

Notes and News

From the President

How time flies! My two-year stint heading up the Association as President is now drawing to a conclusion. I shall have just one more opportunity to write to you in this column of the *Journal* but before that occasion arrives, I would like to look to the future at the BAA, highlighting a few changes that are currently in the pipeline or that I would like to see come to fruition.

One change that happened back in 2005 was our temporary move from Burlington House so that the interior of the building could be extensively refurbished under the direction of the Royal Astronomical Society. The move had the potential to cause major disruption to our operations but with the assistance of the office staff and our fellow members, alternative premises were identified and the transfer was completed successfully. Indeed, the premises we found had sufficient accommodation to house both ourselves and the RAS, and so the two organisations have continued to maintain close links, with the synergy that this brings.

When we return to Burlington House (BH), the BAA Office will be located on the first floor in the Herschel Room near to the RAS Library. As such we shall not have a library of our own in a separate room as was the case prior to the move. I, together with the Library Committee and guidance from Council, have been working towards rationalising the contents of our Library collection such that it is much more fit-for-purpose in the 21st century. This task was well overdue given the recent marked changes in information technology and the changing needs of our members.

As part of this process, Council has approved a plan to make available for free to paid-up members of the Association selected copies of periodicals and books. To see what is currently available consult the website at www.britastro.org and click on 'Library Disposals'. If you wish to signal your interest in particular items then please contact the Office, preferably via e-mail, so that your request can be considered. Applications will be dealt with on a first-come, first-served basis. I should point out that it will not normally be possible for the Office to mail or ship items, rather you will need to make your own arrangements for collection, the cost of which will be your own.

Our return to BH will also herald a new era in that we shall be holding most of our London meetings on the premises in a new purpose-built lecture room on the ground floor. Here the pendulum of time has swung back, returning to the period in the 1960s and earlier when lectures were held regularly at BH. Many famous occasions have taken place in

the former lecture room, including some lively debates when Fred Hoyle was on the podium. For BAA members, visits to Burlington House on meeting days will be an especially rewarding experience, with access to not only the BAA collection but also that of the RAS Library – I can't wait!

Another change at the BAA is that we are expanding the function of the Office by employing a second person as an assistant. The aim here is to deliver an enhanced service to our members. New possibilities envisaged also include introducing a rolling monthly subscription for new members joining, and more support for Section Directors. I also anticipate increased use of our website facilities to supplement what we currently do by way of the *Journal*, e-Bulletins, Circulars, Section webpages, Section Newsletters, etc. Here the emphasis is on having more up-to-date news and colour images from recent events both here at the



The main staircase at Burlington House photographed in 2001. How will it look next year, I wonder? (Photo by Hazel McGee)

BAA and in the form of observational material, as well as highlighting forthcoming astronomical events and observing campaigns. We can also have more contributions from, and assistance for, new members and beginners. The sky's the limit, as they say.

Enjoy your astronomy.

Richard Miles, President

Meteor Section

Perseids set for a favourable showing

Among the major meteor showers, the Perseids – occurring at a time when weather is often good and overnight temperatures reasonably clement – remains the most popular with many observers. The Perseids' dependably high activity in the week or so centred on maximum makes them a highlight for meteor watchers, and in 2007 this core period is accompanied by favourable, moonless conditions.

The Perseids are active from the third week of July until August 20. Initially, activity is fairly low; typical observed

rates in late July and during the first few days of August are only one or two meteors/hour. From about August 6–7 onwards, rates pick up significantly. Maximum is reached around August 12 each year, and at their best the Perseids usually produce a peak Zenithal Hourly Rate (ZHR, corrected for sky transparency and the changing elevation of the radiant from which the meteors appear to emerge) close to 80: in the clearest and darkest conditions, this corresponds to observed rates around 60/hr, one per minute. Activity is at roughly

half this level on the nights to either side of peak, and a quarter its maximum rate at a distance of 48 hours.

