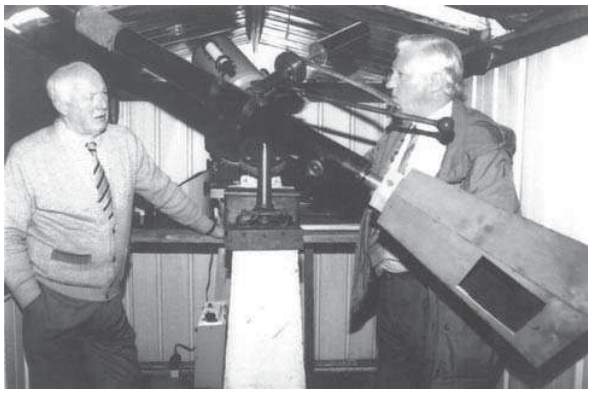
Obituary

Harold Hill (1920–2005)

With the passing of Harold Hill, selenographer *extraordinaire*, not only has astronomy lost one of its last great visual practitioners, but an important link in a chain that stretches back to the moment the first telescope was pointed at the Moon: a period of four centuries during which the backyard astronomer, to use an Americanism, could wander freely across the surface of our satellite making meaningful observations in the spirit of a scientific investigator, and adding to the sum of knowledge. Sadly in the post-*Orbiter* period this role has been reduced to that of a tourist who marvels at relics of the past, and reflects on human destiny.

Though witness to the change, Harold stood aloof. He was linked both in spirit and substance to the great chain of pioneers who struck out against all adversity and established the foundations of lunar cartography. The history of that pioneering interval with all its excitements, its false alarms, its wild speculations, from Schröter's 'Selenites' to William Henry Pickering's 'new selenography' to the patient, careful charting of the topographers has yet to be properly chronicled, but when it is, the name of Harold Hill will again be remembered, and the memory of his long night vigils at his home, idyllic Dean Brook House at Orrell, near Wigan, put into true context.

None except a small handful who knew him intimately, can know just how much time he spent at the eyepiece and how methodical was his approach. Some might think him obsessed. They would be wrong. Enthusiastic certainly, but Harold was never so taken by his subject as to sacrifice all else. He had a genuine sense of wonder, an almost childlike desire to see what it was like on the other side of the hill so to speak. Such an interest cannot be quantified. It is of the same ilk as drives people to risk their lives on some impossible mountain face, or to sail dangerous waters.



Harold Hill *(left)* and Richard Baum with HH's refractor. *Photo by Alan Heath, 1993.*

Each year Harold would purchase *The Astronomical Ephemeris* and methodically plan ahead in a diary bought for the purpose, when and what to observe on the Moon, sometimes getting up before 3 a.m. to catch a formation at a favourable illumination and libration. Weather permitting he remained faithful to that diary. In this way he constructed a large archive of eyepiece impressions of how diverse regions look under various angles of illumination, the technique initiated by J. H. Schröter in the closing years of the eighteenth century and at which Harold with precision and a good eye for detail became highly skilled.

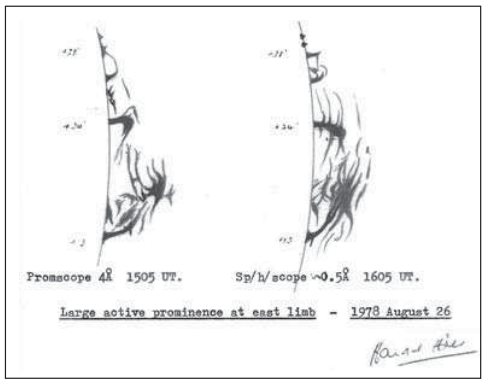
Spectacle also fascinated him and he would wait years to capture a special moment. He was thus rewarded during the early hours of 1988 November 3 by the breathtaking sight of sunset on the Great East Wall of Clavius, a scene he rendered exquisitely in a memorable and evocative series of pen and ink drawings. (See Hill, *Portfolio of Lunar Drawings,* Cambridge University Press, 1991, pp.118–121: 121).

Harold with his spectrohelioscope. *Photo by Norman Rogers, 1977.*

All this is but a fraction of what Harold achieved. Sadly the curtain descended on 2005 October 23 when the man whose consummate artistry had long inspired and encouraged fellow moon-watchers worldwide was suddenly taken ill at his desk. Upon admittance to Wigan Infirmary he was diagnosed as having suffered a mild stroke and kept in for investigation and treatment. Unfortunately he developed a chest infection and in spite of intensive treatment passed away on October 30.

Thus ended the life of a most remarkable man, a dedicated astronomer with a singular gift for drawing exactly what he saw at the eyepiece. But Harold was not solely focused on the Moon. He was also an avid watcher of the Sun and its phenomena, an interest that dates back to the late 1940s. He used a simple but excellent 3" refractor, having made his own projection box. It was equatorially mounted on a tripod and served him for white light observations in his lifetime. He enriched the life of one of the authors (EHS) and awakened his interest in solar work.

Many friends and acquaintances called at Dean Brook House to look at sunspots. Anyone who had a real interest was welcome but Harold was not so happy if a visitor just wanted a 'peep'. He had many friends in the United Kingdom and abroad, mostly like-minded, with whom he had an intensive correspondence. Though often considered a 'loner', he and Phyllis frequently hosted visitors from near and far, some even from the USA. He particularly disliked the occasional flamboyant visitor who professed enthusiasm without any firm grounding. Harold was



An example of one of Harold Hill's solar drawings.

loath to join any local Society. At times he was a member of the BAA and held the position of Director of the Solar Section, but for one year only as he found the job too arduous and it interfered with his observing programme.

Harold had superb engineering skills. He constructed a prominence spectroscope and started to produce fine drawings of prominences. Yet he wanted to record Hα features of the solar disk, and embarked on the construction of a spectrohelioscope – a mammoth task. He obtained a fine grating on permanent loan but the rest of the equipment he made himself apart from the mirrors. He constructed a hut to house the instrument. A motorised heliostat directed the sunbeam through a small hole into the darkened hut. The result was stunning due to his superb planning and craftsmanship. It enabled him to observe the Sun not only in Hα but also in other wavelengths.

With this setup he made a rare observation. During the 1973 November transit of Mercury he was able to see the planet in Hα light *after* fourth contact. (*J. Brit. Astron. Assoc.,* **84**(4), 279–280, 1974.)

A nature lover and a keen gardener, devoted husband and family man, Harold was also a first-class nature and architectural photographer, but never used his camera on astronomical objects. He and his wife Phyllis always had one or two dogs, some having been found abandoned and rescued by their son Edward on the motorway and brought to his parents. Many years ago Harold worked as a surveyor in the coal mines and was held in high esteem as an accomplished draftsman.

As an astronomer, this skill served him well when drawing what he saw at the telescope. He made a sketch, noting carefully the dimension and proportions of the object and numbering the various shades of brightness. Later, at his desk, he transferred his sketch onto drawing paper, using ink and rendering the light intensities by diluting the ink to various degrees or by using the stippling method and, if need be, using subtle and exquisite colouring. He added beautifully handwritten comments to each finished drawing.

Originally, Harold used his fine 12-inch (305mm) f/6 reflector in his home made observatory. Years later he used a 10" reflector. Eighteen months before his passing, he treated himself to a superb 8" Maksutov which he deemed superior to any other reflector he had used. It enabled him to intensively observe Mars at its most recent opposition.

He was awarded the well deserved Merlin Medal by the BAA in 1969.

He was always hesitant about publishing his work but his lifelong friend Richard Baum talked him into sending a selection of his lunar drawings to Cambridge University Press, which resulted in the publication of his masterpiece, *A Portfolio of Lunar Drawings* (1991). His special interest in lunar topography was the South Polar Region. He famously worked on this project for almost four decades, even waiting 18 years, to revise or complete an observation under identical libration and illumination. To his friends his map of the region seemed perfect, yet he was not satisfied as some minor details remained unsolved. Sadly, it was never published.

Around that time one of the authors (EHS) carefully studied Horace Dall's article on constructing an Hα Promscope. He managed to follow the well-described instructions and having obtained a 4Å Hα filter, succeeded. Harold was quite impressed by its performance and decided to make one himself. Both were thus able to observe prominences and compare findings.

Some years later Harold acquired a Daystar Hα filter which enabled him to observe solar disk features such as filaments, plages and the occasional solar flare. Eventually the filter developed a fault. He then gave up solar observing, concentrating on his lunar and planetary work.

He was engaged in observing Mars during its very recent apparition. In September 2005 he wrote to say that he had made some 40 drawings of the planet since July of that year, and was looking forward to its November opposition – but fate intervened.

He is mourned by his dear wife Phyllis, his son Edward and family as well by his very many friends. But his drawings live on as a memorial to a most gifted man whose artistry is unique.

Eric H. Strach
Richard M. Baum

New Honorary Members

Congratulations to the following, who have been members of the Association for a continuous period of fifty years at the start of the new session, and therefore now become Honorary Members:

	Date elected		*Date elected*
Mr L. B. Abbey	1956 Apr 25	Mr J. Morley	1955 Nov 30
Dr D. M. Gavine	1955 Nov 30	Mr K. Stevens	1956 Jan 25
Dr T. H. Lloyd–Evans	1956 Apr 25	Mr J. N. White	1956 Apr 25
Dr J. Marek	1955 Nov 30	Mr P. D. Wroath	1955 Dec 28
Mr J. Meeus	1955 Nov 30	Mr R. J. Smith	1956 Mar 28

Deep sky delights of Lyra

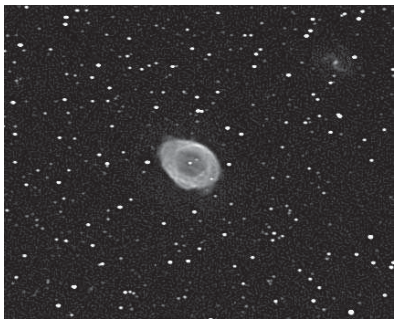
Despite its small size, the ancient constellation of Lyra is a distinctive and bright group of stars, dominated by brilliant Vega and containing one of the most looked at deep sky objects in the heavens – the planetary nebula M57, commonly known as the Ring Nebula. M57 (NGC 6720) was discovered from Toulouse by Messier's colleague Antoine Darquier in 1779, while he was observing the comet of that year which passed close to it. Said to lie at a distance of around 1,400 light years (although the distances to planetary nebulae are notoriously unreliable) it is estimated to be 20,000 years old and still expanding at a rate of 1 arcsec/century.

