

THE BOLTON ASTRONOMER

December 2012

ISSUE No. 19

**Next Meeting
STAR PARTIES
Carl Stone**
An update on events attended
by BAS members
4th December 2012

BIGGEST JOURNAL EVER!
Keep the articles coming.
Email the editor with articles
and images
lenadam@sky.com

The monthly journal of the Bolton Astronomical Society

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Processing a faint comet in IRIS
Ross Wilkinson



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BAS – including an amazing record
of events and observations from
Society members in 1915

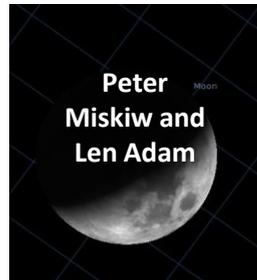


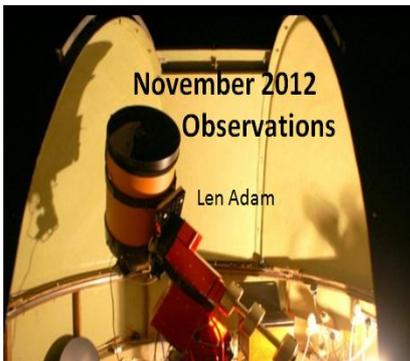
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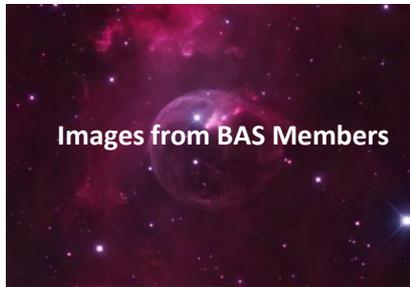


November 2012
Observations

Len Adam



Images from BAS Members



Spreading the Word about the BAS



Antony Walmsley

December Objects of Interest
Hubblesite December Objects Video
Len Adam



More thoughts on Spectroscopy
Richard Newall



LOAN EQUIPMENT
4 INCH MAKSUTOV
TELESCOPE



Library News

BAS Calendar

Meeting Report 20 Nov 2012

**Please send BAS Journal articles
& contributions to the Editor
Len Adam.**

lenadam@sky.com

MEETINGS: Ladybridge Community Centre Beaumont Drive Bolton BL3 4RZ
Non-members invited to drop in to meetings which are held every other Tuesday evening at 7.30 p.m. £2 charge per meeting or £20 annual membership.

Go to <http://www.boltonastro.co.uk/calendar> to find the next meeting. There are plenty of parking spaces at the centre.

BOLTON ASTRONOMICAL SOCIETY

SPREADING THE WORD

Antony Walmsley



As part of our efforts to raise awareness of the Society and attract new members, we now have our own page on the social networking site Facebook. The new page located at www.facebook.com/BoltonAstro is intended to provide benefits for both members and non-members alike.

The page contains the latest news from the Society as well as a public events diary and a map. Anyone can post on the page which could be anything from a member posting a particularly good photograph to a visitor asking a question about one of our meetings. If you have a Facebook account, feel free to add something you think people might be interested in or to answer any questions someone might have. You can also “Like” the page to get the latest posts to appear on your personal account page. The main timeline can only be used by administrators. Posts by others will appear in a separate section.

This is not a replacement for the website, forum or gallery. For example, if you have technical questions about telescopes or you can't get Registax to work, use the forums as before. It is meant to be a quick and easy way for potential members to see the things we have got up to in the past such as Star Parties and outreach events and to enable them to ask questions.

The Society also has a Twitter feed at www.twitter.com/BoltonAstroSoc. You can follow us on there for tweets from the Society as well as others that we follow such as ISS sightings and news from other astronomers. It's well worth a look if you haven't seen it before.

Both the Facebook and Twitter pages are administered by Antony Walmsley and Mike Schaffel. If you have any questions or suggestions for improvements, please get in touch with them.

Starting in December, we will also be featured in the “What's On” guides in both Astronomy Now and Sky At Night magazines as well as our regular appearance in the Bolton Evening News events guide. Our events are also being promoted via the Stargazers Lounge and Sky At Night forums and by the FAS. If anyone has any suggestions for further sources of publicity, please contact our Publicity Officer Antony Walmsley at one of our meetings or via publicity@boltonastro.co.uk.

January sees the return of Stargazing Live on BBC2. This is a great opportunity for the Society to offer observing sessions for members of the public as part of our increasing outreach program. In fact, these are a requirement of receiving the recent grant which we used to obtain our new Dobsonian telescope. If you have any suggestions for locations where these can be held, please get in touch with a member of the committee.

Antony Walmsley

BAS LIBRARY NEWS

Thanks to Ross we have added two splendid books to the society library. These are available for members to borrow.

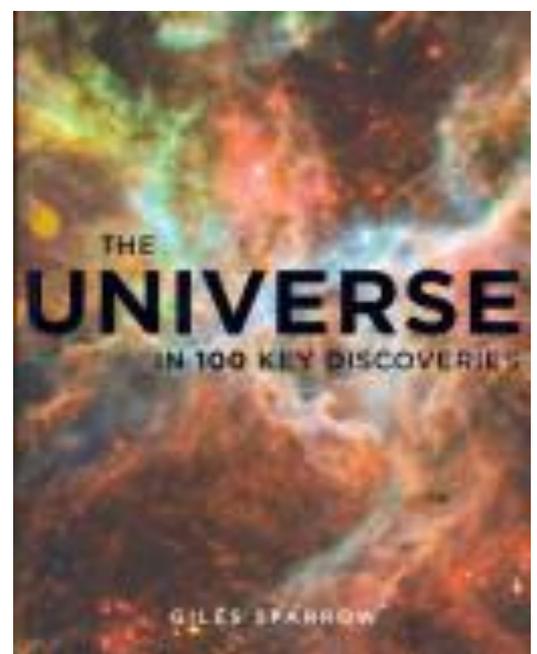
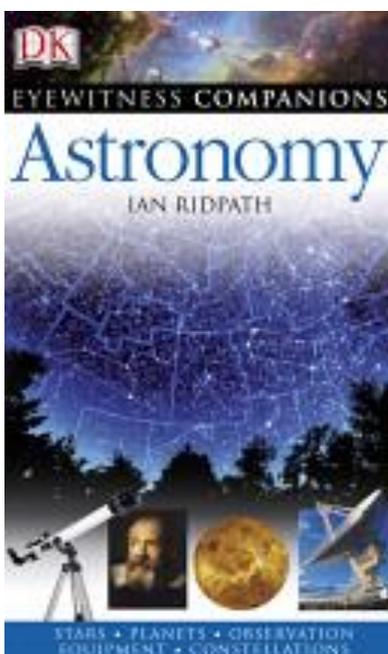
1. 'Astronomy' by Ian Ridpath. In 300 pages this book covers the history of astronomy, structure of the Universe, Solar System, constellations, star maps and monthly almanac. It is well illustrated in colour.

2. 'Universe, A Journey from Earth to the Edge of the Cosmos' by Nicholas Cheetham. This may be called a coffee table photo album. It contains some 200 large format glossy pictures. A real visual treat.

