# Ordinary Meeting and Exhibition Meeting, 2003 June 28
## held at the Cavendish Laboratory, Madingley Road, Cambridge

**Guy Hurst**, President

**Ron Johnson, Nick Hewitt and Nick James**, Secretaries

The President opened the seventh meeting of the 113th session. Dr Nick Hewitt read the minutes to the May meeting, which met the approval of members. Mr Johnson announced that no presents had been received. There were 49 new members proposed for election, and the 105 members proposed at the May meeting were elected. Mr James reported that four papers had been accepted for publication in the Journal:

*Observations of the superoutburst of BC Uma in February 2003*, by David Boyd
*The aurora, 2002*, by Ron Livesey
*Simultaneous transits*, by Jean Meeus
*The Jupiter Section programme in the new century*, by John Rogers

Mr Hurst expressed his gratitude to Nick Hewitt and Jonathan Shanklin for their strenuous labours in organising the afternoon's Exhibition Meeting. He also expressed his thanks to all those who had contributed exhibits, which was followed by prolonged applause.

The next event would be the Out of London Meeting, to be held in York on September 5-7, which would include the third in the Association's popular series of Observing Workshops. Mr Bob Marriot announced that as the new Director of the Instruments and Imaging Section, he would be organising a Section Meeting in Northampton on August 16. He further announced that the 2004 Section Meeting would take place at the Winchester Weekend in April.

The Association's awards were then presented:

## The Steavenson Award

The President announced that Dr Don Parker received the Steavenson Award, but was sadly unable to be present to collect the Award in person. Dr Parker had contributed many fine astronomical images to the Association since the early 1980s, at which time he was already well known in the US. He had achieved exceptionally high-resolution planetary images, and had made major contributions to all the planetary Sections. In the early days of CCD technology he had keenly championed the new techniques to the amateur community, but his visual work was also not to be forgotten.

## The Merlin Medal and Gift

The Association's Merlin Medal and Gift is awarded in recognition of notable contributions to the advancement of astronomy, and the President believed that Mr Steve Evans was a very worthy recipient. Primarily working within the Meteor Section, Mr Evans had always shown tremendous willingness to give advice and assist others. He had sought to obtain scientifically useful data by timing showers and constructing time/rate profiles. The results had invariably been of truly professional quality, and his work in analysing the structure of a number of radiants had achieved considerable success. Mr Evans' work in refining the Leonid stream profile was particularly distinguished.

Thanking the President, Mr Evans admitted a sense of guilt in receiving the Medal; many great observers had received it in the past, and he modestly described his work as primarily an activity of pleasure. Mr Evans wished to thank many of the good friends he had made through the Meteor Section, and whilst there were too many to name, Neil Bone, Mike Maunder, Andrew Elliot and Harold Ridley were singled out for special thanks.

## The Lydia Brown Medal and Gift

Mr David Gavine received the Lydia Brown Medal and Gift for his significant contributions to the Aurora and Variable Star Sections, which had spanned in excess of 30 years. Notably, he had agreed in 1983 to act as the reporting centre for observations of noctilucent clouds. He had also provided great assistance to the professional community in 1973 upon the death of James Paton, overseer of the Balfour Stewart World Data Centre at Edinburgh University. The immense data bank was at risk of dispersion or even destruction, but, through Mr Gavine, the Association had been able to take it into safe-keeping, and continue to add to it.

In receiving the Medal, Mr Gavine said that his past 48 years of BAA membership had given him immense enjoyment, and the Winchester Weekends had proven particularly memorable. He reminisced that whilst the establishment of the data centre

in Edinburgh had sounded superb in principle, conditions had in reality been incredibly cramped. Mr Gavine described how Sir Patrick Moore, George Alcock, Neil Bone, and Michael Gadsden, as well as many other BAA observers had provided him with great encouragement over the years.

Following the applause for the Award recipients, the President welcomed Mr Martin Mobberley to present Sky Notes, which would include an account by Dr Richard McKim of August's favourable opposition of Mars.

