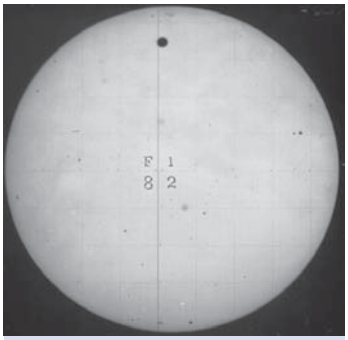
Observing the transit of Venus

A transit of the planet Venus across the brilliant face of the Sun is one of the rarest of all astronomical phenomena. Such transits occur in pairs just eight years apart, but following the second transit of a pair, the next will not occur again for more than a century. Transits of Venus can only occur in June or December, and just five such events have been observed since the invention of the telescope. One was seen in the 17th century, two in the 18th, two in the 19th, and none at all in the 20th century. Indeed, there can be no person alive today who has observed a transit of Venus, the last pair having taken place in December 1874 and 1882.



The last transit of Venus to be observed. A photograph of the 1882 December 6 transit taken on a glass-plate negative by one of the US Naval Observatory expeditions. *(Image courtesy US Naval Observatory Library.)*

The orbit of Venus is inclined at an angle of 3.4° with respect to Earth's orbit, and it intersects the ecliptic plane at two points, the ascending and descending nodes, which are in line with the Sun as seen from the Earth during early December and early June, respectively. If Venus happens to pass through inferior conjunction at these times, a transit will occur. Although Venus' orbital period is only 224.7 days, its synodic period (conjunction to conjunction) is 583.9 days. Due to its orbital inclination, most inferior conjunctions of Venus do not result in a transit because the planet passes too far above or below the ecliptic plane and does not cross the solar disk.

Transits of Venus currently recur at intervals of 8, 105.5, 8 and 121.5 years, so the circumstances of transits repeat themselves after a period of 243 years. A pair of June (descending node) transits will be followed by a pair of December (ascending node) transits after an interval of 105.5 years, and then there will be an interval of 121.5 years before the next pair of June transits. The last pair of Venus transits occurred on 1874 December 9 and 1882 December 6. Now, after an interval of 121.5 years, another transit of Venus is due, and will occur on Tuesday June 8 this year. A second will take place just 8 years later, on 2012 June 6, and then there will be no more until 2117 December 11, an interval of 105.5 years. Consequently, these two forthcoming Venus transits will be the only chances for people alive today to witness one of the rarest of all astronomical events. The phenomenon is no longer regarded as important, as it used to be in the days when it provided the best means of measuring the distance between the Earth and the Sun, but it will certainly be very interesting to watch.

The principal events taking place during a transit of Venus are known as 'contacts'. The event begins with contact I, which is the instant when the planet's disk just touches the outer edge of the Sun's limb. The entire disk of Venus is first seen in silhouette against the Sun at contact II. Contacts I and II define the phase called ingress. During a period of just over six hours, Venus' silhouetted disk gradually crosses the solar disk. At contact III, the planet reaches the opposite limb of the Sun. The transit ends at contact IV when the planet's disk again just touches the outer edge of the Sun's limb. Contacts III and IV are known as egress.

Geocentric times and position angles for the 2004 June 8 transit are as follows:

	Time (UT) *h m*	*PA*
Ingress, Contact I (exterior contact)	05 13.5	116°
Ingress, Contact II (interior contact)	05 32.8	119°
Egress, Contact III (interior contact)	11 06.5	213°
Egress, Contact IV (exterior contact)	11 25.9	216°

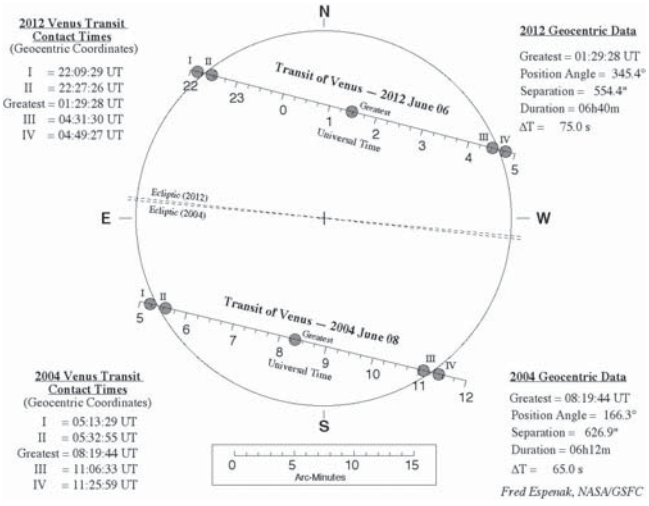
For observers in the United Kingdom, the ingress times will be about 6–7 minutes later, and egress times about 2 minutes earlier than those given above. Don't forget that British Summer Time (which is one hour ahead of these times) will be in force in the United Kingdom in June.