With thanks to Michael Ford for another book with a similar name.

3. 'The Universe in 100 Key Discoveries' by Giles Sparrow. A well illustrated book with over 400 pages covering major discoveries from the times of Aristarchus and Galileo to Dark Energy and Dark Matter.

Richard Newall
Librarian.



MORE THOUGHTS ON SPECTROSCOPY

from
Richard Newall

You may remember not long ago we had a splendid talk about spectroscopy and how to do it yourself.

Spectroscopy is a technique used not only by astronomers, but is widely used in other branches of science and industry. Nor is it confined only to the visible part of the spectrum. Infra-red and x-rays are commonly used. Infra-red can give information about molecular structure and x-rays provide elemental composition.

X-ray spectrometry is usually done in one of two ways. The first method is X-ray Fluorescence (XRF) in which the sample is placed into a beam of x-rays. This causes each element in the sample to fluoresce or emit its own characteristic spectral lines, the intensity of which gives a quantitative analysis. This often only takes a few seconds to do and can detect most elements at concentrations of much less than 1% or with care even down to a few parts per million. When I worked in forensics I frequently used x-ray spectrometry to analyse crime samples. For example it provides a very convenient way to identify counterfeit coins.

Another example is the detection of metal traces on the clothing of metal thieves. I developed also a method for analysing aluminium kitchen foil which is often used to wrap illegal drugs. Although the foil is usually around 99% aluminium it is the presence of other elements such as iron and copper that makes almost every roll from different suppliers quite different. It is then fairly certain that a drug wrap was cut from a particular roll of foil. XRF is widely used for quality control in many industries. Hand held XRF scanners are widely used in the scrap metal trade.

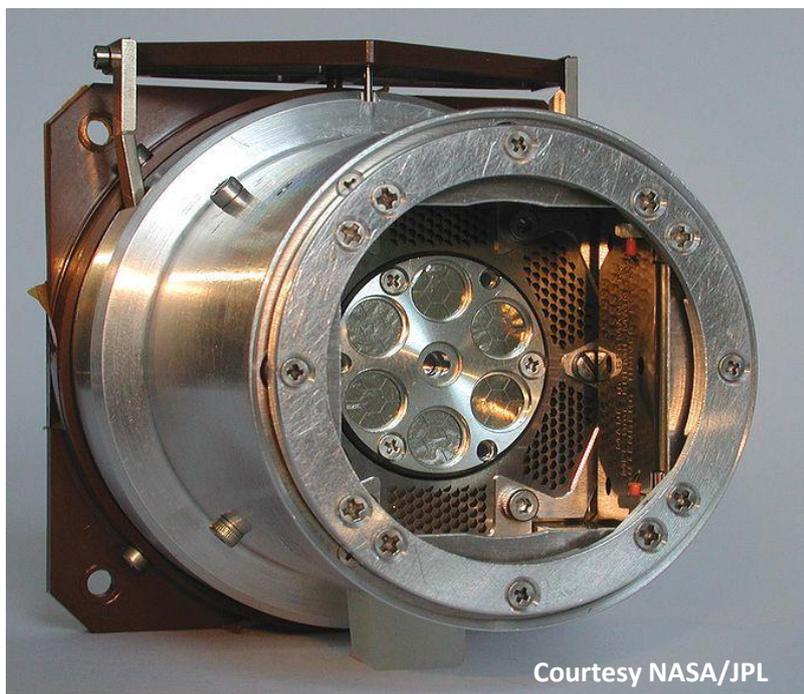
The second method is known as Micro-Probe Analysis (MPA) and is usually done with an electron microscope. Here an electron beam hits the sample causing it to emit its elemental spectrum. The advantage of this compared to XRF is that very small microscopic samples can be analysed. For example, tiny glass fragments invisible to the naked eye, recovered from the clothing of someone suspected of breaking and entering can be compared with glass from the broken window.

This is all very interesting but you may be thinking what has all this got to do with astronomy. Well both of the above methods are invaluable for the examination of Moon rocks and meteorites. In fact many of the probes sent to Mars and other planets carry ingeniously designed compact X-ray spectrometers.



Courtesy NASA/JPL

Curiosity before its journey to Mars



Courtesy NASA/JPL

X-Ray Spectrometer destined for Mars



Courtesy NASA/JPL

Martian panorama from Curiosity

Processing a faint comet in IRIS

Ross Wilkinson

When producing an image of a comet, it's often desirable to align the individual frames on the comet's position, so that it appears stationary in the final stack, with all the stars trailing past it.

I have managed this by selecting *One Star* (and choosing the comet) in the *Stellar registration* panel – but what if the comet is too diffuse to have a centre, or too faint for the automatic process to lock on to? I had exactly this problem with 37 frames of 10th-magnitude *Comet Hergenrother* from 12-Oct, so here's how I solved it...

First I used *Stellar registration* to align the stars in the usual way (to remove tracking errors from my mount). But if I'd just stacked this set of images, then the comet would have appeared as a smear (see picture).



Now the *IRIS Tutorial* on cometary processing¹ suggests the use of the **TRANS2** function, but to apply this you need to work out the rate of the comet's movement (in pixels per hour across the

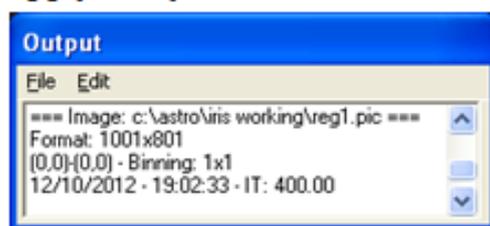
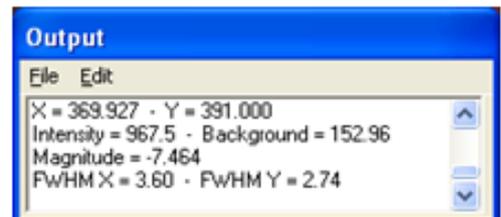


image). This is not as tricky as it sounds – the *Image info* displays (in the *Output* window) the capture time of each image, so just read these off for the first and last images.

At the same time, measure the exact position of the comet in the first and last frames by drawing a box around it and using the *PSF* facility (accessed from the right-click menu).



I've created a custom *Excel* spreadsheet to calculate these deltas and even formulate the required

command-line, which is then easy to copy-and-paste into *IRIS*.

Ross's comet calculator utility

Enter values in blue type and read off result in green

Name of input sequence **reg**
Name of output sequence **ali**
Number of images **37**

Input times and X & Y values below

image	time	X	Y
1	19:02:33	370.379	401.965
37	21:36:03	377.99	421.025
deltas	2.56	7.611	19.06
pix/hr		2.974984	7.450163

Paste this into the IRIS Command window:

trans2 reg ali 2.97498371335504 7.45016286644951 37

command-line, which is then easy to copy-and-paste into *IRIS*.