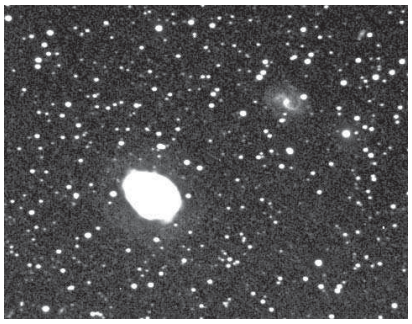
With a visual magnitude of 8.8 and a diameter of 76 arcsec, M57 can just be glimpsed in 10×50 binoculars as a slightly fuzzy 'star', but a 75mm telescope will be needed to show it as a torus and a much larger telescope to really do it justice. Like Saturn, it is an object that never fails to impress, and a good object to show your neighbours when you invite them round to look through your telescope before discussing their security lights! In addition to being bright it is also easy to find, lying approximately midway between Gamma and Beta Lyrae at RA 18h53.6m and Dec +33°02' (2000.0).

Low power views often give the impression that M57 is round, but putting the power up will show that it is elongated approximately ENE–WSW. A 300mm telescope will also show that the torus is fainter on the ends of the elongated axis. The central star illuminating the nebula is notoriously difficult to see visually, although it images easily. There is still some debate over whether the star is variable or not, and estimates over the years have ranged from 13th to 16th magnitude. It now seems to be around 15th magnitude. Success in seeing it seems to depend on using very high power – say 500 or 600 times – to darken the interior of the ring, combined with a night of excellent transparency and steady seeing; but even then it is far from easy.

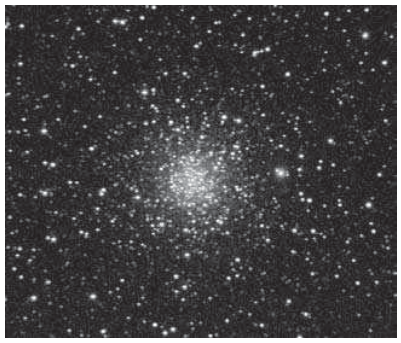
An image of M57, taken by Andrew Wilson and Peter Hewitt is shown. The central star is clear, along with another star inside the ring and one superimposed on the torus. Some variation in intensity around the ring can also be seen. This can be picked up visually in large telescopes, particularly if an OIII filter is used.

Lying just over 4 arcminutes to the north-west of M57 at RA 18h53.3m and Dec +33°3.9' is the barred spiral galaxy IC 1296. An extremely difficult visual target, it shows up well in Andrew's second image which has been processed to overexpose M57 but bring out the galaxy. An additional result of this processing is that it shows a hint of the outer envelope of M57, first photographed by J. C. Duncan in 1937 using the 100-inch telescope at Mount Wilson Observatory.





Images by Andrew Wilson and Peter Hewitt of Tonbridge, Kent, UK. 200mm Meade LX200 at f/10 with Starlight Xpress MX916 CCD camera. 30×60s stacked images, 2005 August 27. *Left:* Detail and the central star in M57. *Right:* Image processed to overexpose M57 and show detail in the barred spiral galaxy IC 1296.



Globular cluster M56, also by Andrew Wilson and Peter Hewitt of Tonbridge, details as before. 10×60s stacked images, 2005 August 27.

Also in Lyra, but often overlooked in favour of M13 in nearby Hercules, is the 8th magnitude globular cluster M56 (NGC 6779). Lying in a star rich area at RA 19h16.6m and Dec +30°11', it can easily be located by sweeping down from Gamma Lyrae to Beta Cygni (Albireo). M56 is a very open class X globular, while its neighbour M13 is a much more concentrated class V cluster. A 100mm telescope shows it well but, as with many deep sky objects, a larger aperture will transform the view, resolving it and showing a small round core.

Stewart L. Moore, *Director, Deep Sky Section*

Erratum – 2006 BZ8

On page 114 of the June *Journal* the 'aphelion distance' of asteroid 2006 BZ8 is given as 1.9 AU. Apologies: this should read 'perihelion distance'.

Letters

McClean star spectroscopes: the mystery solved

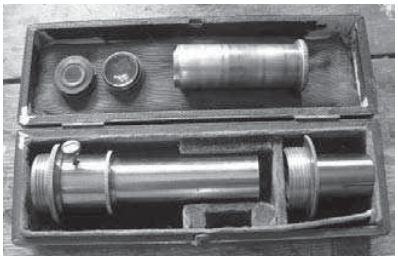
From Mr Brian Manning

Following my letter in the *Journal* in October 2005 [*JBAA*, **115**(5), 296 (2005)], I have had three responses. The first was from Dr O. Macnamara of Abberley, Worcs., who recounts an unsuccessful attempt with his brother in 1932 to see star spectra with a McClean spectroscope, but they did observe solar prominences and the Orion nebula using the positive lens.

Following this I had an email from Barry Clark of Australia who has done much spectroscopy from Melbourne Observatory. Barry drew my attention to the excellent paper by E. T. H. Teague in the April 2001 *Journal*, [*JBAA*, **111**(2), 102 (2001)] describing and illustrating his observations of star spectra with such an instrument. I then had an email from Ben Smith of Florida University, and this solved the problem.

Ben has long been interested in the work of John Browning, the instrument maker of the Strand, London, and sent me a copy of a page in Browning's 1885 book *How to work with the Spectroscope*. This describes how the McClean spectroscope is used, which should have been obvious to me. It is used like a Galilean negative ocular, in other words the spectroscope with the 'negative cylindrical lens is placed inside focus by a distance about equal to its focal length' (my wording in the quotes). Browning says 'roughly, the eyecap of the spectroscope should be placed at the solar focus'. It should be noted that the cylindrical lens is placed so that its refraction is in the direction of dispersion of the prisms, and not across it as inferred by Bell in his book *The Telescope*, (similarly for Sidgewick), thus the lens does not directly widen the spectrum. Instead it collimates the beam in the plane of the spectrum so that the eye can focus on the spectrum, in effect the star image. The widening is just the effect of the light in the other plane being out of focus due to the close proximity of the eye to the star image. This error is misleading and I plead was partly the cause of my not realising how the McClean is applied.

I have three spectroscopes: the Watson & Sons version of McClean, a John Browning version of McClean and an Adam Hilger one, which is very similar but not specifically a star spectroscope. It is of very similar dimensions to the other two, but has only a spherical positive lens fitted to it and I have to tape the Watson cylindrical lens to it in place of the other one. It normally slides into a tube fitted with an adjustable slit.



Brian Manning's McClean spectroscope.

Regretfully I have to say now why I could see so little with the Watson McClean. When tested with a slit on the solar spectrum it barely showed any lines, and an interference test on the outer faces of the prisms revealed that both are 1.5 fringes, convex instead of flat. This is surprising because Watson of course made fine microscopes. The Browning was good on a solar spectrum and the Hilger gave superb resolution despite lower dispersion. A further point is that due to the extreme prism angles on both McClean spectroscopes about half the incident light is refracted onto the prism base and of course lost, leaving a quite narrow beam about 2mm by 5mm. The Hilger with slightly taller prisms of less angle passes a 4.2 by 4.5mm beam .

I have made some star observations with the Browning and Hilger spectroscopes, but with limited time and opportunities due to the weather, not as well as I should have liked. I used my 10-inch f7 reflector and also rigged up an 85mm triple lens I made long ago for my spectrohelioscope. Sirius and Betelgeuse (being prominent at a reasonable hour) were the test stars and chosen from Teague's paper. On Sirius using the 85mm lens and the Hilger and Browning spectroscopes I could see H-beta and H-gamma clearly, but had to remove the eyecap on the Browning because it cut off H-gamma. I could not see H-alpha or H-delta. Using the 10-inch reflector, the same only brighter.

On Betelgeuse using both the 85mm lens and 10-inch reflector and the Hilger spectroscope, two thick lines in the yellow and red could be seen and two similar in the green-blue. Using the Browning and 10-inch reflector the extra dispersion revealed a third line in the blue-violet and two faint narrow ones in the green. This was similar to Teague's drawing, except that the green lines as I saw them were less prominent and he shows lines farther into the violet. I have tried unsuccessfully to get information on the Zeiss pocket spectroscope as used by Teague; I imagine it may be superior to the Browning one, and is not I think a McClean because Teague gives a range of magnification for its use. The McClean magnification is fixed by the cylindrical lens fitted to it, and I assume that the Zeiss is a Zollner spectroscope placed at the exit pupil of an eyepiece, with a positive cylindrical lens at the eye end.

Brian Manning

Moonrakers, Stakenbridge, Churchill, Kidderminster, Worcs. DY10 3LS [bmanning@beeb.net]

'Where have all the observers gone'

From Mrs Lorna McCalman

I am in total agreement with the sentiments expressed by Alan Heath in his letter published in June *Journal* [**116**(3), 149 (2006)], that the increasing use of digital technology is resulting in the visual observer fast becoming an endangered species.

For quite some time, many column inches have been devoted to technology and the practitioners who use these techniques with very impressive results. This has had the unfortunate effect of leaving the visual observer feeling second-rate; that visual observing is an outmoded method of operation which produces somewhat less convincing results than its shiny new digital counterpart. There is no doubt that technology has revolutionised all aspects of astronomy and is an invaluable resource, but the old adage of not throwing out the baby with the bath water is particularly relevant here.

A demonstration of my point can be made when as part of an outing with the Scottish Astronomy Group we went to visit the ancient Pictish stones at Aberlemno in Tayside. We all piled out of the bus to look at the carved stones and afterwards on the way back to Dundee, Ron Livesey, former Director of the BAA Aurora Section, asked me if I had seen the stones. I thought it rather an odd question as this had been the whole point of the outing. I answered in the affirmative, to which Ron observed that it was true that most people had taken photographs of the stones and made admiring noises, before returning to the bus. Ron then produced a beautiful sketch of the stones showing their detailed designs and I realised that I had not really seen the stones at all.

How many amateur astronomers have become celestial tourists, thinking they have *seen* an object when they have simply looked at it as an image to be processed on a computer screen? Another object 'in the bag'.