In the 17th century, the famous astronomer Edmond Halley realised that transits of Venus could be used to measure the average distance between Earth and the Sun – a fundamental unit in the sizing of the cosmos. In practice what had to be done was to accurately time the transit from ingress to egress, using synchronised clocks, from many locations widely separated on the Earth's surface. However, such timings proved more difficult than expected. As Venus passes on to the Sun, it seems to draw a strip of blackness after it. By the time this strip disappears the transit has already begun, so that ingress cannot be timed accurately. The same problem occurs at egress. Although transits of Venus are no longer used for such measurements, many observers will want to witness, for themselves, this so-called 'black drop' effect (which is due partly to atmospheric seeing and diffraction within the telescope), because of its historical importance.

During the forthcoming transit, Venus' apparent diameter will be almost 58 arcseconds, so the silhouetted disk of the planet will be around 1/33rd of the solar diameter and it should be possible to see it without optical magnification (but using solar filter protection) as it crosses the Sun.

As always, observers must take the very greatest care. The visual and photographic requirements for observing a transit are identical to those for solar viewing. Do not stare at the Sun without using a solar filter that is safe for direct viewing; check it for scuffs, scratches or pinholes, and if you are in any doubt about the effectiveness of the filter then don't use it. Those wishing to use solar filters suitable for direct viewing, must follow the TRANSIT OF VENUS SAFETY CODE, distributed with this issue of the *Journal*.

On no account look directly through a telescope unless it is fitted with a suitable solar filter that covers the telescope's full aperture and fits securely over the front end of the instrument. (Many small telescopes used to come supplied with a dark filter that fitted over the eyepiece. These are very dangerous, as they can crack under the magnified and focused heat of the Sun without warning. If you have one of these filters please throw it away.) Much the best method for anyone who is unsure of the suitability of their equipment is to use a small telescope



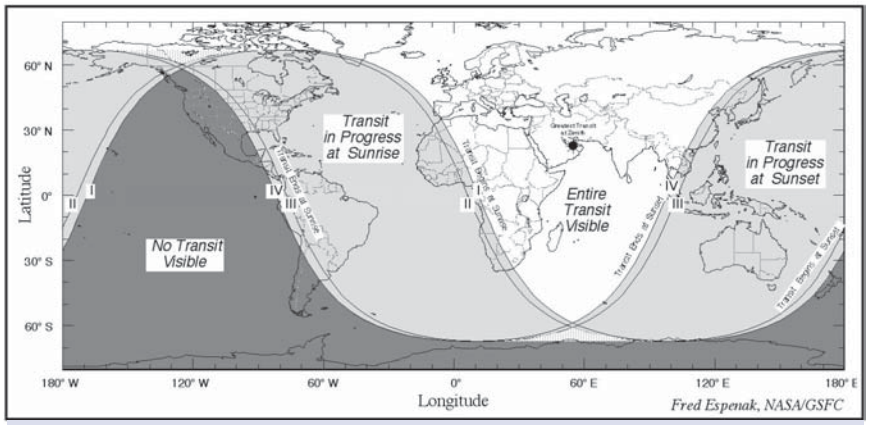
The path of Venus across the Sun's disk on 2004 June 8 and 2012 June 6. *Fred Espenak/NASA GSFC.*

(or pair of binoculars) to project a magnified image of the Sun onto a white cardboard screen. Aim the instrument at the Sun using the shadow of the telescope tube on the card: never look through the main telescope or its smaller finder 'scope to do this.

White light observations of contacts I and IV are not technically possible since Venus is only visible after contact I and before contact IV. However, if a hydrogen-alpha filter is used, the planet will be visible against either the chromosphere or any prominences before and after contacts I and IV, respectively. Contacts II and III are the two instants when the planet appears internally tangent to the Sun. However, just before contact II, the so-called 'Black Drop' effect is seen, when the transiting planet seems to be attached to the Sun's limb by a thin strip or thread of blackness. When the thread breaks and the planet is completely surrounded by sunlight, this marks the true instant of contact II. Contact III occurs in exactly the reverse order. Atmospheric seeing makes it difficult to measure contact timings with a precision better than several seconds.

Given the rarity of such events, many people will wish to see the 2004 June 8 transit of Venus. Clouds are always a potential menace on these occasions, and some enthusiasts will travel to locations where clouds are highly unlikely at this time of the year. The ingress only is visible from Australasia and the extreme eastern part of Asia. The entire transit (all four contacts) is visible throughout Europe except the extreme south-western Iberian Peninsula; Africa except western parts; the Middle East; Asia except extreme eastern parts; most of the Indian Ocean and the northern part of Greenland – so there are plenty of places to choose from. From the UK, the entire transit will be visible – weather permitting, of course. Only the egress can be seen from the remainder of the Americas, except the western part of North America and southern South America.

Let us hope for clear skies on the morning of 2004 June 8, because the next Venus transit – on 2012 June 6 – will be visible in its entirety only from the central and western Pacific Ocean, Japan, the eastern parts of Russia and China, and north-eastern Australia. From the UK, the transit will be in progress at sunrise and only the final phases of the event may be seen. Then it will be a long wait once again – until 2117 December 11.