Strong moonlight, swamping all but the brightest meteors, more or less wiped out the most active parts of the Perseids last year (and will do so again in 2008). The 2005 return, however, was very well covered by BAA observers. Peak was forecast to occur around mid-day on 2005 August 12, and much as

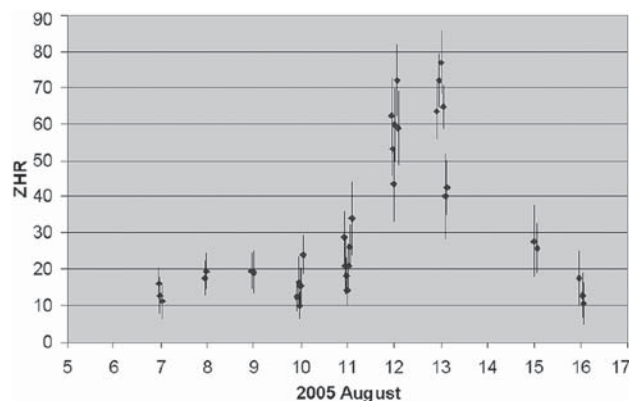


Figure 1. Preliminary activity curve for the Perseids in 2005 from BAA Meteor Section data. Peak occurred during daylight hours on August 12, giving almost equally high activity on the nights of Aug 11–12 and 12–13.

expected UK-based observers found highest rates to either side – just before dawn on Aug 11–12 and in the late evening of Aug 12–13, with ZHR in excess of 70 (Figure 1).

This year, Perseid maximum is expected around Aug 13d 02h UT, just before dawn arrives at the longitudes of western Europe on the Sunday night to Monday morning of August 12–13. For observers in the British Isles, the timing could hardly be better, with the Perseid radiant (near the ‘Sword Handle’ on the Perseus/Cassiopeia border) some 60° high in the eastern sky. New Moon falls on August 12, meaning that skies will be favourably dark.

From UK latitudes, the Perseid radiant is in fact circumpolar. Useful observations can begin as soon as the late evening sky becomes dark, with the radiant at an altitude of about 30° above the horizon around 21h local time. All else being equal, a meteor shower will produce highest observed rates when its radiant is well up in the sky, and on most nights the best times for observing the Perseids come from about 23h local time onwards.

As always, the BAA Meteor Section would encourage observers to carry out watches whenever possible through the Perseids’ long span of activity, and not just at maximum. The earliest parts of the shower will be badly affected by moonlight, but from about August 6–7 onwards, the waning crescent retreats ever-farther into the morning sky, allowing longer watches under dark conditions. Visual watches are straightforward to carry out, as described on the *Journal* web pages at http://www.britastro.org/journal/pdf/114-4_bone.pdf

Observers should take care to note sky conditions accurately (limiting magnitude/transparency, and the presence and extent of any interfering cloud), and please remember to use double dates (e.g. Aug 12–13) and Universal Time (BST minus 1 hour) in recording.

The Perseids are noted for their high proportion of bright meteors (about 20% are magnitude 0 or brighter), and of events that leave behind persistent ionisation

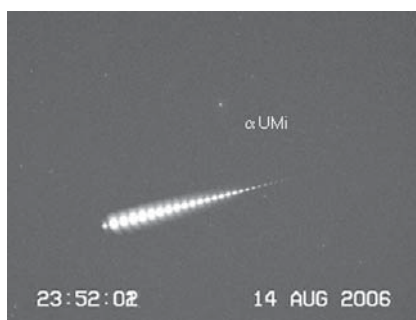


Figure 2. A bright Perseid recorded by Steve Evans on 2006 August 14. The image is a composite from *MetRec* software, and the meteor was recorded with a Watec 902H video camera with a field of view covering 31×23°.

trains. In part these characteristics reflect the high atmospheric entry velocity (60 km/sec) of incoming meteoroids from the Perseid stream, laid down by Comet 109P/Swift–Tuttle.

The abundance of bright events makes the Perseids a good target for photography. Conventional film just about remains the medium of choice for meteor recording. Bright events can be captured on ISO 400 or faster film on undriven exposures of 10–15 minutes’ duration using a standard 50mm or wide-angle 28mm lens at f/2.8. The camera should be aimed to one side of the radiant: Cygnus/Aquila in early evening, the Square of Pegasus after midnight, for example. In 2005, several observers managed to catch Perseids in digital camera images, using programmed 30 second exposures. Emulating this success will, of course, demand adequate memory card space and battery power! It will be interesting to see how meteor photography adapts to the ‘digital revolution’ in the years to come.

Some observers, notably Alex Pratt, Len Entwisle and Richard Sargent, have enjoyed success in recent years in capturing meteors using Astrovid video camera systems. The automated low-light capture setup operated by Steve Evans is a further example of how technological advances are being brought to bear in meteor observing, producing large quantities of positional data (Figure 2). Rest assured, however, that visual observations remain extremely valuable and a mainstay of our work.