## The June Sky

Mr Mobberley opened by presenting a fine selection of images of the annular solar eclipse of 2003 May 31, which had been visible at sunrise from the northern extremities of Scotland, as well as Greenland and Iceland. BAA member Andrew Sinclair had produced an animated map of the path of the partial and annular phases, showing clearly their relation to the day-night boundary. On the day of the eclipse, there had been partial cloud cover which had obscured the view of some, but many others had enjoyed glimpses of it through breaks in the cloud, or through thin haze.

The BAA's only clear images of annularity had come from Dave Thompson, based in Dornoch. Other observers scattered around the Scottish countryside had only managed to photograph the very deep partial phase at best, although Nick James' footage from Durness was noteworthy. Nigel Evans had attempted to photograph the event reflected across the English Channel from Felixstowe, but the weather had not been favourable. He had, however, managed to take a series of images between 3:55 and 4:30UT, towards the end of the partial phase, and including final contact.

Eddie Guscott had succeeded in photographing a water-reflection of the partially-eclipsed Sun from Burnham-on-Crouch. However, the speaker was curious to know whether any Association members had taken advantage of the low altitude of the eclipse to obtain images of the rising, partially eclipsed Sun. At the Australian sunset eclipse of 2002 December 4, the superb "dolphin-fin" images by Nigel Evans had been a sensation. Presently, the only similar images from the May eclipse which the speaker was aware of were those taken by Radu Corlan in Romania, of sunrise across the Black Sea.

Looking ahead, the next lunar eclipse would be November 8-9, with 24 minutes of totality starting at 01:06:16 UT. The brevity of the total phase arose because the Moon would only just skirt the edge of the umbra on this occasion. The UK was, however, close to the optimal longitude to observe from. The next solar eclipse would be total, and would take place virtually diametrically opposite to the recent Scottish annular event, with the path of totality entirely confined within the Antarctic subcontinent. The maximum duration of totality was 1 minute 57 seconds. It seemed unlikely that many Association members would be braving the Antarctic climate, but the speaker wished any observing parties well on their travels!

The astronomical world had been largely quiet over the past month, with little activity in the planetary or cometary scenes. The most readily viewable comet at the time of the meeting was C/2002 O7 (LINEAR), which was at a rather faint mag 12, and would plunge into western twilight in early July. Looking ahead, however, there were some exciting prospects for the coming year. 2P/Encke would return in the autumn, making closest approach to the Earth on 2003 November 17 at approx mag 7, before passing through Cygnus into Vulpecula, and reaching perihelion on December 29. Historically, 2P/Encke had had an interesting past, having been independently discovered by numerous individuals on various returns. The first recorded discovery was by Méchain during the 1786 return, who had spotted the comet in Aquarius. This initial discovery was confirmed by Charles Messier. At the 1795 return, Caroline Herschel rediscovered 2P/Encke, with confirmation by William Herschel. Following further unconnected sightings at the 1805 and 1818 returns, the discoveries were finally pieced together in 1821-3 by Olbers and Encke, whose predictions anticipated the 1822 return. Encke was the second confirmed periodic comet, preceded only by Halley, and its namesake was later appointed Director of the Berlin Observatory.

The 2003 return of 2P/Encke would undoubtedly be the greatest comet of the year, with particularly good prospects in view of the fine southern return in 1997. Furthermore, a few observers had claimed naked-eye observations of the 1980 return, and with a peak around mag 6 possible in late November, it was well worth a look, especially with the Moon out of the way at this return. Mr Mobberley speculated that a quarter-degree coma might be seen.

Two exciting comet prospects for 2004 were C/2001 Q4 (NEAT) and C/2002 T7 (LINEAR), both presently at around mag 14-15. The former was currently a southern object, with UK sky-watchers getting their first glimpse around 2004 May 1. Remaining a northern object, it would reach maximum brightness in Cancer around May 15, and the speaker speculated that it might reach first magnitude. The latter was already in the northern sky, where it would remain until 2004 February, by which time it might have reached mag 4. It would go on to peak in the southern hemisphere in mid-May, and could potentially reach first magnitude there.