World visibility of the transit of Venus on 2004 June 8. *Fred Espenak/NASA GSFC.*

John W. Mason

For more information on the transit of Venus, and links to details of local events throughout the country, visit this website:

http://www.transitofvenus2004.org.uk/

Deep Sky Section

A new Director and a new nebula

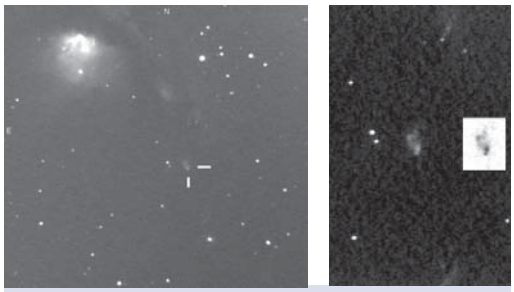
At the 2004 Deep Sky Section meeting held at the Humfrey Rooms, Northampton on March 6, Nick Hewitt stepped down as Director and handed over the reins to Stewart Moore. Nick had been Director for 11 years, during which time he also served as President of the Association and later Meetings Secretary – a position he still holds. Bearing in mind that he also has a busy day-job as a GP in Northampton, he not surprisingly felt it was time to pass the Deep Sky Section on to someone else. The photograph shows Bob Marriott presenting a bottle of wine to Nick in appreciation of all he has done for the Section, while the new Director looks on, wondering if a cheap bottle of wine is adequate recompense for 11 years hard labour.

Dr Nick Hewitt, retiring Director of the Deep Sky Section, receives a bottle of wine from Bob Marriott at the Section meeting in Northampton on 2004 March 6. *(Photo: Callum Potter)*

During Nick's time as Director the deep sky scene, as with many areas of observational astronomy, underwent major changes. Although equipment and techniques have never stood still, the advent of the CCD, goto telescopes and the Internet has led to a sea change in the way in which much deep sky observing is done. Images now being obtained by BAA members using 'off the shelf' equipment – albeit not cheap – rival, and in some cases surpass, those obtained professionally only a few years ago. Searches for supernovae can be automated so that telescopes swing to dozens of galaxies per night and suspect stars or possible asteroids are investigated via the Internet.

Does this mean that the observer with a basic non-goto telescope who enjoys looking through an eyepiece and sketching, or someone who just owns a pair of binoculars, should give up? I hope not, because I largely fit that category myself. The Section welcomes anyone, whatever their age or experience, who has an interest in deep sky observing whether it be CCD, photography, sketching or even just reading about the deep sky.

You don't have to have an expensive telescope to enjoy the deep sky or to contribute to the Section – just enthusiasm. In fact



McNeil's Nebula. *Left:* 2004 Feb.18, 33cm f3 Newtonian + SXL8 CCD, 3×60s exp. *Denis Buczinski. Right:* 2004 Feb.22, 0.3m SCT + MX9 CCD. 10 min exp. *Maurice Gavin.*

to anyone starting out in astronomy, I would recommend learning your way around the sky with a pair of binoculars before you purchase a telescope. I also think that the new observer who uses a goto telescope to find objects without having learned to star-hop to targets first is missing out on a lot of fun and, perhaps, some frustration at times. But I do think you become a better observer if you do a basic apprenticeship before you start pressing buttons to find objects.

As a committee member of The Webb Society I hope to encourage closer links between the Deep Sky Section and the Webb. The 200th anniversary of T. W. Webb's birth takes place in December 2006 and would be an ideal opportunity for a joint meeting. I am also keen to get the *Newsletter* going again and perhaps a higher quality annual publication. Web sites and e-mail are an ideal way to circulate information quickly, but they tend to have a lack of permanence. Also, it is not easy to browse through a site while lying in bed or sitting on a train. Of course, any publication will require members to submit articles or observations; I don't want it to be a one-way affair.

With the exception of supernovae, novae and an occasional small change in the appearance of some variable nebulae, the deep sky has a reputation for remaining unchanging. It must have been a surprise therefore when US observer Jay McNeil processed an image of the M78 area in Orion taken with a 3-inch refractor and CCD on 2004 Jan 23 and found a new nebula staring back at him. The object, which was barely visible on POSS plates obtained with the 48-inch Schmidt on Palomar, appears to be associated with Herbig–Haro object HH22 and is an FU Orionis type outburst of the deeply imbedded IRAS 05436-0007. SIMBAD gives the position for IRAS 05436-0007 as RA 05 46 14.2 and Dec –00 06 01 (J2000.0).

An e-mail alert for observations was issued by the BAA and images were received from Denis Buczynski, Maurice Gavin, Cliff Meredith, Gordon Rogers, Paul Whitmarsh and Tommi Worton. Subsequently it was found that this new variable nebula had been bright in 1966. Anyone with a copy of the book *The Messier Album* by Mallas & Kreimer (Sky Publishing, 1978) can see this nebula as a faint but distinct patch of nebulosity in the image of M78 on page 150. This image was obtained by Evered Kreimer in 1966 using a 12.5-inch (317.5mm) Newtonian reflector and a 15 minute exposure on Tri-X film.

