



From the President

Since the last issue of the *Journal*, the Association has once again set out its stall at the annual Astrofest in Kensington. This year's event was bigger than ever, with more trade displays and even more people attending both the lectures and the exhibition.

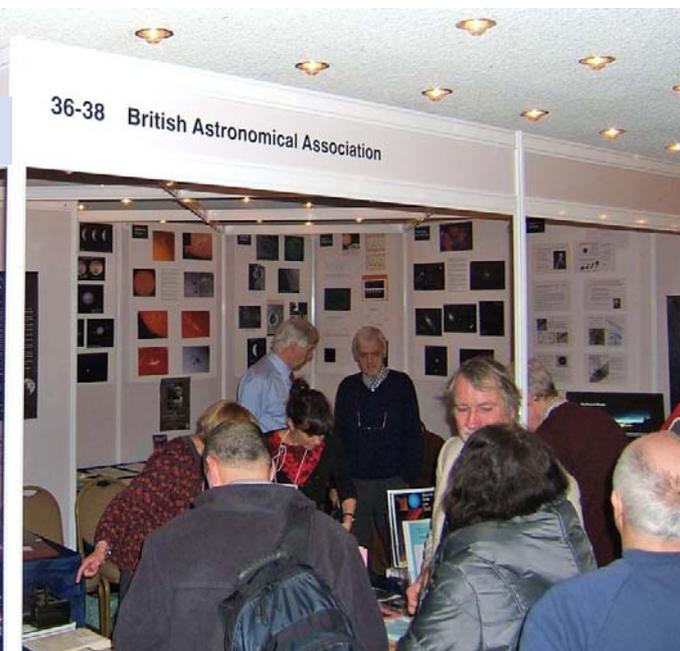
Saturday in particular was hectic, largely because of the additional draw of a presentation by Brian Cox and a panel commemorating Patrick Moore. But even the usually quiet Friday sessions were busy this time, which put additional pressure on those volunteers who turned out to help with the BAA display. We did well for sales and attracted some new members, but the real value of Astrofest is the opportunity it presents to raise the profile of the Association – and here the enthusiasm and commitment of our volunteers come into their own. I would like to record on behalf of the Association our sincere thanks to all those who did their bit over those two exhausting, but worthwhile days. There are too many to list individually, but they know who they are!



Distinguished BAA member Walter H. Haas

Deep Sky Section

At the meeting of the Deep Sky Section in Cheltenham on March 2, Dr Stewart Moore formally relinquished the Directorship and handed over to Callum Potter. Stewart has looked after the Section for the last nine years, but the job is time-consuming and he feels that a change of Director, and perhaps of direction, can only be good in keeping the Section active and healthy. Stewart has done a superb job as Director, raising the visibility of the Section, producing many reports for the *Journal*, providing a steady hand on the tiller and, not least, serving as a wise presence at Council. He will be much missed, and on behalf of the Association I wish him the best for his increased leisure time and extend our deepest gratitude for all his efforts. I'm sure we will continue to see him at both Sec-



This year's BAA stand at Astrofest. Photo by Maurice Gavin.

tion and Association meetings, where he will be a most welcome presence.

We are fortunate in having Callum as a successor to Stewart. Not only is he an experienced deep-sky observer, but he is also well-known to all of us for his contributions to both the BAA and the wider astronomical world. Members of the DSS can rest assured that they will be in the very best of hands.

A gift to the BAA from Walter Haas

The name of Walter H. Haas will be familiar to many BAA members. One of the most senior and distinguished American amateur astronomers, Walter was a founder member of the Association of Lunar and Planetary Observers (ALPO) in 1947. He is also a member of the BAA, which he first joined in 1943.

I am pleased to report that Walter has very kindly gifted his own personal complete set of the *ALPO Journal* (also known as *The Strolling Astronomer*) to our Association. Not only is this an invaluable resource in itself (it

may well be the only such complete set in the UK), but it gains additional significance from its provenance.

I have already written to Walter on behalf of the BAA expressing our deepest gratitude. For the time being the volumes will be held in the Lunar Section archive while we explore options for a more suitable location.

Meanwhile, we wish Walter the very best and thank him again for his most generous gift.

The new BAA Exhibition

Finally, a reminder that the Association's relaunched Exhibition is to be held in Manchester on 13 June 22. This is the first time for some years that the event has been held outside London, and we hope that as many of you as possible will be able to attend. At the time of writing details are still being finalised, but more information will appear in the *Journal* and online in due course.

Bill Leatherbarrow, President

Asteroids & Remote Planets Section

2013 February 15: The day of the asteroids!

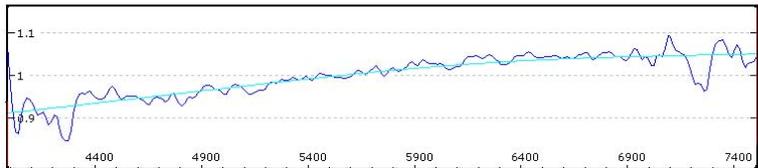
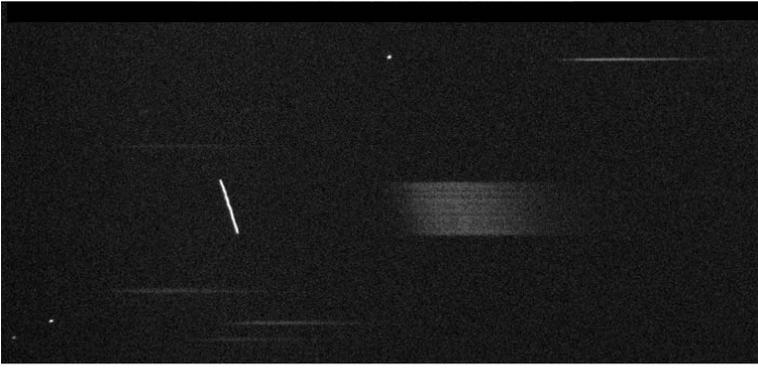
This date will go down in history: uniquely, two extremely unlikely events took place on the very same day – a record collision with a small asteroid, and a record near-miss with another small asteroid.