Mr Mobberley recommended two asteroids which would be at opposition in the coming months for observation: 7239 Mobberley and 4205 DavidHughes. The Association's supernovae hunters had had a quiet month, but elsewhere, Robert Evans had made a bright mag 13.2 discovery on June 12 in M74, designated 2003gd. Variable star observers were requested to watch RS Oph, which had been observed for over a century to outburst around every 18 years from its usual mag 11 to mag 5. Assuming this pattern continued, such an outburst was expected in the near future. A second variable star to watch

was ρ Cas, which was a good binocular target. It had initially generated interest in 1946, when it faded unexpectedly from mag 5 to mag 6. In 2000, a small, slow, brightening had been observed, followed by a sharp fading to mag 5.5. Recently some further variability in its brightness had been detected, and it was unclear whether this was set to continue.

The speaker took the opportunity to recommend the Philips ToUcam webcam, which was readily available for as little as £55 in the UK, and had proven to produce superb astronomical images. The lens was easily unscrewable, and could be replaced with a telescope adaptor, available from BC&F for £24.99, although the speaker had a contact who sold an equivalent part for £11.50, and Mr Mobberley was happy to pass further details to members keen to set up such cameras. He had been very impressed with the eyepiece-quality images which it produced, and its ease of use.

Finally, Mr Mobberley closed with the "Summer 2003 Sky Notes Challenge", which was to image Deimos, the outermost of Mars' two moons, from the UK. At opposition, Deimos was typically around mag 12.8, with its orbit taking it a maximum of 61" from Mars. It was incredibly challenging to observe because of the proximity of the parent planet, and an occulting bar was highly recommended for both visual observers and photographers. The speaker recommended a minimum aperture size of 25cm, and suggested taking exposures of 10-30 seconds. For the even more adventurous, Phobos presented an even greater challenge, never straying further than 25" from Mars. In this case, at least a 35cm aperture would be required. Night-by-night information of the whereabouts of the moons were available online at http://space.jpl.nasa.gov/

Dr Richard McKim was then invited to conclude Sky Notes with a summary of the Association's programme for the summer's Martian apparition.

## The 2003 Martian Apparition

Dr McKim opened with his own experiences of trying to image the Martian moons. The moons were sufficiently faint that a moderately large aperture was required for them to be detectable, and an occulting bar blocking the glow from Mars might be necessary. However, the speaker had seen Phobos and Deimos very easily with the 1-metre Cassegrain on Pic du Midi, and without an occulting bar!

Mars would be at perihelic opposition on August 28, but this year's apparition was already well under way, and the speaker had started his own programme of observation in January. At this time, it was only 4 arcseconds across. At opposition it would be at declination 16° south, and some 25 arcseconds across. Dr McKim urged observers not to wait until opposition to start observing. The previous apparition of 2001 (at the start of southern spring) had coincided with a planet-encircling dust storm, effacing all surface detail for several months.

The speaker showed some of the images which had been received of the 2003 apparition by the Section at the time of the meeting. These included a number of Dr McKim's own sketches, which were, as always, drawn with superb precision and of great artistic beauty. Don Parker's CCD images were also notable, and the speaker took the opportunity to congratulate him on his well-deserved Steavenson Award. Amongst the clearly visible surface features were Syrtis Major; the Hellas impact basin, currently with a dull appearance; and Solis Lacus, a dark eyeball-like spot. The latter had been close to the origin of a small dust storm in May, but the spread of dust had come to a rapid halt. In the same month, the southern polar cap had begun to break up, revealing some interesting surface details.