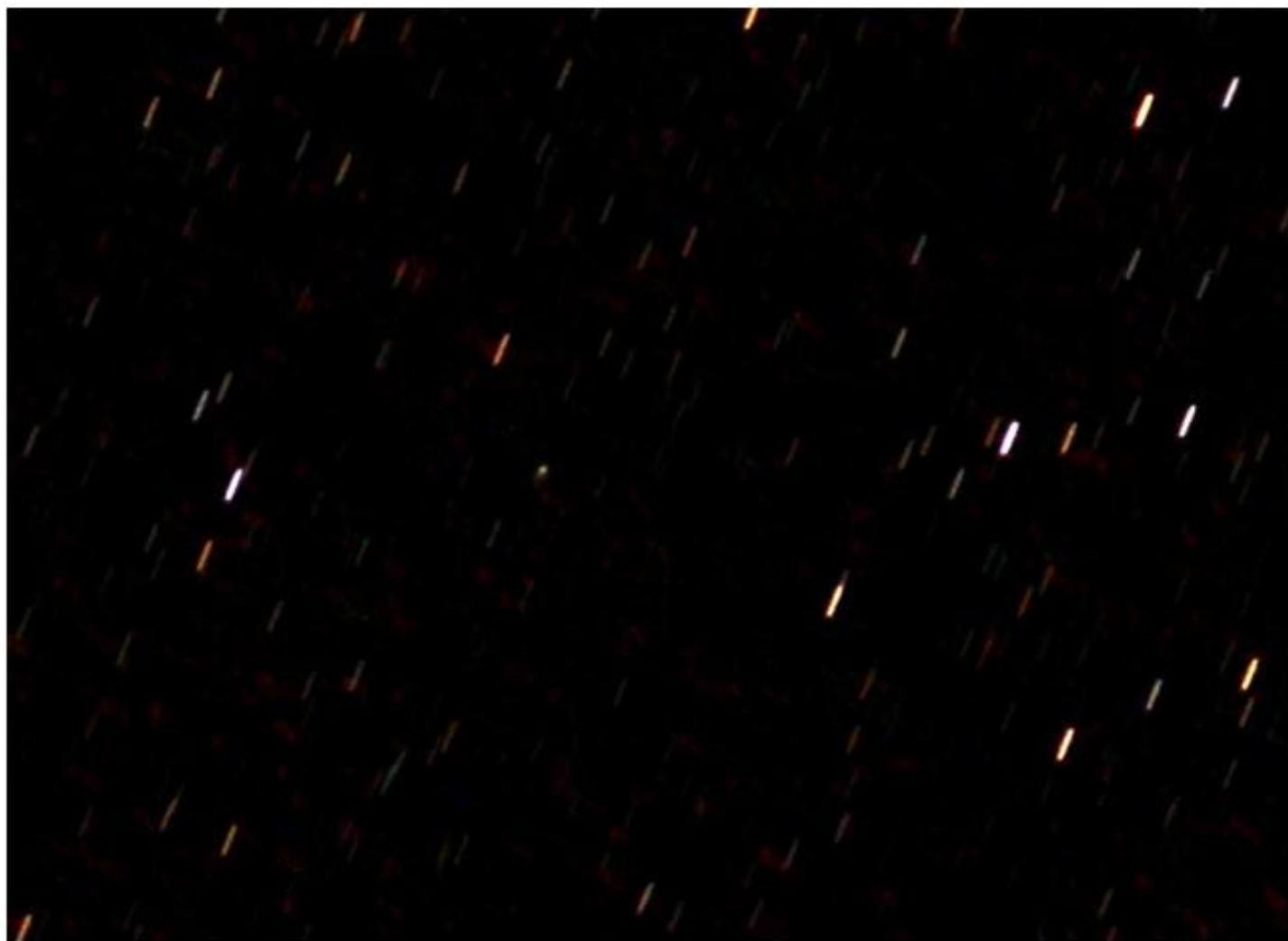
So starting with a sequence of frames **reg1..reg37** (registered on the stars), each one gets automatically shifted by 2.97 pixels/hr in X and 7.45 pix/hr in Y, to make a fresh sequence of images **ali1..ali37** which are aligned on the comet's position.

Then it's just a case of *Add a sequence* and then process as usual...

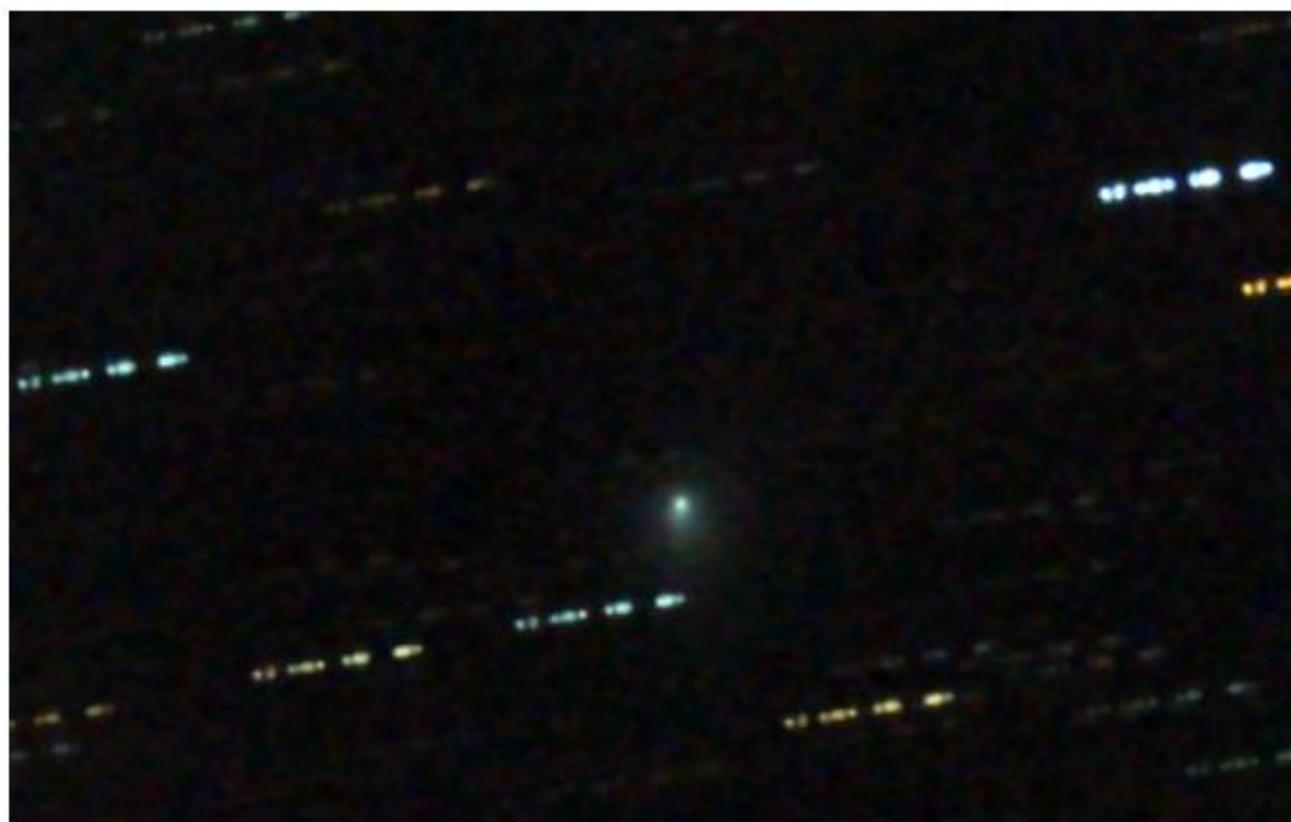
Here are a couple of examples – one from my recent tests on *168P/Hergenrother*, and another generated by re-processing my original images of *c/2006 W3 Christensen* from four years ago; this latter one has gaps in the star-trails due to intermittent cloud-cover that night.

