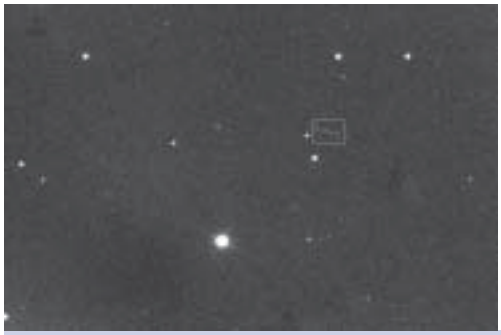
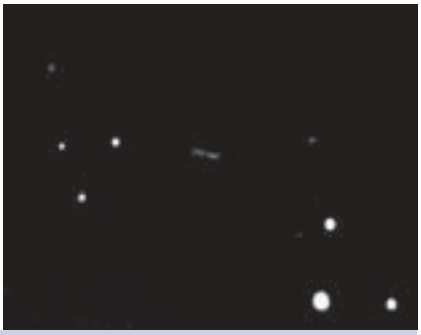
Asteroids & Remote Planets Section

Minor planet Hermes recovered





Images of Hermes by BAA members. *Left:* As soon as Brian Skiff's discovery appeared on the NEO Confirmation Page **[http://cfa-www.harvard.edu/iau/NEO/ToConfirm.html]** Nick James obtained a sequence of images of the object at about magnitude 14, and submitted astrometry and photometry to the Minor Planet Center. The image is a composite of four exposures showing the motion of Hermes over a period of 20 minutes. At the time of the exposures it was moving at around 0.8°/day in Cetus. 2003 October 15, 4×30sec between 19:54 and 20:15 UT, 300mm Newtonian with KAF-0401E CCD. *Nick James.*

Right: 5×30sec images taken with a MX7-16 CCD on 2003 October 19 between 01:30 and 01:42 UT, stacked and centred on stars. *Cliff Meredith.*

For many years the only named minor planet without a number was Hermes. This body was found at about ninth magnitude on a photograph taken by Karl Reinmuth observing from Heidelberg on 1937 October 28, and carried the discovery designation 1937 UB. The asteroid was making a very close pass to the Earth and thus moving rapidly across the sky (about 5 degrees per hour); at its closest it passed only 0.005AU from us, which is about twice the distance of the Moon. It went from opposition to conjunction in only two days and was lost almost immediately afterwards, having only been observed for a period of five days. Due to the shortness of the observed arc subsequent recovery was considered unlikely.

During the 1990s reanalysis at the Minor Planet Center indicated that close approaches would occur in the early 2000s and that recovery could be possible. Searches were carried out and success was achieved on 2003 October 15 when Hermes was imaged by Brian Skiff of Lowell Observatory under the LONEOS project (Lowell Observatory Near Earth Object Search). Checking the image files it was found on several going back to August. An alert was put out requesting further images so the orbit could be refined as, with there being 31 revolutions between the two, direct linking to 1937 was not possible as it has a chaotic orbit. Subsequent imaging allowed the orbit to be determined using sophisticated software at JPL.

Usually Hermes crosses the Earth's orbit well away from our planet. The orbit shows that in 1942, 1954, 1974 and 1986 it came close to us. Images were also found taken during the 2001 pass and a single one in 2002. This time it made its closest approach on 2003 November 4 and was imaged by several amateurs, including Nick James and Cliff Meredith.

When the rediscovery was announced it was estimated the asteroid's diameter was 0.9km. Radar observations from Arecibo showed it is in reality a contact binary body orbiting around the common centre of mass in about 21 hours. As the orbit is now precisely known it has been given a number, 69230. There is now no longer a named, un-numbered asteroid. It should never be lost again.

Welcome back, Hermes!

Andrew J. Hollis, *Director*

From the President

2003 ended with some of the worst weather of the year. During November I had barely three clear nights observing. December was a little better. This was emphasised even more as this long spell of clouds followed one of the better years that I can remember as far as weather is concerned. Certainly better for me as I have been able to take full advantage of the continual run of clear nights that occurred during late summer. So good was the weather during September, with twenty-six clear nights out of thirty, that I was in the lucky position of wishing for a few cloudy nights. I observed on twenty-five of those twenty-six nights because, as experience of our island climate has taught me, the long run of clear skies never continues forever and our maritime climate will prevail. It is during these 'weather' breaks that we can catch up on some of the tasks that we have left neglected. Perhaps finish that book that we began to read at the start of summer, or clean, oil and dust the telescope ready for the hopefully better weather ahead.

This is the time when the social side of astronomy plays such an important role. Often when I speak to fellow astronomers about what attracts them to astronomy meetings and talks, they will readily admit that although the talks and presentations give them new information and guidance on this fascinating science, it is often the casual conversation in the corridors or over tea that they secretly look forward to. We are privileged in the BAA by having people at all levels and experience amongst our membership. If there is an area where advice is needed, there is always someone with the experience and knowledge that can help. That help is always given generously and openly no matter what experience and knowledge the enquirer has, or may not have. This can be a valuable tool in getting started either in astronomy in general or in a particular area.