The instant gratification provided by GPS systems allowing rapid location of almost any celestial object has its benefits, but the satisfaction gained from finding and being able to find the object by one's own skill and effort is far more rewarding and is an aspect ▸

Planetary observing has never been healthier

From Mr M. P. Mobberley

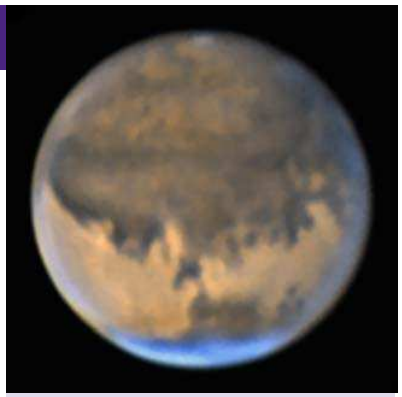
I would like to make a few comments regarding Alan Heath's letter in the June *Journal,* in which he describes planetary CCD imaging as 'push button' technology and 'fine if one just wishes to produce 'pretty pictures' '. I can sympathise with him to some extent: it must be very painful to have mastered the considerable skills necessary to observe fleeting details at the eyepiece, and transfer those observations accurately to paper, only to find that, in the last few years, a new technology has now surpassed 'eye and pencil' domination. But when one puts the pain aside it is obvious that CCD, or rather, *webcam* technology is a far more consistent, objective, reliable and high resolution way of obtaining scientific results. The *Cassini* and *Hubble* teams use enhanced CCD images and no-one queries the integrity of those digital pictures.

In fact, the differences between observers' results are far less controversial now than in the heyday of the visual observer. One only has to think of Lowell and his canals to realise just how easily the eye and brain can be fooled. If only Lowell had owned a webcam! In living memory there have been relatively few BAA observers who really could sketch precisely what they saw, without bias. In the cases of both George Alcock and Paul Doherty this led senior BAA members to cast doubt on what they could see with modest instruments and even to leave their fine drawings out of Section reports. The webcam has shown us that even small instruments can indeed reveal the fine details claimed by George and Paul, but not the illusory details 'seen' by many others.

In the early days of amateur digital imaging over-processing did occur, and artefacts did emerge. But in 2006 planetary imaging by amateurs is a mature technology and images are regularly scrutinised by dozens of peers worldwide within hours of their being taken. Often near-simultaneous images taken by multiple observers with different instruments allow objective analysis and a positional accuracy that is impossible with a sketch. The plotting of Jovian features drifting with time has reached professional levels within the BAA thanks to digital imaging and digital measurement by amateurs. Indeed, the webcam revolution has meant that planetary observing has never been so popular (surely a good thing) and it is no longer restricted to a tiny group of those with exceptional eyesight and drawing skills.

Personally, I find there are few things more fascinating and relaxing than observing the planets visually, when seeing is reasonable. But I know that if I want to faithfully record what I glimpsed, with maximum positional accuracy, I have to use the webcam. The next day I can tweak the contrast, gamma and colour balance to match what I saw visually, so there is still a visual role in the process.

It has taken me years to fully grasp this exciting new technology and change from being a planetary photographer. This is not a 'push-button' process at all; there is a huge input from the observer at the keyboard, as well as a nightly collimation ritual, rarely practised by all but the most dedicated visual observers. Each image takes many hours (or days) of work to complete and the concept of a 'push-button' approach is truly laughable – it is hard, but satisfying, work. I attach my favourite image from the recent 2005 Mars apparition. As far as I am concerned this accurately depicts the planet's appearance visually, through my Celestron 14, on the night of 2005 November 18. Just looking at this image gives me enormous satisfaction of 'a job well done' and great memories of the visual view that night.



Mars on 2005 Nov 18 at 22:30 UT. Image by Martin Mobberley with a Celestron 14 SCT at f/44, +Lumenera LU 075M CCD camera. The diameter of the planet was 18.8 arcsecs.

Finally, if there is one tradition the BAA should uphold it is that of moving with the times. We have always done so in the past and if we do not do it now the Association will definitely flounder and die in the 21st century.

Martin Mobberley

Denmara, Cross Green, Cockfield, Bury St Edmunds, Suffolk. IP30 0LQ. [martin.mobberley@btinternet.com]

of amateur astronomy which should be actively encouraged and promoted.

I recently bought a 12" Dobsonian with absolutely no gizmos attached... no time-consuming fumbling around in the dark 'setting up', no adaptors, no wires to trip over, no batteries and electronics to malfunction in sub-zero temperatures. My most used instruments remain 15×80mm binoculars and a small 80mm refractor with which I make variable star brightness estimates and still find great pleasure in locating and actually *seeing* the object in the eyepiece. The immediacy of the object in the eyepiece is not something which can be replicated digitally or otherwise.

Three cheers for Mr Heath for standing up for the visual observer. There may be fewer of us around, but we have as valuable a contribution to make as any other.

Lorna McCalman

20 Hillside Crescent, Edinburgh, EH7 5EB. [lmccalman@blueyonder.co.uk]

The late Ronald Irving

From Mr J. C. Vetterlein

I should like to add a few words of appreciation to Christopher Lord's obituary of the late Ronald Irving of H. N. Irving and Son (*Journal* **116**(3), 146).

I first came to know Ron way back in 1956. I became a frequent visitor to his home and workshop. Both he and his wife, Joan, were of the kindliest disposition and always made me most welcome. I recall many an amusing lunch at table with the family and one of Ron's stalwart colleagues, Fred Penny, who was always rich in his vocabulary.

Later, when between jobs, I worked with Ron for about two years on a number of projects one of which was mentioned in the obituary. In 1963 the then owner of the Brightling Observatory, Commander Hugh Malleson, approached Ron with a view to refurbishing the lead-clad dome and providing a suitable telescope. Ron entrusted the design and most of the construction of a new dome to me. This was fully assembled in four sections, together with a double shutter, at the workshop. With the aid of Ron's brother, John, and Ron himself, we took the dome in parts to the site at Brightling where, in the course of eight hours, the old dome was removed and the new one put in place.

In 2001 I produced a monograph of the exercise (*The Brightling Observatory,* ISBN 1-902582-40-3). This was reissued this very month, June 2006. (Incidentally, the diameter of the dome was around 8 ft, not 14 ft as mentioned in the obituary notice – see photograph.)

I last spoke to Ron and Joan on the telephone about five years back. They sounded no different from when we last joked together (there are many opportunities for laughter in the engineering business) all those years ago at 258 Kingston Road. Rich memories indeed.

John C. Vetterlein

Springfield, Rousay, Orkney, Scotland KW17 2PR. [springast@supanet.com]

Universal Time and UT1

From M. Jean Meeus

For about fifty years, the 'Universal Time' that is in use has actually been UT1. There is an official formula that gives the mean sidereal time at Greenwich as a function of UT1, but actually that formula *defines* UT1 as a function of the observed sidereal time.

The remarkable fact is that this 'new Universal Time' UT1 no longer refers to the Sun at all. On page 51 of the American *Explanatory Supplement to the Astronomical Almanac* (1992) we read that 'UT1 deviates secularly from solar time; however, the divergence is extremely small.' But the authors don't tell how large this divergence is. By the year 5000, will it be about 1 second, or 1 minute, or perhaps 1 hour?

Indeed, UT1 is bound to diverge from mean solar time, the 'true' UT that is locked to the mean Sun. But I don't think that many people realise that there is any divergence at all.

The difference between UT1 and the 'true' UT is approximately equal to 0.0027379 ΔT, where ΔT is the difference between the uniform Dynamical Time and Universal Time, and the numerical constant is equal to 1/365.242, the inverse of the length of the tropical year in days. For the year 2006, with ΔT= 65 seconds, this gives UT1–UT = 0.18 second. The quantity ΔT cannot be predicted accurately, but from estimated values it follows that in AD5000 the difference between UT1 and the 'true' UT will be about 89 seconds, a difference that is no longer negligible, though not catastrophic for current civil life. But by the year 10,000 the difference UT1–UT will have increased to about 10 minutes, and by the year 30,000 to an intolerable 2 hours.

Of course, the formula that connects the sidereal time to UT1 is not intended to remain in use for longer than a few millennia. Nevertheless, we might consider that the subject is a matter of principle, and we would have preferred to use the good old UT, that is connected to the actual mean Sun.

Jean Meeus

Leuvense Steenweg 312, Box 8, 3070 Kortenberg, Belgium. [jmeeus@compuserve.com]

'The Revd William Ludlam'

From Dr David Gavine

Two minor remarks on Martin Mobberley's excellent paper on the Cockfield Tower Observatory (*JBAA,* **116**(3), 119–126). The 'Scots' were not 'crushed at Culloden'; there were Scots on both sides. Indeed, most of the Lowland inhabitants, especially in Edinburgh and Glasgow, welcomed the defeat of the Highland rebellion which included only some of the clans.

Also, James Watt did not invent the steam engine. He improved its efficiency by introducing the separate condenser.

David Gavine

29 Coillesdene Crescent, Edinburgh, EH15 2JJ. [drdave37@tiscali.co.uk]

From Mr John Farquharson

Apropos of Martin Mobberley's paper 'The Revd William Ludlam... and the Cockfield Tower Observatory', may I clarify the position regarding 'The Scots were crushed at the battle of Culloden in 1746.' This refers to Charles Edward Stuart (Bonnie Prince Charlie) and his Jacobite army which was defeated at Culloden by the British army led by the Duke of Cumberland. The battle was the suppression of a rebellion by the Jacobites who supported the claims of the House of Stuart to the throne.

A sad feature of Cumberland's victory was the atrocities committed by his soldiers on wounded Jacobites and the civil population, hence 'Culloden' does not appear on the battle honours of any regiment of the British Army.

John Farquharson

21 Woodlinn Avenue, Cathcart, Glasgow G44 5TY.

[We regret that this correspondence is now closed].

Reviews

Star clusters and how to observe them

by Mark Allison

Springer–Verlag, 2005. ISBN 1-84628-190-3. Pp xi + 211, £22.00 (pbk).

Mark Allison is clearly an enthusiast and keen amateur observer of the Deep Sky, and in *Star clusters and how to observe them* the reader is persuaded that he has observed many star clusters over the years, one suspects visually, using binoculars and telescopes typical of the new observer. Many of the cluster observations describe their appearance in 4- and 8-inch telescopes. His style is friendly and welcoming to the newcomer to the field, although his enthusiasm can be over-punctuated with exclamation marks.

The book divides into two parts; the first discusses the astrophysics of stellar associations and open and globular star clusters in the Milky Way galaxy, then mentions asterisms and extragalactic clusters. In the second half Allison surveys equipment, observing techniques and resources such as paper and electronic star atlases. Some information is specific to star clusters but much is general Deep Sky observing advice, and may be surplus to requirements.

Just under half the book and most of Part Two is a 'comprehensive observing list' of 110 open and globular clusters and a couple of asterisms, ranging from 'easy' to 'hard' targets. Most on the list are visible from northern temperate latitudes, although Omega Centauri and 47 Tucanae are also described. Most well-known clusters get a mention, but there is a good range of challenge here for the more the adventurous or veteran observer. Perhaps it is not made clear enough that there are very many more clusters of both varieties on show to the owner of a modest telescope. Clearly Allison's selection policy must have been a personal one and understandably it would be impossible to include all clusters, especially of the open variety, but a few fairly obvious omissions in the 'comprehensive' list include IC 4665, NGC 6819 and NGC 7789.