Two recent images of the nebula by Denis Buczynski and Maurice Gavin are reproduced here. There is a lesson to be learnt from this episode. The deep sky does change – very occasionally – so do check all your images and don't assume that something new is an artefact of your imaging system. Of course, 99% of the time it probably will be, so do carry out all basic checks before you alert anyone. All eyes and CCDs will now be on Orion when it reappears in the autumn skies to see if the nebula has faded or brightened further.

Please do contact me with any suggestions about the Section or observations you want to submit, or if you'd like to join the Section. My address is inside the back cover of the *Journal*. Doing the circuit of annual meetings I'm very conscious of seeing the same faces all the time – and they are not getting any younger. If Astrofest is anything to go by there must be tons of telescopes being sold every year. I hope some of those are going to new astronomers in the BAA who are interested in joining and contributing to the Deep Sky Section.

Stewart Moore, *Director*

From the President

The Association is very fortunate to have an enthusiastic and efficient Meetings Secretary in Dr Nick Hewitt. Nick has worked relentlessly to ensure that we have speakers at our meetings who are entertaining, up to date in their chosen subjects and of the highest possibly quality. This gives us all the opportunity to enjoy talks of the highest calibre from people who understand their subjects well. Nick has been Director of the Deep Sky Section for eleven years and has recently relinquished this post to allow him to concentrate on the ongoing task of Meetings Secretary. I would like to formally record my personal thanks and those of the Association, especially the Deep Sky enthusiasts, for the excellent work done by him over the past eleven years. The Section has had a strong and enthusiastic leader who has made the subject interesting and enjoyable. Stewart Moore has taken over the reins of the Section from Nick and was formally introduced at its annual meeting in March at Northampton. Stewart is a very experienced visual observer and will be able to bring additional focus on the importance and pleasures of visual observing in addition to photographic and CCD imaging. Congratulations and best wishes to Stewart.

Richard Flux organised a very successful Winchester Weekend again this year. This was the 38th 'Winchester' and it was supported by well over a hundred resident attendees even before the day visitors are taken into consideration. A new feature of recent Winchester Weekends has been the challenge from Richard for Sections to hold meetings on Saturday afternoon as part of the activities. This year it was the turn of our Instruments & Imaging Section.

The Weekend was particularly enjoyable for me this year, as it was the first time since taking on the Presidency that I have been able to attend a meeting and completely relax in the knowledge that Richard would be doing the hard work of introducing the speakers and making sure that everything ran smoothly. It prompted me to think just what is most enjoyable about astronomy meetings and BAA meetings in particular. The agenda and choice of speakers are certainly areas which are no doubt studied carefully. This can be because the subject material is one that is relevant to one of your areas of interest – or it can sometimes be the exact opposite; the subject can be something that you know relatively little about and want to know more. But there are other attractions to astronomy meetings in general, be they local club meetings or nationally organised ones. Meeting fellow astronomers must be very high on the list. There is such a vast

range of people and personalities in astronomy, and astronomers are usually very friendly and approachable people. I knew many people in astronomy before I was elected BAA President. That number has increased tremendously since then thanks to people approaching me or to my becoming involved in conversations that would otherwise not have happened. There is always someone with expertise in a subject who is more than willing to help and share it with you should you need advice or assistance.

Astronomy is a vast discipline and no one can know all of its aspects in detail. Meetings can therefore become a learning experience, not just on the subject that the speaker happens to be discussing that day but on any aspect of this great science that you might be currently investigating. Just being in an environment surrounded by astronomers can itself be very enjoyable – and how often have we said that this should be an enjoyable subject?

Astronomers do have views of course, as so they should. Some of these might well be very polarised and focused on their own area of interest and expertise. What we must always remember however is the vastness of this science. There are many aspects of it which interest different astronomers, and in different ways. We need to be tolerant and respect each others' reasons for being involved in the subject. The range of interests and activities might be anything from highly organised and disciplined observing programmes through casual fun observing. It needn't even involve observing. It can be enjoyed by such interests as armchair astronomy, the building and refurbishment of instruments, the history of astronomy or the satisfaction of teaching or running a local astronomy group.

It is not practical to be active in every area of astronomy. We each have an area or areas which grab our interest and keep us fascinated by the subject. Thankfully we are not all the same and we do not all share the same interests. It is important to respect that people are into astronomy for different reasons. We should not be critical because someone's interest doesn't align with our own, or because he or she doesn't apply themselves to the subject in the same way as we do. Select that part that you enjoy doing and do it because it is enjoyable. Astronomy is fun and should always be so.