I can remember the exact moment when astronomy became the passion that I immediately knew would follow me through life. It was a normal school day when a friend brought a two-inch (5cm) ex-government naval telescope to school. In Scotland, darkness comes early in the afternoon in midwinter. On that day we viewed the Pleiades, Jupiter and Saturn (in that order) in this small instrument and I was truly hooked. It is interaction with fellow astronomers that continues as experience increases and makes the whole process much easier and more enjoyable. These people are there and eager to help. Every member of the Association is entitled and encouraged to join a Section – at

least one. This helps by bringing your area of interest a bit closer and helps to identify the people to whom you should be speaking for that needed advice. If you are fortunate enough to be able to attend a meeting of your chosen Section then do so, whatever your level of expertise. Participation can be anywhere from sitting quietly and absorbing the new information to presenting and sharing a particular area of interest once your experience grows. It will not only be exciting and a learning opportunity but the interactions can be fun as well.

A quick look inside the back of the *Journal* will show the Sections and the phone numbers and email addresses of the people to contact. Most of the Sections are directly connected with chosen areas or subjects for observing, but not all. Feel free, start as slowly as you like if you are a beginner. A Section meeting can be a cornucopia of information and an invaluable resource if you let it. And it is not only a resource to members starting out. How about all those observations that are sitting on the bottom shelf of an observer's bookcase? The relevant Section will welcome them. They can be pooled with other observers' work, be analysed and archived.

I have heard many observers say (and I have been one of them) that their observations are not good enough to be reported, they will wait until they get a little bit better at observing and recording. If you do that, much valuable work will be lost. All observations have value, even if the observing or drawing skills are not perfect. The fact that a record is kept has value in itself. A new branch of astronomy has blossomed in recent years which researches historic records as far back as those made in ancient China and correlates these to modern observations. Major discoveries have been made from this. I cannot guarantee that your or my observations will ever reach such pinnacles of importance but observations can be like good wine and be more sought after the more mature they become.

Tom Boles

Comet Section

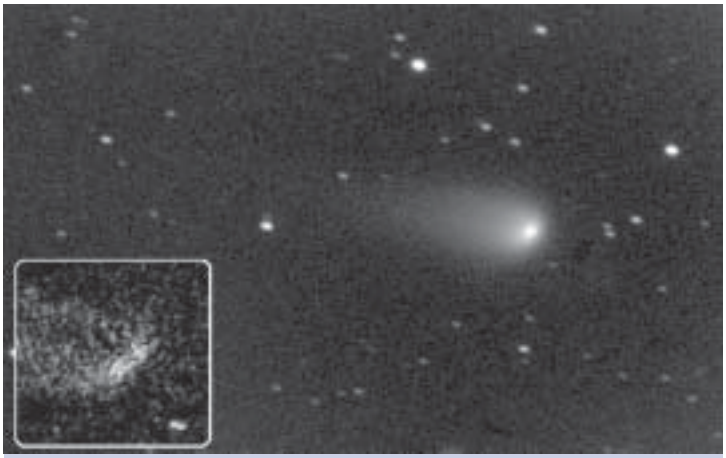
Waiting for NEAT and LINEAR

Over the coming year we may see several naked eye comets, all bearing rather dull names. Whilst it is easy to describe their tracks across the sky, predicting how bright they will become is something of a lottery. This unpredictability does make observing comets worthwhile, as you never quite know what you will see.

Increasingly CCD imagers are obtaining objective views of these objects, but observations of visual magnitude and artistic drawings are still important. I am concerned about the drop in the number of these types of observation that are being submitted. For long-term comparative studies it is very important to continue making observations in the traditional way and this particularly applies to magnitude estimates of comets. Making drawings of astronomical objects helps train the eye and allows the observer to see and appreciate more detail, which in some of the coming comets may be significant.

2P/Encke has come and gone and whilst not spectacular, did reach 6th magnitude in what was one of the best apparitions for many years. Sadly a blanket of cloud descended on the UK in December preventing observations in the final week of visibility. This comet has now been observed by the Section at 13 returns since 1951 and shows no sign of fading away. Visual magnitude observations actually suggest that this return had one of the brightest absolute magnitudes in our record, whereas if CCD observations were used, it would be one of the faintest. This dramatic difference between CCD and visual methods demonstrates the importance of continued visual observation.

2002 T7 (LINEAR) is brightening nicely and appeared as a well-condensed object during the autumn and early winter of 2003. A best fit to the currently available observations suggests a peak of 1st magnitude in mid-May, however by then it is a southern hemisphere object and we will lose it at around mag 7 in early March. Southern observers should see a spectacular object, with a tail perhaps 20° long. Some locations may even be able to see two naked eye comets at the same time, as **2001 Q4 (NEAT)** should also be on view.