Dr McKim displayed some images by Eric Ng, and others, taken with the same model of the Philips ToUcam Pro webcam which Mr Mobberley had praised earlier. This camera had recently become increasingly popular among the section's CCD observers. The speaker had found that whilst the webcam produced excellent red and green images, the blue images were not directly comparable with those of other cameras unless subjected to further selective filtration.

The speaker's own programme presently involved getting up at 3am as often as possible to make pre-dawn observations whenever the weather permitted. Recently, the conditions had often been favourable, with Mars high enough in the sky to make good observations around half an hour before dawn. The seeing was often good, but usually deteriorated rapidly towards sunrise.

The Martian year was now significantly past the date when the 2001 planet-encircling storm had erupted, and Dr McKim believed that historical precedents placed the chances of a similar storm at this opposition at one-in-three. During the spate of such storms in the 1970s, there had often been planet-encircling dust storms in two successive Martian years, but never in more than four successive years.

Dr McKim closed by urging all BAA members to make observations of Mars this year, and preferably to start as soon as possible.

Following the lengthy applause for Mr Mobberley and Dr McKim's presentations, the President adjourned the Ordinary Meeting until the Association's Out of London Meeting, to be held in York on September 5. The meeting was followed by four short talks by Association members, and Neil Bone commenced by reviewing the meteor activity of 2002-3.

## Meteor Review 2002-3

Mr Bone started by summarising the results obtained from the 2002 August Perseid shower. Despite poor weather shortly before the shower, and fears that it might join the long list of recent meteor events which had been washed out, the sky cleared up a great deal shortly before the peak. A collaboration with the BBCi science/space website had allowed the Section to encourage members of the public to perform simple measurements. Whilst none of these were of great scientific interest, they had generated public interest.

During the period August 1-2 until August 15-16, the Association had records of a total of 2216 Perseid meteors, 249 Sporadics and 103 others. The rate had taken off sharply on August 10, with the peak on August 12-13, before sharply declining shortly after 15th. The maximum zenith hourly rate (ZHR) had been of order one meteor per minute. This was comparable with the rate which had been observed fairly consistently since the 1980s. The required data analysis had been minimal: results were pooled into hourly bins, before being normalised to give the ZHR. This normalisation took account of the effect that the height of the radiant in the sky would have had upon the observed rate due to the variation in seeing conditions. The ZHR was the rate which would have been observed had the radiant been at the zenith.

The magnitude distribution was estimated by binning observations into one-magnitude sized categories. Comparison with similar treatment for sporadic events revealed that the average brightness of the Perseids, +1.8 (sample size 2216), was brighter than that of sporadics, +2.6. A consistent shift in the brightness distribution by around one magnitude was clearly discernable. There was also a marked contrast in the proportion of events recorded as leaving persistent ionisation trials: 21% of Perseids as compared to 9% of sporadics. Particularly notable had been an event at August 13 22:01UT, recorded at mag –8, and still visible two minutes later. During that time, the trail had appeared to kink and distort in the high winds of the upper atmosphere.

The Perseids are frequently reputed to be fine photographic candidates, and this claim was perhaps backed by a superb image by Worthing Astronomical Society at August 13 22:27UT. A long trail was visible with a bright flare towards one end. The same event had also been recorded elsewhere, allowing the altitude of the trail to be triangulated by studying its relative position at different observing sites. Such treatment yielded an estimated altitude of 90-92km.

Mr Bone opened his discussion of the 2002 Leonid storm with the Asher & McNaught prior forecasts. In recent years these had become renown for their accuracy, and on this occasion they were as reliable as ever. Two peaks had been anticipated, one at November 19 03:53UT resulting from the debris of the 1766 return of Temple-Tuttle, and a second peak at November 19 10:36UT as the Earth passed through the 1866 debris. The former peak was expected to give a rate of around ZHR 3000 and the latter ZHR 5000. The observations matched this predicted profile closely, and had an average brightness of mag +1.2 (based upon 455 observations). Particularly distinguished among the BAA results was Hazel McGee's image from Guildford of a bright trail at November 19 04:09UT.

