of the short-lived Wigglesworth Observatory located near Scarborough, North Yorkshire, which operated 1885-88. Notice the pictures hanging on the dome wall and the decoration on the lower wall (RAS ADD MS 93/29, courtesy of the Royal Astronomical Society).

Potential readers of this volume should not be put off by the somewhat prosaic title as it belies a work of academic thoroughness and great significance. Within the history of astronomy it addresses a topic that has not been coherently tackled until now. Individual institutional histories exist for some British University observatories, but these vary in depth and none try to present a broader picture of the astronomical community they describe. Astronomy historians until now have had to piece together diverse accounts from a wide bibliography if they hope to get a full picture of how British and Irish astronomy developed in these university institutions. The book does for the history of these observatories what Allan Chapman achieved a decade earlier when he described the past importance of the amateur astronomers in Britain and Ireland. The works are complementary in that they provide a well-balanced historical picture of astronomy for the period covered.

Roger Hutchins’ work is published by Ashgate under the series title of Science, Technology and Culture, 1700-1945. Other topics include John Herschel’s Cape Voyage, Jesse Ramsden the instrument maker and the instrument making trade during the Industrial Revolution. The book was developed from the author’s doctoral thesis on the same subject with significant expansion. In addition it provides a thorough and polemic-free account of Neptune’s discovery, an area of much academic dispute in recent years after the recovery of missing archival papers. The strategy of the book is to examine the whole context of the university observatory, its broader social setting and how it related to astronomy in general, both on the local and international stage. The work does not set out to provide a detailed technical history of astronomy in the context of academic institutions, but does give ample details on these matters when it is relevant to the topic being addressed. To this end the chapters are thematic, examining the experiences of Cambridge, Durham, Glasgow and Armagh observatories along with the Radcliffe and Dunsink institutions in Oxford and Dublin. The topics examined include foundation, their operation, research and teaching duties, and their place in the age of the ‘Grand Amateur’ during the nineteenth century. Another important topic examined in some detail is the position of the university observatory with regards to traditional positional astronomy, in particular its relationship to the Royal Observatory, Greenwich. Likewise, the position of the Astronomer Royal in influencing appointments at these academic institutions is examined in detail. George Biddell Airy’s power of patronage is described and his influence on research strategy is considered. The network of the so-called ‘Greenwich-Cambridge Axis’ Observatories is outlined and its influence delineated. To some, Airy’s influence may not be new, but its degree and depth will surprise most readers. He is portrayed as a powerful figure in British science whose sway was tsar-like in matters of job appointment at university observatories. Airy’s authority is also noted as an obstacle to changes in the research strategy at the Royal Observatory, Greenwich and those of the university observatories.

Later chapters, in this account of British University Observatories, examine how these institutions adjusted to the new discipline of astrophysics. Hutchins describes in great detail how the various observatories tackled the challenges of this new discipline within astronomy. In particular the book examines the experience of Oxford and Cambridge in funding the new research area and how the interdisciplinary aspect of the new science was addressed. It is made clear that astrophysics needed the expertise of chemistry and physics rather than just mathematics. In addition, the need for separate laboratory facilities is explained. This new and extra expense had to be paid if the new research strategy was to be followed. When George Ellery Hale convinced the streetcar mag-
The story begins with Ruth Belville’s father, John Henry Belville. He came to Greenwich in 1811 at the age of fifteen, with his guardian the new Astronomer Royal John Pond. He soon became active in the work of the Royal Observatory (RO), and five years later officially joined the staff. His mother had fled from revolutionary France, and because of this for most of his career at this government establishment he did not use his French surname but was known by his forenames, referred to in RO records as ‘Mr Henry’. In his forty-five years at the RO he became a valued Assistant, undertaking major responsibilities. When John Pond died and was succeeded in 1835 by George Airy, the new Astronomer Royal recorded the duties then undertaken by him: ‘Mr Henry … manages the observations with the Transit, the reductions of the Transits, the rating of the Clocks, the comparisons of Chronometers belonging to the Royal Navy, or on trial for purchase by the Government, and the dropping of the Signal Ball at 1h mean time every day.’ This quotation is extremely important, as in a single sentence it illustrates why Belville was ideally suited to be involved in setting up a system for making Greenwich Time available to those who needed it.