Comet 2002 T7 (LINEAR) imaged at 2.4AU from the Sun on 2003 December 14 with a 300mm f/5.2 Newtonian. 4×30 sec. exposures, KAF-0401E CCD. The inset was processed with a 15° rotational gradient to highlight radial detail already apparent in the coma. *Nick James.*

This is currently in the southern hemisphere, but it rushes northwards in May and should burst into our skies as a 3rd magnitude object around May 7. The tail will initially be nearly parallel to the horizon and could be 10° long. As the comet climbs higher in the sky on succeeding nights the tail should become more obvious, but will be steadily shrinking as the comet retreats tail first from the Sun.

As NEAT fades, **2003 K4 (LINEAR)** is brightening and by June it should be an easy binocular object. It should reach borderline naked eye brightness in August, but sinks into the evening twilight in early September. Finally **2003 T4 (LINEAR)** creeps into binocular range in February 2005 and may reach naked eye brightness in March.

Further details and ephemerides of these and other observable comets are on the Section Web page, which is usually updated several times a week. I will be away in Antarctica from mid-February to the end of March and should be able to view comet NEAT in binoculars. In the past I have been in only limited email contact whilst away, but the British Antarctic Survey is hoping to install a permanent internet link this season, so I hope to keep the Web pages up to date during my absence.

Jonathan Shanklin, *Director*
[jds@ast.cam.ac.uk]

Mars Section

Mars in 2003: Fifth interim report

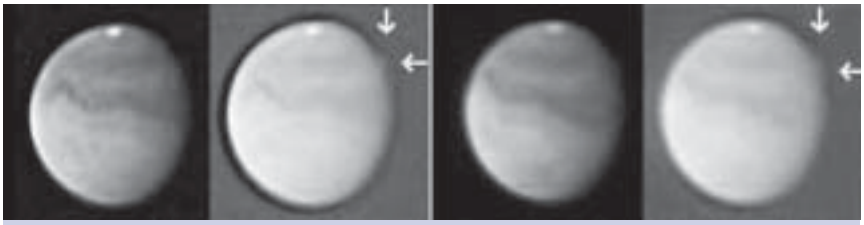
At the 2003 October AGM, I gave an illustrated summary of the apparition now ending. The present brief report continues from the December *Journal*, and covers a further portion of the martian southern summer. It is based upon data received for the period 2003 October 16 (Ls = 280°, D (disk diameter) = 17.7 arcsec, tilt = –21° S) to November 30 (Ls = 308°, D = 11.1 arcsec, tilt = –26° S). Although the planet's altitude much improved (with the declination only –1° at the end of the period), the number of observations received daily has declined rapidly.

More than a hundred observers (see Table) contributed useful work this year. Most recent data continue to show a small south polar cap in its summer remnant phase, a high level of morning terminator clouds, and a north polar hood.

The most interesting thing about the great perihelic opposition of 2003 has been the complete lack of a really major dust storm. In terms of seasonal date, the latest planet-encircling storm ever to begin was that of 1924 December (Ls = 311°). This point has now been reached, and so it seems unlikely (unless existing records are broken) that such an event could now begin during the present martian southern summer.

However, some airborne dust did contrive to produce a dull projecting cloud over Ausonia on the morning terminator on November 8, when the CML lay between 190 and 209°, according to CCD work by Isao Miyazaki (illustrated here). A similar visual record was secured by Mario Frassati (Italy) on November 17 (CML = 201°). Hellas was a little lighter in its northern half, but seems to have remained inactive. Polarisation measures by Richard Schmude (USA) as of November 16 demonstrate a general lack of airborne dust over the longitudes 300–360° (including Hellas).

A final interim report about this apparition will be submitted later.



Mars, 2003 November 8. CCD images (ToUcam webcam) by I. Miyazaki with 40cm refl. (Okinawa, Japan). Two pairs of images, with the first normal, and the second brightened in each case to enhance the terminator projection. *Left:* 11h 05m, CML= 190°; *right:* 12h 21m, CML= 209°.

Observers of Mars in 2003

G. Adamoli, B. Adcock, L. Aerts, T. Akutsu, P. Baldoni, D. R. Bates, R. M. Baum, J. D. Beish, N. Biver, A. Block (*per* T. Bopp), J. Blockley, G. Boerjan, M. Bonadiman, N. M. Bone, K. Bovill, R. D. Bowen, A. G. Bowyer, J. N. Brown, P. Bruce, S. Buda, P. Camaiti, P. Campbell, F. Canapine, P. Carter, A. Chaikin, A. Cidadão, J. A. Clark, P. Coelho, E. Colombo, J. Cooper, D. Crudeli, D. Crussaire, B. Curcic, P. Devadas, J. Dijon, T. Dobbins, E. L. Ellis, C. Fattinanzi, S. Faworski, D. J. Fisher, M. Foulkes, M. Frassati, G. Galli, M. Gaskell, M. V. Gavin, P. Georgopoulos, E. Grafton, D. L. Graham, D. Gray, M. Green, W. H. Haas, D. Hatch, A. W. Heath, M. J. Hendrie, C. Hernandez, H. Hill, R. Hill, T. Ikemura, G. F. Johnstone, S. Keenor, C. Lau, P. R. Lazarotti, T. W. Leong, C. J. R. Lord, P. Lyon, L. T. Macdonald, R. J. McKim, R. Martens, C. Meredith, M. Minami, I. Miyazaki, M. P. Mobberley, D. M. Moore, S. L. Moore, P. Morel, E. Ng, D. Niechoy, G. Okša, B. Pace, R. Panther, P. W. Parish, D. C. Parker, T. J. Parker, K. C. Pau, D. C. Peach, C. Pellier, J. Phillips, T. Platt, C. J. Proctor, G. Quarra, T. J. Richards, J. H. Rogers, R. W. Schmude, B. Shaw, W. P. Sheehan, P. C. Sherrod, E. Siegel, D. Storey, D. Strange, P. Tanga, M. M. Taylor, G. Teichert, R. Topping, D. M. Troiani, M. Valimberti, A. Van der Jeugt, E. Van der Velden, A. G. Vargas, F. A. Violat Bordonau, J. Warell, S. Whitby, A. Wilson, C. K. Yan, F. Zanotti.