Most people with an interest in astronomy will know of the Tunguska explosion which occurred over Siberia in 1908. A small celestial object around 60 metres in size entered the Earth's atmosphere at hypersonic speed, exploding at high altitude releasing energy equivalent to 10–15 million tons of TNT. The unexpected collision which happened on Friday, 13 February 2013 was not so dissimilar to the Tunguska event in that it took place not far from Siberia, specifically over the city of Chelyabinsk in the Urals (see map on the front cover).

This 'hyperbolide' may have been the most energetic such event known since that 1908 ex-

plosion, the latter having devastated more than two thousand square kilometres of Siberian forest. Other poorly witnessed events of similar intensity may have occurred during the last cen-

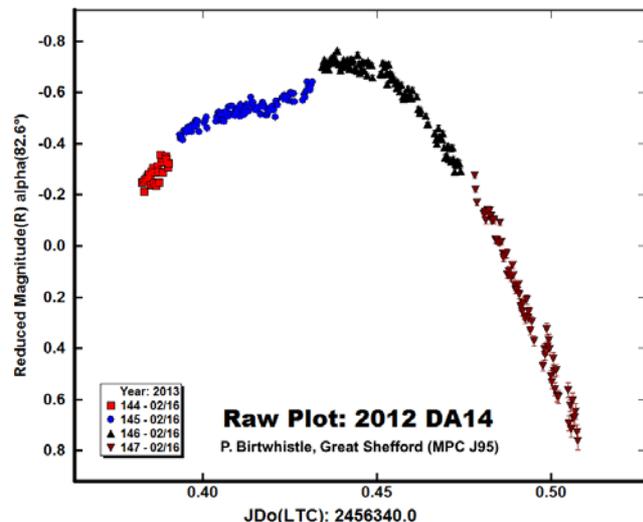




Spectrum of 2012 DA14. The mean of 5-sec exposures taken every 10 minutes from 20:50–22:00 UT, 2013 Feb 15. 0.28m SCT, ATIK314L + Star Analyser. Robin Leadbeater, Three Hills Observatory, Wigton, Cumbria.

tury or so, most notably an energetic airburst over north-west Brazil in 1930. Remarkably, no-one in the Chelyabinsk area was killed as a result of February's impact from space, which appears to have involved a small asteroid some 17–20 metres across, of a stony composition with an estimated mass of 11,000 tons, travelling at about 19 km/sec and liberating energy equivalent to some 0.5 million tons of TNT.

The devastation caused by this event was relatively limited largely owing to the asteroid's comparatively glancing (16–20°) angle of approach. About 1,500 people required medical attention, most having been injured by flying glass. Buildings in six cities in the region were damaged and an estimated 200,000 square metres of window glass were destroyed by the associated shock waves. The incoming asteroid mainly broke up at an altitude of 20–25km, but if its entry path had been more steeply inclined to the vertical it would have penetrated much lower into the atmosphere before exploding, with inevitable catastrophic consequences.



Photometric analysis of 2012 DA14 on 2013 February 16, 0.4m SCT. Peter Birtwhistle, Great Shefford, Berkshire.

The radiant of the approaching asteroid was in or near the constellation of Pegasus, such that its trajectory as it approached the Earth during its last few hours remained within about 15° elongation of the Sun, so it could not have been detected in advance by survey telescopes patrolling the night sky. It appears to have been a relatively ordinary Apollo asteroid having a perihelion distance of 0.8AU and aphelion of 2.5AU.

The second unusual event of February 15 involved the near-Earth asteroid 2012 DA14, which was discovered by the La Sagra Sky Survey almost one year earlier and which was included in the list of 'NEO Close Approaches to Earth' on p.51 of the 2013 BAA *Handbook*.

This object was predicted to pass at a distance of just 27,700km at 19:25UT (16 hours after the Chelyabinsk impactor) when it would attain 7th magnitude: the brightest-ever NEO to be observed approaching within 0.1AU of the Earth. Indeed, given that 2012 DA14 measured some 20x40 metres in size, it was by far the largest known object to have approached closer to the Earth than the geostationary satellites.

We shall have to wait until 2029 April 13 before an even larger object, measuring some 325 metres across, is predicted to make a similar close pass. This asteroid, (99942) Apophis, will be visible to the naked eye as seen from the UK if the skies are clear.

Prior to the encounter with 2012 DA14, BAA e-Bulletins were issued on Jan 15 and Feb 15, and Asteroids & Remote Planets Section members were further notified of website updates on February 12. It should be stressed that although these two events took place on the same day, they were entirely unrelated, since the two objects travelled on very different orbits about the Sun and approached the Earth from completely different directions.

With observers around the world alerted well in advance, many prepared to monitor the close approach of 2012 DA14 using optical aid such as binoculars and telescopes, or by recording its passage with CCD and video cameras. For UK-based observers the opportunity was marred by cloudy weather across the country. As the evening progressed, small patches of sky cleared allowing some to catch a view of the fast-moving visitor to our skies. Many observers sent in their observations to the Director and a gallery depicting images, animations and videos is available at

http://britastro.org/asteroids/Neos/2012DA14/2012DA14_observations.html

Nick James, Dominic Ford and Callum Potter set up a live webcast broadcasting near real-time images taken from Chelmsford, Essex using a small telescope with a 1° field of view. Unfortunately, cloudy skies dogged the attempt with just the occasional star or two being visible from time to time. Despite this, a large number of folk accessed the images and the exercise proved very useful. It is anticipated that live astronomical images will be broadcast in future as and when observing opportunities arise.