Thinking about all of this variation in people and in their interests makes me appreciate even more the efforts of those hard working meeting organisers in the hundreds of societies around the country. They can satisfy some of the people some of the time, but…

Tom Boles

Aurora Section

In 2004 February the general level of geomagnetic disturbance was less than in previous months. There was moderate disturbance from Feb 01 to 06 with a period of calm on Feb 08. Conditions became stormy on Feb 11 and 12 and this continued to Feb 15. From 16 to 25 disturbance was minor with calm on Feb 26. From 27 to 29 things became progressively more disturbed, ending the month as stormy.

Reports of auroral activity were minimal. Alastair Murray at Staxigoe by Wick noted an active rayed arc and rays to an elevation of 10° on February 18/19. Dr Alastair Simmons, observing from Waterhead in the Campsie Hills, detected glows, arcs and active rays to an elevation of 15° on 13/14. Alastair detected quiet aurorae comprising low elevation glows or arcs on Feb 17/18, 18/19, 19/20, 21/22, 22/23, 27/28, 28/29 and 29/March 01.

Jay Brausch ast Glen Ullin, North Dakota, recorded active aurorae comprising glows, arcs and rays on February 11/12, 12/13, 26/27 and 27/28, the first and last being the most active.

On Feb 06/07 Steve Martin, flying from the Taymyr Peninsula in Siberia to the Kara Sea under the auroral oval, observed multiple arcs to an elevation of 65°. The geomagnetic disturbance had increased during Feb 06 and was beginning to decline at the time of the aurora.

On Feb 25/26 Howard Miles at Pityme in Cornwall reported observing white and pink glows to his north. Geomagnetic conditions were very quiet and it is unlikely that the apparition was of auroral origin. However, Howard has reported aurorae from Pityme when magnetic conditions were active and aurorae substantiated by other observers, so we can say that from time to time aurorae other than those of the great storms can be seen from that latitude.

The quiet aurorae comprising glows and arcs were observed by Dr Simmons when geomagnetic activity was quiet. These apparitions of the diffuse continuous aurora, normally circling the magnetic pole, had expanded southwards as a result of an increase in the flux of central plasma sheet electrons entering the diffuse aurora from the magnetotail.

2004 March began with disturbed magnetic conditions from March 01 to 04. 06 to 08 was quiet but there was a short burst of activity on the night of 07/08. Conditions became stormy from 09 to 12 and thereafter the magnetic field reverted to disturbed conditions.

An active aurora was seen on March 09/10 from North Scotland by four observers, comprising glows, arcs, rayed bands, ray bundles and active moving forms. At Wick rays rose to an elevation of 60° and included the colours of green, red, violet and white. David Friend, a BA pilot, observed active aurorae at low elevations over the western North Atlantic on March 16/17, 20/21 and 21/22. Other individual Scottish sightings of aurorae were reported on 10/11, 13/14 and 14/15. Observers reported much cloud affecting sky visibility.

In North Dakota Jay Brausch recorded quiet glows and arcs on March 17/18, 20/21, 28/29 and 29/30. More active aurorae comprising active forms including ray structures were observed on 09/10, 11/12 and 21/22. The aurora of March 09/10 reached an elevation of 23° but the remainder were never higher than 8°.

R. J. Livesey, *Director*

Campaign for Dark Skies

ODPM sees the light!

The Office of the Deputy Prime Minister has reacted to the Parliamentary Science and Technology Select Committee's recommendations on light pollution (see the 2003 December *Journal*) with a surprisingly far-reaching statement. A spokesperson for the ODPM stated in March 2004 that the Government intends to provide new planning guidance, in the form of an annexe to Planning Policy Statement 23 (Planning and Pollution Control), specifically on light pollution: 'This will send a clear signal to local planning authorities that they should take the issue of light pollution as seriously as they do other types of pollution when considering planning applications and drawing up development plan documents'.

This initiative should have a very positive effect upon lighting practices nationally, though the fact remains that the environmentally damaging 500 watt domestic floodlight is not considered to be 'development', and will not come under this control. While welcoming the ODPM's forward step, the BAA Campaign for Dark Skies will continue to press for the ban-

An eye-catching lighting design reflects the history of Lyme Regis.

Good lighting awards in Dorset

ning of such poorly designed and over-bright domestic lamps.

Meanwhile on 2004 April 7, Joy Griffiths, one of the Campaign for Dark Skies' 123 local officers, presented two CfDS Good Lighting Awards, to Dorset County Council and to the people of Lyme Regis. The innovative 'ammonite design' full-cutoff streetlights in Marine Parade, Lyme Regis were recognised by the CfDS as exemplary environmentally-friendly streetlighting. They efficiently illuminate Marine Parade, while reducing glare and preventing wasted, stray light from shining into the sky and out to sea. The streetlights were designed by Dorset County Council after extensive consultation with local people.

It is unusual that two Good Lighting Awards are given to one site. One Award was accepted by Councillor Hilary Cox to acknowledge the part played by the County Council in helping the public with the design and provision of a sky-friendly lamp. The other Award, for the townspeople of Lyme Regis, was received by Mayor Barbara Austin. Judy Simmonds, former proprietor of the Bay Hotel, who was particularly involved in the public consultation, also represented the townspeople.

