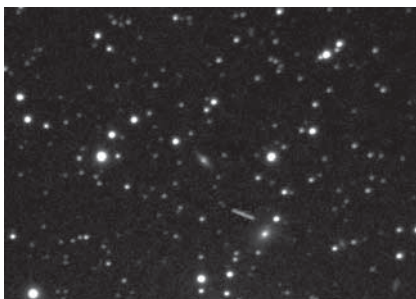


From the President

Enjoy your astronomy

If all goes to plan this month, we should witness the next milestone of the latest space triumph, the arrival in orbit of the European Space Agency's *Venus Express* spacecraft (for information on how you can get involved, see the next page). The mission has involved 15 nations including the USA and has been modelled on the highly successful *Mars Express* probe. It is the latest in a plethora of space adventures involving unmanned missions, of which *Galileo*, *Cassini-Huygens*, *Deep Impact*, *Stardust* and *Integral* are just a few which spring to mind. Thanks to the World-wide Web and the Internet, we can now all follow their progress as it happens from the comfort of our armchairs, which is a marvellous thing to do. However, these advances, whilst being great achievements of exploration and understanding by mankind, are but one aspect of the whole subject that is astronomy.

As President of your Association, I know that astronomy provides a vista of many perspectives for our members, of which space missions are but one. There are many other topics which appeal to our members, especially observational astronomy, both what we can achieve ourselves observing firsthand and what has been achieved by astronomers working at the major observatories and elsewhere. Other areas of interest involve the construction and use of astronomical equipment or observatories, and developing ever more powerful software, as well as researching various historical and biographical aspects of the subject. I could go on. Let me emphasise that here at the BAA we are keen to encourage interest and fascination in all aspects of astronomy, however simple or complex the topic. Indeed, I hope that from all the very varied articles, notes, etc. that we publish in each issue of the *Jour-*



Richard Miles imaged the BAA's own asteroid, (4522) Britastra, four days before opposition in January. The streak shows the minor planet's movement across the sky in just under 45 minutes of exposure, at average magnitude 15.8. 2006 Jan 07.917–07.953, 99×30sec unfiltered, 280mm SCT + SXV-H9 CCD camera. R. Miles.

nal, there are always several that appeal to you personally.

The *Journal* is just one of the means by which we are able to develop and popularise the subject. Our regular meetings are another such opportunity, through which you as a BAA member can learn more about astronomy as well as meeting fellow enthusiasts. In January we held our first meeting at our new venue of New Hunts House, Guys Hospital, London Bridge, and I can report that all went well thanks to the sterling work of our new Meetings Secretary, Hazel Collett. Also in January, I took part in the latest in our series of Back-to-Basics Workshops, which this time was held in Canterbury thanks to Hazel and to the local South-East Kent Astronomical Society (SEKAS), who provided invaluable assistance. These workshops are primarily intended for beginners and others who want to hear an overview of a subject without getting too lost in the detail. This meeting proved to be the most successful of its kind yet with about 120 attendees, of whom the majority were neither members of the local society nor of the BAA. It was most enjoyable to meet so many of the general public who wanted to be educated and entertained by what we had on offer that day.

What had attracted so many folk I am not sure: probably a combination of factors including the excellent publicity. However, I was left wondering whether it could be something to do with the information overload that we are all exposed to nowadays. All of these wonderful space missions to the various corners of our Solar System are just fine, but maybe some folk would like to understand the basics of the subject so that they can better relate to the astounding advances reported in the popular astronomy magazines and elsewhere in the media. Also a key feature of our workshops is that we instruct people on how best to observe the heavens. Indeed at Canterbury with the help of SEKAS, we held both daytime solar observing as well as an early evening session outside the lecture room looking at the stars, planets and nebulae with the help of local amateurs who had brought along a wide assortment of telescopes and binoculars.

Certainly an attraction for me is to observe at firsthand the many different celestial ob-

jects that come and go in the night sky. Reading articles and looking at images captured by space-borne instruments or gigantic Earth-based telescopes is one thing, but seeing these things for yourself is yet another equally valuable experience: that first sight of Saturn's rings, or the first time you were able to explore the Andromeda Galaxy, can be quite a thrill and can leave you with a fond memory, never to be forgotten.