The observing aspect of the book is more successful than the astrophysical which has many interesting things to say but which is littered with somewhat dubious statements throughout. One such assertion suggests the open cluster NCG 559 contains a supernova remnant – dubious indeed.

The text also contains a lot of mistakes that would have been spotted if the book had been more carefully prepared. Samples include the description of the nomenclature of M34 as also being named NGC 2362, the Praesepe and Beehive (these refer to M44 of course – p.60); M.82 is said to be a Local Group galaxy which it is not (p.49); Kemble's Cascade is not just 'near' Camelopardalis, it is well within it (p.44); that 'the nearest genuine cluster is the Pleiades at 400 light-years with the Hyades coming a close second at 1,540 light-years' which is nonsense – the Hyades are at 147 light-years, a fact that is stated later when each object is described (pp.19 and 125 respectively). Such carelessness misleads, and distracts from the book.

As with some other volumes in Springer's series, the illustrations could be better. The book is not designed to be a coffee-table eye-catcher, but in the age of modern imaging, many pictures are poor. That of the Coathanger (Brocchi's Cluster), one of the easiest Deep Sky objects of which to obtain a good image, is awful. Several others are trailed, blobby, or under-contrasted. This is partly due to selection of images, partly to reproduction. But it would have been a simple matter to have obtained better pictures from a wide variety of sources.

The few maps are of limited value. They are taken from Software Bisque, and are accurate but could have been so much more useful. Most observers will have an atlas, charts or an electronic programme with the ability to generate charts that will serve better. The Cygnus map misses off many accessible clusters; so do those of Vulpecula and Auriga. The Taurus map shows NGC 1647 but doesn't label it, and omits NGC 1746 completely; that of Perseus labels NGC 1245 but doesn't show its position – irritating.

The book will not displace Archinal & Hynes book *Star Clusters* for astrophysics and a comprehensive catalogue, or Kepple & Sanner's *The Night Sky Observer's Guide* for observing (both Willmann–Bell), but for the newcomer to star clusters looking for a relatively inexpensive alternative, it may serve.

Nick Hewitt

Dr Nick Hewitt, a former President of the Association, directed the Deep Sky Section from 1992 to 2005.

The sky at Einstein's feet

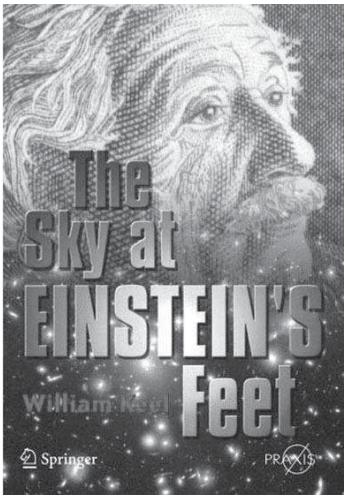
by William Keel

Springer/Praxis, 2005. ISBN 0-387-26130-3. Pp xiii + 246, £19.50 (pbk)

This book is a review of current observational astronomy and the contribution of Einstein's thought to our present understanding. It possesses considerable depth of coverage and insight and, generally, reads very well. The acknowledgement of the debt to Einstein generally works, too.

If you want the title explained, you must read the book. William Keel is a talented writer and that is about all I know about him.

His explanation of the ellipsoid geometry of some light echoes is brilliant. Another early example of good explanation is the odd fact that, if the Sun were suddenly to switch off like a light we should see it go out first at the disk centre and spreading to the limb. However, I dispute the idea that our appreciation of these phenomena is solely, or even chiefly, due to Einstein. The speed of light was first estimated in the 1680s and attempts to disprove the constancy of the speed of light occupied much of the last thirty years of the 19th century.



The editing strikes me as uneven – a colour version of a monochrome plate is listed as a 'Table'. A beautifully worked illustration of the relativistic clustering of objects, if one were proceeding at speeds closer and closer to that of light, suffers because it is difficult to identify the target constellation of Orion in the first frame, impossible thereafter.

Section 3.1 gives a lot of detail on the discovery of Sirius B. Much of this was new and welcome to me. The cautions about gravitational redshifts being expressed in kms^{-1} are timely and well explained. Similarly, I really enjoyed reading about the *HIPPARCOS* mission's need to take into account relativistic factors to achieve the impressive accuracy of its results.

I enjoyed much more than I could criticise adversely and both style and pace are good. For a general reader this book provides insight and information in an entertaining manner. There is plenty of depth, more than adequate scope, and lots of nuggets of unusual information.

Roger O'Brien

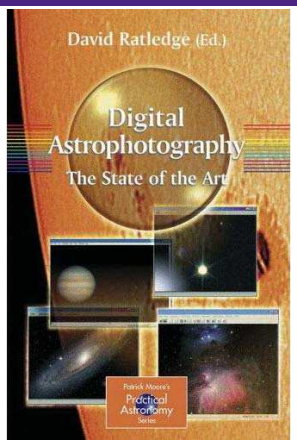
Roger is an Open University tutor for astronomy, planetary science and cosmology. He maintains that curved space is much easier to understand after several pints of Norfolk Wherry.

Reviews

Digital astrophotography – the state of the art

by David Ratledge (ed.)

Springer-Verlag, 2005. ISBN 1-85233-734-6. Pp viii + 177, £22.00 (pbk).



It is particularly difficult to compile a book on the 'state of the art' when the subject you are discussing advances as rapidly as digital imaging, but David Ratledge does a very good job. This is certainly a book to inspire. Ratledge has used many of the acknowledged experts in the field, each of whom has written a chapter on their own particular specialisation. These are people such as Christian Buil, Damian Peach, Brian Lula and Dale Mais so there is no shortage of practical experience on offer.

The book starts with relatively simple techniques, such as afocal photography, webcam imaging and the use of digital SLRs. It then progresses to more serious work and this is where the real jewels are to be found.

For many years I have received superb images from Brian Lula. Brian is an absolute perfectionist and takes amazing high resolution, widefield colour images with exposures of hours. I particularly enjoyed reading about the techniques he uses and seeing the instruments that he has built. Brian's results are stunning but they might be rather intimidating to some readers. Much more down to earth and closer to home is the work of David Ratledge himself. David shows that, with the right technology and processing, it is possible to take excellent images from Lancashire.

This book does have one fault. It is a shame that Christian Buil's chapter on the *Iris* image processing program did not receive more attention at the editing stage. *Iris* is a fantastic program which I use on a daily basis but the description in this chapter is not very clear and it suffers from poor copy editing which is a characteristic of Springer. Christian was writing in a foreign language (he is French) and he should have expected more support from his publisher.

Despite the problem with Christian Buil's chapter I can thoroughly recommend this book. Many excellent images are included and the reproduction in colour is very good. If you are new to digital imaging it will help you get started. If you are already an 'expert' it will inspire you to higher things, although the images obtained by messrs Lula and Peach are probably beyond most of us mortals.

Nick James

Nick James is the BAA Papers Secretary and is a professional engineer working in the space industry. He occasionally gets time to image the sky using an SBIG CCD and a Canon DSLR.

Meetings

Annual General Meeting, 2005 October 26

held at The Geological Society, Burlington House, Piccadilly, London W1

Tom Boles, *President*
Ron Johnson, Nick Hewitt and Nick James, *Secretaries*

The President opened the 2005 Annual General Meeting, extending an especial welcome to Mr David Freedman of the Association's Auditors, and our Accountant Mr Roy Dowsett. Dr Hewitt was invited to read the minutes of the previous year's AGM, which, receiving the approval of members, were duly signed. Mr Guy Hurst, Vice-President, was then invited to present the Association's accounts.

Mr Hurst explained that since the previous meeting, Mr David Tucker, the Association's Treasurer, had, at short notice and with regret, found himself unable to continue in his duties, as a result of the new time commitments demanded by his having taken increased responsibilities in his professional employment as an architect. Being unable to attend the present meeting, he had passed to the speaker the duty of presenting the accounts. As these had appeared in the October *Journal*, Mr Hurst remarked only that the Association had recorded a healthy surplus of £4,998 over the course of the year, before inviting questions. As no issues were raised, he proposed that the accounts be adopted, which was seconded, and carried *nem con*.

Mr Hurst expressed his gratitude, on behalf of the meeting, to Gates Freedman & Company, auditors to the Association, and to Mr Roy Dowsett, Accountant, for their valuable services in advising Council on financial matters. Members applauded.

The President then presented his annual report, which on this occasion covered the months from 2004 October to 2005 September. Opening with a summary of what the sky had offered, perhaps Comet Machholtz, visible in December and January, had been most notable. Peaking at around mag 4, it passed within a degree of the Pleiades on January 7, shortly after maximum, which had been an especially beautiful sight. Shortly afterwards, on January 13, Saturn's opposition was magnificent – the rings briefly appearing much brighter the usual, a consequence of the opposition effect. And in the same eventful week, on January 14, the *Huygens* probe had made history, landing on Saturn's moon Titan, thereby becoming the first probe to land on a moon of another planet, the first to return images from the surface of so distant a body, and the first to reveal what lay beneath Titan's thick hydrocarbonaceous clouds. Many had predicted that it would find oceans of methane, possibly covering the entire planet; in the event, however, it had imaged surface relief, before touching down on solid ground.

In the spring, binary star γ Virginis had passed periastron for the first time since 1835–'6, on which occasion it had been observed by Herschel, Dawes and Smyth, amongst others. This time around, the components, closing to within 0".3, had for a time been unresolvable even to amateurs of the likes of Damian Peach, who, after closest approach had been the first Association member to successfully separate them on May 7. This feat had been achieved using a blue 350–450nm filter whilst on an observing expedition to Barbados; he had estimated their separation to have been 0".35 at this time from his images.

July 4 had brought another space exploration first, as NASA's *Deep Impact* probe had smashed a 370kg projectile into Comet 9P/Tempel at a speed of 10.2 km/s. It had

been a tremendous engineering and scientific success, revealing much about the structure of cometary nuclei, though those amateurs who had been expecting a significant flare might have come away rather disappointed by its meagre visual brightening.

The UK's supernova patrollers had had a slow year; the weather had been some of the worst for years. At the end of September, Ron Arbour had 16 discoveries to his name, Mark Armstrong 71, and the President himself 90. The total number of UK discoveries now stood at 177. One notable non-UK discovery, however, had been SN 2005cs, in M51, reported by Wolfgang Kloehr on June 28; given the Whirlpool Galaxy's prominence, many amateurs had subsequently found pre-discovery images in their archives. It was the second supernova in M51 in a very short period of time, preceded 11 years earlier by SN 1994i.