Richard McKim, *Director*

Solar Section

2003 September

September saw the sunspot MDF fall to a low level similar to that recorded in late 1998. We are now clearly seeing the declining trend of the current sunspot cycle. No high latitude spots were reported but sunspots were seen at low latitude towards the end of the month. Both hemispheres showed a decrease in spots with the north showing no spots from Sept 5 to 14.

At the very beginning of the month the southern hemisphere showed three AAs, all of them small. As the month progressed, the north became devoid of spots and the only sunspot activity seen was a type Csi group nearing the CM and just south of the equator at –7°/221° on Sept 8 and 9. This group developed into an extended type Dac group of small spots by Sept 11 after it had crossed the CM. By the time it had reached the W limb on Sept 15 it had begun to decay.

Hedgerow prominence on the E limb, 2003 Sept. 15. *Eric Strach.*

Thereafter, the northern hemisphere began to show sunspot activity again. This consisted of a group at +11°/160°, a single spot lying near the E limb at +11°/38° and a pair of spots at +18°/64°. It was not until Sept 21 that significant sunspot activity appeared over the E limb in the form of two AAs at +2°/1° and a follower at +6°/351°. By Sept 22 and 23 smaller spots had appeared in between the main leader and follower spots and unusually were seen to 'spill over' the solar equator into the southern hemisphere. The appearance of the group had changed by Sept 25 when it had become a chain of seven penumbral spots from +5°/5° to +7°/349° and an Fko type group. On Sept 26 the group crossed the CM. By Sept 27 the follower spot was seen as the largest in the chain and it then became increasingly isolated from the rest of the group. The area of the whole group was estimated to reach 620 millionths and was seen with the naked eye from Sept 23 to 27.

Hydrogen alpha

Prominence MDF for September 7.07 (8 observers). There was in contrast a rise in the prominence MDF.

Despite this rise there was little of note except for a large mound prominence on the NE limb on Sept 3 extending from latitude

+34° to +44°. It was slightly diminished in height by the following day with a small prominence having appeared just to the south. By Sept 6 it was seen to separate into six small arches. By Sept 7 the whole prominence had appeared fully on to the solar disk. It crossed the CM on Sept 14 and disappeared thereafter. However, a second larger filament had appeared to the west and lasted longer and its northern part reached the W limb on Sept 17 forming a prominence at lat. +41° to +48°.

On Sept 14 a low hedgerow type was seen on the E limb from lat. –01° to –10°. By the next day it had come further into view over the limb and it then showed a complicated changing structure as shown in the image. This was later seen as a broad filament hugging the E limb on Sept 17. It crossed the CM on Sept 22 and became a dense and slightly curved structure on Sept 23. It was not seen the next day and it is believed to have been ejected.

A curiously shaped filament was seen on Sept 4 near the W limb from lat. –01° to –20°. Its northern part resembled a question mark while the southern part of it seemed like an inverted image of it. As it crossed the W limb only small prominences were observed.

The disk was very active on Sept 12 when 13 filaments were seen.

BAA sunspot data, 2003 September–October

	September		*October*	
Day	*g*	*R*	*g*	*R*
1	4	62	6	93
2	4	53	6	85
3	4	49	4	65
4	4	58	3	63
5	3	47	3	58
6	4	46	2	49
7	3	35	3	49
8	1	19	3	54
9	1	22	4	59
10	1	30	3	47
11	2	38	4	56
12	2	33	2	24
13	2	32	1	11
14	2	38	1	12
15	3	38	1	17
16	3	46	2	24
17	5	68	3	32
18	5	70	3	44
19	5	66	3	46
20	4	57	3	57
21	4	62	3	64
22	4	63	3	56
23	5	76	3	68
24	4	74	3	67
25	4	79	3	99
26	5	92	3	106
27	5	92	6	141
28	4	86	6	175
29	5	80	8	196
30	5	85	7	161
31			6	184
MDFg		3.56 (60)		3.59 (56)
Mean R		56.60 (54)		72.97 (51)

North & south MDF of active areas g

	MDFNg	*MDFSg*
September	1.28	2.30 (37)
October	1.47	2.27 (35)

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

2003 October

October was a month of contrast. From October 4 to 20 sunspot activity was at a low level. The northern hemisphere was blank from Oct 3 to 14 repeating the scenario seen last month. Activity then increased to a high level at the end of October with three naked eye sunspot groups crossing the solar disk. No high latitude spots were seen but there was a low-latitude group at –4°/334° seen on Oct 21.