Although everyone's calendar is quickly filled up these days, do look out for forth-



The Great Andromeda Galaxy imaged by Tony Cook of Leeds Astronomical Society, using a Televue 85 on a Losmandy GM-8/Gemini mount and a Canon 10D digital SLR. 12×300sec at ISO 800, processed with *Images Plus* and *Adobe Photoshop*.

coming BAA meetings – just this month we have the 40th Winchester residential weekend as well as an Out-of-London meeting in Liverpool courtesy of the Liverpool Astronomical Society. The first such Winchester meeting was held the year after I joined the BAA, so this occasion should evoke some memories for me. Likewise, Liverpool has always been close to my heart having lived 'across the water' in Cheshire for many years. There are many more opportunities to get together and talk astronomy later this year, including our ordinary meetings in London, the Exhibition Meeting in Cambridge, an exciting Variable Star Section meeting at the Rutherford Appleton Laboratory, an Observers' Workshop in Leicester and last but not least another Back-to-Basics, this time in Cheltenham.

If you are planning to attend one or more of these BAA-organised gatherings then do feel free to bring along a guest or two since these meetings are open to all: non-members however may have to pay a small charge on the day. In the meantime, enjoy your astronomy and I wish you clear skies if you intend to get out there and observe the heavens firsthand.

Richard Miles, *President*



Mercury & Venus Section

Ground-based support for the Venus Express mission

In 2006 February I was in touch with Jason Hatton, who is Biology Science Co-ordinator at the European Space Agency. He invites BAA members to participate in a 'Venus Express Ground Based Observing Project'. He has personally contributed high quality Venus images to the Section during 2004.

Jason writes as follows: '...[this] is an opportunity to contribute scientifically useful images and data to complement the Venus Express (VEX) spacecraft observations of Venus. The project will focus on utilising the capabilities of advanced amateurs to obtain images of the atmosphere of Venus, specifically filtered monochrome images obtained with CCD-based cameras in the 350nm to 1000nm (near ultraviolet, visible and near infrared) range.

'The VEX spacecraft will observe Venus using seven instruments for at least two Venusian years (1000 days) beginning in 2006 May. The instrument package includes the Venus Imaging Camera (VMC) which will image the planet in the near-UV, visible and near-IR range. Although VMC will provide much higher resolution images of the planet than visible from Earth, continuous monitoring of the planet will not be possible... there may be periods when parts of the planet are visible from Earth that are not visible from the spacecraft (due to the spacecraft position in orbit). Additionally it is important to compare Earth-based observations with simultaneous spacecraft observations.

'The objectives... will be to obtain high quality images of Venus before, after and during VEX operations. 'Images can be ac-

quired using either a high-quality monochrome CCD camera or a monochrome digital video camera (*e.g.*, based on webcam technology). Colour CCD cameras/video are not suitable for this project since these limit the possibility of obtaining meaningful filtered images, particularly in the near-UV regions. Some examples of cameras successfully employed for Venus imaging include:

- Atik Instruments ATK-1HS or ATK-2HS
- Lumenera LU075M
- modified Philips ToUcam camera with a monochrome CCD chip

'To perform worthwhile imaging of Venus a core set of three filters is required:

- a U-band filter (*e.g.*, Johnson-Cousins photometric U-band or Schott U-360, 300-400nm bandpass) ▶

Comet 73P/Schwassmann-Wachmann 3 this May

This comet was discovered in 1930 and currently has an orbital period of 5.36 years. The orbit gives rise to occasional close approaches to the Earth as happened in the discovery year, when it came within 0.062 AU, and as will occur again this year. Since the orbit comes close to Earth it is thought that the comet was responsible for the Herculid meteor shower seen in 1930 but a repeat of this in 2006 is unlikely.¹

The comet is intrinsically faint and, since the original orbit was not very well known, all

of the returns up to 1979 went unobserved. It was missed again in 1985 but since then it has been seen on each subsequent return.

The 1995 return was expected to be unremarkable but just prior to perihelion in September, the comet was observed to be significantly brighter than predicted. In 1995 December astronomers using the ESO 3.5m New Technology Telescope at La Silla in Chile found that the comet's nucleus had split into three fragments separated by around 4 arcseconds. The brightest of the fragments was designated fragment C.

The next return in 2001 was very unfavourable but the comet was first recovered in 2000 November with fragment C still dominant. One of the other fragments had disappeared and when it was last seen in 2001 December only fragment C and the fainter fragment B remained.