The dark-sky, ideally timed peak of the Perseids ushers in a potentially very productive time for meteor observing in the latter parts of 2007. Coming up in the autumn we have good opportunities to cover the Orionids (partially), Leonids and Geminids. For those who haven’t yet tried it, this August’s Perseids offer a perfect introduction to meteor work, and new observers are always welcomed by the Association’s Meteor Section.

Neil Bone, Director

Solar Section

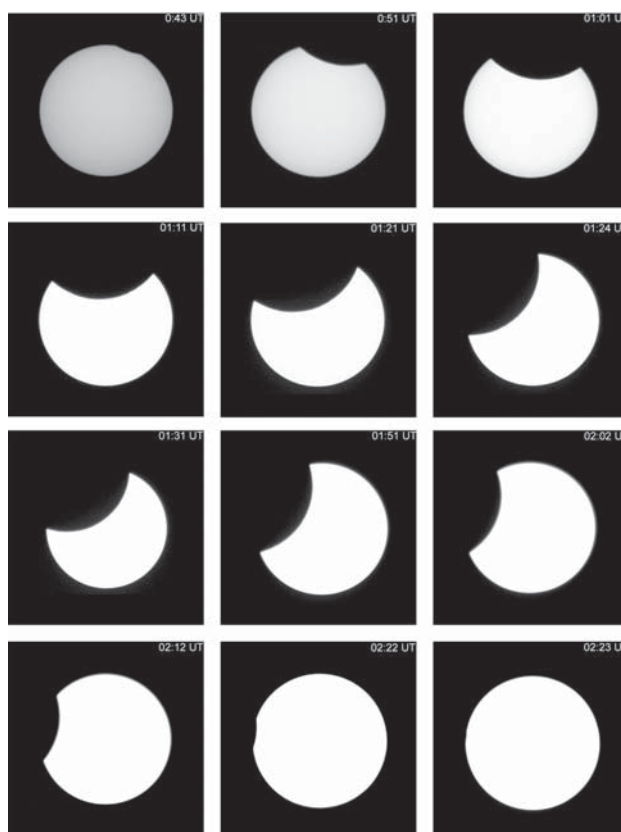
2007 March

Activity fell to a new low in March. The northern hemisphere maintained its February activity level, but the southern hemisphere quietened to account for the overall drop. Most observers reported spotless days between March 7 and 10, 13 and 23, 25, 27, 28 and 31. All observers reported March 8, 14 to 17, 19, 20 and 22 as blank.

AR944, S05°/046°, remained on the disk from February as an Hsx spot 10° west of the CM with an area of 70 millionths. The spot was last seen on March 6 rounding the western limb, type Axx.

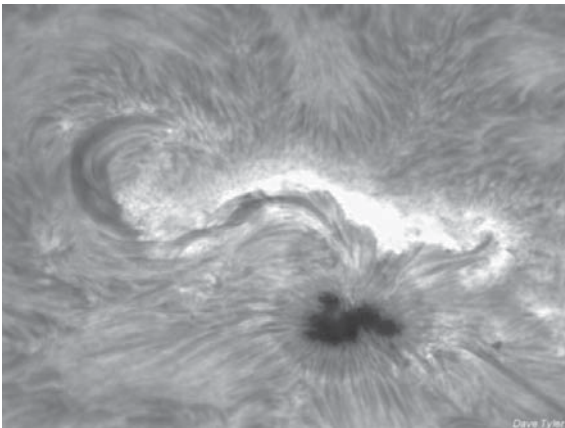
AR945, S05°/006°, was evident on March 5 type Bxo but had decayed to a single spot by the following day and had cleared the limb by Mar 8.

AR946, N10°/315°, was first seen on Mar 11 in the NW quadrant, type Bxo, but had



A partial eclipse of the Sun was visible from eastern Asia on 2007 March 19. These images were recorded by Dr Dipen Bhattacharya and BAA member Naimal Islam Opu at Dhaka, Bangladesh.

decayed to a single spot by the following day nearing the western limb and was not seen thereafter.



Active area AR953 on April 28, 09:53 UT. Dave Tyler.

AR947, S12°/156°, broke the lull of spots on Mar 23 as a small Cso type group. The group approached the western limb on Mar 24 and crossed the following day.