I've posted a copy of my *Excel* spreadsheet in the *Library.. Software* section of the *Members' Area* of our BAS website.

¹ http://www.astrosurf.com/buil/iris/tutorial19/doc40_us.htm



Comet Hergenrother on 12-Oct-2012, taken with *Pentax* 135mm lens,. Sum of 37 images tracking comet's position



Comet Christensen on 30-Nov-2008, taken with 8" SCT at f/6.3. Sum of 19 images tracking comet's position.
The gaps in the star-trails are due to patchy cloud wiping our some of my sequence of exposures.

Image Processing Secrets 9

Perfectly Flat

David Ratledge

Introduction

Go on own up. Do you always take flat-fields for your images? Bet many of you don't! I will try and convince you that not only are they an essential part of the imaging process but we also need to take as much care taking them as we do with our deep-sky images.

Flat Fields – why bother?

If our silicon imaging chips (CCD or CMOS) were absolutely uniform, our telescopes had perfect optics and we kept everything spotlessly clean then flats would not be necessary. In the real world each pixel on the chip reacts slightly differently, our telescopes suffer from vignetting (uneven light transmission) and inevitably dust will appear as if from nowhere. What flat-fielding does is correct for these unavoidable problems. The benefits from flat-fielding are most noticeable in the faint details in our image – often the most interesting part! So if you want to drag out detail in those faint spiral arms or explore the full extent of a nebula – read on.

A Uniform Target

Silicon imaging chips are wonderful devices but each pixel varies ever so slightly in sensitivity. It is not just the vignetting and dust spots we need to correct for but this non-uniformity of the actual chip as well. To do this we need to take an image of uniform white target. How uniform – what variation? Well less than 1%. If this were easy then everyone would be taking flats. Don't give up yet – it is possible and can become routine.

Taking Flats

So how do we take these flats and to better than 99% perfect uniformity? Well the law of averages will help if we take plenty of them and vary critical aspects - just which ones I will explain as we go along.

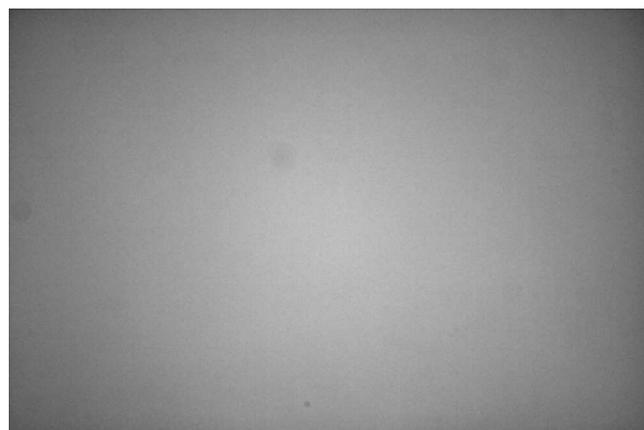
Probably the easiest type of flats to take are twilight or sky flats. We simply aim our telescope + camera + filter at the sky and fire away. The exposure must not overexpose the image. For digital SLR cameras using the "P" setting and setting 1 stop under exposure will be about right. To make sure the result is uniform – the sky could well have a gradient – rotate the telescope between exposures. I aim for 16 exposures and rotate 90° after every 4 images. This will average out any sky gradient and achieve that 99% uniformity. If the telescope cannot be rotated, I make use of meridian reversal and shoot 8 sky flats before the meridian and 8 after. The snag with sky flats is we must take them either the day before or the day after. This does tend to mean keeping the same telescope/camera/filter combination all night.

Alternatives to sky flats are shooting at an illuminated target sometimes called dome flats. This can take place at anytime and even between imaging at night. But how do we get an illuminated target with that magic uniformity? A white sheet or card plus even illumination will do it. Again the law of averages can help with the even illumination. Take 16 flats again but vary the position of the light source so as to get the average correct. On the market now are electro-luminescent flat panels – a bit like computer screens but white. These are probably the easiest source of even illumination but they come at a price, especially in the larger sizes – see the following website:-

<http://www.posterpoweruk.co.uk/page7.htm>

Light boxes can also be homemade with LEDs for the light source. They are bulkier but do work.

If you have ever wondered how the Hubble Space Telescope takes flat-fields then the answer is a simple one! If it aims down at Earth it will see plenty of white clouds! This was done with the Wide Field Planetary Camera (WFPC2). It can also generate flat-fields from actual images by using advanced mathematics. IRIS has similar routines but believe me it is easier to take them conventionally.



Typical flat-field. Note dust spots and darker corners.