The return this year is particularly favourable with perihelion due on June 06, preceded by a very close approach to the Earth at a distance of 0.078 AU on May 12, when the comet will be well placed for observation from UK latitudes. Predicting the magnitude of comets is notoriously difficult but fragment C could reach naked eye visibility when at its closest.

The comet was first picked up this apparition in 2005 October when it was around 19th magnitude, and fragments C and B have both been recovered. Fragment B is around 3 magnitudes fainter than C and is currently trailing behind it by just under a day. At the end of February this corresponded to a sky separation of just over 1°. At the comet's

closest these two fragments will be around 15° apart.

At the start of April fragment C will be in Boötes, moving into Corona Borealis. It starts May in Hercules and then moves quickly through Lyra and Cygnus passing close to the Ring Nebula (M57) on May 08. At its closest it will be in Vulpecula but it then dives down through Pegasus, becoming lost in the morning twilight from UK latitudes around May 20.

At its closest the comet will be best seen at the start of morning astronomical twilight. On the morning of May 12 at 01:30 UT the comet will be around 40° up the east in Vulpecula. Unfortunately the Moon will be full, but it will be low in the southwest so should not be a major problem if the sky is transparent.

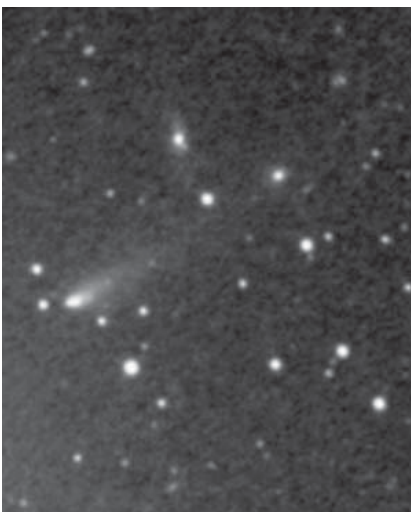
It is particularly difficult to predict the magnitude of a comet, especially since in this case it has fresh surfaces exposed as a result of the breakup. In early February fragment C had brightened to 14th magnitude and the best guess is that it could reach mag 3-4 around the time of closest approach.² It won't be spectacular as the light will be spread out over a large coma, but it should still be a nice binocular object rushing through Lyra and Cygnus in the second week of May.

An ephemeris for both fragments is available from the JPL Horizons website at <http://ssd.jpl.nasa.gov/cgi-bin/eph/>.

Nick James

1 Wiegert P. A. *et al.*, MNRAS **361**, 638-644 (2005)

2 Private communication, Mark Kidger, 2006 February 23



Comet 73P fragment C imaged on 2006 February 7 by Giovanni Sostero and Ernesto Guido, Italy, using a remote 0.25m, f/3.4 telescope and SBIG-ST8XE CCD camera situated in New Mexico.



- V-band filter (e.g., Johnson–Cousins photometric V-band)
- I-band filter (e.g., Johnson–Cousins photometric I-band or an infrared cut-on filter. In the case of non standard infrared filters the cut-on wavelength and/or bandpass should be noted.

‘Filters should ideally be photometric quality... In any case the specifications... should be noted with all observations. The following filters are also useful to expand imaging possibilities:

- a photometric B-band filter
- a Wratten 47 or violet filter in combination with IR-blocking
- a photometric R-band filter
- an 850LP filter (850nm cut-on)
- an 1000LP filter (1000nm cut-on).

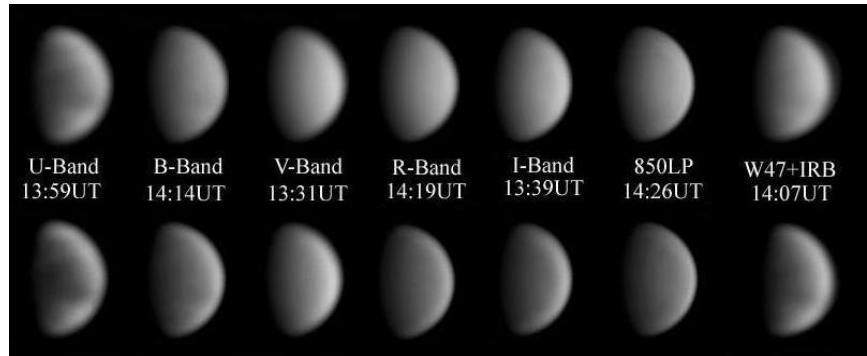
‘The effective focal length of the instrument should be adjusted so that the image scale per pixel is approximately twice the resolution limit of the instrument (e.g., if the resolution of the telescope is 0.5", then the image scale per pixel should be approximately 0.25")... The image exposure should be adjusted to ensure a good dynamic range, without saturating the image...’