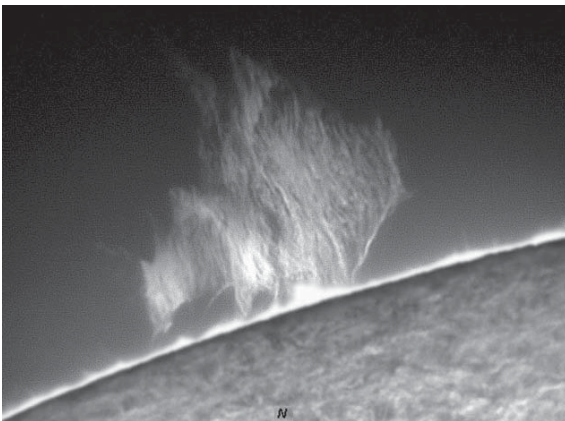
AR948, S01°/102°, appeared suddenly on Mar 26, type Bxo, in the SW quadrant. The group rapidly deteriorated into a single spot on the following day and was gone by Mar 28.

AR949, N07°/332°, was seen close to the eastern limb on Mar 28, type Hax. The following day the group developed small satellite spots becoming type Cso and remained unchanged when observed on Mar 31. The group is probably a reoccurrence of AR946.

H-alpha

Prominences

12 observers reported a prominence MDF of 3.55 for March. On March 1 Monty Leventhal recorded a spike prominence on the NW limb extending 121,000km in height. Eric Strach observed a high arc prominence on the W limb at S04° to S07° on Mar 8, the southern limb of the arch being very bright. The following day, it became even brighter and developed several extensions northward.



Prominence on 2007 March 28 at 09:59 UT. Dave Tyler.

March 9, 10 and 11 produced the most active period for the month. A long hedge-row prominence developed on the SE limb S55° to S70° extending some 293,000km on Mar 9 and 307,000km on the 10th. Peter Meadows recorded two sets of closely spaced prominences on Mar 10 in this area and by the next day he saw reduced activity, the northern-most prominence of the set resembling 'a chimney with smoke appearing from the top and then at right angles to the chimney'.

On Mar 27 Lee Macdonald saw an 'active-looking' prominence group at the E limb and noted a small very bright spike at this location at 10:40 UT which by 10:45 UT had grown into a noticeable 'stump'. By 10:49 the stump had doubled in size and at 10:51 it had grown to similar size of the tallest neighbouring prominence, but was now less bright than before. On the same day Eric Strach noted a pyramidal type on the W limb at S34° to S37° which developed fine strands in the centre on the following day.

An active eruptive prominence was seen on March 31. Initially it was seen at 08:20 UT as a simple prominence on the E limb at S26°, but by 11:20 it had developed an extremely bright extension northwards, hugging the limb for 4°. At 11:33 it lifted slightly off the limb and lost contact with the original feature. At 11:38 it had lost some of its brilliance and by 11:54 it was much fainter. At 13:20 UT there was no evidence of it.

Filaments

Few filaments were reported this month, the most striking, which persisted to the end of the month, being seen on March 28 to the north of AR949 as the group rounded the E limb. Two further filaments were seen on this day, one much further north near the E limb and the other in the SE quadrant.

Flares

No flares were reported this month.

2007 April

Members reported very low activity in April, Ken Medway commenting that it was the lowest he had recorded since January 1997 and Eric Strach the lowest for 28 years. All observers recorded a blank disk from April 4 to 12, 15 and 16, and

BAA sunspot data, 2007 March–April

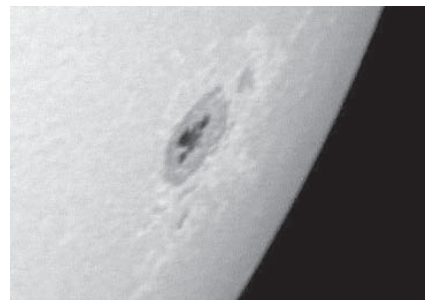
Day	March		April	
	g	R	g	R
1	1	11	0	6
2	1	14	0	1
3	1	12	0	1
4	1	15	0	0
5	1	18	0	0
6	1	11	0	0
7	0	1	0	0
8	0	0	0	0
9	0	1	0	0
10	0	2	0	0
11	1	8	0	0
12	1	8	0	0
13	0	1	0	1
14	0	0	0	1
15	0	0	0	0
16	0	0	0	0
17	0	0	0	1
18	0	1	0	0
19	0	0	0	0
20	0	0	0	0
21	0	1	0	0
22	0	0	0	0
23	0	6	0	0
24	1	9	0	0
25	0	2	1	11
26	1	12	1	15
27	0	6	1	15
28	0	5	1	20
29	1	11	1	24
30	1	6	2	29
31	0	1		
MDFg	0.41 (51)		0.27 (55)	
Mean R	5.24 (44)		4.16 (47)	