Calibration with Flat-fields

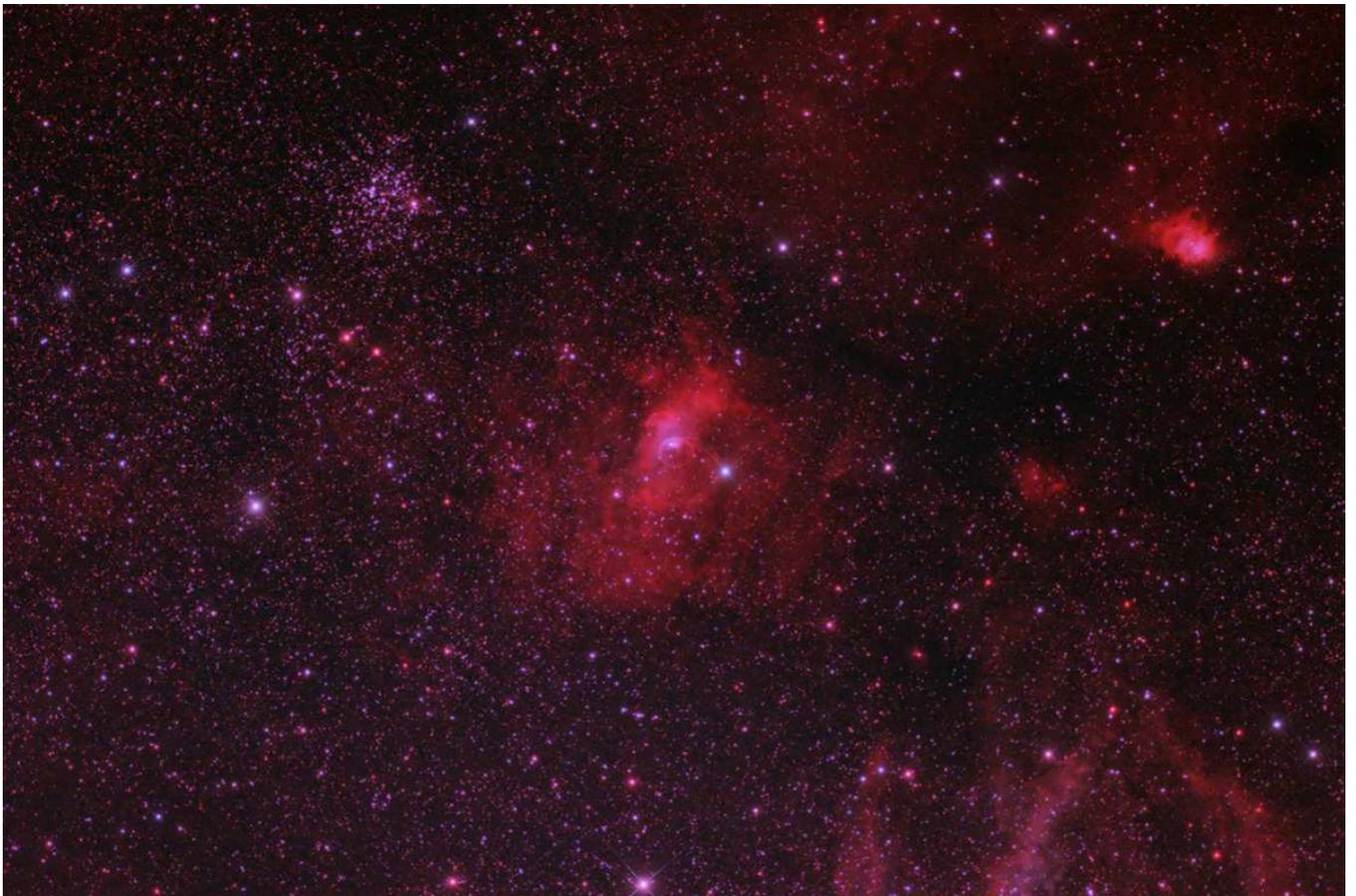
Most software automates the calibration process and will first turn those 16 flat field images into a master flat. Then subsequent pre-processing routines will know what to do with the master flat so the imager doesn't really need to be concerned with what actually goes on. For those that wish to know then read on. It is commonly said the light images will be divided by the flat. Actually they will be divided by the *normalised* flat. In the normalised flat each pixel's value is divided by the average pixel value of the whole flat field. A pixel that performs below average will have a value less than 1 whereas a pixel that performs above average will have a value above 1. In this way each pixel has its own correction coefficient – quite staggering in the era of mega-pixel chips!

Conclusion

Flat-fields are an essential part of image processing - one that you cannot afford to ignore and they need to become an integral part of your imaging routine.

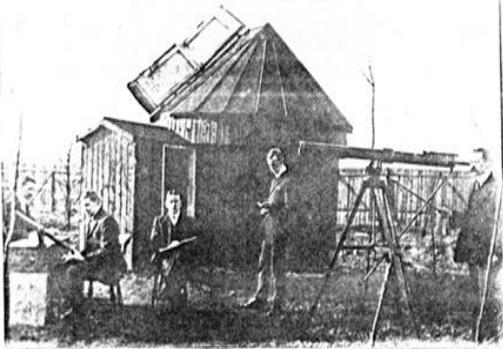


M52 & the Bubble Nebula processed WITHOUT flat-fields. If you get results like this you now know why!



M52 & the Bubble Nebula processed WITH flat-fields. The faint nebulae appear as if by magic!

Report of astronomical Section for 1914 & 1915.



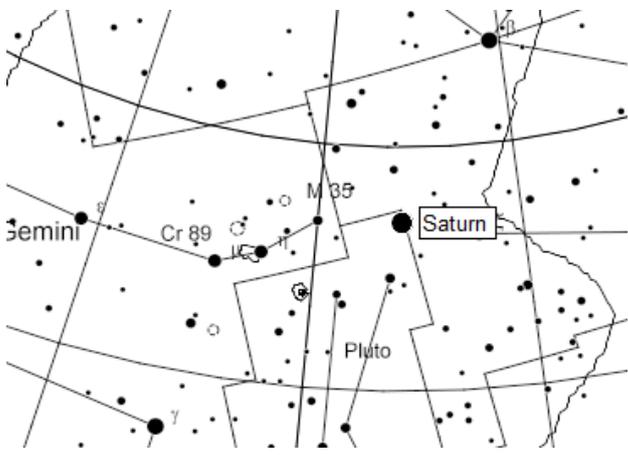
We have more material submitted by local astronomy history expert Peter Miskiw about the Bolton Astronomy division from 1914/5 which gives a fantastic insight into amateur astronomy in 1914. The annual report from George Grundy (see last issue of BAS Journal) gives real substance to the nature of member interests 99 years ago. In the absence of readily available photography they were clearly *observational* astronomers concentrating on and sketching the details of what was happening in the night sky using the naked eye or a small telescope. The meetings sound extremely interesting. Peter has used his time machine (Stellarium) to go back to the astronomical events described (see images). The observatory was clearly quite popular with a lot of visitors during the year and numbers had increased since the previous year. The weather sounds very familiar! I like the reference to "Potting Shed" meetings to discuss "various astronomical topics" - perhaps we ought to reintroduce potting shed meetings but if current membership persists we will need a very large shed! (LA)

Visitors included Deane Historical Society in large numbers and also the Clarion Cycle Club (a Socialist organisation) - I can't help but visualise a huge number of 1914 style bikes parked outside the observatory!

My last annual report was read on the 16th of March 1914. I mentioned in that report that the number of visitors to the Observatory was 274. The number of visitors during the last 12 months to the Observatory is 636. The weather during the past winter has been very unfavourable for astronomical observation rain & cloud being very persistent. The parties who have arranged to visit the Observatory are as follows. A party of 20 from Unity Church Deane Rd on Aug 21st. Sky very clear. Their leader was Rev Morgan. Deane Hist Society arranged for a visit on the 26th of January 1915. Sky clear. good views of Moon & Saturn.