Bob Mizon, *Coordinator, CfDS [http://www.dark-skies.org]*

Variable Star Section

Janet Akyüz Mattei (1943–2004)

It is with great sadness that we report that Dr Janet A. Mattei, the Director of the American Association of Variable Star Observers (AAVSO), died on 2004 March 22 after a seven-month battle with acute myelogenous leukaemia.

Dr Mattei was Director of the AAVSO from 1973 until her death. The AAVSO is a non-profit, scientific and educational organisation founded in 1911, whose main purpose is the collection and dissemination of observations and analyses of variable stars, and coordination of professional and amateur involvement towards this effort.

Janet A. Mattei was an internationally recognised astronomer specialising in the field of variable stars, particularly eruptive (cataclysmic) and pulsating (long period) variables. As the Director of the AAVSO, she was responsible for the quality control of the observations submitted by observers – mostly amateur astronomers – worldwide. She coordinated over 600 observing programmes between amateur astronomers and professionals using large, ground-based telescopes in well-known observatories and also satellite telescopes, and provided observations from the AAVSO international database for over 600 projects for multi-wavelength data correlation.

Dr Mattei was keenly interested in education and provided guidance in setting up over

Photo: Mike Mattei

200 observing programmes in schools and for student science projects. She played a key role in amateur astronomers being given observing time on NASA's Hubble Space Telescope (HST), and served on the working group to choose the amateurs who would observe with the HST from 1986 to 1995. She published over 180 papers on variable stars and related topics, mostly in refereed journals, abstracted in *Astronomy and Astrophysics Abstracts*.

Janet Mattei was born in Bodrum, on Turkey's picturesque southwestern coast. After graduating from high school she travelled to the United States to study at Brandeis University, from which she graduated in 1965. In 1967 she returned to her native country to teach physics and mathematics, but gave up teaching and began graduate studies in astronomy. At the end of 1969 she became a member of the AAVSO and three years later, while a graduate student at the University of Virginia, married Mike Mattei. She joined the AAVSO staff as assistant to the Director, taking over that position herself the following year when the Director retired. She completed her doctorate degree at Ege University in 1982.

Her directorship took place during a time of tremendous challenges and opportunities:

Cassini is almost home

Saturn and its rings completely fill the field of view of *Cassini*'s narrow angle camera in this natural colour image taken on 2004 March 27. This is the last single image of Saturn and its rings achievable with the narrow angle camera on approach to the planet; from now until orbit insertion on 2004 July 1, Saturn and its rings will be larger than the field of view of the camera. The image is a composite of three exposures, in red, green and blue, taken when the spacecraft was 47.7 million km (29.7 million miles) from the planet. *NASA/JPL/SScI*

the advent of satellite astronomy, the evolution of computer technology that opened up new vistas for communication and data management, and instrumentation advances that gave amateur astronomers access to observing equipment only dreamed of before. Janet rose to these challenges and opportunities, staying flexible and open to new ideas and possibilities while remaining unyielding on the integrity, quality, and reliability of the AAVSO, its database, and its services and programmes. Her many honours included the Jackson–Gwilt medal of the Royal Astronomical Society (1995), and minor planet 11695 Mattei was named for her in 2001.

She had an outgoing and enthusiastic personality and worked tirelessly on behalf of the AAVSO and its members and observers, those who want to learn about astronomy and variable stars, and to further the field of variable star astronomy. She strove continually to teach the global astronomical and educational communities about the vital contributions that amateur astronomers make to variable star astronomy. In her talks she demonstrated how astronomers, educators, and students could enhance their research through utilising the talents of variable star observers worldwide. She travelled widely in pursuit of her goals and visited the UK several times, meeting several BAA Presidents and many VSS officers. She had a remarkable memory, never seemed to forget a face, and always had a warm, genuine welcome for everyone she met.

The AAVSO enjoys fruitful working relationships with many other variable star organisations around the world, and looks to the future for exciting new possibilities – all as a direct result of Janet's leadership. I have been touched by the many emails on the AAVSO mailing list from around the world, including Russia and Japan, from both amateur and professional astronomers who perhaps only met her once but who have been moved to express their sadness. She will be sorely missed by all variable star enthusiasts.

Much of the personal information in this short appreciation was taken from the AAVSO web page set up in her memory: **http://www.aavso.org/aavso/membership/mattei.shtml**

Dr Janet Mattei with BAA variable star observer John Toone, at the AAVSO meeting in Hawaii in July 2002. *(Hazel McGee)*

Roger Pickard, *Director*

Solar Section

2004 January

The sunspot MDF fell again in January to a level seen previously in early 1998. The southern hemisphere was a little more active than the north. Towards the end of the month the Sun was seen as spotless on three days.

Early January saw an Eko type sunspot group at –10°/73°. The leader spot appeared bean-shaped and on January 4 was seen to contain six separate umbrae. On the 6th it still showed many umbrae and extensive penumbrae. It was seen with the naked eye from Jan 6 to 9 (it may have been visible on other days either side of these but poor weather in the UK prevented its observation). After Jan 9 it was still complex but less extensive. It was near the W limb on Jan 13.