Finally, Mr Bone closed with a discussion of the 2003 Quadrantid results from January 3-4. A peak had been anticipated at 22:00UT, but in the event the temporal profile had been rather flat and the rate had not been particularly high. In some years a peak rate of around 120 ZHR had been recorded, but on this occasion the maximum had only been a disappointing 40-50ZHR.

The President proceeded to introduce Roger Pickard, who would present the second short talk on the work of the Variable Star Section.

## Variable Stars: Why Professionals Need Our Help

Mr Pickard explained that variable stars were of particular scientific interest because they often give us clues about the processes which underlie stellar evolution, and also because some classes of variable stars, such as Cepheids, are useful as distance indicators. Professional astronomers have to rely upon the assistance of the amateur community, however, for the simple reason that there are vastly more variable stars in the sky than they have the resources to monitor themselves. The BAA's own data archive included results dating back as far as 1890, and contained a total of around 2 million observations, 1.5 million of which were now stored in easily accessible electronic format.

The speaker outlined a few of the marked changes which the Section had seen since its foundation. Firstly, the number of active members had increased sharply during the 1950s and 60s, peaking at well over 100 in the mid 1970s. Sadly there had been a slight decrease since then, and the speaker was keen to see this latest trend reversed. The types of object being observed had also changed significantly throughout the Section's history. In its early, pre-1925, era, Mira-type stars had made up the vast majority of those studied. By 1975, however, a much wider variety of objects were being examined, with semi-regular stars now being the most-observed category.

More recent data from 1997 indicated that the trend had changed again, with cataclysmic variables and dwarf novae now the most observed objects, though Mira-type stars and semi-regulars were still receiving significant attention. Cataclysmic variables are binary systems with very rapid rotation periods, typically of order six hours. Extreme astrophysical phenomena

occur under these gravitational conditions, and it was thought that material was often gravitationally accreted from one star onto its more massive companion, giving rise to the observed chaotic variability. The rôle of magnetic processes within this accretion remained poorly understood, with various speculative theories. The speaker believed that the latest trend towards increased interest in cataclysmic objects was possibly the result of the relative ease with which papers could be written about them. Their rapid rotation allowed papers to be written making use of only a modest number of nights of observation.

The preparation of charts and sequences was a major area in which the Section could benefit from additional assistance, and the speaker was keen to hear from anyone who was interested in helping out. In the past, many visual observers had been hampered by poor charts, and despite the strenuous efforts of the Section's Chart Secretary, John Toone, and Mike Simonsen in the US, the task remained substantial. In particular, charts had historically only included stars down to mag 13, but now there was an increasing demand from observers with modern equipment for charts extending down to mag 16. The speaker expressed his gratitude to Chris Jones and Richard Hunt, who had recently joined the team.

The Section's interaction with the professional community had initiated in around 1990, when Dr Paul Roche had requested observations of X Per from the Association. Since then, professionals had been enlisting the assistance of the BAA's observers with ever-increasing frequency. Visual observations were in as much demand as CCD images, and the speaker urged members not to abstain from submitting contributions in the belief that they would not be worthwhile if their equipment was modest.

Karen Holland had instigated a CCD programme within the Section, and was planning to complement the presently available charts, which were primarily aimed at visual observers, with similar resources for all stars on the CCD target list. This included some objects which were simply too faint for binocular observation, whilst others were bright enough for visual identification, but exhibited very small changes in magnitude which only CCDs could detect accurately. Karen Holland had also set up a mentoring scheme for new members of the Section, both CCD and visual astronomers, whereby less-experienced observers were allocated an experienced mentor, who they could contact to seek advice. This was presently running smoothly, and widely thought to be a success.