David Briggs enjoyed clearer skies from the Hampshire Astronomical Group's hilltop observatory above the village of Clanfield and at 20:05 UT managed to secure the first image of 2012 DA14 taken from the UK, while the asteroid was only 8° above the local horizon. During his 30-sec exposure, the object moved quickly out of the field of view at a rate of 42 arcsec/sec leaving behind a bright trail on his image.

Robin Leadbeater observing from Cumbria was also lucky with the weather and managed to record a spec-

spectrum of the fast-mover by averaging the results from several images. The reflectance spectrum was rather featureless and of an unusually low slope, consistent with the object's being similar to a carbonaceous chondrite meteorite of type CO or CV.

The following night much of the UK was clear and Peter Birtwhistle took advantage of the improved conditions to take a long time-series of images using his 0.4m SCT at Great Shefford, Berkshire. Photometric analysis as depicted in the accompanying plot showed the object to be a relatively slow rotator spinning once every 9 hours or so.

In addition to the above, positive observations were reported to the Section by Damian Peach, Nick Quinn, Richard Fleet and Ian Sharp from southern England; Peter Carson from cloudy Essex; Martin Willock from York; Steve Johnston in central England (visual, remarking on its orangish hue); Jay Tate from Spaceguard UK, mid-Wales; Dave Storey from the Isle of Man; Roy Tillcock from the Isle of Wight; David Strange and Steve Bullen from southwest



CCD images of 2012 DA14 on 2013 Feb 15. Top: 30 sec. from 20:04:52 UT, 0.61m refl. at f/4.75. David Briggs, Clanfield, Hampshire. Below: 3x20s from 21:38:33 UT, 0.35m SCT. Denis Buczynski, Tarbatness, Ross-shire.

Aurora Section

Considering that it is believed we are close to the maximum of solar cycle 24, there has been remarkably little auroral activity during 2012 November to 2013 February, particularly in December, January and February following a reasonable November. A coronal mass ejection (CME) on 2012 Oct 27/28 resulted in magnetic disturbances on Oct 31 when the Bz rotated southwards for about 20 hours. This had the effect of producing a major to severe storm on the evening of Nov 01/02. Aurora was reported by several observers and radio aurora was also noted.

With the exception of 2012 Nov 13/14, Kp levels have not reached 5 during these months although several displays were reported during November. A CME on Nov 9 assisted by a southerly Bz resulted in a rise of Kp to 6 in the early hours of Nov 14 and produced an auroral display which was seen in Scotland. Reports were also received of a display the previous night, one from an airline pilot high over the North Midlands.

An increasing solar wind and a southerly Bz caused the Kp to briefly rise to 4 on Nov 20 and aurora was reported by several observers in northern Scotland. A CME resulting from M class flares on Nov 20 & 21 reached Earth on the evening of Nov 23/24 and increased the Kp to 4 for several hours. Aurora was reported as far south as southern Scotland on the night of Nov 23/24.

By way of contrast, December was a very quiet month for solar activity, the Kp only rising to 4 on Dec 17 as a result of a coronal hole



2012 Nov 20/21, 19:22 UT, Thurso, Caithness. Gordon Mackie.

high speed stream. No reports of aurora were received from UK observers during December.

The quiet spell continued into 2013 January which was broken by a coronal hole high speed stream on Jan 13/14, which only raised the Kp to a value of 3 but produced a few auroral reports from observers in northern Scotland. A CME on Jan 13 arrived on 17/18 to produce displays seen on the nights of Jan 16/17 & 17/18, again by observers in northern Scotland. During that period, the Kp values were constantly about 3, reaching 4 on Jan 17/18. Radio aurora was reported on Jan 26 but there were no reports of auroral activity seen from UK.

A CME on Feb 6 arrived on 08/09 and caused a slight rise in Kp to level 3. Surprisingly, a faint aurora was reported from Thurso on that night

but was not noted from any other site. A prolonged southerly Bz caused the Kp to reach 4 on the evening of Feb 13/14 and faint aurora was reported from northern Scotland. Finally in February a weak transient CME caused a slight rise in Kp and again weak aurora was reported from one site in northern Scotland.

Dave Gavine has compiled the following list of auroral observations which provides details of the prominent features of the displays and the observers and their locations.

Aurora: 2012 November to 2013 mid-February

The geomagnetic field remained relatively quiet as before, with solar outbursts sufficient only to confine aurorae to Scandinavia, northern N. America and the far north of Scotland. The Kp indices touched 6 on Nov 13/14 and 5 briefly on Nov 1/2 and 23/24, Jan 16/17 and Feb 13/14.

Nov 1/2: Sudden storm commencement (SSC). Aurora visible from dusk, fade around 23:00UT, from Aberdeenshire, Elgin & Banff to the north Caithness coast, several periods of active multiple rayed arcs and bands showing movement with rays up to 30° at Thurso. Weak radio aurora reported in the afternoon of Nov 1.

Nov 6/7: Kp 4. 02:09–03:25 rays in cloud gaps at Garioch, Aberdeenshire.

Nov 7/8: 18:20–02:06 rays in cloud gaps at Garioch.

Nov 12/13: Kp 4, indirect coronal mass ejection (CME) arrived about 23:00, aurora over Scandinavia (see *Spaceweather.com*). In Aberdeenshire auroral light & rays in cloud gaps 22:23–02:53, red topped rays. Arc & red rays at Thurso 23:00–0040. Alan Clitherow in flight over N. Midlands 00:12–00:30 reported a homogeneous band. Radio aurora in high latitudes.

Nov 13/14: Kp 6. Aurora reported from Michigan by Art Boyko. Red and green light in cloud at Thurso 20:00–20:30.

Nov 14/15: 19:02–19:27 fragment of homog. arc, slow pulsations.

Nov 17/18: 19:55–21:40 low faint light & rays. **Nov 19/20:** M-class solar flare. 22:16–03:15 faint light, occasional faint rays with red tops.