The Moon at 9 p.m. On the 26th January 1915

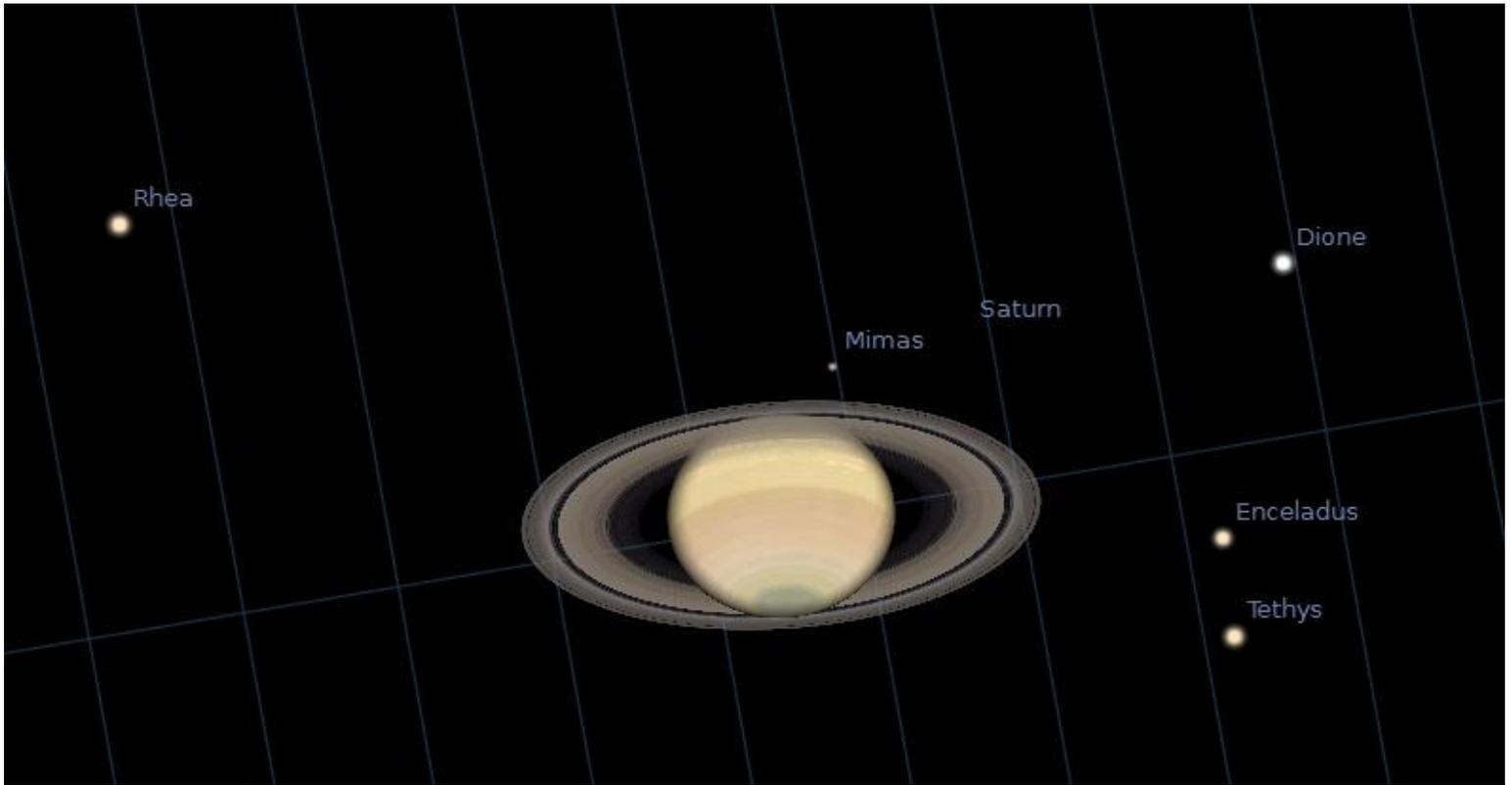


Saturn at 9 pm on 21st January 1915 as BAS members must have observed it (near M35) with their visitors from Deane Historical Society.

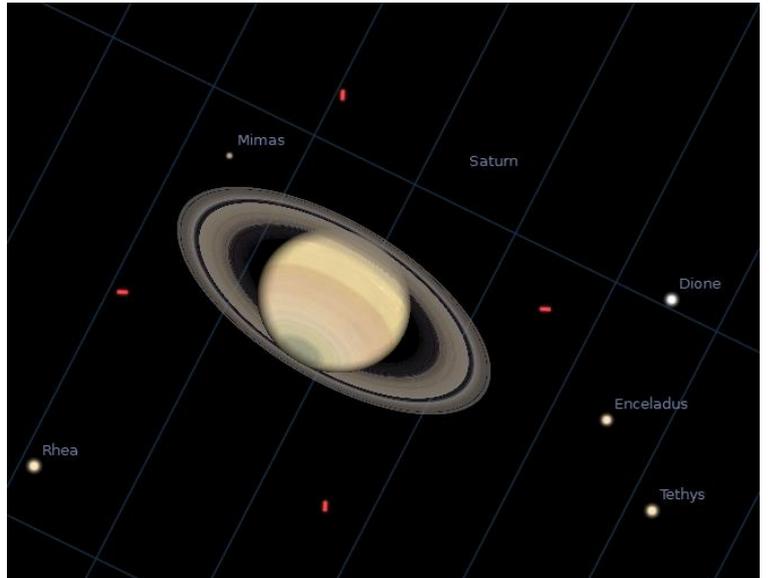
Note that Pluto was nearby – but of course it would be another 15 years before it was discovered!

Saturn

Magnitude: 0.61
 Absolute Magnitude: 27.62
 RA/DE (J2000): 5h49m55.2s/+22°21'34.0"



On Feb 20th 12 members of the Deane Hist Society visited the Observatory. The sky was beautifully clear grand views of craters were obtained on the moon. Saturn was seen to advantage.



On Feb 25. ~ 30 members of the Clarion cycle club visited the Dome, the sky was covered with a film of cloud and poor views was the result.



Courtesy of the Clarion Cycling Club

The same party have arranged to come and try their luck later. The progressive league have arranged four times with me to view the sky, all the meetings being unsuccessful, owing to rain and cloud.

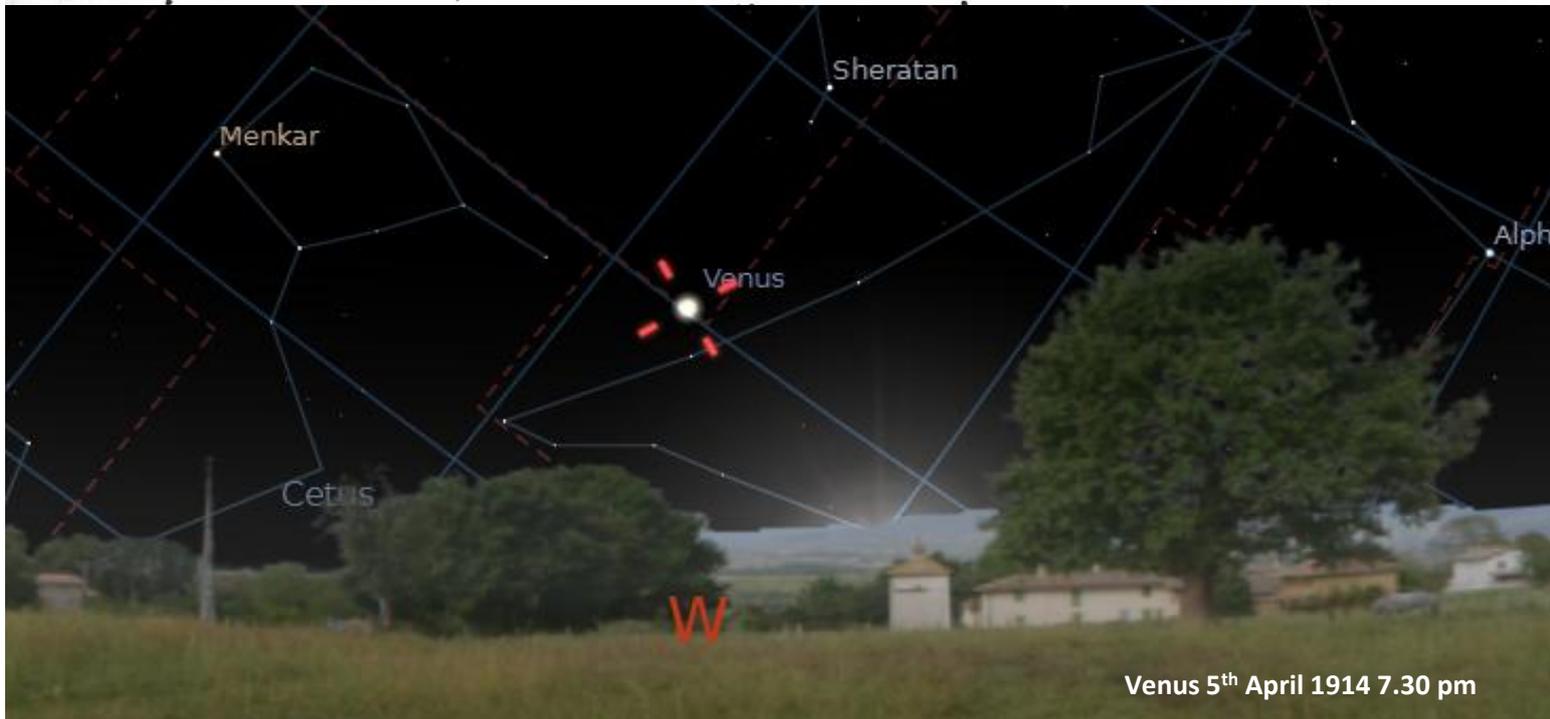
George Grundy now listed the 1914/1915 meeting details which are summarised in the table below