It is anticipated that BAA members will send their images to the Section, but Jason has also requested that we (as one of the very few amateur organisations collecting Venus observations) also act as a clearing centre for observations from around the world. I have agreed with Jason that this is reasonable. The idea will be to make a copy of our *Venus Express* archive available to ESA, though of course we shall also be making use of the work for our own purposes. I have explained to Jason the file naming format I prefer (or at least the format I use for archiving): please simply put the year-month-day-UT-observer's initials in that order. For example a fictitious image by myself might be labelled 2006-06-29-1108UT-RJM. All details of observer, telescope, imaging system, etc., should be written upon the image itself and not sent in the text of an email.

‘Routine observations of Venus are needed throughout the period that VEX is observing the planet, as well as after completion of the mission... Co-ordinated observing campaigns in conjunction with spacecraft observations will be organised periodically. Information on observing campaigns will be posted on this website: <http://sci.esa.int/science-e/www/object/index.cfm?fobjectid=38833>.’

I have reproduced above a sample of Jason's own work showing typical images in the infrared and ultraviolet. I hope BAA members will welcome the opportunity to contribute scientific data to ESA, and would remind the visual observer that their work is wanted too. Good observing!

Richard McKim, *Director*



Filter images of Venus during western elongation on 2004 October 13 by J. P. Hatton, Mill Valley, California, USA. 230mm Schmidt–Cass., ×3 Barlow, ATK-1HS camera, Schuler U, B,V, R and I-band photometric filters, showing the appearance of Venus at different wavelengths. 850LP= 850nm cut-on filter; IRB= IR blocking filter; ca. 400–1200 frames stacked per image. *Top row*: mild image processing; *bottom row*: strong processing. South is uppermost. Average seeing and transparency. U-band (ultraviolet) and W47+infrared blocking (violet) images show cloud structure, most apparent in the ultraviolet. This agreement between the UV and violet images demonstrates that BAA observers who use the W47 violet filter visually really have been recording the classic UV features. Venus was largely featureless in the visible and near-infrared.

Meteor Section

Meteor outbursts

Following a very successful run at last August's Perseids, meteor observers in the British Isles have endured rather thin pickings of late, thanks mainly to poor autumn weather. Very little was seen of the Giacobinids¹ on October 08–09, but reports elsewhere indicate that a minor outburst did occur. Modest visual rates were enjoyed by observers in the Far East, suggesting a corrected Zenithal Hourly Rate around 35 close to 2005 Oct 08d 16h UT. Canadian radar observations show a peak – possibly from sub-visual meteors – around Oct 08d 17h UT. It would therefore seem that the most substantial Giacobinid activity, such as it was, came too early to have been visible from the UK in any case.

Small numbers of possible Giacobinids have been reported by George Spalding (Oxon.) and Tom Lloyd Evans (St Andrews), observing in early evening on Oct 08/09. Video observations by Richard Sargent at Chester yielded a couple of Giacobinids in the interval from 18:40 to 19:44 UT, before cloud intervened.

A few days before the Giacobinid outburst, between 17–23h UT on October 05/06, automated low-light video observing systems in Finland and Germany detected a modest outburst of bright meteor activity from a radiant at RA 10h 47m, Dec +79°. These ‘October Camelopardalids’ have been noted before, in 1902, 1942 and 1976, and may result from material in close proximity to an extinct comet in a short-period, Earth-crossing orbit. The burst of increased activity was also evident in forward scatter radio observations.



A Quadrantid meteor captured by Alex Pratt on 2006 Jan 03/04, using an Astrovid video camera system. The field measures roughly 30° across the diagonal, and is centred on Polaris.

The autumn of 2005 was notable for large numbers of bright Taurid meteors, including several in the fireball class (magnitude –5 or brighter). In most years, this shower produces a crop of reasonably bright events, but – as analysis of past BAA data has shown – there isn't usually a great abundance of fireballs.² Perhaps every three to four years, however, we encounter a ‘swarm’ of larger meteoroids in the Taurid stream, laid down by Comet 2P/Encke. Under these circumstances – as obtained in 1988 and 1991, for example – an enrichment of bright Taurids is seen, consistent with the 1993 stream model of Asher, Clube and Steel. At least a dozen events, some quite widely seen, were reported to the BAA (either directly to the Meteor Section, or via the Office) between October 23 and the end of November 2005.