At the beginning of October the former naked eye group at mean position +5°/351° was nearing the W limb. It went over the limb on Oct 2 and 3. The remaining activity was then all in the southern hemisphere with most of it lying between the SE limb and the CM. This comprised a single spot at –7°/241° and a following group of small spots from –8°/229° to –7.5°/221°. They all crossed the CM on about Oct 5/6 mainly as small spots strung out just south of the equator. As they approached the W limb on Oct 10 both AAs were still present but the latter had become slightly less active. The solar disk then became very quiet.

The group at +5°/351° reappeared over the E limb on Oct 16 at a slightly different position of +4°/349°. It comprised mostly small spots up until about Oct 19 when it suddenly became an Ekc type group showing many penumbrae. As it reached the CM on Oct 23 it was nearly 1700 msh in area. By Oct 25, 22 major sunspots were counted in the group and still showed extensive penumbrae. As the group neared the W limb it began to decay to a Dkc group of 1080 msh on Oct 27 before crossing the limb on Oct 30. It was visible to the naked eye from Oct 20 to about 29.

On October 23 another large spot group appeared over the SE limb at –20°/284°. By Oct 25 it was classed as Fkc and some 2300 msh in area. On Oct 26 the smaller leading spot had split into two while the main following spot covered 10° in longitude and 8° in latitude, and appeared irregular with photosphere within it. Many more small spots had appeared in the group by Oct 27 with the following spot the largest. Maximum group size seems to have been on Oct 30 when it reached 2380 msh in area before a reduction was seen the following day. The group was visible to the naked eye from Oct 24 to 31.

On Oct 27 an unusual sunspot group appeared at +8°/291° taking the form of an oval of ten small spots covering some 6° in longitude and 4° in latitude, with the middle devoid of spots. On Oct 29 this group was classified type Eki with a substantial leader spot at +8°/298°. The remaining spots still formed an oval. The group was Fkc (1570 msh) on Oct 30. The leader spot had a large umbra while the following spot contained many smaller umbrae. On Oct 31 the two main spots had merged together and the group area was 2040 msh. It was seen with the naked eye from Oct 28 to 31.

Hydrogen alpha

Prominence MDF for October 5.40 (8 observers). A slight fall but it was still at a level seen earlier in 2003.

On October 10 at 10.15 UT two dense prominences were observed by Eric Strach at latitudes –23° and –25°. At 10.55 UT they both began to enlarge and change rapidly. Shortly after 11.07 UT they were seen to erupt explosively with debris ejected up to 280,000 km. After 8 minutes only two minor strands of prominences remained (see image). It seems that much of the H-alpha activity this month was associated with the three large sunspot groups. As the spot group at –20°/284° came over the E limb on October 23, a display of loop type prominences was seen on the limb at lat. –17°. At the same time a high massive prominence was on the W limb near the equator.

On Oct 23 a filament and flare were seen near the sunspot group at +5°/351° by several observers. At 10.45 UT a bright spot was seen by Alan Heath even through passing cloud together with the filament. By 10.53 UT the bright spot had become two and then a bright crescent just south of the two brilliant spots. Eric Richardson later saw the filament disappear by 12.15 UT. Solar flares were also reported on the mornings of October 26, 27 and 28.

The remarkable activity on 2003 October 27. *Kevin Smith.*

Geoff Elston, *Director*

Into the lion's den at Bishop's Stortford High School

During my time as President of the Association, I received many requests from outside groups asking for advice and help in the advancement of their knowledge of astronomy.

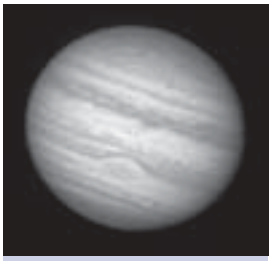
One of these, received during 2003, came from the Head of Religious Studies at Bishop's Stortford High School, Simon Etheridge. He explained that the school ran a General Studies Programme for fifth and sixth form students aimed at extending their knowledge beyond the normal syllabus. It was also designed with the aim of allowing students to meet people running organisations with the emphasis on debate and questions rather than merely the traditional talk.

This all seemed fairly straightforward and just one more addition to my lecture tour for 2003 until I learnt that past speakers had included Kate Adie, Michael Brunson, Linford Christie and Jon Snow among others! I also discovered that there were to be at least 150 students in the lecture hall all fired up to ask the most searching questions on astronomy, which, as we know, is a very wide subject.

My wife Anne once again kindly helped with the driving and, with her lifelong experience of teaching, probably felt more at home at the school than myself.

I initially gave a short lecture using *Powerpoint* describing the aims and workings of the Association followed by some examples of results, especially some of the spectacular images secured by our members. I placed special emphasis on images of Mars which I knew was a subject students were particularly interested in following the planet's very close approach in 2003.