North & south MDF of active areas g

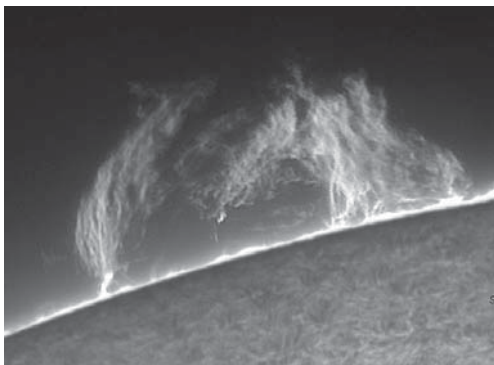
	MDFNg	MDFSg
March	0.12	0.31 (35)
April	0.03	0.26 (34)
g	= active areas (AAs)	
MDF	= mean daily frequency	
R	= relative sunspot number	
The no. of observers is given in brackets.		

18 to 24. The majority of activity was again confined to the southern hemisphere.

AR949, N07°/331°, remained on the disk from March type Axx but was decaying and most observers reported a blank disk on April 2.



AR953 on April 26. Geoffrey Johnstone.



Prominence on 2007 April 5, 09:02 UT. Dave Tyler.

Sporadic reports of spots came in throughout the rest of the month probably due to short lived pores, until April 25 when the next substantial group appeared.

AR953, S10°/309°, appeared over the eastern limb on Apr 25 type Chi. The following day it had developed to type Cko with 5 satellite spots to its north and south. The group showed a marked Wilson effect which was still evident on Apr 27, when it had developed 3 umbrae

within a large penumbra. By the next day the group had an area of 270 millionths which had grown to 410 millionths by Apr 30 and was seen with the protected naked eye.

AR954, S06°/288°, was first seen from Australia on Apr 28 at 22:05 UT type Bxo which developed on the disk. By Apr 30 it was type Cso with an area of just 30 millionths.

H-alpha

Prominences

15 observers reported a prominence MDF of 3.34 for April. Most prominences were small throughout the month. Eric Strach reported an interactive pair on the NW limb on April 4 at 31° to 38°, consisting of two high and dense structures connected by faint strands. The pair were still present on Apr 5 as 3 stubby shorter structures but by the following day, a high spike was seen with 2 connections to the limb in the same position.

On April 6, Lee Macdonald noticed a 'curious little dark bite out of the chromosphere near the N point of the disk, looking almost like a silhouette of Mercury about to tran-

sit the Sun.' Monty Leventhal reported a 'very active prominence' on the SE limb arching to a height of 84,000km on April 10. Ken Medway reported looping prominences on Apr 14 at N45°, NW limb, which by Apr 15 had developed into a system of arch prominences.

Filaments & plage

The important filaments of the month were associated with sunspots. AR949 produced a filament northwards on April 1 and AR953 gave rise to several filaments particularly on Apr 28 when associated with a bright plage.

Ken Medway noted the 'most impressive filament of the month', 10° east of the CM on Apr 29, curving from N01°/005°E down to S20°/010°E.

Flares

An unconfirmed flare was reported type B on April 27. Monty Leventhal reported a flare in association with AR951 at 22:05 UT on April 28 and Ken Medway reported a type Sb ribbon flare at 14:30 UT on April 29 at S15°/032°E.

Lyn Smith, Director

Asteroids and Remote Planets Section

New members

I would like to welcome the following new members, literally from three of the four corners of the United Kingdom: Lawrence Harris (Southampton), David Storey (Isle of Man) and John Vetterlein (Orkney Islands). According to *Sky at Night* magazine's Editor Emeritus Leif J. Robinson, 'the discovery and observation of asteroids, along with Trans-Neptunian Objects' is one of the hottest areas in astronomy. So don't stay out there in the cold, come on in and keep warm!

Discoveries

The total number of asteroids with defined orbits had reached 374,256 by 2007 May 2. Of these 157,788 were numbered and 13,722

named. Peter Birtwhistle's discovery total continues to increase, and by the end of May, had reached 72. Peter is also the recipient of this year's Steavenson Award, which is given for 'an outstanding contribution to observational astronomy'. His dedication to the imaging of both asteroids and comets is illustrated by his observing statistics for 2006: 80,515 images were taken during 798 hours observing on 169 nights. Many congratulations Peter.

Space missions

The *New Horizons* spacecraft is well on its way to Pluto having passed Jupiter at the end of February. The *Hayabusa* sciences team have made public all the scientific data obtained by the spacecraft during its mission to asteroid 1998 SF36 Itokawa.