Observations with the transit instrument at Greenwich ensured the accuracy of its clocks, and the daily dropping of the Timeball signalled correct time to those who could see it, principally the masters of ships on the Thames. But many establishments across London also needed this information in order to keep their public clocks showing correct time. Particularly the numerous clock and watchmakers in the city required it to ensure that their

David Rooney’s book tells the story of a remarkable lady, who occupied a unique place in the history of Greenwich Time and its distribution around the world. It also tells us about other members of her family who were also involved and about the ever-changing technological background to their activities over a century. Written by the Curator of Timekeeping at the Royal Observatory, Greenwich, this is a story which cannot fail to appeal to all with an interest in the history of our national observatory.


[This book is available for loan from the Sir Patrick Moore Library — Ed.]
products reached the required standards of accuracy. Many of them regularly sent an apprentice to the Observatory with an accurate watch to determine its error against the standard clock, but it was soon recognised that it would be much less inconvenient both for them and for the Observatory if a chronometer showing correct time could be taken to them. Their contact at the RO was of course John Belville, but he was far too busy to undertake this chore himself; instead he employed a messenger to carry a corrected chronometer around the list of subscribers to this service. The chronometer chosen by Belville for the new service was made by John Arnold in 1794 and became a legend in its own right, known to all as ‘Arnold’; it can still be seen in the Museum of the Clockmakers’ Company.

John Belville became ill and died in 1856, aged almost sixty-one. Towards the end of his life he had undertaken the weekly round with the chronometer himself, and after his death his widow Maria Belville took on the role, checking Arnold against the standard clock at the RO and carrying it around a list of sixty-seven subscribers. She carried out this weekly expedition for the next thirty-six years, retiring in 1892 aged eighty-one. She had doubtless often been accompanied by her daughter Ruth Belville, who then assumed the responsibility.

Roney tells an astonishing story of how, for almost half a century, Ruth Belville provided such an accurate and reliable service that many recipients continued to use it, despite the growth of new technologies such as the telegraph, electrical clock-synchronisation services, etc. and inevitable commercial rivalry. There were periods when this rivalry led to considerable publicity, not least for Ruth Belville herself, but she continued to receive the support of her customers and became affectionately known to many as ‘the Greenwich Time Lady’. He tells us too of the other work necessarily undertaken by the Belville ladies to secure a living, and the ever-changing background of suburban life.

The success of this service for almost a century, despite these changing circumstances, is quite remarkable, but even more so in that it was the achievement of a single family. Its success, and the circumstances of its initiation and continuance, is an important aspect of the history of the Royal Observatory. The book is well written and has been extremely well researched; Rooney has utilised a vast range of resources, many of them not too easily accessible. He provides full details of his sources in an appendix, stating in his Introduction that they are not however footnoted ‘in the interests of readability’; this will be regretted by historians, but as he states, the book has also been written for a wider readership. The volume is nicely produced and has some relevant illustrations; these are mostly used as chapter headings however and would have benefited from reproduction in a larger format.

David Rooney should be congratulated on a major achievement, which provides us with a detailed and very readable account of an aspect of Greenwich history that may not be known to many, but which deserves wider circulation as it is a story with much human interest as well as historical information. Highly recommended!

Gilbert Satterthwaite

[This book is available for loan from the Sir Patrick Moore Library — Ed.]

Books noticed

Madeline Cox and Clive Davenhall

This column lists some recently published books which might be of interest. Listing here does not preclude a review at a later date, nor does it necessarily imply endorsement. Books are now given their thirteen digit ISBN. Please note prices may vary according to suppliers.


Also noticed

Clive Davenhall

Listing here constitutes neither a review nor a recommendation, nor does preclude future review. Information is given in good faith but cannot be guaranteed.

Biography of Joseph Needham


Joseph Needham (1900-95), initially a biochemist, became an eminent sinologist whose monumental, multi-volume Science and Civilisation in China virtually founded the study of the history of science and technology in that country. Only the first seventeen volumes were published during Needham’s lifetime and publication continues. Chinese astronomy was well-represented, particularly in Volume III, Mathematics and the Sciences of the Heavens and Earth, and was also treated in some of Needham’s other publications outwith the series. Simon Winchester has written the first full biography of Needham who, while an outstanding scholar, was also an unconventional and controversial character.