Normally one is used to a few questions at the end of a lecture but what followed rapidly became more of a workshop or seminar! Questions lasted about a further 45 minutes and the range of subjects was very wide. Students had clearly been impressed with the results by our members, ranging from actual discoveries through to the more routine monitoring, but were surprised that some of our records and archives stretched back over 100 years. They also noted that many observing projects had involved professional and amateur astronomers working together which was not something they had expected. There was discussion about the reasons for this and the difficulty professional astronomers experience with applying for telescope time and often waiting a long time for an observing slot to become available.



Jupiter: always changing. *D. Peach.*

Many enquiries, reassuringly, were about the solar system and why BAA members felt it was necessary to continue to monitor the planets. I say this because the students may, in some cases, have assumed that space missions had completed all the work that was necessary, until I showed planetary images of Jupiter where they appreciated that changes were continuing all the time. Near the very end of this session I received a question which often crops up on such occasions, relating to whether I felt there was a conflict between our knowledge of the formation of the Universe and our solar system when compared with the text in the Bible. This was especially interesting on this occasion as I had four teachers listening to proceedings and one was the Head of Religious Studies!

I gave my standard answer that I had always regarded the biblical texts as illustrative. Thus I feel there is no need to look for conflict between our constantly changing scientific view of creation and that given in the Bible. Naturally I stressed this was my personal view and not necessarily the view of everyone in the BAA.

Anne and myself were invited to lunch. I was amazed what an improvement had occurred when I looked back to the old days at my Grammar School where my opinion of the food could not be repeated here. We had the opportunity to talk to other teachers about amateur astronomy as well as mingle with the students.

Overall it was a very enjoyable day. Clearly the Association has a vital role in promoting astronomy through schools and I have given several talks to children ranging from ages 5–17 during the last year. Although the students I met at Bishop's Stortford asked some far-reaching questions, younger children still have considerable enthusiasm for space-related issues so tailoring presentations to different age groups is naturally essential.

Guy M. Hurst, *Vice-President*

Variable Star Section

Digitising variable star data - can you help?

Since its formation in 1890 the BAA Variable Star Section has accumulated around two million visual observations of the magnitudes of variable stars. Although a great many have already been converted into machine readable form there are still around a quarter of a million observations awaiting that privilege. Once this is done, they can be made widely available to both professional and amateur researchers. You can imagine the advantages of records on CD-ROM – much easier to store, easily distributed and convenient for computer searches, manipulation and calculation.

The Section has the problem of how to get the massive task of conversion done. It is a manual job of typing the records into a simple computer text file in the required format. The sheets of records do not seem to be in a form suitable for rapid scanning. Dave McAdam, a former Secretary of the Section, began this work over 10 years ago and made enormous strides with a small band of helpers, but Dave has now retired from these duties and similarly his helpers have dwindled in numbers. Currently, we have some four or five people engaged on this work, but it is too much and progress is too slow for such a small group. Hence this appeal to BAA members.

I quote now, in part, from an article one VS member, Dr Alex Menarry, wrote in his local Society magazine:

'Whenever I have a bit of spare time, I sit at the keyboard and get typing. I've converted the records for 5 stars so far and I suppose there must be hundreds in the database. Some of the people who have sent in records are local observers and some have familiar names - a young Patrick Moore, for example.

'The size of the job is such that lots of people are required. The reward is knowing that the massive database you are contributing to will be so much more accessible to everyone.

'This work is going on all over the world, of course - amateur Astronomical Associations in New Zealand, Australia and Europe are doing the same. There is also a big effort going into an international agreement on how amateurs record data, using the same comparison stars with agreed magnitudes, in which the BAA is a leading member.

'A number of volunteers have already put some time into this work, wishing to make a return to the world of astronomy for some of the pleasure they have had from observing variable stars. I will be pleased to introduce you to the people involved and help with the details of exactly how to do the job. It's really very easy and you will learn a lot about how the magnitudes of variable stars are recorded. You may even be inspired to send in some observations of your own!'

If you feel you could put some time into this work, please contact the Director.