Nov 20/21: Kp 4. 18:00–22:30 (fade). Active aurora seen from Aberdeenshire north. Homog. arc then band with purple veil above, active periods about 18:43 with 3 arcs, 21:30 bright rayed bands, movement, red tops.



2013 Jan 13/14, 22:34 UT, Elgin, Moray. Alan Tough.

► England; Ray Emery and Alex Pratt (who obtained a video record timed to 0.01 second accuracy) from northern England; Denis Buczynski and Bill Ward from mainland Scotland; John Vetterlein in the Orkneys; and Kieran Rooney from Northern Ireland. Thank you everyone

for persevering under somewhat difficult weather conditions, including those many folk like me who were ready but clouded out on that memorable night.

Richard Miles, Director



Nov 23/24: CME, SSC, Kp 5. 21:45–04:50. Active aurora over north of Scotland, well seen despite a bright Moon. Active rayed bands with bright sharp red rays showing drift east and west, periods of quiet light, maximum altitude about 20°. Faint light visible at Kelso & Ayrshire.

No appreciable aurora was reported from the UK in December.

Jan 12/13: Green band to 10° from Cromarty.

Jan 13/14: Kp 4. 21:20–22:25 several photos of double arc then bright rayed band with red veil above.

Jan 16/17: Kp 5 briefly. 21:37–23:37 faint light & rays, bright rayed bands & arcs. Max alt. 25°.

Jan 17/18: Quiet magnetic field. 17:50–22:12 active rayed bands with rays to 50°. Photos from Hopeman by Stewart Watt & Steven McConnach. Jan 18 radio aurora in N Scotland.

Feb 08/09: Green glow with red seen in images from Thurso.

Feb 13/14: Kp 5 briefly. 23:30–00:45 active rayed bands, red tops.

Feb 17/18: Faint green glow in images but little visually from Thurso.

Observers: A. Boyko (Michigan), I. Brantingham (Banff), D. Buczynski (Portmahomack), A.

Clitherow (aircraft), J. Fraser (Alness), J. Gray (Lewis), K. Kennedy (Dundee), R. Leith (Lerwick), T. McEwan (Glengarnock, Ayrshire), G. Mackie (Thurso), J. MacKintosh (Cromarty), G. MacLeod (Wick), P. Sherman (Spey Bay), A. Simmons (Milngavie), D. Small (Kelso, Borders), A. Tough (Elgin), B. Ward (Glasgow), S. Watt (Thurso), G. Whipps (Garioch, Aberdeenshire), D. Pettitt (magnetometry, Carlisle), F. Vincent (radio, St Andrews).

Dave Gavine, Assistant Director
[daveimg37@hotmail.co.uk]

It can be seen from the above that there were few auroral displays from 2012 December to 2013 February. Most of these were faint and required a good dark site to spot them. More southerly observers have not been particularly fortunate during the recent part of this solar maximum and although we would like to see more auroral displays, I am not particularly hopeful if the current trend of active solar areas continues.

Ken Kennedy, Director
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Solar Section

2012 December

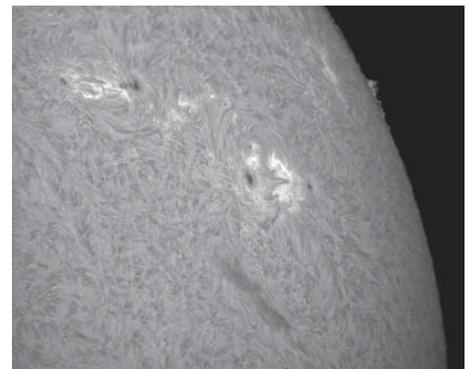
December saw a fall in activity with R the lowest recorded since 2012 February. Since that month, the southern hemisphere has shown strong activity but December saw that fall back to the low levels of last February. However taken as an average for the year 2012, both the northern and southern hemispheres have performed to a very similar level.

AR1621 N15°/018° survived from the previous month and on Dec 1 was the most westerly group of only 3 on the disk, all in the northern hemisphere. The group was type Cso consisting of a penumbral leader and a tiny follower which disappeared by Dec 2. The leader had decayed by Dec 5 when it was seen approaching the NW limb as three faint small sunspots type Bxo.

AR1623 N09°/340° the most southerly of two sunspot groups travelling within close proximity, this group was type Dao in the NE quadrant on Dec 1. The next day the penumbral follower had declined to a single spot with the group now designated type Cao. The group was of a similar appearance on Dec 5 and when last seen on Dec 9, only a small Hsx sunspot was visible very close to the NW limb.

AR1625 N14°/341° accompanied AR1623 across the solar disk, just to the north of that group. On Dec 1 the group was type Dao containing 7 sunspots although the leading penumbral spot was smaller than that of AR1623. The group was of a similar appearance on Dec 2 retaining its trailing penumbral sunspot unlike its companion group. However by Dec 5 its follower had disappeared leaving only an Hax spot. The group continued to decline to a single Axx spot as it journeyed to the NW limb and was not seen on Dec 9.

AR1629 N12°/239° appeared on the disk in the NE quadrant on Dec 7 type Csi. The group developed to type Dso on Dec 9 and had an area of 90 millionths by Dec 10. By Dec 11 the follower was in decline and when



An H-alpha image of Active Regions 1629, 1632 and 1631 by Eric Roel, 2012 Dec 15.

Deep Sky Section

Your new Deep Sky Section Director – Callum Potter



The Deep Sky has always been my main passion in astronomy. Whilst I have always enjoyed casual views of the Moon and planets, I would not say I have

been an ‘observer’ of these objects, never really paying them the attention that others do, and that maybe they deserve. I would like to think of myself primarily as a deep sky ‘observer’ though – and principally a visual observer.