Biography of Frances Yates


Studies of the history of magic and the occult, and their influence on the development of science and technology, are now common. Frances Yates was one of the pioneers of this field, her particular speciality being magic and the occult in the Renaissance and Early Modern times, and they interaction with the religion, art, politics and philosophy of the period. Nowhere is this connection closer than in astronomy, which was inextricably joined with its irrational sibling astrology. Working largely alone in post-war England, Frances Yates produced an influential body of work, much of which is still in print. Many years ago a friend told me that her PhD supervisor was wont to affectionately refer to Yates as ‘Auntie Frances’. It is pleasing that Marjorie Jones has now produced the first full biography of this important figure.

Victorian Pastimes


SHA members will be well-aware that the Victorian period saw a great expansion in amateur astronomy, from the ‘grand amateurs’ to those of more modest means. The reasons are not difficult to find, and include: improved manufacturing, better education, increased wealth and more free time. Astronomy was, of course, but one of many hobbies that became popular. Flander’s book is an informative survey of the way that the Victorians (and despite the title, earlier generations; there is coverage back into the eighteenth century) spent their leisure time. It could be of interest if you want to see Victorian amateur astronomy in its wider social context.

Ancient Calendars


Books about ancient timekeeping must be like omnibuses; there are none for ages and then three come along at once. However, these three volumes have different emphases: Clarke’s theme is the Greek articulation of time and the creation of history, Feeaney concentrates on the use and understanding of calendars in Classical Antiquity and Hannah on devices for measuring time.

Writing Scientific Biographies


Biography is not the only way of writing about the history of science, but it is a popular one, not least in the SHA. However, hitherto there has been little study of the particulars of writing scientific biographies; the features which differentiate the biographies of scientists from those of people working in other fields. Söderqvist’s volume attempts to address this topic. The contributions range widely in period and scientific discipline and adopt the approaches and methods of cultural studies and the history, philosophy and sociology of science. The text is also available as an eBook.
Obituary: Mary Brück

It is with very great regret that we report the death of astronomer, eminent historian of astronomy and SHA member Dr Mary Brück on 11 December 2008 at the age of eighty-three after a short illness.

Máire Teresa Brück née Conway (she often used the Anglicised form of her first name outside Ireland) was born on 29 May 1925 in Ballivor, Co. Meath in the Irish Republic. She was the daughter of Thomas and Margaret Conway, the oldest of their eight children. She attended St Louis Convent in Monaghan. From school she attended University College Dublin where she studied physics. After graduating she pursued doctoral research in solar physics at the University of Edinburgh, where normal academic life was resuming after the war. This work resulted in the thesis Studies of Hα Line Profiles in Prominences, for which a PhD was awarded in 1950.

Following the award of her doctorate Mary Conway, as she then was, took up an appointment at the Dunsink Observatory, Dublin, where she continued her solar work. While at Dunsink she met her future husband, Prof. Hermann Alexander Brück, then Director of the Observatory, and they married in 1951. In 1957 Prof. Brück was appointed Astronomer Royal for Scotland, Regius Professor of Astronomy at the University of Edinburgh and Director of the Royal Observatory Edinburgh (ROE), posts which he held until his retirement in 1975, and his family relocated to Scotland with him.

Although she now had three children of her own as well as two stepchildren, Mary Brück continued to pursue an academic career. In 1962 she was appointed a part-time lecturer at the University of Edinburgh, later becoming full-time and retiring as a Senior Lecturer in 1984. From 1984 to 1987 she was a Fellow of the University and more recently an Honorary Fellow. Throughout her time at Edinburgh Mary Brück was heavily involved in undergraduate teaching, for which she will be fondly remembered by generations of students. During this period she switched from solar to stellar research, pursuing a programme of three-colour photometry, initially largely of southern galactic clusters and later becoming an expert in the Magellanic Clouds.

After retiring in 1975 Prof. Brück took up the study of the history of astronomy. Initially Mary Brück collaborated in this work, but she was to become an eminent and respected historian of astronomy in her own right. The collaboration led to The Peripatetic Astronomer (1988), the definitive biography of Piazzi Smyth, the second Astronomer Royal for Scotland. In later years Prof. Brück’s health declined and Mary Brück looked after him through his final years until his death in 2000.

Mary Brück’s own particular interest was women in astronomy and much of her work subsequent to The Peripatetic Astronomer was in this area. However, she also maintained her interest in the history of the ROE and in its magnificent...
Crawford Collection of historic astronomical texts. In 2002 she published Agnes Mary Clerke and the Rise of Astrophysics, a masterly piece of work which is likely to remain the definitive study of its subject. When Miss Clerke’s Popular History of Astronomy during the Nineteenth Century was republished in 2003 it was natural that Mary Brück should provide the Foreword. Her final book, Women in Early British and Irish Astronomy, is to be published posthumously later in 2009. Each of its chapters contain biographical essays on various women astronomers. It will stand as her last word on the subject.