The New Year opened with poor weather for the Quadrantids, peaking on January

03/04, and very few observations have been received. Alex Pratt at Leeds had some success with his Astrovid system, recording a number of good trails (see Figure).

Comet observers have been following the return of 73P/Schwassmann–Wachmann with interest (see page 61). The comet underwent a dramatic brightening and breakup at its 1995 return, and it has been suggested that relatively close passage between Earth and the surviving fragments in May 2006 might be accompanied by enhanced activity from the associated Tau Herculis meteor shower. The shower has, it must be

noted, only been reliably observed once, in 1930. Modelling of the debris distribution around the comet's orbit by Wieger *et al.*³ suggests that a Tau Herculis outburst is, in fact, unlikely at this return. Closest encounter with the 73P nucleus fragments is predicted for May 13–17, at distances between 0.05–0.07 AU; by contrast, the Leonid 'filament' encounters leading to the 1999–2002 storms were at distances less than 0.001 AU. Observers can still keep an eye open for possible activity of very slow (entry velocity 15 km/s), moderately bright meteors around the encounter dates. Tau

Herculids should emanate from a diffuse radiant centred at RA 15h 12m, Dec +39°. Moonlight will severely hamper observations (Full Moon is on May 13). Stream modelling suggests better opportunities for Tau Herculis outbursts in 2022 and 2049.

Neil Bone, Director

- 1 Mason J., *J. Br. Astron. Assoc.*, **115**(5), 241–242 (2005)
- 2 Bone N. M., *J. Br. Astron. Assoc.*, **101**(3), 145–152 (1991)
- 3 Wieger P. A. *et al.*, *MNRAS*, **361**, 638–644 (2005)

Aurora Section

2005 November

Geomagnetic activity in the period of November 02 to 06 and 30 appeared to be the effect of a longstanding active region on the Sun. The magnetic signatures of the solar cause were traceable back to 2004 October and were most active in 2005 September. The planetary magnetic index reached a value of 5– on the morning of Nov 03. There were periods of lesser activity from 12 to 14, 19 to 20 and 29 to 30 when the maximum Kp values were respectively 4, 4 and 5–. There was a particularly quiet period on Nov 17 which was a repeat of similar quiet periods on Sept 24 and Oct 21.

Most auroral observations in November were low-key and sometimes hindered by cloud. Ian Brantingham near Banff reported quiet glows on the nights of Nov 01/02 and 05/06. Tony Rickwood at Ullapool detected glows through cloud on 02/03 and 06/07. Stephen Martin in flight across the Atlantic south of the auroral oval detected a quiet arc on 27/28. Howard Miles at Pityme in Cornwall reported a strange white glow and band on 20/21 when his magnetometer was disturbed. Jay Brausch at Glen Ullin, North Dakota, detected only a glow on 05/06 and glows with an arc on 19/20. Winter blizzards were affecting the state.

Laars Poort, our relatively new observer in Greenland, has moved from Uummanaaq to Thule at 77°28'N, 69°14'W and is thus closer to the magnetic pole than any of our observers may ever have been. On November 02/03 he noted an active homogeneous green glow rising to an elevation of 40° above his southern horizon. On 05/06 he noted an active homogeneous green band from 7 to 30° above his southern horizon.

2005 December

As mentioned above, an active zone on the Sun has caused a series of significant magnetic periods that have repeated themselves with each solar rotation. This series was evi-

dent from Nov 30 to Dec 04, and from Dec 26 to 31. The maximum value of the planetary magnetic index was 5– on Dec 01 and 5+ on Dec 27.

A further activity period took place from Dec 09 to 12 and was found to follow corresponding disturbances in October and November. Again the Kp value reached 5– on Dec 11. On Dec 19 and 20 there was a lesser disturbance with Kp peaking at 4. The magnetic field became virtually undisturbed on Dec 05/08 and 23.

Our magnetic observers reported detecting the disturbances on Dec 01, 09, 10, 11, 12, 19, 20, 27 and 28.