I have tried some simple wide field astrophotography in the past, and still do dabble from time to time, but I find the simplicity of visual deep sky observing very alluring. Going out on a clear night with a Dobsonian telescope, a couple of eyepieces and a printed chart – this is all you need to explore the universe around us. Perhaps it’s a reaction to a high-tech day job, going low-tech in one’s hobbies.

Of course many in the Section will be interested in ‘high-tech’ imaging and processing – I can talk that lingo too! And we have many experts in the Section, so if this is something you want to get into, we are here to help.

Stewart Moore has done a great job over the past nine years steering the Section forward, and I do want to build on the work that he has done. There are a number of observing programmes under way, which I hope we can continue, and I would like to hear members’ views on new programmes that they might like to contribute to or lead.

I would also like to encourage all members of the Association to contribute to the Section. Don’t feel it is just the remit of those with large telescopes, or expensive imaging equipment –

whatever you have you can make a contribution. What is important is to observe, and to report your observations. Whether these are textual, sketches, or images – all are equally valid.

I plan to issue the Section newsletter three or four times a year – again, your news, views, observations and articles are what will make this a success, so if you have anything to share, please do send it to me.

The observant amongst you will probably have noticed rather a shortage of papers or articles in the *Journal* by members of the Section – this is something I hope to address, and I am certainly keen to encourage and help anyone that would like to write something for publication in the *Journal* – do let me know.

I am also keen to promote contacts with other deep sky observing groups. We already have a healthy interchange with the Webb Deep Sky Society which I hope we can continue and grow, and I would like to encourage contacts with groups around Europe, the USA and other parts of the world.

So please do get in touch: let me know what you are observing, send me your images for the Section Archive and newsletter, and contribute to the observing programmes. I am here to assist all members of the Association, whatever your level of skill or experience, and if you have a question that I can’t answer directly, the team is bound to have someone who can. You can contact me direct by emailing deepsky@britastro.org and my full contact details are in the listing at the back of every *Journal*.

Clear, dark skies to you all.

Callum Potter, Director



last seen on Dec 17 it was as a single Hsx sunspot near the NW limb.

AR1630 N18°/253° appeared on the disk in the NE quadrant on Dec 9 type Dro and by Dec 10 was type Dsi consisting of small penumbral spots at either end of the group with numerous small spots and a more defined sunspot between the two. The group decayed on Dec 11 to type Bxi consisting of 9 small sunspots, most of which were in the trailing component. The following day the group developed again into type Dso with an area of 70 millionths before declining again on Dec 14 and fading away as it approached the western limb.

AR1633 S05°/111° rotated around the SE limb on Dec 15 and when seen on Dec 17 was type Eao with an area of 200 millionths. Detailed observations of this group were not received until Dec 26 when the group was type Hsx near the western limb.

AR1634 S13°/109° also appeared around the SE limb on Dec 15 just to the south of AR1633. The group was a single penumbral sunspot that accompanied AR1633 across the disk making the two groups appear as a triangular formation.

AR1635 N14°/062° appeared around the NE limb on Dec 18 type Cso. By Dec 26 the group had developed to type Dsc with an

area of 200 millionths. The group was in decline by Dec 28 and type Hrx the next day as it neared the western limb.

H-alpha

Prominences

14 observers reported a prominence MDF of 5.29 for December.

Prominences throughout December were not very active and many were faint and/or small.

On Dec 2 a tall bright ragged arch prominence was seen on the E limb and a distinctive filarom was on the SE limb.

Several observers reported an arch prominence on Dec 5 on the NE limb that reached a height of approximately 56,000km and extended across the limb for about 233,000km. Another filarom was seen on Dec 11 this time on the NE limb with a small prominence hearth to the north and another to the south.

An arch prominence was seen at NE50° on Dec 16 & 17.

A column type prominence on Dec 18 reached an approximate height of 112,000km on the E limb. Also on Dec 18 an active prominence was observed on the N limb comprising a central column with two appendages like outstretched arms at the top.

Another arch prominence was on the NE limb extending for approximately 428,000km around the limb on Dec 23.

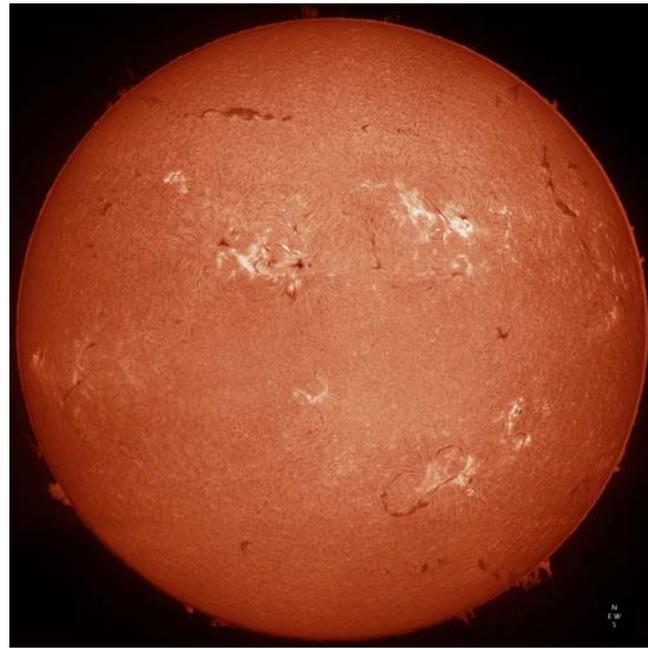
Filaments & plage

9 observers reported a filament MDF of 4.06 for December.

A distinctive long filament was seen just over the edge of the SE limb heading in a NW direction on Dec 5.

A very large, long filament stretching from S30°/250° to N20°/220° was seen on Dec 8 with a broad head at the northern end and a curved 'tail' to the south.