Mr Pickard explained that the Section operated by producing lists of interesting objects, and observers were urged to check these stars periodically to check for outbursts or other interesting activity. He urged members to get involved, because presently there was a substantial number of objects for which professionals had requested data from the Section, but for which it did not have an adequate number of observations. It was not just CCD observers who were in demand: there was currently a greater shortage of visual observers. The Section was also in need of help with the electronic data entry of historical records, as there were 500,000 observations still needing to be transferred into electronic format. Roger Dymock was presently involved in a project to make the archive available via an online database.

The speaker closed his talk with three sample magnitude-variation plots, for dwarf novae AB Dra and SS Vir, and for the circumpolar Mira variable T UMa. Following the applause, the President then welcomed Jonathan Shanklin to give the third short talk, focusing on the Association's activities in the comet scene.

## Observing Comets

Mr Shanklin set the scene with an introductory history of the Comet Section. Founded in 1891, only one year after the BAA itself, it had always been a staple part of the Association. Since the Second World War, around 300,000 observations had been amassed of over 400 separate comets. The first Director of the Section had been W.F. Deeming, whose work had earned him the honour of having a comet named after him, though it had since been lost. It seemed likely that a survey such as LINEAR would rediscover it whenever it made its next return. The speaker was the 12th Director that the Section had seen.

This long heritage was profoundly beneficial, because it allowed the Section to directly compare observations made using the same equipment at different epochs. It was found that the results obtained from different instruments often showed more discrepancy than might be imagined, and the Section could draw much better comparisons by taking advantage of this continuity. The speaker explained in particular that modern CCD cameras did not always give results that were directly comparable with visual observation. Thus there was still a significant opening for visual comet observers to contribute.

The Section communicated the latest news to its members via its website, which could be found at http://www.ast.cam.ac.uk/~jds. A paper newsletter, *The Comet's Tale*, was published twice a year, and sent to members at a cost of £5 for two years' subscription. Results were communicated to the rest of the Association primarily via papers in the Journal and talks at meetings. Notably, Nick James and Gerald North had recently produced a handbook, *Observing Comets*, published by Springer, which the speaker warmly recommended.

Mr Shanklin then proceeded to discuss four of the most important stages of cometary astronomy, and first of all, the discovery of new comets. This was a field where amateur comet-hunters now faced significant competition from robotic surveys such as LINEAR and NEAT, which covered vast areas of the sky. However, the speaker urged amateurs not to be too disheartened, for these surveys did not quite cover the entire sky, with the northern polar twilight zone being omitted.

Furthermore, there were presently no robotised surveys sweeping the southern sky at all. Among the Association's most famous comet discoverers were George Alcock, and Albert Jones. Jones' recent co-discovery of 2000 W1 had put him into the record books on two counts: both as the oldest ever comet discoverer, and as having the longest span between his discoveries – his first comet discovery had been in 1946.

The SOHO satellite, launched in 1995, had introduced exciting new possibilities for the discovery of comets which were too close in the sky to the Sun for ground-based observation. Whilst SOHO was primarily intended to probe solar phenomena, two of its on-board instruments had comet-discovering potential: the SWAN (Solar Wind ANisotropies) detector, and the two Lasco solar coronographs. The former provided an Hα map of the entire sky, which was particularly well suited to detecting the hydrogen coma of comets. It had discovered a modest number of previously unknown objects. The Lasco coronographs had had greater discovery potential, covering a 10° field of view around the Sun, and had found around 640 new comets. However, they were now significantly past the end of their design lifetime and were suffering technical difficulties. Presently, there were 20 days in every three months when they were unable to return data.

The second stage of cometary astronomy was the follow-up observations which were required after each discovery. These were needed in the first instance to verify the initial discovery, and later on to refine our knowledge of the object's orbital parameters. Other questions which needed addressing were how fast the newly discovered object was brightening, and whether it was an asteroid or a comet. This latter distinction was determined primarily upon the location of the predicted perihelion of the orbit. The process of gathering follow-up observations was initiated as soon as the discoverer informed the Central Bureau for Astronomical Telegrams (CBAT) of their suspected new object. An anonymous observation report would then be posted by CBAT, with a request for other astronomers to report both positive and negative observation attempts.