Date	Topic	Speaker	Number Attending	Notes
21st March 1914	Pioneers of Astronomy Part 1	George Parker	16	
28th March 1914	Finding the time by the stars	George Grundy	10	
4th April 1914	The Constellations	Mr Allcock	13	
9th May 1914	Pioneers of Astronomy Part 2	George Parker	13	
16th May 1914	The Origin of Lunar Mountains	George Grundy	20	
6th June 1914	The Sun	Mr Shepherd	15	
25th July 1914	Nebula Theory	George Grundy	12	
26th September 1914	The Movement of the Planets	Mr Morton	10	
17th October 1914	Sunspots	George Grundy	8	Illustrated with Lantern Slides
7th November 1914	The Winter Constellations	Mr Allcock	10	Illustrated with Lantern Slides
21st November 1914	The Earth-Moon System	Mr Shepherd	12	
5th December 1914	Jupiter	Mr Shepherd	4	Low attendance - heavy rain
19th December 1914	Kepler's Laws	Mr Moss	7	
23rd January 1915	Meteorites	J. Greenlees	13	



The attendance to the potting shed to discuss the various astron subjects is persistent and ~~to~~ encouraging.

Observations made by G Parker, W Deekhurst
 James Moston Tom Shepherd & Geo Gundy.
 April 5th we obtained a naked eye view of Venus
 at 7:30^{pm} Position West.

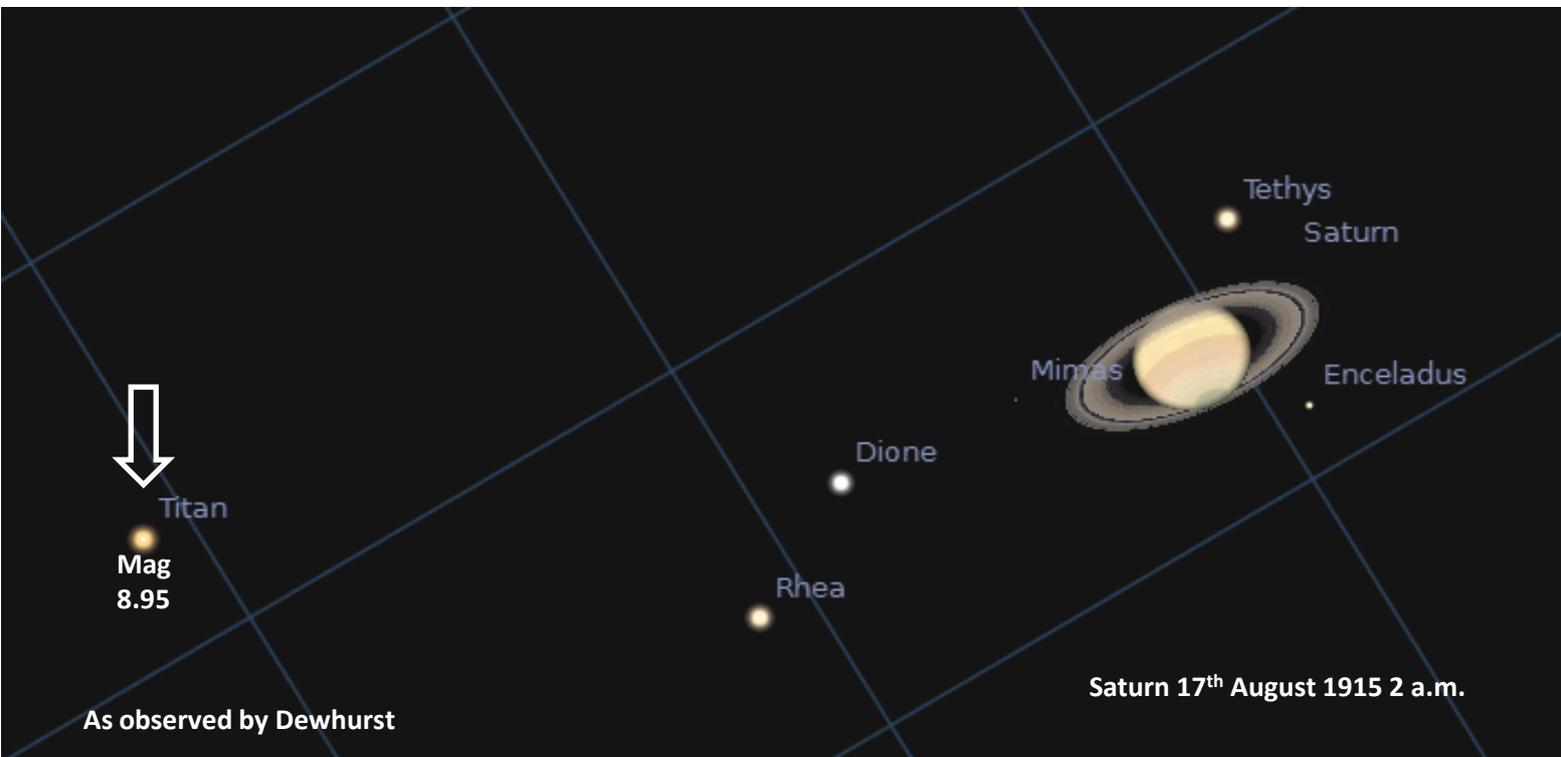


April 14th. Venus viewed through the telescope, presents
 a phase half moon, setting N.W. 8.22^{pm}.

NOTE: Looking back to this date and time (assuming the 14 refers to the 14th April 1914) shows a setting date for Venus
 of 8.36 p.m. but a Phase of 96% not the 50% described.