The year had seen several nova discoveries, including Ron Arbour's detection of a mag 15 event in M31 in January. Later in the year had come two well-observed specimens: Nova Cygni 2005, discovered by Nishimura in February, and Nova Aquilae in June. On August 3, news came that the orbit of transneptunian object 2003 UB313 suggested it is 97AU distant, which, given its visual brightness of mag 18.7, placed estimates of its radius at 1½ times that of Pluto, assuming a typical albedo. This made it the largest Sun-orbiting body to have been discovered since Neptune in 1846, and had opened debate as to whether it could be called a tenth planet. The latest reports suggested that it might have an unresolved moon – an exciting development, as an orbital determination would allow a more accurate mass estimate of the parent body to be made. At the same time however, if some of its luminosity were to be attributed to a moon, this would invariably decrease the predicted size of the object itself.

Turning briefly to the planetary scene, the President remarked that this year's apparition of Mars had arguably been the finest chance to observe the Red Planet for 14 years; though its angular size had been a little less than that seen in 2003, its more northerly declination had placed it at a much more favourable altitude in the UK's skies this year.

It had been a year of change in the Association's Office; after many years of steadfast service, Patricia Barber had stepped down as Assistant Secretary. She was a hard act to follow, but Jean Felles and Valerie Stoneham were doing a superb job, taking advantage of the transition to install a new computer system. The Association's other officers had also continued to provide outstanding service: Dr John Mason was thanked for his work as Publicity Officer in handling media enquiries and membership campaigns, whilst all of the Section Directors were given especial thanks for encouraging members in their observing work, and collating the results. Bob Mizon and the Campaign for Dark Skies (CfDS) were congratulated for their work in lobbying for legislation against intrusive light pollution, which had this year reached the statute books for the first time.

Mrs Hazel McGee was thanked for her industrious work in editing the *Journal* – its quality was not only maintained, but improved – and Mr Nick James, Papers Secretary, for his unfailing efforts to ensure that the standard of the accepted papers was maintained. Ms Valerie White was congratulated on the fine results of her first year as editor of the Association's annual *Handbook*, and Mr Gordon Taylor for ensuring such a smooth handover of this rôle. The President further thanked Mr Callum Potter, website manager, for overseeing a change of the Association's internet service provider, and working tirelessly throughout the year to keep the website up-to-date.

All the members of the previous year's Council were thanked for their hard work behind the scenes, ensuring the smooth running of the Association. Especial mentions were given to Richard Flux, organiser of the very successful Winchester Weekend, and the outgoing treasurer, David Tucker – who was thanked and offered all best wishes upon his departure.

Sadly, the year had brought unhappy news as well. On August 29, David Sinden had passed away; he had been a long-standing friend of the Association, and a member since 1949. His interest in amateur astronomy had been by no means eclipsed by his professional work as Chief Optician for Grubb Parsons, through which he had had a cardinal rôle in the construction of such mirrors as the 4.2m for the William Herschel Telescope, the 3.9m for the Anglo-Australian Telescope, and the new corrector plate for the 48" Oschin Schmidt at Mt Palomar. After the demise of Grubb Parsons in 1983, he had formed his own company, Sinden Optics, which had produced fine mirrors for both amateur and professional applications.

The President turned finally to summarise the Association's own activities over the past year, taking the opportunity first to thank Dr Nick Hewitt, Meetings Secretary, for once again providing such a fine crop of speakers, and Mrs Hazel Collett, who, having assisted him so ably over the past year, would be taking over the job for the coming session.

November had seen the Association's first Joint Meeting with the Royal Meteorological Society, which had generated a large amount of positive feedback: it had been an unusual opportunity to see broader aspects of a common science. In January, the occasion of the seventieth anniversary of Sir Patrick Moore's election to the Association was celebrated – a happy event, though it had been sad to see Sir Patrick so frail, reluctantly conceding it was likely to be his last appearance at a BAA meeting. On April 9, an Association-commissioned plaque commemorating the life of George Alcock was unveiled in Peterborough Cathedral by the Astronomer Royal, Prof Sir Martin Rees. It seemed a fitting tribute to the life of a man whose mastery of the art of visual comet hunting was surely surpassed by none.

To close, Mr Boles thanked all of those members with whom he had communicated over his two year tenure as President; their feedback and suggestions had been invaluable.

The President then invited the Business Secretary, Mr Ron Johnson, to announce the results of the ballot for Council for the coming session. Mr Johnson declared that 502 ballot papers had been received, and the voting was as follows: President: Richard Miles, 460; Vice-President: Tom Boles (ex-officio); Treasurer: David Tucker (candidacy withdrawn); Secretary (Meetings): Hazel Collett, 420; Secretary (Papers): Nick James, 434; Secretary (Business): Ron Johnson, 438. Other members of Council: Dr Nick Hewitt, 427; Maurice Gavin, 408; Dr David Boyd, 393; Valerie White, 391; Dr John Mason, 383; Anne Davies, 372; Mark Armstrong, 365; Roger Dymock, 350; Martin Morgan–Taylor, 320; Michael Maunder, 315; Sheridan Williams, 310; Geoffrey Johnstone, 292. Due to outstanding subscription charges, nine ballot papers had been declared invalid.

Mr Johnson said that since the distribution of ballot papers, and as mentioned earlier, the Association's Treasurer, Mr David Tucker, had resigned and withdrawn his candidacy for the post in the coming session. Dr David Boyd had kindly agreed to fill the post, and thus withdrawn his candidacy as a General Member of Council. Furthermore, the speaker was saddened to report that ill-health had recently forced the Director of the Asteroids and Remote Planets Section, Dr Andy Hollis, to stand down. Mr Roger Dymock would be taking over that rôle, thus also with-

Mr Tom Boles *(left)* hands over the Presidency to Dr Richard Miles. *(Photo: Hazel McGee)*

drawing his candidacy from the ballot. After the removal of these two names, ten candidates remained in the ballot for the ten remaining Council positions, thus all were elected to serve.

After thanking the scrutineers of the ballot for their attentive work, Mr Boles delivered his second Presidential Address, entitled 'Tools for supernovae – discovery and follow-up'. He offered a personal account of the process of finding, checking and reporting supernova candidates, including a survey of some of the other amateur patrols from around the world, as well as of the professional competition presented by robotised surveys. This Address will be printed in a subsequent *Journal*.

Following the applause, Mr Boles congratulated Dr Miles upon his election as President, adjourned the meeting until 2006 October 25, and invited the new President to take the chair for the following Ordinary Meeting.

Dominic Ford

Ordinary Meeting, 2005 October 26

held at The Geological Society, Burlington House, Piccadilly, London W1

Richard Miles, *President*
Ron Johnson, Hazel Collett and Nick James, *Secretaries*

Dr Miles opened the first meeting of the 116th session, expressing his congratulations to his predecessor, Tom Boles, for having seen the Association successfully through two years of rapid change, including a complete change of staff in its office, and the installation of a new computer system. He expressed the hope that Mr Boles, with the time commitments of running the Association passed, would now be able to devote more time to his eyepiece and to his excellent supernova patrol work. He then invited Mrs Hazel Collett to read the minutes of the last meeting of the previous session, which were approved by members and duly signed.

Mr Ron Johnson, Business Secretary, said that two books had been received by the Association since the previous meeting: *Fifty Golden Years 1954–2004*, donated by the Aryabhatta Research Institute; and *The Stargazing Year*, by C. L. Calia, donated by its author. Members applauded the donors.

The President announced that there were 46 new members proposed for election; the election of the 82 who had been proposed at the previous meeting was approved by members, and they were duly declared elected. Dr Miles welcomed any newcomers to introduce themselves at the end of the meeting. Mr Nick James, Papers Secretary, reported that Council had recently approved six new papers for *Journal* publication:

Performance of a fibre-optic coupled high resolution spectrograph with CCD camera data recording of solar absorption spectra, by David Airey

A home-made Newtonian filter holder for planetary imaging, by Martin Mobberley

The visibility of the dark side of Venus, 1921–1953; a series of observations by M. B. B. Heath, by Richard Baum

The Perseid meteor shower in 2002, by Neil Bone

High-precision radial-velocity measurement with a small telescope: Detection of the Tau Boötis exoplanet, by S. Vanaverbek *et al.*

Observations of the recently discovered dwarf nova 1RXS J053234.9+624755 during the 2005 March superoutburst, by Gary Poyner & Jeremy Shears

Dr Miles announced that the Association's next meeting would be the Northern Back To Basics Workshop, to be held in Doncaster on Saturday November 12. The following week, there would be a meeting of the Instruments & Imaging Section on November 19 in The Humfrey Rooms, Castilian Terrace, Northampton. The next Ordinary Meeting would be the Christmas meeting, to be held in the English Heritage Lecture Theatre on the afternoon of Saturday December 17; the Christmas Lecture would this year be delivered by Prof Don Kurtz, and would be followed by Rod Jenkins and Martin Mobberley.

The President then welcomed Nick James to make a short presentation of images on behalf of all those who had observed the annular solar eclipse of 2005 October 3.

October 3 annular eclipse observations

Mr James opened by giving the circumstances of the eclipse, which was visible in its annular phase along a path which traversed Spain, Portugal and parts of Africa. A good partial eclipse was seen from London between 07:49 and 10:19 UT, to a maximum of 66.1%.

The speaker, and a number of other Association members, had taken advantage of cheap airfares to fly to Madrid for a long weekend, and had viewed the eclipse from Valencia. Others had observed from Tunisia, while many others still, of course, had watched the partial event visible from the UK. Spain had enjoyed clear skies throughout; the Tunisian groups had had some worries about localised cloud patches, but in the event they had not affected anyone of whom the speaker was aware. Many in the UK had been clouded out, though there had been some clear patches, especially in the south-east.

Martin Mobberley, in Suffolk, had imaged some of the partial phase through a thin veil of cloud; in Worcester Park, Maurice Gavin had had good enough skies to take a series of images, later to be stacked into a fine composite, which revealed clearly the magnitude of the eclipse. In Surrey, John Murrell had taken another fine series of images by mounting his digital SLR onto the back of his telescope.

Mr James then showed some of the images from Valencia – firstly those by Damian

Montage of images of the partial solar eclipse of 2005 October 3, obtained from Worcester Park, Surrey, by Maurice Gavin.