The southern hemisphere featured again on Dec 9 with a strong thick broken east-west filament to the south of AR1630 and AR1629. Two other very long east-west filaments featured in the SW quadrant although they were fainter. The most southerly of these remained on Dec 10 and was even longer reaching the SW limb, but quite broken. The feature was still evident on Dec 11. The filament south of the sunspot groups persisted on Dec 10 & 11 al-



H-alpha image by Pete Lawrence on 2013 January 1.

though much reduced in length and intensity.

An irregular and diffuse filament was seen on Dec 16 in association with ARs 1633 & 1634.

Plage was seen with AR1621, AR1623, AR1625, AR1629 & AR1630.

Flares

Anthony Stone reported two small flares on Dec 8 10:15UT to 10:25UT in the SE quadrant in association with a long curved diffuse filament.

Lee Macdonald observed a small but bright flare in progress when he commenced observing at 12:25UT on Dec 16. The flare was in the vicinity of ARs 1629 and 1631 near the NW limb and became brighter at 12:32 UT. This was corroborated by Anthony Stone's observation at 12:20 UT.

2013 January

Solar activity in January increased and the relative sunspot number recorded was the highest since 2011 December. Activity increased in both solar hemispheres with the north still remaining dominant. During the first half of the month, there was an explosion of small sunspot groups over the solar disk with NOAA recording fourteen separate groups on Jan 5 & 6. The second half of the month returned to more modest levels.

AR1638 N12°/311° survived from the previous month type Cso consisting of a small penumbral leader and 3 small followers. The group lost its followers by Jan 4 and became a single Hsx sunspot, remaining so until it rotated over the western limb on Jan 8.

AR1640 N28°/319° also survived from December and was the largest group on the disk on Jan 1 being type Dac. The group was near the CM with an area of 260 millionths. By

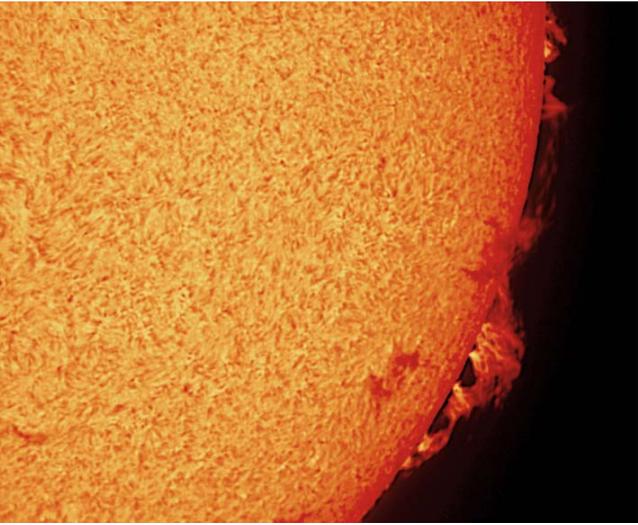
BAA sunspot data, 2012 December–2013 January

Day	December		January	
	g	R	g	R
1	3	44	6	86
2	3	41	6	78
3	3	39	7	107
4	3	45	11	141
5	3	42	12	149
6	2	30	12	147
7	2	22	10	141
8	3	37	9	131
9	3	39	9	124
10	2	38	8	129
11	2	38	9	145
12	4	63	7	128
13	3	58	6	112
14	3	49	6	98
15	4	55	6	92
16	4	57	4	67
17	4	56	3	52
18	3	48	2	38
19	4	56	3	46
20	4	62	3	43
21	3	53	2	40
22	3	65	3	40
23	3	59	4	60
24	2	49	4	52
25	3	50	3	44
26	3	52	4	52
27	3	50	4	56
28	3	43	4	46
29	3	45	4	52
30	3	42	4	46
31	6	91	4	43
MDFg	3.16 (44)	5.75 (51)		
Mean R	48.87 (39)	83.39 (46)		

North & south MDF of active areas g

	MDFNg	MDFsg
December	2.29 (34)	0.66 (34)
January	3.74 (38)	2.27 (38)

g = active areas (AAs)
MDF = mean daily frequency
R = relative sunspot number
The no. of observers is given in brackets.



group had developed a small follower that was still present on Jan 18. The follower was lost by Jan 22 when the sunspot returned to type Hsx as it approached the SW limb.

AR1660 N12°/065° formed on the disk near the central meridian on Jan 20. By Jan 22 the group was type Dsc consisting of several small penumbral sunspots and accompanying pores. By Jan 23 the group coalesced into a leading a following group of sunspots and when last seen on Jan 26 near the limb was type Dso consisting of two small penumbral sunspots.

AR1662 N27°/317°; **AR1663** S11°/298°; **AR1665** N12°/243°; **AR1666** S23°/244° were all present on the solar disk at the close of the month. All were small groups of no particular significance being mainly small single penumbral sunspots.

12 observers reported a Quality number of Q=14.84 for January.

H-alpha

Prominences

15 observers reported a prominence MDF of 6.00 for January.

A hearth consisting of four elements was seen on the SW limb on Jan 1. On Jan 9 a long 'splash' prominence was on the W limb.

A hedgerow prominence extended along the SE limb on Jan 10 for about 289,000km whilst on the SW limb an active loop prominence reached a height of around 130,000km.

A broken arch was on the SW limb on Jan 14 and an unusually bright small prominence hearth was seen on the ENE limb.

A large mass was seen on the SE limb at SE70° on Jan 15 & 16 and another mass was also on the SW limb on Jan 15.

On Jan 16 an active prominence was observed on the NW limb which consisted of a small stem that fanned out at the top and displayed a bright area.

A short but bright pillar was seen on the NW limb just ahead of the approaching AR1654 on Jan 18. A medium sized pyramid was on the SE limb just south of a smaller hearth consisting of five small prominences.

A 'rocket' shaped prominences was conspicuous on the NW limb on Jan 22 and also a large but faint mass was seen on the SE limb.

An active prominence was observed on the NW limb on Jan 23 reaching an estimated height of 121,000km.

An extensive hedgerow prominence was on the SE limb at SE30° on Jan 28 extending over 20° of the solar limb.