She wrote entries for the Oxford Dictionary of National Biography and published numerous papers and book reviews. She was a member of the Editorial Board of the Journal of Astronomical History and Heritage from its founding. She never lost sight of her Irish roots, writing two chapters for Stars, Shells and Bluebells (1997) published under the auspices of the Irish WITS (Women into Technology and Science) initiative and celebrating the achievements of early women pioneers of science in that country. Its forthcoming companion volume, Lab Coats and Lace, to which she also contributed, is dedicated to her memory.

Mary Brück contributed what became the first paper in the first issue of the SHA’s journal, The Antiquarian Astronomer (AA). She later joined the Society and became a member of the AA’s Editorial Board. She continued to contribute material to both the AA and the Newsletter. She was a strong supporter and benefactor of the Society, always generous with advice and assistance to members and donating numerous items to the Library. Her children have kindly made additional donations from her estate.

Mary Brück was a Fellow of the Royal Astronomical Society and an Honorary Member of the Irish Astronomical Society. In 2001 she was awarded the Lorimer Medal by the Astronomical Society of Edinburgh for her work in popularising astronomy and was made an Honorary Member of that Society. The ROE held a short workshop in her honour on the occasion of her eightieth birthday in 2005.

She remained active until shortly before the end, regularly attending meetings and giving talks. In May 2006 she spoke on Agnes Clerke at the Society’s Spring Conference, held in Cambridge, whose theme was Women in Astronomy. As recently as May 2008 she gave a well-received public lecture to the RAS in London on The Fascination of the Heavens about pioneering women astronomers. In addition to Women in Early British and Irish Astronomy she also had a paper in press in the AA. Co-written with David Gavine, it documents the Revd Hector MacPherson, a populariser of astronomy in early twentieth century Edinburgh.

In her youth Mary Brück imbibed the deep Catholic faith of her parents and it sustained and underpinned her throughout her life. Always modest and self-effacing, she was unfailingly generous and helpful to colleagues and students alike. She will be greatly missed both by her many friends in the Society and more generally in the history of astronomy community. She is survived by her children Anne, Catherine and Andrew and her stepchildren Mary and Peter.

Clive Davenhall
The Survey of Astronomical History

Roger Jones

I have been an avid ‘Googler’ since its early days, and more recently have relied on Google Books Search for hard-to-find information, especially in the field of history of astronomy. Google, in partnership with several major university libraries, has to date scanned more than seven million volumes. Most interesting are the out of copyright publications from the early nineteenth century, where the entire text can be searched and if required, freely downloaded as a PDF. Following a recent groundbreaking agreement, copyright books will also be available to search and download, but at present only in the US.

So what can be found that might be of interest to the historian of astronomy? Let us say that you have no idea where to look, but want to know about old observatories. Just type the word ‘observatory’ into the Google Books search engine. Many hundreds of results will be listed, and not all are specifically astronomical works.

Let’s take a look at a work by John Weale entitled London Exhibited in 1852. In it we find a chapter on both public and private observatories in and around the capital. The observatories at Greenwich, Oxford and Cambridge are well researched and little in this volume adds to what is already known. Descriptions of the private observatories and their instruments however are less well known and include those belonging to:

Sir James South on the Camden Hill, Kensington
George Bishop Esq in the Regents Park
W. Simms Esq at Carshalton
A.K. Barclay Esq at Bury Hill, near Dorking
S.C. Whitbread Esq at Cardington near Bedford
J. Drew Esq at Southampton
Dr Lee at Hartwell, near Aylesbury
The Revd C. Lowndes at Hartwell Rectory
The Revd J.B. Reade at Stone Vicarage, near Aylesbury
T. Dell Esq at Aylesbury
R. Snow Esq at Ashurst, near Mickelham, Kent
C. May Esq at Ipswich
The Revd John Slater at Rose Hill near Oxford
The Revd W.R. Dawes at Wateringbury, near Maidstone

County guides are another useful source and in Delineations of Somersetshire John Rutter mentions John H. Smyth Pigott who owned Brockley Hall. In the centre of the roof he placed an octagonal dome, fitted up as an observatory with one of Dolland’s powerful telescopes. Near Worcester lies Thorngrove, once owned by Lucien Bonaparte (1775-1840), Napoleon’s younger brother. In Memoirs of Napoleon, His Court and Family by Laure Abrantes we learn that whilst in England under ‘house arrest’ he purchased Thorngrove and being an acquaintance of Herschel, obtained a telescope from him for 50,000 francs, installing it in an observatory and doing a great deal of work with it.