Peach and David Tyler, taken during annularity. The resolution achieved was astounding – some aspherical details were even apparent on the lunar limb. The speaker was unsure whether these were lunar mountains, as he might like to believe, or seeing effects; in either case the images remained superb. Pete Lawrence had obtained a fine image of the central moment of annularity, when the Sun had appeared to form a perfect ring. Perhaps the best images of third contact were those by Glyn Marsh, who had captured the annulus breaking up into a whole series of many Baily's Beads; these were without question the result of lunar topography, the Sun setting first behind the mountains, lingering a little longer above the valleys, each for a moment shining like a sparkling bead.

In Tunisia, Nigel Evans had attempted successfully to take a composite image of the eclipse, using film rather than digital stacking – the old-fashioned way. A fair amount of advance planning was required, to frame the shot appropriately and select a suitable exposure; the speaker congratulated him heartily: he had good reason to be pleased with the result.

Mr James concluded by showing a video that he had taken from Valencia of the annular phase; he also remarked upon one of the most interesting demonstrations that could be done during the partial phases of an eclipse: projecting little crescent images of the Sun through pinholes and other crevices.

Following the applause for Mr James, the President introduced the evening's final speaker, Dr Stewart Moore, Director of the Deep Sky Section.

The autumn deep sky

Dr Moore remarked that his talk would provide a striking contrast to Mr Boles' earlier Presidential Address: whereas the supernova patrol work described there had been at the cutting edge between amateur and professional work, the present talk would contain a lot of pictures, showing some of the beautiful gems of the night sky. The autumn was often thought a poor season for amateur astronomers. The glorious winter constellations – Orion, Taurus, Gemini, etc. – rose very late in the night, while the summer constellations and the galactic centre began to sink into the twilight of dusk. As for the autumn's own constellations – Andromeda, Triangulum, Aquarius, etc. – they seemed to consist of rather faint and unappealing stars.

But he wished to right this view, for what these constellations lacked in bright stars, they made good with a fine showing of deep sky objects. Concentrating on the vicinity of Pegasus, the speaker began to tour the sights.

Perhaps the most famous among them was the Andromeda Galaxy, M31, an Sb spiral, and its companions, M32, a dwarf galaxy, and M101, an elliptical. Here was a fine illustration of the gregarious nature of galaxies – a triplet separated by a mere degree on the sky. Showing a three-dimensional map of the Local Group of galaxies, the speaker illustrated how M31's relationship to its two companions was very similar to that of the Milky Way to the two Magellanic Clouds; in both cases, smaller satellite galaxies orbited around a more massive parent.

M31 itself was ~3° across, and readily visible as a misty patchy to even mediocre eyes given sufficiently dark skies. Given its brightness and size, it was an easy target to find telescopically; the star α And (aka δ Peg) provided a nearby reference for star-hopping. Through a telescope with a 30' field, however, it was often a disappointment: only the central region could be seen, which seemed to merely fade away towards its edges. A good pair of binoculars generally provided a much more appealing view. The speaker's personal favourite of the trio, however, was M101 – though the faintest of the three, it was set in an attractive starfield, and its mottled core and a faint obscuring dust lane made it appear slightly spiral, despite its elliptical classification.

Despite these galaxies' fame, Dr Moore thought that Andromeda had better sights to offer – NGC 891, for example. It was easy to locate, being 18' of RA to the east of mag 2 star γ And – one could simply find this star, turn off the drive, and drink tea for 18 minutes! An edge-on Sb spiral, it appeared spindle-like, with a strikingly dark dust lane running through its centre, and two mag 12–13 stars marking either end. Another nearby edge-on spiral (classified Sbc) was NGC 7640, appearing as a thin needle of light – a long thin streak of faint nebulosity with a slightly grainy core. It was a remarkable sight, but despite being quite bright at mag 11, its low surface brightness required a good sky.

Moving now to the constellation Triangulum, the speaker showed the famous Pinwheel Galaxy, M33 – to be found 4.3° north-west of α Tri. Despite sounding as if it should be rather bright at mag 5.7, it actually had a rather faint surface brightness on account of its size – at 71'×42', larger than a Full Moon. It was the third largest member of the Local Group, and within its sweeping spirals could be found many deep sky treats, including the bright HII region NGC 604. However, the speaker wished to draw more attention to nearby NGC 672 and its companion IC 1727 (8' distant). Both were beautiful Sb spirals, but under-observed, despite their being visible even with a mere 150mm aperture. The Pinwheel, by contrast, could be a challenge with a 250mm aperture.

As a final Messier galaxy, Dr Moore mentioned M74, though warning that it was perhaps the most difficult of all objects in the Messier catalogue to observe. A fine face-on spiral, visible as a square bright patch in poor sky conditions, rewarded those who persevered. The speaker recommended fine frosty nights as the times most likely to yield the best skies.

Turning to star clusters, M2 in Aquarius and M15 in Pegasus were surely the finest globulars of the season, measuring 12' and 15' across respectively. NGC 7006 in Delphinus was also fine, though rather more distant – 185 thousand lightyears (kly), as opposed to 30 and 37 kly for M2 and M15 respectively. Consequently, a mere 1'.5 across, it was too compact to be resolved. NGC 7492 in Aquarius was also worthy of note, though at –16° declination it never rose more than 23° above the London horizon, and at 6' across, was tricky to resolve.

Cassiopeia was littered with many tens of open clusters, but surprisingly only one was a Messier – M103 – and even this a rather stubby unexciting specimen. Rather more interesting, to the south-west of the 'W', was NGC 7789 – missed by Messier and later discovered by Caroline Herschel, very much an observer in her own right, though so often recorded in history as a mere secretary to her brother.

Two planetary nebulae were particularly well-placed in the autumn sky: NGC7662, the Blue Snowball, in Andromeda, and NGC 7094 in Pegasus. The former was visually easy and required no filter; it could be found close by galaxy NGC 7640. John Herschel had first noted it to be 'blue in colour'; its nickname derived from Leyland Copeland's remarking upon its 'looking like a light blue snowball'. This trademark colouration was quite tricky to make out, as the eye's most sensitive cells, the rods, were colour insensitive, but it could be discerned with a reasonable aperture. NGC 7094, 1.5° away from M15, was rather harder – it was rather fainter, and greatly benefited from the use of an OIII filter. It presented all that a planetary nebula should: a bright shell surrounded a central star, with faint nebulosity filling the shell.

At half the size of the Full Moon, the largest, and at 0.45 kly, also the closest, of all planetary nebulae was the Helix Nebula, NGC 7293, which presently culminated at around 20h00 UT. At δ= –20° it never rose more than 18° above the London horizon, and was easiest viewed from the Continent, but was a beautiful sight through a large aperture. It could be seen through a 150mm aperture, but 305mm brought out much more structure; in both cases an OIII filter was recommended.

Following the applause for Dr Moore's fine, well illustrated tour of the autumn sky, the President adjourned the meeting until December 17 at the English Heritage Lecture Theatre, 23 Savile Row.

Dominic Ford

Sky notes

by Neil Bone

2006 August & September

Sun and Moon

Sunspot cycle 23 is now very close to minimum, and on many days recently the projected solar disk has appeared blank. The few spot groups which have broken out in the last few months have mostly been quite small. Regular observers are now on the lookout for the first spots of cycle 24, which are expected to soon appear at high solar latitudes.

From the terrestrial perspective, the Sun is now heading southwards on the ecliptic, its apparent annual path against the star background. At 04h 03m Universal Time (UT, equivalent to GMT; BST minus 1 hour) on September 23, the Sun sits on the celestial equator: this is the moment of the autumnal equinox. Thereafter, the hours of darkness exceed those of daylight for those at the latitude of the British Isles, ushering in the prime observing season.

The Moon is new on August 23 and September 22, giving the darkest night-time skies in the last ten days or so of either month. Full Moon on August 9 will severely hamper observations of the Perseid meteor shower. The September 7 Full Moon undergoes a small partial eclipse in Earth's shadow. The event is part-visible from the British Isles; first umbral contact is at 18h 05m UT, and the eclipse ends at 19h 37m UT. From UK locations, moonrise is around 18h 40m UT, close to mid-eclipse when 19% of the Moon will be immersed in shadow – the northern lunar limb really only just clips through the outer edge of the umbra. The 'bite' should, at least, be noticeable, albeit diminishing in extent as the Moon rises higher.

Traditionally, September's Full Moon is the Harvest Moon, its strong light for several evenings after Full being welcome in times past as extra natural illumination for bringing in the crops. In both August and September, the angle between the ecliptic and the eastern evening horizon is shallow, with the result that the Moon's daily eastwards motion (about 13°/day) makes minimal difference to the time between successive moonrises, and right up to last quarter (August 16, September 14) the Moon is up well before midnight. This is a favourable circumstance for observers wishing to view features in the heavily-cratered lunar southern hemisphere under local sunset conditions at a user-friendly hour.

The planets

Mercury is in the morning sky in early August. At greatest elongation 19° west of the Sun on August 8, it will rise only about 90 minutes ahead of sunrise, and at magnitude 0 will be quite difficult to find in the brightening northeastern sky. Superior conjunction, on the far side of the Sun, is reached on September 1, then Mercury moves into the evening sky where it is very unfavourably placed for observers at northern latitudes.

Venus' stint as 'Morning Star' is drawing to a close. Never spectacularly easy this time around, despite its brilliant mag –4, Venus rises about 1h 40m ahead of the Sun during early August, but by the month's end it will be pretty much lost from view. Through September, the planet's elongation west of the Sun diminishes rapidly, and Venus will not be visible again until about Christmas when it begins a much more favourable evening showing.

The long wind-down of Mars' current apparition continues, with the red planet now essentially lost into the bright evening sky close to the Sun. Setting about an hour after the Sun, Mars is now a dim, distant second-magnitude object with a tiny (4 arcsec diameter) apparent disk.

Jupiter, seen against the stars of Libra, is still reasonably-placed in the southwestern sky for an hour or so in the early evening during August. The mag –2 planet has a disk diameter close to 35 arcseconds, and should show a fair amount of detail in small telescopes. During September, Jupiter becomes lost into the evening twilight, setting an hour after the Sun.

Saturn reaches conjunction on the far side of the Sun on August 7, emerging into the morning sky during September. Now located in Leo, a little west of Regulus, the mag +0.5 ringed planet rises around 02h UT – 2h 30m ahead of sunrise – in mid-September, providing reasonable telescopic views for early risers. As its orbital motion carries it southwards along the ecliptic, Saturn's rings begin to close in their presentation towards us: observers will find the rings markedly less open than they were during spring 2006.