Another active prominence was observed on Jan 29 on the SE limb reaching an approximate height of 65,000km.

Filaments & plage

11 observers reported a filament MDF of 3.40 for January.

Numerous filaments were seen throughout

the disk on Jan 11, mainly in association with sunspot groups. The same was seen on Jan 12 and a long arcing east-west filament was seen through the group AR1654. Two long east-west filaments also trailed AR1650.

A hook shaped filament was seen within AR1654 on Jan 14.

A long east-west filament was in the northern hemisphere straddling the CM on Jan 15 with a small arc filament just south of the leading sunspot in AR1654.

A long curving east-west filament was north of a new Axx sunspot near the NE limb on Jan 22 and several short filaments were seen in association with AR1658 in the SW quadrant.

Plage was seen in association with AR1640, AR1649, AR1650, AR1652, AR1654, AR1658 AR1660, AR1663 and AR1664.

On Jan 14 a single 'hot spot' was seen at 12:48UT slightly north of AR1654, followed by three bright spots a short time later in the same general area. Another observer reported a short elongated 'hot spot' just south of the leader in AR1654 on the same day.

Flares

On Jan 2 Monty Leventhal reported a surge in the region of AR1644 starting at 22:50UT and ending at 23:20UT. A C2 flare type 2N was recorded on Jan 15 from AR1654 starting at 20:50UT peaking at 22:55 and ending at 23:10UT.

Lyn Smith reported a bright C1.5 flare on Jan 11 from the northern part of the leader of AR1654 during her observation commencing at 14:15 UT that day. NOAA recorded the flare starting at 14:22UT peaking at 14:24 and ending at 14:28UT.

Brian Mitchell recorded a ring flare on Jan 12 with bright plage remaining until Jan 15 within AR1654. Anthony Stone reported flare activity from AR1656 on Jan 13.

Kevin Kilburn imaged a reverse 'S' between AR1654 and AR1656 on Jan 15 which NOAA recorded as a C1.2 flare between 12:00 and 12:17 UT.

Lyn Smith, Director

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STARGAZING LIVE

2013

and at New Lanark Mills

in Regent's Park

As we did last year, the BAA collaborated with the Baker Street Irregular Astronomers on a public observing event at The Hub in Regent's Park, London, to coincide with the BBC 'Stargazing Live' series broadcast in January, one of many such public astronomy events around the country. Ours took place on Wednesday January 9 (deferred from the previous evening due to the weather). The sky was very clear, a large number of telescopes and binoculars were brought along, and good views were obtained of Jupiter and its moons and of some of the brighter deep sky objects, including M42, open clusters in Auriga, and binary stars.

Attendance was estimated at over 350. Stargazing booklets provided by the BBC, and BAA leaflets, were given out to attendees, and there was a free raffle for a 150mm (6-inch) reflector, donated jointly by the BAA and London telescope store

The Widescreen Centre. This was won by Mr Nick James (not the BAA Papers Secretary, another one). Most of the public left by 22:00 when the café closed, but some hardcore observing went on until after 23:00.

The 'Baker Street Irregular Astronomers' (bakerstreetastro.org.uk) meet every month, weather permitting, at The Hub, a café and sports pavilion in the park with an excellent 360° horizon, for observing sessions which attract many casual passers-by, rather like

the American 'sidewalk astronomy' events. They are not a society with formal membership, but an informal group offering free events, notifications of which are issued by email and on Twitter.

We expect to run another observing session with the BSIA later this year as one of the outreach events connected with the European Planetary Science Congress, taking place nearby at University College London from Sept 8-13.

David Arditti



Clydesdale Astro (clydesdaleastro.org.uk), South Lanarkshire, Scotland held a public observing event at the national heritage site at New Lanark Mills. Over 200 people turned up which far exceeds numbers we've experienced with previous events. Even last year's Stargazing Live event at New Lanark only attracted 80 or so people.

We gave a short talk on the night sky and then went out onto the roof garden of the main mill to do some observing. We had half a dozen telescopes available and everyone at least got a view of Jupiter and its moons before we were clouded out after an hour or so. Over 30 people have left their contact details and expressed an interest in hearing more from the Society. There is no doubt there is a good deal of interest in astronomy and a programme like this just gives people the impetus to get out there and do something. I wish it was on every month!

Lyn Smith



Mr Nick James with his 150mm telescope donated by the BAA and the Widescreen Centre.





Mercury & Venus Section

Recent observations of Mercury

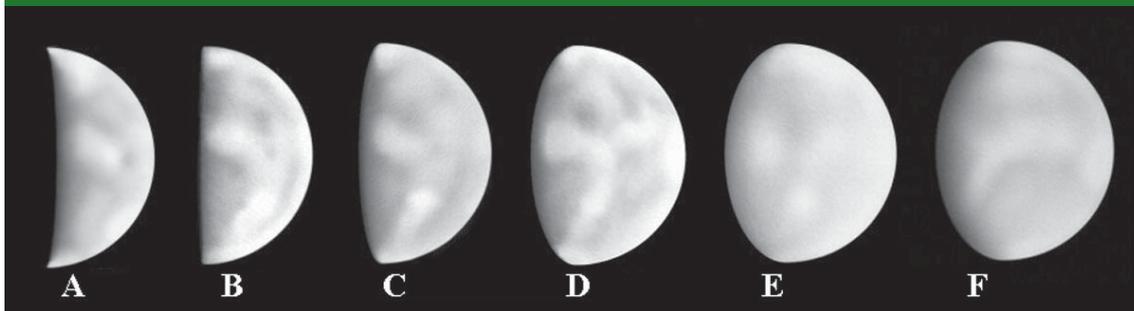


Figure 1. Drawings in 2012 Nov–Dec, 415mm Dall–Kirkham Cass., apodising screen, W22 orange filter and $\times 365$ binocular eyepieces, *D. Gray*. (A) Nov 30d 07:50UT, CM= 85°, Seeing II–III; (B) Dec 2d 08:25UT, I–IV (W15 (yellow) + W13 (yellow-green) filters), CM= 96°; (C) Dec 4d 08:40UT, II–III (W15 + W13 filters), CM= 107°; (D) Dec 8d 08:10UT, II–III, CM= 127°; (E) Dec 11d 08:55UT, III–V, CM= 142°; (F) Dec 13d 08:50UT, III–IV, CM= 151°.

the planet showed many spots and streaks. These can readily be identified.¹

An image by Frank Melillo (New York, USA) on Dec 13 showed some signs of the larger markings drawn by Gray. The planet reached superior conjunction on 2013 Jan 18.