In spite of the magnetic activity driven by coronal holes in the second half of 2005 there has been a marked lack of auroral activity seen from the UK. In December quiet glows were suspected from Cornwall on the evenings of 12/13 and 28/29. An active aurora comprising glows, rayed arcs and pulsating patches with a maximum elevation of 60° was observed at Ullapool on Dec 27/28 from 18:00 to 21:15 hrs UT. Quiet glows or arcs were also noted that night at Culbokie, Banff and Wigtown. In North Dakota a quiet arc was seen on Dec 19/20 and a quiet arc on 28/29.

In the 30-year period 1976 to 2005 some 15,000 observations of the aurora have been collected and recorded by the Aurora Section. These have come from 17 countries but principally from observers in the United Kingdom, North America and New Zealand. In the earlier days a significant contribution was made by the British Merchant Navy and weather ships through the good offices of the Marine Department in the Meteorological Office at Bracknell.

Upon my retirement as Director of the Aurora Section I would like to thank all observers and correspondents past and present who have provided the auroral, magnetic and noctilucent cloud observations upon which the work of analysing their activities has been based.

R. J. Livesey, Director, 1982–2005

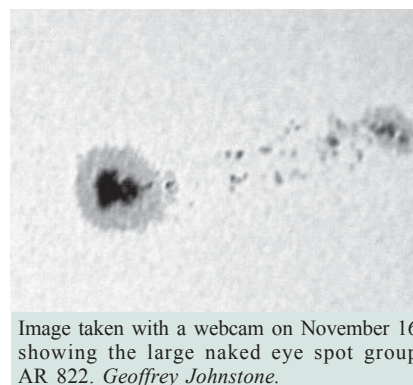
Solar Section

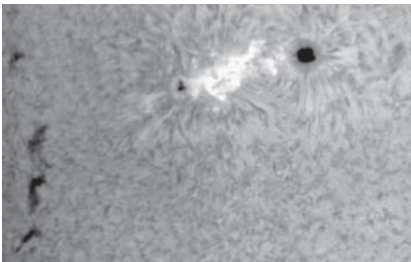
2005 November

November saw a slight upturn in solar activity compared with October, with only five days of zero sunspot activity. However all this activity, apart from an Axx spot at +12/177° on Nov 17, occurred in the southern hemisphere, the north remaining blank for 29 days.

AR 818 at –08/283°, first seen on October 5, reappeared on October 30. On Nov 1 it was accompanied by AR 819 at –09/293° as a Cso group. On Nov 5 a new group (AR 820) was seen on the disk, well past the CM at –16/280°, containing three small spots. During the next two days it became a Dao type, crossing the west limb on Nov 8.

The most prominent spot of the month (AR 822) appeared on Nov 13 near the eastern limb as a type Eao at –06/81°. The next day the whole group was on the disk, the follower spot at –07/74° with some 20 smaller spots between the leader and follower. By Nov 15 the leader appeared larger but there were fewer penumbral spots throughout the group. The total area was estimated to be some 600 millionths and was a naked eye feature. It remained so for the next 5 days. The group straddled the CM on Nov 18. On Nov 20 the number of penumbral spots had reduced to just two (the leader and follower) and the size of the group had reduced to some 480 millionths.





Flaring around AR 822, 2005 November 19 at 11:35 UT. *Eric Strach*

Hydrogen alpha

Prominences

The prominence MDF for November was 4.08 (6 observers).

The first day of the month saw the largest number of prominences recorded in November. There were two hedgerow types on the W limb and one interactive group in the E., none of them reaching any considerable height. On the following days there were similar types, though less numerous.

On Nov 12, three prominences were seen in the SE at S32, S47 and S51. The one at S47 was the highest and its structure was most intricate. No further prominences of any significance were observed.

BAA sunspot data, 2005 November–December

Day	November		December	
	g	R	g	R
1	1	23	3	54
2	1	31	3	54
3	1	12	4	71
4	0	0	3	57
5	1	13	4	69
6	1	18	4	50
7	2	24	2	27
8	1	12	3	36
9	0	0	2	30
10	0	0	3	44
11	0	0	4	46
12	0	0	3	48
13	1	16	3	42
14	1	23	3	48
15	1	27	3	43
16	1	32	3	39
17	1	34	2	32
18	1	33	3	34
19	2	36	3	49
20	3	45	3	47
21	2	37	3	41
22	2	35	2	35
23	3	37	3	42
24	3	33	4	59
25	2	24	4	52
26	1	17	5	66
27	1	15	5	59
28	2	22	5	57
29	1	17	5	57
30	3	40	4	58
31			4	49
MDFg	1.31 (45)		3.37 (44)	
Mean R	22.37 (39)		48.25 (39)	

Filaments

Two long filaments were seen on Nov 7 in the S: one was crossing the CM obliquely, the other lay parallel 3° south of the equator and W of the CM. Both were connected by faint strands. They were again seen on Nov 9 nearer to the W limb in diminished intensity.