In Memorials of Oxford (1837) by James Ingram there are a number of observatories mentioned and the line sketch shows the ‘Old observatory in New College Lane’ purportedly used by Bradley.

Captain Joseph Huddart is remembered in a biography written by his son and published in 1821. He was an East India Company man and in retirement furnished his house in Highbury Terrace with an observatory. We also note that Capt. Huddart is mentioned in another list of those who owned private observatories. This time the book is A Philosophical and Mathematical Dictionary containing Memoirs of the Lives and Writings of the Most Eminent
Authors by Charles Hutton (1815).

Here is the list:

Blackheath — Stephen Groombridge
Blackheath — William Larkins
Blenheim — Duke of Marlborough
Cambridge — Revd Mr Catton
Chislehurst — Revd Francis Wollaston
Derby — William Strutt Esq.
East Sheen — Revd William Pearson
Finsbury Square — Dr Kelly
Godwood — The Duke of Richmond
Gosport — Dr William Burney
Hackney Wick — Colonel Beaufoy
Harefield — Count Bruhl
Hayes — William Walker Esq.
Highbury House — Alexander Aubert Esq.
Highbury Terrace — Capt. Huddart
Hoddesdon — William Hodgson Esq.
Islington — Gavin Lowe Esq.
Milford — Hon. Charles Greville
Paragon, Southwark — James Strode
Park Lane — Sir Henry Englefield, Bart.
Rose Hill, Sussex — John Fuller Esq.
Sherburn — Earl of Macclesfield
Shuckburgh — Sir George Shuckburgh
St Ibbs, Hitchin — Mr Professor Lax
Woolwich — Royal Military Academy

A few of the names in both of the above lists are mentioned in Allan Chapman’s excellent work The Victorian Amateur Astronomer; many however need further research. But initially there is no need to spend hours travelling to distant libraries. Google brings the libraries to you... astronomical gems are just a few mouse clicks away. Google Books can be found at URL http://books.google.com/

Finally, my apologies to SHA member Paul Whiting, co-ordinator for Northamptonshire. In the last issue I omitted his name from the county list.

Right: Title page of the biography of Captain Joseph Huddart published in 1821 by his son William.
THE Observatory Scrapbook series presents illustrations and a brief description of historical observatories. This issue we show two views of the Bessemer House Observatory in Dulwich, South London. This observatory was built by Sir Henry Bessemer (1813-1898), who is mostly remembered for his process for manufacturing steel cheaply.

Bessemer’s work made him wealthy and in 1863 he bought the house which subsequently bore his name in Green Lane, Dulwich. He had the building extended with the addition of glass houses, a huge conservatory and the observatory shown here. The observatory was a substantial construction; in addition to the dome rotating, the whole observing floor moved with it, under hydraulic power.

Bessemer intended to equip the dome with a 50-inch reflecting telescope. The mirror was to be manufactured by a process of his own devising in which suction was applied to a thin, glass spherical mirror, which was then polished over a ‘pressure cup’. Bessemer hoped that this process would allow telescope mirrors to be produced more cheaply. He entrusted the manufacture of the mirror to the renowned telescope maker George Calver, but the process failed spectacularly and the mirror was never mounted in a telescope. The eventual fate of the mirror is unknown; Calver would later comment ‘I do not know where the 50-inch mirror I made for Sir Henry Bessemer is. He gave me the power to offer it as a gift to any institution or Society who would mount it or equip it in an observatory suitable for it. I tried to find a place for it, but could not on account of funds.’

The house had several owners after Bessemer’s death and in 1947 it was demolished to make way for a housing estate.