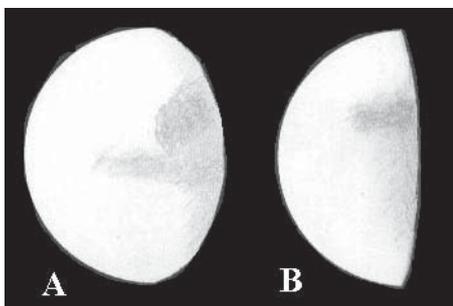


Figure 2. Drawings in 2013 February, 235mm SCT, $\times 270$, *G. Adamoli*. (A) Feb 9d 15:45UT, no filter, Seeing IV, CM= 55°; (B) Feb 15d 17:00UT, W25 red filter, Seeing IV, CM= 84°.

Morning elongation, 2012 November to 2013 January

Mercury was at greatest elongation west on 2012 Dec 4 (21°) and David Gray (Spennymoor, Co. Durham) enjoyed a rare period of clear and stable morning skies to make a series of drawings of the planet (Figure 1). These representations of the albedo features recall some of the more detailed studies previously made at Pic du Midi Observatory.¹ Seeing quality varied from day to day, and is reflected in the degree of detail shown. On Nov 30 the small dark spot near the *f.* limb was surprisingly distinct. On Dec 2 seeing was very variable, but Gray wrote that in the best moments

Evening elongation, 2013 February

Mercury arrived at greatest elongation east on 2013 Feb 16 (18°). Its southerly declination deterred UK observers, but it was studied by Gianluigi Adamoli from Verona, Italy. On Feb 6 the planet was badly defined but the phase was seen to be around 0.86. Adamoli subsequently secured drawings showing markings near the terminator (Figure 2).

A temporary clearance of the clouds enabled John Vetterlein (Rousay, Orkney) to succeed in capturing both Mars and Mercury at their close conjunction on Feb 8 (Mars being only 16 arcmin S. of Mercury), despite their low altitude of just 4.5°, and his best image is shown here (Figure 3). Mars was at magnitude +1.2 against the brighter Mercury (–1.0).

Mercury is a challenging object for most amateur astronomers, but securing good observations always brings much personal satisfaction.

Richard McKim, Director

¹ D. L. Graham, 'The nature of albedo features on Mercury, with maps for the telescopic observer', *J. Brit. Astron. Assoc.*, **105**, 12–16 & 59–64 (1995)

The BAA and the European Planetary Science Congress 2013

The European Planetary Science Congress, one of the largest astronomical gatherings in the world, will come to the UK for the first time this year, taking over University College London on 2013 September 8–13. There are over 70 sessions planned, and attendance is likely to be approaching 1000 – mostly professional astronomers, but amateurs are also warmly encouraged to participate. (There will be a much-reduced attendance fee for amateurs).

The BAA is organising a specific session on amateur astronomy. Dr Richard Miles (Director, Asteroids & Remote Planets Section) and Dr John Rogers (Director, Jupiter Section) are co-convenors, and can be contacted by members who have work that they would like to present at the Congress, either in the form of a short presentation, or a poster. See also the general Congress website, www.epsc2013.eu. Note that the deadline for abstracts to be submitted is May 6. We already have a number of contributions likely from BAA members. For those from abroad who wish to attend, there is an offer from the Open University of financial assistance with travel – contact the BAA Office for details.

We are also organising a special BAA Workshop meeting, within the Congress, to take place on the final day, Friday 13 September, lasting all day. This will be an opportunity to hear longer presentations from BAA observers on current work within the solar system sections, and from professionals looking for amateur help with specific projects. We will be using a lecture theatre in the morning and a computer room in the afternoon, the latter for practical workshops. Speakers confirmed so far are David Arditti, Paul Abel, Tony Cook, Peter Grego and Richard Miles from the BAA, and Prof Nigel Mason from the Open University. Attendance will be limited to 50; contact the Office to book your place.

With additional events round the Congress, such as an exhibition on the European space effort on Tuesday to Thursday, a science-themed theatre show on Thursday night, and a BAA/BSIA observing session in Regent's Park on one of the evenings, weather permitting, it should be well worth making a special journey to attend this exciting event.

David Arditti

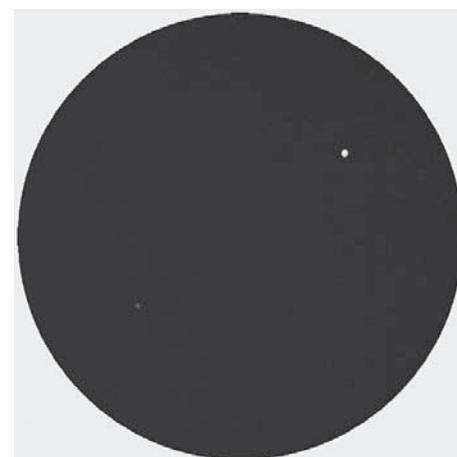


Figure 3. 2013 Feb 8d 17h 37m: Mercury (top right) & Mars (below left) imaged with 100mm OG $\times 45$, Minolta camera at F/200, 1/30sec ISO100. *J. Vetterlein*.