The dearth of naked eye planets is somewhat compensated by the favourable presentation of Uranus and Neptune – each visible in 10×50 binoculars – during this interval. The brighter of the two at mag +5.7, Uranus reaches opposition – 180° from the Sun in Earth's sky – on September 5, when it will be a little more than a degree due east of the mag +3.7 star Lambda Aquarii, SSE from the 'Water Jar' asterism in Aquarius.

Neptune, somewhat trickier at mag +7.8, is at opposition on August 11, a degree to the north of mag +4.3 Iota Capricorni.

Both these outer ice & gas giants are too remote to show much more than tiny (3–4 arcsecond) disks in amateur telescopes. Their favourable presentation in August and September, and the comparative short-

age of other planetary targets, might make them interesting subjects nonetheless for observation in telescopes of 100mm aperture upwards: seasoned planetary observers might find it interesting to compare the visual appearance of these two distant worlds.

Minor planets

(1) Ceres is at opposition on August 17, when it reaches visual magnitude +7.6. Its southerly declination against the stars of Piscis Austrinus, west of Fomalhaut, makes it a rather unfavourable target for UK-based observers.

Somewhat better placed is 8th magnitude (6) Hebe, moving retrograde against the stars of Capricornus about 5° east of the wide naked eye pairing of Alpha and Beta Capricorni, and reaching opposition on August 7.

Meteors

Normally the summer's main attraction, the Perseids are severely affected by moonlight at their August 12/13 maximum in 2006. Only the brightest meteors will be visible, with glare from the early-rising waning gibbous Moon dominant by the time twilight has ended. Conditions will be much, much better next year.

The later parts of August provide some relatively low-key minor shower activity which, augmented by reasonable background sporadic rates, can make for productive watches. The Kappa Cygnids, from a radiant in Cygnus' more northerly 'wing', have their nominal peak around Aug 17/18, when rates of around 5 meteors/hr might be attained. Kappa Cygnids are slow (meteoroid atmospheric entry velocity 25 km/s), and in some years bright meteors and fireballs have been reported from the shower.

Towards the very end of August, peaking around September 1, the Alpha Aurigids produce modest activity from a radiant near Capella, well up in the northeastern sky by the early hours.

Variable stars

The long-period (Mira type) variable Chi Cygni is expected to be at maximum light around August 19, when it should be a faint naked eye object. Peak brightness is reached at intervals of about 14 months, and Chi Cyg usually gets as bright as 5th magnitude: some maxima are noticeably brighter, as was the case in 2004. Chi appears as an additional star along Cygnus' 'neck', close to 4th magnitude Eta Cyg, and it will remain an easy binocular object even as it begins to fade during September.

As autumn approaches, the familiar 'W' of Cassiopeia becomes more prominent in the northeastern evening sky. The middle star of the 'W', Gamma Cassiopeiae, is a well-known naked eye variable star. Gamma Cas is a young, massive rapidly-rotating B-class star, prone to 'shell' episodes during which outer layers are shed leading to a prolonged period of brightening. Currently around mag +2.3, Gamma reached mag +1.7 during the 1930s, for example. Brightness estimates made at weekly intervals may reveal subtle short-term variations, and suitable non-varying comparison stars include Alpha Persei (mag +1.8) and Alpha Cephei (mag +2.4).

Autumn's arrival also makes it possible to again follow minima of the eclipsing binary Algol (Beta Persei), during which the star dips from its usual mag +2.1 down to mag +3.4. This will occur on September 26/27, and in the early evening of September 29/30.

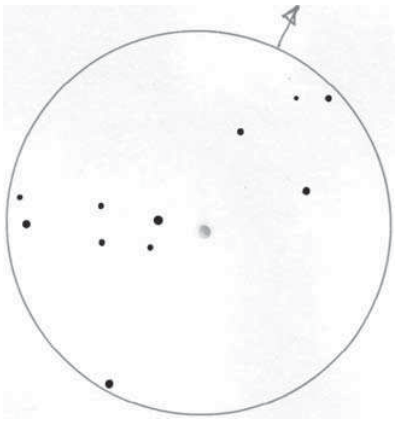
Deep sky

The rich Milky Way fields south of Aquila remain well-placed in August and – early in the evening – into September. Another region well supplied with good targets is in eastern Ophiuchus, adjacent to Aquila's western (to the right in British skies) 'wing', around the triangle of fourth-magnitude stars 67, 68 and 70 Ophiuchi – sometimes known as 'Poniatowski's Bull'.

70 Oph, the star at the eastern point of the triangle, is a good double for medium-aperture (80–100mm) telescopes. The components are separated by a comparatively easy 5 arcseconds. The brighter star is yellowish, and shines at mag +4.2, while the mag +6.0 secondary, at position angle 148° to the SSE, is reddish.

A couple of degrees to the west, just NNW of mag +2.8 Beta Ophiuchi, IC 4665 is a fine, loosely-scattered open cluster, readily visible in 10×50 binoculars. Around thirty stars of mag +7 to +8 are contained in a region 45 arcminutes (1½ moonwidths) across.

A binocular sweep to the east of Poniatowski's Bull will turn up another of this region's good open clusters, NGC 6633. Binoculars show this as a prominent north-



NGC 6572 sketched by Neil Bone using an 80mm f/5 refractor at ×40. Unfiltered view. (2005 August 28).

east-pointing hazy wedge of faint stars. In a small telescope at low powers (×20 is good), NGC 6633 appears to contain about twenty stars, ranging from mag +7 to +9, in a narrow triangle with a long axis of about 10 arcminutes. A solitary 6th-magnitude star lies to the south.

North of 70 Oph, the 4th-magnitude star 72 Oph is a good guide (2.5° to its NNW) for the compact planetary nebula NGC 6572, an excellent object for medium-sized telescopes. In small telescopes, the 15 arcsecond diameter, mag +8.1 disk is essentially star-like; an OIII or UHC filter will give away its nature (NGC 6572, emitting more or less exclusively at the 500.7 and 485.9nm excited oxygen wavelengths, remains undimmed, unlike the stars, when such a filter is passed in front of the eyepiece). Larger telescopes at higher magnifications will show NGC 6572 as bluish, and may reveal the 13th-magnitude central white dwarf star.

Neil Bone

Notice board

Meetings diary

2006 September 2
BAA Out-of-London Meeting at the National Space Centre, Exploration Drive, Leicester, LE4 5NS. See notice opposite.

2006 September 8–10
Horncastle Astronomy Weekend. Further details from Paul Money, e-mail **paul@astspace.demon.co.uk**

2006 September 15–16
6th European Dark Skies Symposium at Portsmouth, Hampshire, UK, organised by the BAA Campaign for Dark Skies. For a discounted ticket application form for amateurs (just £3 per day, or £5 for 2 days) contact **cfds@nightlife.demon.co.uk**

2006 September 23
***The Astronomer* Annual General Meeting,** 11:00 a.m., St Mary's Church, Goat Lane, Basingstoke. Speakers include Revd Bob Evans (Australia), Dr Robin Catchpole, Gary Poyner and Dr Mark Kidger. Full details from Guy Hurst, guy@tahq.demon.co.uk, or see **www.theastronomer.org**

2006 September 23
Meeting of the BAA Radio Astronomy Group, 10:30 a.m., Institute of Astronomy, Cambridge University. Speakers include Dr Jim Cohen (Jodrell Bank), Laurence Newell, David Farn, John Cook. For more information contact radiogroup@btinternet.com or see **www.britastro.org/radio**

2006 September 30
Federation of Astronomical Societies Annual Convention & AGM. 09:30 for 10:00 at the Birmingham & Midland Institute, 9 Margaret St, Birmingham. Speakers: Prof. John Brown, Dr Allan Chapman, Dr Somak Raychaudhury, Dr David Whitehouse. Tickets £12 on door or £10 in advance from Callum Potter, president@fedastro.org.uk, tel. 01684 773256 or see **www.fedastro.org.uk**

2006 October 7
Society for the History of Astronomy Autumn Conference, 11:00 to 17:30 at the Birmingham & Midland Institute, 9 Margaret St, Birmingham (City Centre). Conference theme: 'Historic instruments and imaging'. Tickets available at the door or in advance, £10 each from the SHA Treasurer, Mr K. J. Goward, 14 Keightley Way, Tuddenham St Martin, Ipswich, Suffolk, IP6 9BJ [Treasurer@shastro.org.uk]. Please make cheques payable to the Society for the History of Astronomy.

2006 October 13–15
The Scottish Astronomy Weekend will take place at the Cowane Centre, Stirling. Stirling is a pleasant small city with a fine castle and many historic buildings. One of the themes will be 'Instruments', with main speaker Bob Marriott. For bookings and details please contact Dr Alex. Houston, 41 Keirfold Avenue, Tullibody, Clackmannanshire, Scotland, FK10 3BE, e-mail: **alex.houston@tinyonline.co.uk**

2006 October 25
BAA Annual General Meeting, 17.30 hrs at New Hunts House, Guy's Hospital, London Bridge, London SE1 9RT. The 2006 Presidential Address will be given by Dr Richard Miles on 'A light history of photometry'.

2006 October 28
The 4th 'Back to Basics' Workshop will be held in Cheltenham, Glos. *(Note revised date from that given on the Meetings Card)*. Further details to follow.

2006 November 11
Leeds Astromeet 2006, at the Clothworkers Hall & Foyer, School of Music, Leeds University. 10:00 to 18:30 (doors open 09:00). Cost: £10 on the door. Speakers: Tom Boles: 'Type I Supernovae, the new stars of cosmology'; Prof. John Brown: 'The uncertain universe – magic of the cosmos'; Nik Szymanek: 'Photographing the night sky'; Dr Simon Green: '*Stardust* – a new view of comets'; Dr Allan Chapman: 'Mary Somerville and the Lady Astronomer'. Ample free car parking on the campus. For further info, see **www.leedsastronomy.org.uk**

2006 November 25
Ordinary Meeting, 17:30 hrs at New Hunts House, Guy's Hospital, London Bridge, London SE1 9RT.

2006 December 16
The Christmas Lecture will be given by the Astronomer Royal for Scotland, Prof. John Brown, preceded by a Christmas lunch. Book the date in your diary now!

Items for this diary should be sent to the *Journal* Editor [hazelmcgee@compuserve.com] as soon as dates and locations are known. Details of all astronomical meetings of regional or national interest are welcome. The Editor's decision on inclusion or otherwise of any meeting in this listing is final.

Small advertisements

25p per word, minimum £5.00. Box number 40p extra.

Small adverts must be typed or printed clearly and sent with the correct remittance in sterling, payable to the British Astronomical Association, to the BAA office at Burlington House, Piccadilly, London W1J 0DU, England.