To access images and movies from *New Horizons* of Jupiter, its moons and rings, and the *Hayabusa* data, follow the relevant links on the 'Space missions' page on the ARPS website <http://homepage.ntlworld.com/roger.dymock/index.htm>.

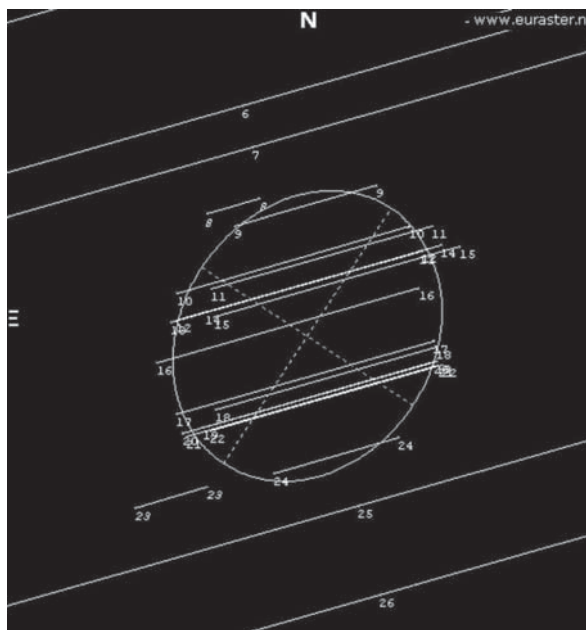


Figure 2. The derived shape of asteroid (17) Thetis from European observations of the stellar occultation on 2007 April 21. Courtesy Eric Frappa, www.euraster.net

The impact risk

Although there are currently no asteroids which pose an immediate threat a couple did come rather close in April. 2007 HV4 passed by at 1.4 lunar distances, and 2007 HB15 at 0.6 LD.



Figure 1. Image of Edgeworth-Kuiper Belt object 2005 FY9 taken on 2007 March 10 by John Fletcher using a 250mm SCT.



Observations

Due to the large amount of material received by the Director, observations are now published on the Section website rather than being distributed in the monthly newsletter.

Astrometric reports, including discoveries and follow-up observations, were received from: Peter Birtwhistle, David Briggs, Alan Cahill, John Fletcher, Nick James, Richard Miles, Bob Neville and John Rock. All data was also submitted to the Minor Planet Center. The Section helps and encourages members to obtain a MPC Observatory Code so they can participate in this activity.

Images were received from: Alan Cahill, Michael Clarke, John Fletcher, Bill Leslie, Bob Neville, Gary Poyner, Grant Privett, Richard Sargent and John Vetterlein. Figure 1 is an image of Edgeworth–Kuiper

Belt object 2005 FY9 taken on March 10 by John Fletcher. At that time it was 51.5 AU from Earth.

Occultations of stars by asteroids is one area where visual observers can play a useful part. Unfortunately UK observers (visual and video) have drawn a blank so far this year but not for want of trying. Between them Andrew Elliott, Malcolm Jennings, Hazel McGee, R. and E. Simonson and J. R. Stapleton totalled 13 nega-

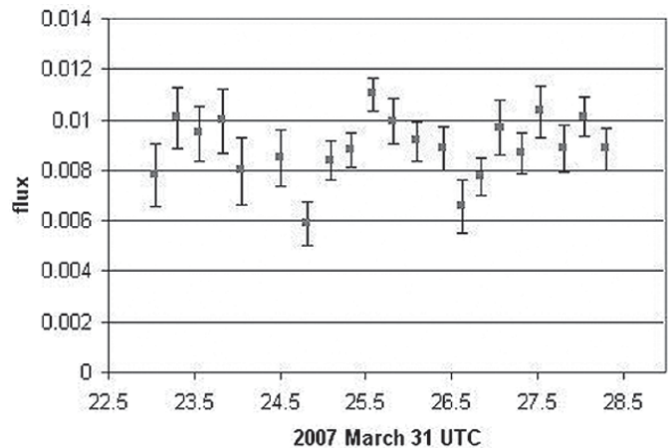


Figure 3. Lightcurve of Trans-Neptunian object 2003 EL61 from observations on March 31/April 1 by John Saxton.

tive results. The occultation of TYC 1407-00130-1 by asteroid 17 Thetis was however seen by a number of European observers and the approximate shape of the asteroid derived from those observations (Figure 2). The chords represent positive observations. The importance of negative observations near the ground track in bounding the size of the asteroid is shown to good effect by the continuous lines immediately above and below the oval representing the asteroid.