Once follow-up observations had been gathered, the provisional orbit inferred from them could be used to predict how the comet's brightness would vary in the future. However, comets which were approaching their first perihelion were frequently observed to show anomalous lightcurves as their surfaces warmed for the first time. For example, they might be unusually bright on approach, and then much fainter after perihelion. This was a common reason for comets proving to be disappointing. An accurate knowledge of the orbital parameters was particularly important for those objects to which there was potential interest in sending spacecraft to rendez-vous.

The third aspect of the Comet Section's work was determining the morphology of comets: looking at the structure of their tails and comas. The human eye was notorious for its subjective judgement in this regard, and consequently the focus tended to be on CCD work. Streamers were frequently identifiable within ion tails, as were jets and halos.

The final category of work within cometary observation was the estimation of visual magnitudes, which remained an important exercise. The basic principle behind such estimations was to find reference stars of known brightness close to the comet, and to use these as comparisons to the comet itself. The brightnesses of reference stars could usually be looked up in either the Guidestar or the Tycho catalogues. A potential hitch arose if one of the reference stars turned out to be a double star, but the mathematics of adding the two component magnitudes to find the total brightness of the binary system was straightforward. Usually the aim was to find one reference a little fainter than the comet, and a second a little brighter than it, and to scale subjectively between these two reference points. However, matters were usually complicated because the comet's light was spread over a finite area of the field, with a hazy coma and tail. Hence some caution was needed when comparing its total brightness to those of pointlike stars, since a comet would thus subjectively appear fainter than a star of the same magnitude, because of its light being more widely spread. Mr Shanklin suggested that more accurate photometry could therefore be achieved if the eyepiece was placed a little out of focus when observing the reference stars, so they appeared blurred by the same amount as the comet.

For some comets, the visual magnitudes were prone to undergo dramatic changes as inhomogeneities within the nucleus were revealed, and as different layers boiled off in turn. In other cases, such as 2P/Encke, the absolute magnitude appeared completely unchanged over 50 years of observation. The speaker demonstrated this point with George Alcock's artwork of the 1954 return, with appearance entirely consistent with the present day. He returned to his initial point that the Comet Section benefited greatly from having such a rich historical archive, allowing this kind of comparison to be made readily, often even using observations from the same instruments.

Following the applause for Mr Shanklin's comprehensive discussion, the final talk of the afternoon was presented by Dr Chris Baddiley on the Association's crusade against the menace of light-pollution.

## CfDS, CPRE and Parliamentary initiatives 2002-2003

To open, Dr Baddiley set out the aims of the Association's Campaign for Dark Skies (CfDS). Most amateur astronomers were, of course, familiar with the frustrations of light-polluted skies. Even in many remote parts of the UK, low-altitude aerosols carried the glow from surrounding urban areas tens-of-kilometres. However, it was not just the present-day practitioners of amateur astronomy who were argued to be losing out, but also the masses who had never had the opportunity to marvel at the wonder of the night sky, or to consider astronomy as a pastime. Thus, since its initiation in 1990, the Campaign had striven to lobby the public, national government, and most importantly the lighting industry, on issues

relating to light pollution and intrusion. Central to the strategy for attracting publicity to the campaign were the *Good Lighting Award* and the *Award of Appreciation*. The former was awarded to those who had installed lighting which had been modified to minimise intrusion, with the hope that the publicity given to such examples would lead others to follow. The latter was awarded to noteworthy non-astronomers whose work had benefited the CfDS, and past recipients had included lighting consultants and journalists, for example.

A common misconception faced by the CfDS was that it advocated an outright reduction in street and security lighting. The speaker took care to emphasise the difference between light pollution and street lighting: the CfDS did not dispute that good street lighting was necessary for safety, but sought to see a more widespread use of well-directed lighting with minimal glare. Such lighting was potentially capable of delivering the same level of illumination to streets and properties, and thus did not detriment health-and-safety. Its increased use not only provided astronomers with darker skies, but could also be less wasteful of energy.