The beginning of the month also saw the third return of the near equatorial group. This time it appeared as a Cai type group at +3°/9°. It had appeared before in the middle of October, November and December. It crossed the disk and did not seem to undergo much change.

On Jan 13 a pair of sunspots appeared over the SE limb, the leader spot at –12°/292°. It consisted of two penumbral spots just 10° apart with some intervening pores between them. It grew slightly in area from Jan 13 to 14 (from 280 msh to 350 msh) and was flare active on Jan 17. It was on the CM by Jan 19 and was on the W limb by Jan 24, by then a single Hsx spot.

By Jan 24 only pores were visible near the W limb but they were sufficiently far apart to count as four Active Areas. When these pores passed over the limb the Sun became spotless on January 26, 27 and 28. This period ended on Jan 29 when two small AAs appeared on the southern hemisphere. These were a pair of pores just west of the CM at –17°/162° (some observers missed these as they were quite faint) and a single spot near the E limb at –16°/77°.

Polar faculae were seen on Jan 2 (N & S); 3 (N & S); 4 (N & S); 15 (S); 16 (S); 17 (S); 24 (N & S); 25 (N & S); 28 (N & S). Observers were: C. Bowron, F. Dubois and G. North.

Hydrogen alpha

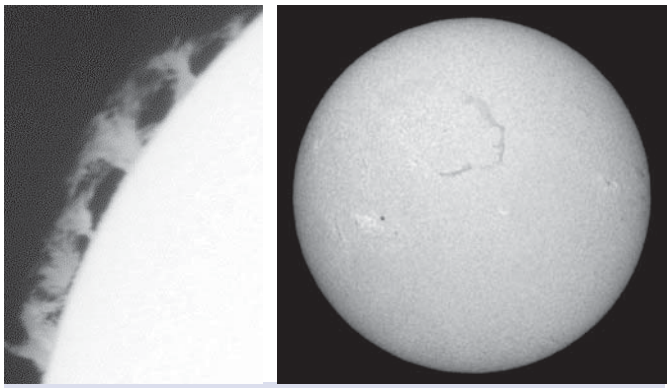
Prominence MDF for January 5.09 (8 observers). A sharp fall in the prominence MDF bringing it to a level seen previously in early 1998.

A very extensive hedgerow prominence was seen on Jan 9 on the E limb extending from latitude –01° to +35° and along longitude 320°. It was estimated to be two-thirds of a solar radius in length. By Jan 11 only the most northerly and southerly parts were seen as prominences, the rest was seen as a filament on the disk.

A curiously shaped prominence was seen on Jan 16 on the E limb at lat. +20°. It consisted of three interlacing jets which frequently changed their direction. To the south lay a more stable block-like prominence with part lying above but detached from the limb. Both were seen again on January 17.

An impressive anvil-like prominence appeared on the E limb extending from lat. +49° to +56° on Jan 27. By the next day it had become two dense prominences from lat. +46° to +62° with a high latitude filament arising from its most northerly part.

The very extensive hedgerow prominence mentioned earlier was observed crossing the disk as a large reversed 'C' shaped filament. Quite a number of members saw this filament and provided images and drawings of it. It passed over the CM on Jan 16 and was followed until Jan



Left: 2004 January 9; large hedgerow prominence on the E limb. *E. Strach. Right:* On January 16 the prominence at left became a reversed C-shaped filament on the disk. *Ray Emery.*

18 when poor weather interfered with further observation. However, a small prominence was seen at the W limb at lat. +4° on Jan 24 and it is thought that this was a remnant of this filament.

On Jan 24 a dense undulating filament was seen just west of the CM at lat. +15°. There were also five filaments observed in the SE quadrant and these were still present on Jan 27, but by then they were on the SW quadrant.

2004 February

Following the decrease in sunspot MDF in the previous two months, February saw a small recovery. The southern hemisphere was again the more active (a trend that has persisted since August 2003).

The beginning of February saw a bipolar group near the NE limb at +13°/45°. It was a Dao type group and embedded in faculae. There were other sunspots visible but they were all south of the equator and consisted of small spots and pores. On Feb 5 in the group at +13°/45° a number of observers considered the leader and follower spots to be 10° apart and counted it as two Active Areas. It reached the CM on Feb 6 and showed many small spots in between the leader and follower spots. It was then counted as a single AA once again. By Feb 8 the group appeared to fade and was not seen by Feb 11.

A second bipolar group was also visible at –6°/25°, the follower spot of this group being larger than the leader. It was across the CM by Feb 6 and continued to develop further. Unusually, the follower spot was nearer to the equator than the leader spot. As the group was carried westwards it started to fade from Feb 11 onwards.