Using images he obtained on March 31 and April 1 and the LYMM software he has developed (with assistance from Prof Tim Naylor), John Saxton produced a lightcurve (Figure 3) indicating a period of 3.9 hours for Trans-Neptunian object 2003 EL61. Considering that the object was at magnitude 17.4 and the observations were made with a 30cm telescope, photometric analysis, as John described it, 'presented a severe challenge'. The software is available free of charge from John's website at <http://www.lymmobservatory.net>.

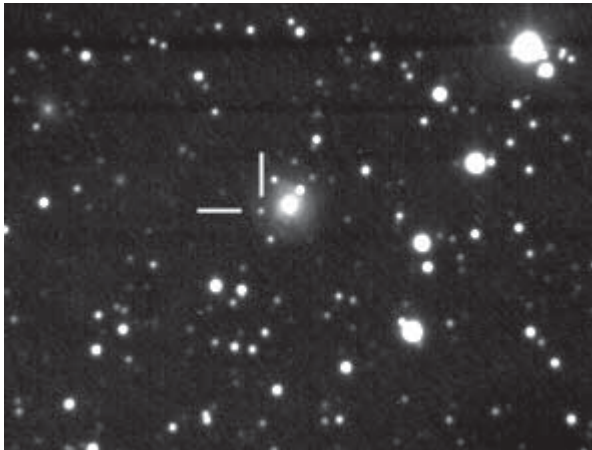
Roger Dymock, Director

Deep Sky Section

Another supernova for Tom Boles

Hard on the heels of two supernova discoveries by Ron Arbour reported in the June *Journal* (p.115), prolific UK discoverer Tom Boles detected a further supernova on the night of 2007 May 19. This was Tom's first discovery of 2007, bringing his total discoveries to 106 in just under 10 years – his first was on 1997 October 29 – a remarkable achievement.

Designated SN2007ck the supernova, at discovery magnitude 18.5 (see image), is in galaxy MCG +05-43-16, a rather obscure magnitude 14.8 galaxy on the Hercules/Lyra border. The position of the supernova is RA 18h 23m 05.59s and Dec +29° 54' 01.0" (2000.0), which puts it approximately 17.9" east and 4.2" south of the centre of the galaxy. Announced on CBAT electronic telegram No. 970, with further details on CBAT 971, the supernova is a type IIp (plateau type) thought to be about 1 month past maximum brightness at discovery. These supernovae often plateau in brightness for many days after dimming slightly, before fading at a regular rate. The discovery was made from Tom's Coddenham, Suffolk observatory using a Celestron C-14 Schmidt–Cassegrain telescope on a Paramount German equatorial mount and Apogee AP7 CCD camera.



Stewart L Moore, Director

Part-time Accountant required

The BAA is looking for a qualified Accountant to carry out the following tasks on a part-time basis:

- Prepare monthly management accounts and reports for Council and perform routine bookkeeping tasks in support of this;
- Examine financial controls monthly to supervise accounting work done by Office staff;
- Prepare quarterly VAT returns;
- Prepare annual accounts compliant with SORP 2005 for audit, for reporting to the membership and for submission to the Charity Commission and Companies House;
- Provide advice and support to the Treasurer and Office staff on financial matters.

A working knowledge of Sage Line 50 Accountant Plus software and Excel spreadsheets is required. The BAA uses a customised membership data base which feeds financial information directly into Sage.

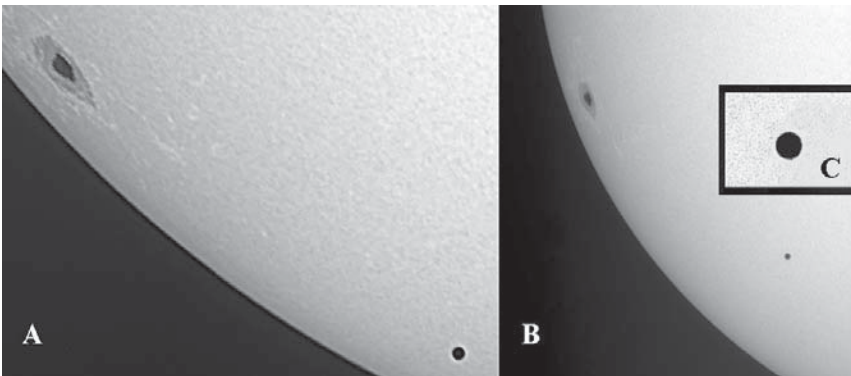
An appointment of about 24 days per year is envisaged. Much of the work can be carried out remotely via the internet. Terms and conditions are subject to negotiation.