Further reading
The details of the manufacture of the mirror came from a Web page about George Calver written by Ken Goward: http://www.ast.cam.ac.uk/~ipswich/History/Calver.htm. The quotation by Calver is reproduced by H.P. Hollis, The Observatory, 1914, 37, pp245-252.
Purchases


Donations


BMI news

In terms of content and organisation the SHA’s Library at the Birmingham & Midland Institute has gone from strength to strength in the past year, during which we moved the Sir Patrick Moore Lending Library to the BMI. Since November 2008, volunteer staff have spent several days working together in the Library to take advantage of new shelving. A significant reorganisation of stock and shelf-checking has resulted in a new integrated catalogue, written by Madeline Cox with additional data provided by Roger Jones and Stuart Williams.

It was decided earlier this year that to avoid confusion the Sir Patrick Moore Library would be renamed the Sir Patrick Moore Lending Collection. It is now located on its own dedicated shelves and forms a distinct but integrated part of our Sir Robert Ball Library. The latter includes all
of our collections and honours by name the ‘Victorian Patrick Moore’ and his strong connection with the BMI as a past president.

The Library staff now feel that the Sir Robert Ball Library and the service we can provide is as well-organised and available as it can and needs to be under present economic circumstances. However, despite publicity to members, there have been no requests for access to the Library or research enquiries in recent months, which is, of course, a matter for concern. We therefore encourage members to consider using the Library if they have the need, and to read the online Library Manual and Catalogue which are on the SHA Web site’s Library page, where further information about the Library services is available (please see the link noted below).

Further details
The SHA Web site (http://www.shastro.org.uk) gives further details of the SHA Library Service, or send an SAE to Madeline Cox (see under Contacts) if you do not have access to the Internet.

Contacts
Madeline Cox by email: library@shastro.org.uk or by post: 4, Rutland Close, Warsop, Mansfield, Notts, NG20 0DY.

Stuart Williams by email: research.librarian@shastro.org.uk or by post: 26, Matlock Road, Bloxwich, WS3 3QD.

By kind invitation SHA members may use the Library of the Royal Astronomical Society. The opening hours are 10:00 am - 5:00 pm, Monday to Friday. The address of the RAS is Burlington House, Piccadilly, London, W1J 0BQ. Contact Peter Hingley (020 7734 4582, ext. 215; mobile: 07757 133891 or pdh@ras.org.uk).

On-line catalogue:
http://ras.heritage4.com

Saturday opening
The Library opens on the first Saturday of each month, Bank Holidays excepted. For the remainder of 2009 the Library will be open 10:00 to 12:30, 13:30 to 17:00 on the following Saturdays: 4 July, 1 August, 5 September, 3 October, 7 November and 5 December. There will only be one member of staff on duty so it will be necessary to ring the bell and wait to be admitted; if the delay is excessive please telephone (details above). You are advised to confirm out-of-hours openings with the Librarian, Peter Hingley, before undertaking a lengthy journey.

Below: The RAS Library.
SHA News
Compiled by Clive Davenhall

Treasurer and Membership Secretary

Following the tragic death of Ken Goward (see p3) the Society has had to appoint a replacement Treasurer and has also separated the handling of membership matters into the new post of Membership Secretary. Stuart Williams has taken over as Treasurer. Peter Hingley has volunteered as Membership Secretary and all membership inquiries should be directed to him. In both cases contact details are on the back page. It will inevitably take a while for the new officers to fully ‘learn the ropes’ of their new duties and we thank you for your forbearance with any consequent delays.

The Antiquarian Astronomer

Issue five of the Society’s journal, The Antiquarian Astronomer, was due to be published around Christmas, but continues to be delayed. The delay is due to both the journal’s Editor, Dr Reg. Withey, and members of his family suffering time-consuming health problems. Nonetheless, Dr Withey continues to make progress with the issue and anticipates that it will be published later in the year. We thank you for your patience.

Summer Picnic

This year’s SHA Summer Picnic will take place at the Hanwell Community Observatory (HCO), near Banbury, Oxfordshire on Saturday 4 July. Members are asked to meet at 1 pm, but the grounds open at 12 noon. Admission is free of charge.

Hanwell Castle, Oxfordshire, where the 2009 Summer Picnic will be held.
The Observatory is sited in the grounds of Hanwell Castle, the remains of a fine early Tudor house just north-west of Banbury, three miles from junction 11 of the M40 and a similar distance from Banbury railway station. The extensive grounds, with their lake, Medieval fishponds and leafy walks, provide many attractive spots for a picnic on a fine day and are of considerable interest in their own right. The Observatory is the permanent home of the McIver Paton 12.5-inch reflector, the main mirror of which is a 1908 Calver, a 30-inch reflector due to be commissioned for public use this Summer, and the John Wall 30-inch dialyte, the largest refractor ever to have been mounted in the UK, all of which will be on display on 4 July.