On the subject of security lighting, Dr Baddiley explained that there had been some debate as to the rôle of lighting in crime prevention. Some UK studies, sponsored by the lighting industry, had concluded that there was a correlation between areas with enhanced lighting, and those with reduced crime levels. Two suggested explanations of this trend were that lighting increased surveillance of potential offenders, and also that it improved the community's pride in its surroundings. This had been the view adopted by the Home Office in recent times. However, the US Department of Justice had concluded from American surveys of crime statistics in areas before and after the installation of enhanced street lighting, that there was no statistical evidence for a reduction in crime. The statistical analysis of the UK studies appeared to be seriously challenged, and was under review.

The CfDS also made use of books and leaflets to communicate its message, with a noteworthy venture being Bob Mizon's recent guide *Light Pollution: Responses and Remedies*, which advised amateur astronomers on how to combat the problem. The selection of leaflets on offer advised those who were considering installing lighting systems about the work of the CfDS and how they could aid the cause. CfDS had provided information and images for many other organisations, including government departments, the Countryside Commission, newspapers and magazines. CfDS first collaborated with the Council to Protect Rural England (CPRE) in the mid 1990s, producing a joint leaflet 'Starry Starry Night'. To appeal to the public at large, it was sometimes necessary to focus more upon the pollutant effects of excessive lighting than the astronomical implications. For example, it could be pointed out that a 1kW light left on day-and-night for a year generated seven tonnes of $CO_2$, a major contributor to the Greenhouse Effect.

Conferences had been organised to address the issue at both national and international level. In November 2001, a Schréder/CfDS Light Trespass Conference had been organised at the Institute of Mechanical Engineers in London. It had brought together over 200 delegates, from both the government and the lighting trade. On the European scale, delegates had united in calling for their governments to legislate against light pollution at the second *European Symposium on the Protection of the Night Sky* in Lucerne, Switzerland. Stuttgart would be host to a similar conference on 2003 September 12-13, and a further symposium in the UK was being considered.

Closer to home, the CfDS had recently supported the Campaign to Protect Rural England (CPRE) at the launch of its *Night Blight* campaign at a high-publicity event in Greenwich on May 9. All of the major newspapers had covered the campaign launch, and radio and television broadcasts had also been secured. Part of the campaign included the distribution of leaflets featuring images of the UK from space, revealing an average 25% increase in light pollution levels between 1993 and 2000, with disturbing predictions for the appearance of equivalent images in 2025 if the present trend were allowed to continue. Dr Baddiley thanked those hard-working CfDS local officers who had resolved or prevented excessive lighting developments around the country.

The campaign welcomed a recent parliamentary initiative for the Science and Technology Committee to inquire into the impact of light pollution upon astronomers. The CfDS had been actively involved throughout the process, in the first instance submitting written evidence to the inquiry. On June 4, both the CfDS and the RAS had given presentations before the Parliamentary Committee at the Royal Greenwich Observatory, with a subsequent questions-and-answers session in public at the first formal evidence session at Westminster Palace on June 9. The reaction of the committee had seemed very warm, and it seemed likely that a parliamentary debate would follow. The committee was believed to be considering the possibility of proposing a Private Member's Bill.

The Czech Republic had already set a precedent, with legislation coming into force in 2002 June obliging citizens to prevent any artificial light from dispersing outside the intended region of illumination. Heavy fines of up to £2,800 threatened those who failed to comply. In particular, lighting directed above the horizon was prohibited. For example, local authorities were obliged to use fully-shielded lighting, and advertising billboards could only be illuminated from above. A number of states in other countries had also introduced legislation to control the problem.

Following the applause for Dr Baddiley's efforts in campaigning for an issue of such importance to all UK amateur astronomers, the Meetings Secretary closed the afternoon's proceedings on behalf of the President.

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Dominic Ford