If you are interested, please contact the BAA Office in the first instance with a short summary of your relevant experience.



Mercury & Venus Section

Mercury in transit, 2006 November 8–9



The transit of Mercury, 2006 November 8, imaged by Don Parker (A), Ed Lomeli (B) and Mike Salway (C). The southeast limb of the Sun is visible. The sunspot is group AR923, latitude -5° .

Mercury once again crossed the face of the Sun on 2006 November 8–9. The 2006 BAA *Handbook* gives the geocentric times for 1st and 4th contacts as 8d 19h 12m UT

and 9d 00h 10m UT, respectively. Observers based in the Americas and Australasia could view the event, but it could not be observed from the longitude of the UK.

Don Parker's beautiful image (A) at 19h 21m 32s UT was obtained from Coral Gables, Miami, Florida, with his 400mm reflector. The planet appears obviously darker than the sunspot umbra that was also on view at the time. From Sacramento, California, Ed Lomeli captured a similar image (B) from a two-minute video sequence centred at 19h 48m 32s UT with a 102mm OG and DMK 21BF04 camera. He writes of the event: 'I did manage to get some images of the transit. It rained earlier in the day and it finally stopped about an hour before 1st contact but the clouds did not clear until just after 2nd contact. Thereafter, the wind was pretty strong. Before 3rd contact the clouds appeared again so I missed 3rd and 4th contacts.' From Central Coast, New South Wales, Australia, Mike Salway used a 254mm Newtonian and DMK 21AF04 camera to image the planet against the solar granulation. (C)

No timings were received by the Section. Some images of the event also appeared in *Sky & Telescope* magazine and elsewhere.

Richard McKim, *Director*

Saturn Section

A daylight occultation of Saturn

The second of the two lunar occultations of Saturn that were visible from the UK this year occurred on 2007 May 22. (A report of observations relating to the first event, which took place on March 2, appeared in the June *Journal*). Although the May occultation took place at a much more sociable hour than that in March, it was potentially a more challenging event to observe as it occurred in daylight.

Saturn ingress occurred at approximately 19:00 UT (depending upon observer location) with the planet disappearing behind the dark limb of a 6 day old Moon. At this time, the Sun was still above the horizon.

Egress took place approximately one hour later on the bright lunar limb adjacent to the

Mare Smythii. For observers in the northern part of the UK, the Sun was still above the horizon although close to setting. For observers in southern UK, the Sun had just set.

Observations of the occultation have been received from Alan Heath (Long Eaton), Peter Lawrence (Selsey), Richard McKim (Peterborough), David Tyler (High Wycombe) and the Director. At some locations, the entire occultation could not be seen due to cloud.

The bright sky was expected to make the detection of Saturn rather difficult, especially at ingress. However despite some thin cloud, Alan Heath was surprised how easy it was to visually detect Saturn at ingress with a 20mm Schmidt–Cassegrain ($\times 50$). Richard McKim was able to observe egress visually with a 70mm refractor ($\times 80$).

However the most interesting observation of this occultation was made by Peter Lawrence who imaged Titan in a bright sky prior to ingress. At the time, the Sun was approximately 6° above the horizon and Titan was of magnitude approximately $+8.4$ (Figure 1).

Mike Foulkes, *Director*

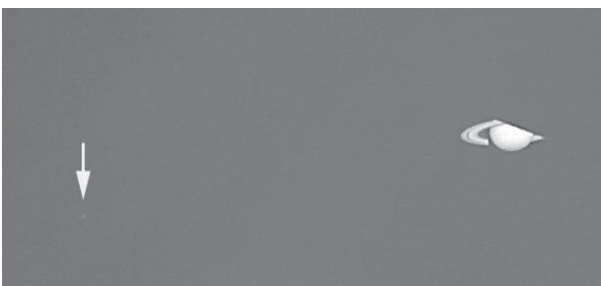


Figure 1. Saturn at ingress at the dark lunar limb at 19h 11m 26s UT, Peter Lawrence. 356mm Schmidt–Cassegrain (C14) at F11. Luminera SKYnyx-2-0M camera with Astronomik red filter. (North upwards). This image was taken with the Sun approximately 6° above the horizon and also shows Titan (arrowed).



Figure 2. Composite image of Saturn at egress adjacent to the Mare Smythii at 20h 18m 21s UT, Peter Lawrence. Equipment details as per Figure 1. The lunar image was taken at 20h 19m 15s UT.