There is also likely to be a display of various astronomical items of antiquarian interest. Onsite parking up to a maximum of ten or twelve cars exists, so we ask members intending to drive to share vehicles as far as possible, with overspill parking just outside our gates in the village; a location-map and further details will be put up on the HCO Web site (http://hanwellobservatory.org.uk/) about one month before the event (contributed by Christopher Taylor, Director HCO).

**SHA Council meetings in 2009**

Council meetings were successfully held on Saturday 21 February at Burlington House in London and on Saturday 13 June at the BMI, Birmingham. The remaining Council meetings during 2009 will be: Saturday 12 September, BMI and Saturday 5 December, Institute of Astronomy, Cambridge. Meetings usually start at 1:00 pm. Council meetings are not open due to lack of space, but any member may attend by prior arrangement with the Secretary.

**Forthcoming meetings and events**

Compiled by Clive Davenhall

The following meetings and events will be held during the remainder of 2009. Unless noted otherwise, booking is necessary for meetings but not for exhibitions. Except where noted the events are organised by the SHA.

The details of non-SHA events are checked as far as possible but cannot be guaranteed. Items for inclusion in this list in future issues of the Bulletin are welcome. They should be sent to the editorial address on the back page.

Saturday, 4 July. Summer Picnic. To be held at the Hanwell Community Observatory (HCO), near Banbury, Oxfordshire. Admission free, grounds open at 12 noon. HCO Web site: http://hanwellobservatory.org.uk/. See p49.

Thursday 16 and Friday 17 July. The Long View: 400 Years of the Telescope. A conference jointly organised by the Scientific Instrument Society and the National Maritime Museum. To be held at the Queen’s House, NMM. Registration £100 (or £50 concession). See http://www.nmm.ac.uk/researchers/conferences-and-seminars/thelongview (non-SHA event, but the SHA Summer Conference, below, is deliberately timed to immediately follow).

Saturday 18 July. AGM and Summer Conference. To be held at the National Maritime Museum, Greenwich. Details circulated separately. A joint meeting with the Scientific Instrument Society (http://www.sis.org.uk/). Contact Gilbert Satterthwaite (email: chair@shastro.org.uk).

Monday 10 to Thursday 13 August. Astronomy and Civilisation. A SEAC (Société Européenne pour l’Astronomie dans la Culture) meeting organised as part of the International Year of Astronomy (IYA). To be held in Budapest, Hungary. See http://www.archeoastronomy.org/ (non-SHA event).

Sunday 18 to Friday 23 October. The sixth conference on The Inspiration of Astronomical Phenomena. To be held at the Palazzo Franchetti, Venice, Italy. See http://www.astro.unipd.it/insap6/ (non-SHA event).

Sunday 25 to Saturday 31 October. From Alexandria to Al-Iskandariya, Astronomy and Culture in the Ancient Mediterranean and Beyond. The seventeenth annual SEAC conference (and an IYA event), to be held at the Bibliotheca Alexandrina (BA), Alexandria, Egypt. See http://www.archeoastronomy.org/ (non-SHA event).

Saturday 31 October. SHA Autumn Conference at the Birmingham and Midlands Institute, Birmingham. The theme of the meeting will be Astronomers Abroad. Details TBC. Anyone interested in offering a talk should contact Kevin Kilburn (email: secretay@shastro.org.uk; postal details on the back page).

Subscription reminder

If you have already renewed your subscription of the SHA, please ignore his note and thank you for your prompt support. However, if you have not renewed, you are reminded that annual subscriptions were due on 1 January 2009. Your membership will be deemed to have lapsed by March 2009 in accordance with the Society’s constitution.

Subscription details were included with the previous issue and are available from the Society’s Web site, but briefly a personal subscription costs £25.00 per annum. Cheques should be made payable to ‘The Society for the History of Astronomy’ and sent to Peter Hingley at the address opposite.

Contributions to the Bulletin are welcome

Articles, letters and Bulletin inquiries should be sent to the Editor, Clive Davenhall at the address opposite. For electronic contributions the email address is:

newsletter@shastro.org.uk

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General communications to the Society should be directed to the Secretary in the first instance.

SHA Web site: http://www.shastro.org.uk

* - also a Council Member

The deadline for the next edition of the SHA Bulletin is Saturday 29 August 2009