No further significant filaments were seen except those related to spot group AR 822.

2005 December

The dominant group of the first week was the Dkc spot at $-7/230^\circ$ which was just past the central meridian on Dec 1. On this date it had an area of 850 millionths and comprised one irregularly shaped penumbral spot with the main umbra to its west and an area of photosphere to its east. As this spot neared the western limb, it began to reduce in size and lose its surrounding spots. On Dec 6, the group now consisted of a much smaller irregular penumbral spot and two smaller penumbral spots to its south. The next day just one penumbral spot was seen on the solar limb.

On Dec 2 an Hsx spot was seen close to the eastern limb. By Dec 5 a loose collection of several penumbral and other spots was seen at $-7/130^\circ$ with a total area of 180 millionths. Over the next two days, more small spots appeared which spread out in longitude to make the group of type Fac. On Dec 8 the group expended some 20° in longitude which included the central meridian. On Dec 10 there were three leading penumbral spots which gave the group a total area of 240 millionths. With the group nearing the western limb on Dec 12, the penumbral spot had split into three. When last seen on Dec 13 just a single small irregular spot remained.

An Hsx spot was seen on the eastern limb on Dec 08 at $+13/52^\circ$. As the spot rotated further onto the disk a following spot could be seen to make the group of type Eko on Dec 10 with an area of 450 millionths. On subsequent days the size of the group reduced such that on Dec 15 it was of type Dac with an area of 180 millionths. On Dec 17, 18 and 20 just an Hsx spot was seen. In fact on Dec 20 it was the only spot visible on the disk.

The largest of the groups seen after Dec 20 was first seen on Dec 22 as a Dso group at $-8/237^\circ$ comprising 2 small penumbral spots. On Dec 24 more small spots had appeared within the group although its total area remained similar at 110 millionths. When the group straddled the central meridian on Dec 27 the size of the penumbral spots increased to give a total area of 140 millionths.

North & south MDF of active areas g

	MDFNg	MDFSg
November	0.04	1.33 (31)
December	1.54	1.84 (29)

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

On Dec 30 and 31, the group became type E but the penumbral spots were only seen at either end of the group with a few spots between.

(Report by Peter Meadows.)

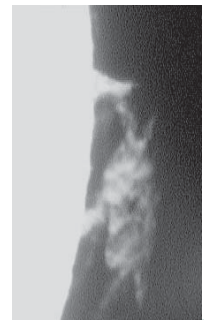
Hydrogen alpha

Prominences

The average MDF for the month was 3.7 (9 observers). This is about average for the year 2005, with some predominance of the southern hemisphere.

Most prominences were relatively small.

An array of prominences was seen on the SE limb on Dec 11. The three northerly prominences were interactive.



Large prominence on W limb, 2005 Dec 12, 10:20 UT. *Eric Strach*

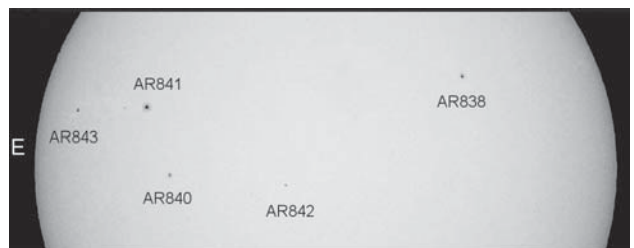
A larger prominence was observed on Dec 12 at -8° on the W limb at 10:20 UT. It consisted of three plume-like structures extending northwards like windswept feathers and probably interacting with a small jet prominence at $+3^\circ$. At 12:03 UT it had changed its appearance, resembling a giant beetle perching upon one of the 'plumes' and interacting with a prominence in the N. (See image.)

Filaments

A rather long, lightly oblique filament was seen well to the S of the adjacent spot groups AR 826, AR830 and AR828 on Dec 6. The length was estimated at 1/3 of the solar radius.

On the same day a 'lazy' S-shaped filament was connected with a small prominence on the E limb at -42° . (Report by Eric Strach.)

Mike Beales, Director



White light image taken on 2005 Dec 27 showing the five active areas. *Peter Paice.*