Roger Pickard, *Director*
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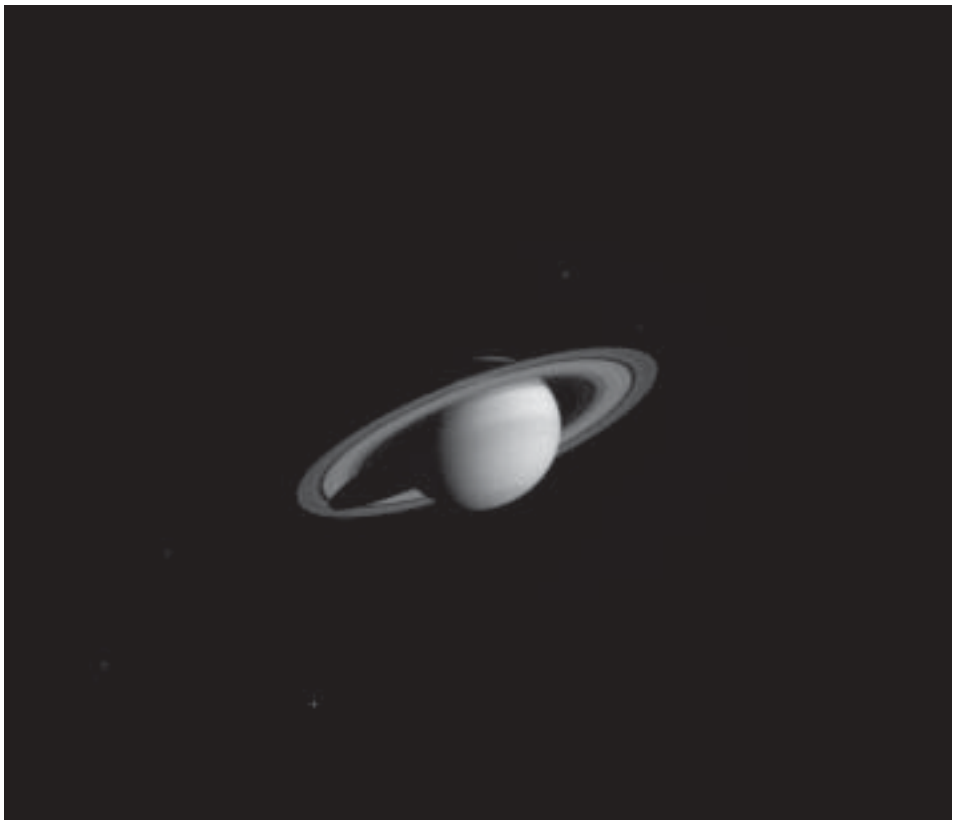
Cassini views Saturn from 235 days out



This image was composed from exposures taken by the NASA/ESA spacecraft *Cassini* with its narrow angle camera on 2003 Nov. 9, from a distance of 111.4 million km (69.2 million miles). The spacecraft is 235 days from reaching Saturn. The smallest features visible here are about 668km across. Structure is evident in the B ring, the middle and brightest of Saturn's three main rings. The 325km wide Encke gap in the A ring, near the outer edge of the ring system, is visible, as is the fainter C ring, interior to the B ring. Most of Saturn's northern hemisphere is in shadow of the rings, with the exception of a small sliver visible on the limb. Five Saturnian satellites can also be seen in the image: on the left, from brightest to faintest, Rhea, Dione, and Enceladus; on the right, from brightest to faintest, Tethys and Mimas. *Cassini* is due to enter Saturn orbit on 2004 July 1. *NASA/ESA/JPL: PIA04913*

Aurora Section

The geomagnetic field in 2003 October remained relatively quiet for the first 12 days. From Oct 14 to 22 the field was very disturbed to stormy due to coronal hole and other solar wind streams. The solar zone causing the disturbance has been active since April and its effects have shown up with every 27-day rotation of the Sun. No sunspots were visible with projection of an image from a 64mm reflector between October 14 and 17. There was a transient storm sudden commencement and magnetic storm on Oct 24/25.

SSCs were reported on October 26, 28 and 29 and thereafter massive geomagnetic storms took place on 29, 30 and 31. On all three dates the planetary magnetic index Kp reached the maximum possible value of 9, while the planetary magnetic index Ap reached respectively values of 204, 191 and 116 for the three days in succession, as reported from Potsdam.

Relatively quiet apparitions of the aurora comprising glows, arcs and rays were seen from Scotland on October 01/02, 02/03, 06/07, 15/16, 16/17, 17/18, 19/20, 20/21, 26/27 and 28/29. Aurorae on 14/15 and 21/22 were noted as all-sky over Orkney, and recorded in Central Scotland to comprise active glows, rays and arcs. The event of 14/15 was also seen from Denmark. An active aurora on 24/25 comprised quiet glows, rays and arcs and was reported not only from all over Scotland but also from Kielder Forest, Morpeth and Anglesey.

Jay Brausch of Glen Ullin, North Dakota reported active aurorae on 1/2, 6/7, 14/15 through to 21/22, 23/24 and 31/01. The event of 14/15 was a landmark observation in that it was the 2000th night on which Jay had recorded details of an auroral apparition since his first observation in 1981 (see below). Although Jay lives in one of the most cloud-free locations compared with European observers, UK members of the Aurora Section

will have sympathy for him that he was clouded out on October 29/30 and 30/31 during major auroral events.

As might be expected the solar flares and coronal mass ejections generating the massive geomagnetic storms of October 29 to 31 produced corresponding displays of the aurora (see cover). It is reported that the north–south component of the interplanetary magnetic field Bz was not strong in the southern direction, otherwise the effects might have been even more massive.

Some 36 valid reports have been received for the aurora of October 29/30. It was seen from Greece, was coronal at Kiev, and up to the zenith at Detroit. From 17.50 to 04.00 UT it was visible in spite of cloudy conditions throughout the UK. It covered the whole sky from Scotland down to Northumberland and at times observers on Shetland and Fair Isle were looking southwards to see the aurora. Coronal structures were reported from southern England, but most observers there reported rays rising to an elevation of 60 to 80°. The aurora comprised glows, arcs, bands, rays and patches. Green appeared to be the predominant colour but red rays, glows and patches were also noted.