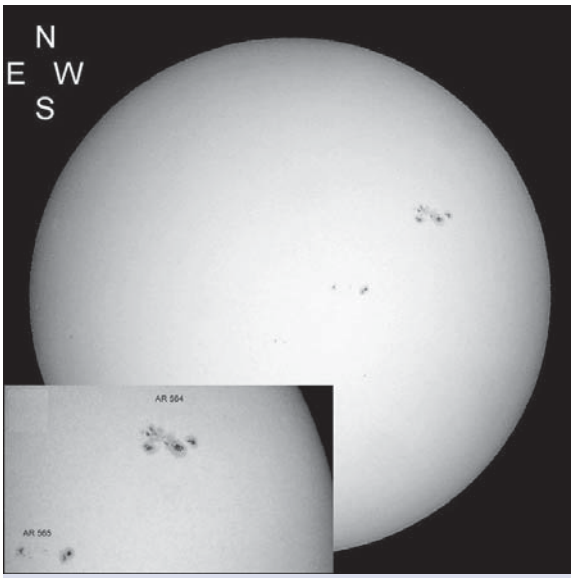
A near equatorial spot was seen from Feb 16 until about Feb 20 at +1°/216°. Another spot was seen at +1°/268° but it appeared very faint and was not seen by most observers.

Towards the end of February a rapidly developing sunspot group appeared near the NE limb at +12°/162°. On Feb 21 it was 70 msh in area but two days later it had grown to 290 msh. As it crossed the CM on Feb 24/25 its area was 400 msh and it became visible to the naked eye from 23 to 28. On Feb 25 the leader consisted of two spots and the follower a single, larger, spot. The following day the group had changed appearance as penumbra now connected the leader to the follower with two smaller spots. Many umbrae were seen within the main penumbra. The total area was 620 msh and the group a type Ekc. On Feb 29 the group had decayed into several spots and was now close to the W limb.

Polar faculae were seen on Feb 7 (N & S); 15 (possible S); 18 (N & S); 19 (S); 20 (S); 22 (N & S); 25 (N & S); 28 (S); 29 (N & S). Observers were: C. Bowron, F. Dubois and G. North; E. Strach.

Hydrogen alpha

Prominence MDF for February 5.06 (8 observers). The prominence MDF showed no change from last month. Much of the activity was seen in the last week of February.



The Sun on 2004 February 27, with two active areas AR 564 and AR 565. *Peter Paice*.

The first three weeks saw no major prominences apart from a curious twisting jet seen on Feb 8 at latitude +4° which gave the impression of an 'ice skater'. Filaments were visible crossing the W limb on Feb 19 and 20. Prominences were then seen on the limb from lat. +6° to +22°. There were other more southerly filaments visible and they gave rise to a hedgerow prominence with multiple arches on Feb 21 and 22 at lat. +3° to +16°. An array of prominences was visible on the W limb on Feb 25. Their positions were seen to change daily. Eric Strach also saw a prominence eruption in the shape of two jets at lat. –60° and –63° on Feb 29. The whole event lasted no more than 15–20 minutes from 11:55 UT until 12:10 UT.

Minor filaments were visible prior to Feb 16. On that day, three filaments were seen on the western hemisphere and three on the eastern hemisphere (the former later gave rise to the prominences on the W limb mentioned above). Those on the eastern hemisphere were followed as they crossed the disk. Of note was one at lat +32° (with a small prominence at +38°) which veered in a SW direction. This configuration persisted throughout its passage across the disk. It was also very conspicuous with many thorn-like features. It was seen to break up after crossing the CM on Feb 20 and was seen part prominence part filament on the W limb on Feb 25.

The southern hemisphere showed a pair of almost parallel filaments aligned in an E–W direction. The first at around lat. –22° was nearly two-thirds a solar radius long while the second was much shorter in length at lat. –30°. Both reached the W limb on Feb 25 and parts of them were then seen as prominences.

Geoff Elston, *Director*

BAA sunspot data, 2004 January–February

	January		*February*	
Day	*g*	*R*	*g*	*R*
1	2	37	3	45
2	3	57	4	62
3	3	62	5	85
4	3	58	4	67
5	2	51	5	77
6	2	50	3	52
7	3	60	2	54
8	3	60	3	60
9	2	54	3	62
10	2	50	4	61
11	2	37	4	52
12	3	42	4	66
13	3	44	4	51
14	2	33	4	49
15	3	45	5	59
16	4	60	4	49
17	4	62	2	26
18	3	53	2	28
19	4	74	2	23
20	4	85	3	35
21	4	86	3	38
22	4	75	3	46
23	4	61	4	64
24	4	44	3	56
25	2	21	3	63
26	0	0	3	62
27	0	0	4	76
28	0	0	4	72
29	2	27	4	61
30	3	34		
31	4	50		
MDFg	2.69 (48)		3.43 (52)	
Mean R	27.52 (45)		55.17 (49)	

North & south MDF of active areas g

	MDFNg	*MDFSg*
January	1.01	1.75 (32)
February	1.50	2.01 (32)

g = active areas (AAs)
MDF = mean daily frequency
R = relative sunspot number
The number of observers is given in brackets.