Wanted

An active amateur astronomer in Poland has requested help in finding an equatorial mounting capable of taking a 16" reflector. He has little or no funds and is looking for a mount that is very cheap or that someone is discarding. Shipping costs will be covered. If you think you can help, please contact Tom Boles on 01449 761950 or at tom.boles@coddenhamobservatories.org

Wanted, for private/educational observatory and library: Schmidt *Der Mond* 1856; Tobias Mayer *Grossere Mondkarte*, Gottingen 1881; Dr Kitchiner, Any; Jamieson *Celestial Atlas*; Fauth *Unser Mond*, *Neue Mondkarte* 1932, *Beobachtungen* etc. 1893–'95; Pickering *Moon* 1903; Goodacre *Moon map in XXV sections* 1910; Whitaker et al *Consolidated Lunar Atlas*; Beer & Madler *Mappa*, *Physikalisches Beobachtungen des Mars* Berlin 1830; Warren De La Rue's Solar papers; *Phil. Trans*. Complete libraries, books, periodicals, notebooks, charts, atlases and medals related to observational work. Also wanted old brass telescopes, accessories etc. by Cooke, Dollond, Tulley, Wray etc.; Large binoculars by Zeiss. In doubt, please give me a ring; thanks to all who have contacted me. Please contact: Andy Stephens, 01242 675719 (Cheltenham); e-mail nighthawk@glasseyes.fsnet.co.uk

Members' private sales and wants

One advertisement of up to 35 words per member per issue is accepted FREE OF CHARGE, at the discretion of the Editor. This offer is not available for business advertisements or to non-members.

For sale

5-inch f14 Refractor. Cooke adjustable cell and OG circa 1880. Superb performance. Tube assembly easily portable. Heavy equatorial driven head and pedestal with weatherproof aluminium cover, allowing telescope to be used without observatory. Excellent condition. Offers. Tel. 01306 881208 (Surrey).

Saturday Sept. 2, 09:45 – 17:00 hrs

Out-of-London Meeting

at the National Space Centre, Exploration Drive, Leicester

Robin Catchpole – *Stellar evolution and star birth*

James Wild – *Aurora Watch and the UK sub-auroral magnetometer network*

~~ Session on the Faulkes Telescope ~~
(weather etc. permitting)

Alice Courvoisier – *The magnetic Sun*

Darren Baskill – *The evolution of cataclysmic variables*

Graham Verner – *BiSON: the Birmingham Solar Oscillation Network*

Tom Boles – *Supernovae and star death*

Further details on the BAA Web page, www.britastro.org/meetings

2006 October 25, 17:30–20:00 hrs

at New Hunts House, Guys Hospital, London Bridge, London SE1 9RT

Annual General Meeting

Dr Richard Miles: ***The Presidential Address***

A light history of photometry

Confirmation of the Report and Accounts for 2005–2006

Followed by the

Ordinary Meeting

Nick James: Sky Diary for October and November

Notice

Voting papers

Members will find the Balloting List for Council enclosed with this issue of the *Journal*. Please take a few minutes to vote and return the balloting list to the office no later than 2006 October 18 in the envelope provided. When returning the Balloting List please make sure that NOTHING ELSE is enclosed in the envelope. These envelopes are not opened until after October 18, so any subscriptions enclosed would not be processed until after the end of October, resulting in your October *Journal* and *Handbook* being received very late.

Ron Johnson, *Business Secretary*

Officers and Council Session 2005–2006

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President: Dr Richard Miles, Grange Cottage, Golden Hill, Stourton Caundle, Dorset DT10 2JP. Tel. (01963) 364651. E-mail: president@britastro.org

Vice-Presidents: Tom Boles, Dr Nick Hewitt, Sir Patrick Moore.

Treasurer: Dr David Boyd, 5 Silver Lane, West Challow, Wantage, Oxon. OX12 9TX. Tel. (01235) 765985. E-mail: drsboyd@dsl.pipex.com

Secretary (Business): Ron Johnson, 53 Manor Drive, Ewell, Surrey KT19 0EU. Tel. (020) 8393 0679. E-mail: 113457.1736@ compuserve.com

Secretary (Papers): Nick James, 11 Tavistock Road, Chelmsford, Essex CM1 6JL. Tel. (01245) 354366. E-mail: ndj@blueyonder.co.uk

Secretary (Meetings): Mrs Hazel Collett, 16 Wilstrop Farm Road, Copmanthorpe, York YO23 3RY. Tel. (07944) 751277. E-mail: meetings@britastro.org

Other elected members of Council

Mark Armstrong, Ann Davies, Maurice Gavin, Geoffrey Johnstone, Dr John Mason, Michael Maunder, Martin Morgan–Taylor, Valerie White, Sheridan Williams.

Directors of Sections

Solar: Lyn Smith, Dunglass House, Ayr Road, Lanark, ML11 9TU. Tel. (01555) 880911. E-mail: marlyn@marlynsmith.wanadoo.co.uk

Lunar: Alan Wells, 135 Elmdon Lane, Marston Green, Birmingham B37 7DN. Tel. (0121) 779 5082. E-mail: awells@citycol.ac.uk

Mercury & Venus: Dr Richard McKim, Cherry Tree Cottage, 16 Upper Main St., Upper Benefield, PE8 5AN. Tel. (01832) 205387. E-mail: RMcKim5374@aol.com

Mars: Dr Richard McKim, Cherry Tree Cottage, 16 Upper Main St., Upper Benefield, PE8 5AN. Tel. (01832) 205387. E-mail: RMcKim5374@aol.com

Asteroids and Remote Planets: Roger Dymock, 67 Haslar Crescent, Waterlooville, Hants. PO7 6DD. Tel. (023) 9264 7986. E-mail: roger.dymock@ntlworld.com

Jupiter: Dr John Rogers, 10 The Woodlands, Linton, Cambridge CB1 6UF. Tel. (01223) 893758. E-mail: jhr11@cam.ac.uk

Saturn: David Graham, 46 Leeming Lane, Catterick Village, Richmond, N. Yorks. DL10 7NL. Tel. (01748) 812200. E-mail: davgram@ic24.net. *Cassini* encounter imaging coordinator: Damian Peach, E-mail: dpeach_78@yahoo.co.uk

Comet: Jonathan Shanklin, 11 City Road, Cambridge CB1 1DP. Tel. (01223) 571250. E-mail: jds@ast.cam.ac.uk

Meteor: Neil Bone, 'The Harepath', Mile End Lane, Apuldram, Chichester, West Sussex PO20 7DZ. Tel. (01243) 782679. E-mail: bafb4@central.sussex.ac.uk

Aurora: Dr David Gavine, 29 Coillesdene Crescent, Edinburgh EH15 2JJ. Tel. (0131) 657 2338. E-mail: drdave37@tiscali.co.uk

Variable Star: Roger Pickard, 3 The Birches, Shobdon, Leominster, HR6 9NG. Tel. (01568) 708136. E-mail: rdp@astronomy.freeserve.co.uk

Deep Sky: Dr Stewart Moore, Conifers, New Town Road, Thorpe-le-Soken, Essex, CO16 0ER. Tel. (01255) 861 349. Email: slm@sigarro.demon.co.uk

Instruments and Imaging: Bob Marriott, 24 Thirlestane Road, Far Cotton, Northampton NN4 8HD. Tel. (01604) 765190. E-mail: ram@hamal.demon.co.uk

Computing: Gordon Taylor, 20 Badgers Walk, Deanland Wood Park, Golden Cross, Hailsham, East Sussex BN27 3UT. Tel. (01825) 873153. E-mail: mp2603@talk21.com

Historical: Anthony Kinder, 16 Atkinson House, Catesby Street, London SE17 1QU. Tel. (020) 7701 0626. E-mail: anthony_kinder@hotmail.com

Other officers

Journal Editor: Mrs Hazel McGee, Starfield, Dedswell Drive, West Clandon, Guildford, Surrey GU4 7TQ. Tel. (01483) 222791. E-mail: hazelmcgee@compuserve.com

Journal Advertising Manager: Sheridan Williams, The Clock Tower, Stockgrove Park, Leighton Buzzard, Bedfordshire LU7 0BG. Tel. (01525) 237370. Fax (08700) 522352. E-mail: baa@clock-tower.com

Circulars Editor: Don Miles, 96 Marmion Road, Southsea, Hants. PO5 2BB. Tel. (02392) 591146. Fax: (02392) 862466. E-mail: donmiles@webbsoc.demon.co.uk

Public Relations Officer: Dr John Mason, 51 Orchard Way, Barnham, West Sussex PO22 0HX. Tel. (01243) 554331. Fax: (01243) 554272. E-mail: docjohn@dircon.co.uk

Librarian: Anthony Kinder, see above (Historical Section)

Curator of Instruments: Bob Marriott, 24 Thirlestane Road, Far Cotton, Northampton NN4 8HD. Tel. (01604) 765190. E-mail: ram@hamal.demon.co.uk

Coordinator, Program and Data Library, Computing Section: Robert Watkins, 7 Shirehampton Close, Webheath, Redditch, Worcs. B97 5PF. Tel. (01527) 404419. E-mail: robert_r_watkins@hotmail.com

Coordinator, Campaign for Dark Skies: Bob Mizon, 38 The Vineries, Colehill, Wimborne, Dorset BH21 2PX. Tel. (01202) 887084. Web page: http://www.dark-skies.org

Coordinator, Education Committee: Dr Anne Urquhart–Potts, Tanyard Farm, Somerford Booths, Congleton, Cheshire CW12 2JT. Tel. (01260) 224332. E-mail: anneupotts@surfree.co.uk

Coordinator, UK Nova/Supernova Patrol: Guy Hurst, 16 Westminster Close, Kempshott Rise, Basingstoke, Hants. RG22 4PP. Tel. (01256) 471074. E-mail: guy@tahq. demon.co.uk

Coordinator, Radio Astronomy Group: Dr Laurence Newell, 25F York Road, Martlesham Heath, Ipswich, Suffolk IP5 3TL. Tel. (01473) 635461. E-mail: laurence.newell@btinternet.com

World Wide Web site manager: Callum Potter, The Cottage, Bredons Hardwick, Tewkesbury, Glos. GL20 7EE. E-mail: callum.potter@gmail.com

New Members' coordinator: Martin Morgan–Taylor, 39 Sports Road, Glenfield, Leicester LE3 8AL. Tel. (07894) 075941. E-mail: mart@dmu.ac.uk

Office Manager: Mrs Jean Felles, Burlington House, Piccadilly, London W1J 0DU. Tel. (020) 7734 4145. Fax (020) 7439 4629. E-mail: office@britastro.org