The aurora of 30/31 generated some 21 reports. It was coronal at Halifax, Nova Scotia. In the UK it was observed from 18.15 to 03.30 UT and was an all-sky event in Scotland. Rays rose to an elevation of 90° along the southwest coast of England. As on the previous night all types of auroral forms were seen, mainly in green but with some red.

Notwithstanding the severity of the magnetic storm on Oct 31/Nov 01 only two UK observations were received, from southern Scotland where a rayed arc was detected through cloud, and one report of a green glow seen from Cornwall. Brausch's report showed that the aurora seen in North Dakota comprised quiet glows, arcs and rays with a maximum elevation of only 12°.

2003 November saw further coronal hole type magnetic disturbances with our observers recording minor storm conditions on Nov 04, 06, 09, 11, 13, 21 and 22. The big event was a geomagnetic storm on the night of Nov 20/21 which all observers recorded either as major fluctuations in the horizontal field strength H or in the deviation angle D.

Auroral conditions were noted in Scotland on the nights of Nov 02/03, 10/11, 12/13, 13/14, 19/20 and 23/24. A major all-sky aurora occurred on 20/21 when Scottish observers were turning southwards to observe coronal bands at the magnetic zenith and quiet arcs low down on the southern horizon. Red and green bands were seen from Cornwall up to the zenith. Some 21 observers submitted reports on this aurora. The entire sky was covered by a mist-like airglow that made variable star observing, for example, impossible. Reports on this aurora came in from Canada, the USA, Austria, Greece and Russia.

A lesser aurora took place on November 22/23. It was well observed down to Northumberland but was coronal only in Shetland. Seventeen observers reported this event.

In Glen Ullin, North Dakota, Jay Brausch observed quiet aurorae on Nov 01/02, 13/14, 14/15 and 29/30, with active events on 17/18, 18/19 and 19/20. The aurora of 20/21 was substantial and covered three quarters of the sky at its peak.

R. J. Livesey, *Director*

Jay Brausch – 2000 not out

On the morning of 2003 October 15 Jay Brausch, of Glen Ullin, North Dakota, USA made observations of the 2000th apparition of the aurora that he has seen from his location.

When Jay first approached the Aurora Section in 1988 to find out if the BAA would be interested in receiving details of his observations, he had already recorded 600 events since he began his vigil in 1981. Sceptical that one person could have seen so many aurorae, Dr Mike Hapgood of the Rutherford Appleton Laboratory ran a statistical comparison between the intensities of geomagnetic activity and reported auroral activity on the dates concerned. The result was significant, and the case was proven when Jay sent over for us to examine, three albums of about 1000 photographs of his aurorae giving dates, times and photographic data on the exposures.

With the help of the British Meteorological Office I obtained sight of the US Air Force cloud cover atlas, giving world wide statistics on the probability of perceiving a cloud-free sky at elevations of 10, 30 and 90 degrees above the horizon. It turned out that of all our aurora observers, Jay is in the most cloud-free position.

Jay Brausch observing and recording the sky at his home in North Dakota. *www.observingthesky.org.*

Further, because he is situated nearer to the north magnetic pole, and in darker summer skies at his geographic latitude of 46°48'N than we of mainland Britain, he is well situated to observe the mid-latitude aurora all the year round.

Jay is a dedicated observer[1] and works from sunset to sunrise if the aurora is active. He continues to send monthly detailed reports on every aurora he observes, backed up as necessary with photographs. For his work he was awarded the Merlin Medal of the BAA in 1993. Copies of his photographs have featured regularly at BAA Exhibition Meetings and at Scottish Astronomy Weekends. Jay has also received the James Paton Award of the Scottish Section of the Royal Meteorological Society in recognition of his superb photographs.

Jay has also contributed to the study of noctilucent clouds (NLC) which he also photographs. When Jay produced his first pictures Dr Michael Gadsden, a world expert on the subject, considered that Jay was at too low a latitude for NLC to be regularly seen and thought that the apparitions could be possible rocket trails. However, NLC continued tobe photographed from Glen Ullin culminating in the display of 1999 June 22/23 when Jay had to look south-west to see it, and it was observed and photographed by Dr M. J. Taylor from Boulder, Colorado at 40°03'N.[2]

Jay is presently lead observer for a new NASA-funded internet site designed to introduce the public to space research and the night sky at www.Observingthesky.org. Jay says 'I suppose I observe for the love and passion of it. Observing and recording the beauties of the night sky satisfies an adventurous, restless and youthful spirit inside me'. Chuck Wood, the principal investigator for Observingthesky says 'Brausch is probably the best person in the world for this job because of his total dedication to observing'.

R. J. Livesey

1 Livesey R. J., 'Observations of the aurora from North America', *J. Brit. Astron. Assoc.*, **111**(1), 1 (2001)
2 Gadsden M. & Taylor M. J., 'Noctilucent clouds: anywhere, anytime?', *J. Brit. Astron. Assoc.*, **113**(2), 77 (2003)