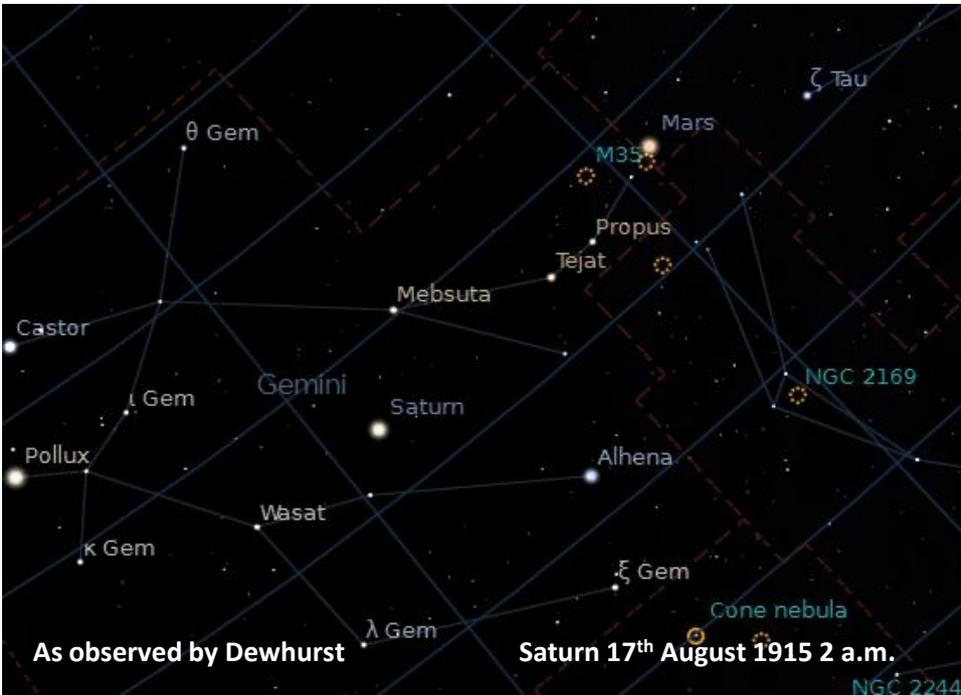
Jupiter has been under observation during last
 summer & many interesting observations were
 recorded of its moons & its cloud belts.

Planet Saturn was recorded by Mr Deekhurst on
 Aug 17/15 2 o'clock^{AM} rings well open 1 moon visible
 Saturn between Taurus & Gemini. The interest of this
 planet is well shown on account of its slow journey
 through the sky. April 26/14. G Parker records Saturn
 in line with Aldebaran about 3° above.



Saturn 17th August 1915 2 a.m.

As observed by Dewhurst

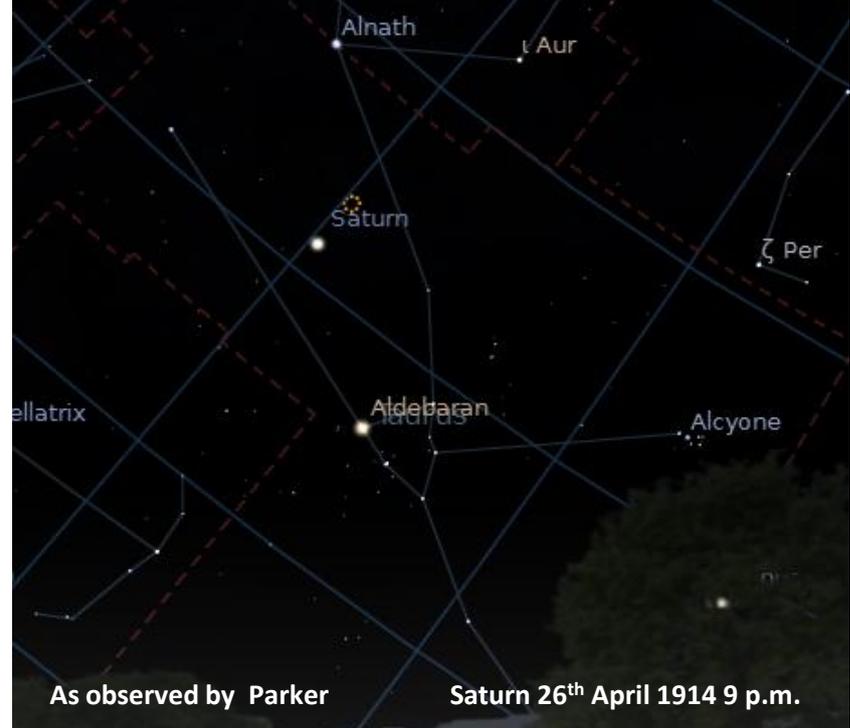


Saturn 17th August 1915 2 a.m.

As observed by Dewhurst

AUGUST 1915

The moon of Saturn observed by Dewhurst will have been Titan at mag 8.95 (above) as the other moons were much fainter. Saturn was actually in the constellation of Gemini (left). As you can see Mars was not far away in Taurus in fact at the same brightness as Saturn.



Saturn 26th April 1914 9 p.m.

As observed by Parker

APRIL 1914

As George Grundy points out, the previous year in April placed Saturn close to Aldebaran although the separation was in fact 8 degrees 20 minutes rather than 3 degrees.

time 10.15.^{DM}

Aug 27/14. χ Comet Delavan's) found in the telescope by G Gundry in the constellation of Lynx. position N.E. Sep 20/14. ^{9.15} The comet passing below the pointers Ursa Major. Oct 14/14. ^{9.30} The comet showing a nucleus, coma and a fan shaped tail, several stars observed through the tail of comet. ^{further} x seconds are to be seen in the observation book.

Popular Astronomy.

Vol. XXII, No. 9.

NOVEMBER, 1914.

Whole No. 219

DELAVAN'S COMET.

E. E. BARNARD.

Though this comet has made but little display, it is far from being a disappointment. It has really done all that was reasonably expected of it, considering its large perihelion distance. There were some astronomers, however, who had hoped for a notable display near the time of perihelion passage. But so far the comet has done little in the way of show, and it is not likely now that it will do any better.

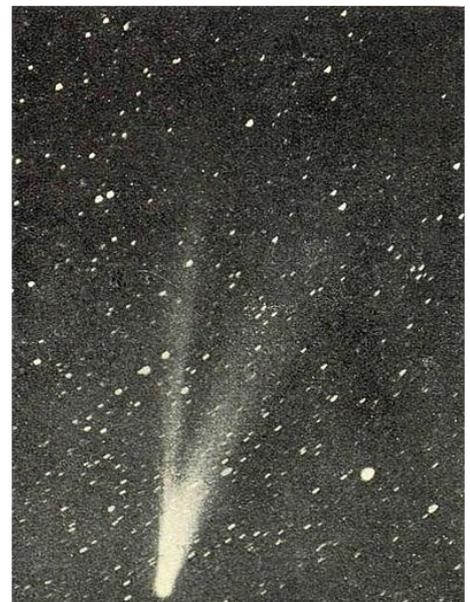
For three months it has been visible to the naked eye, and for at least half this time it has been fairly conspicuous, though the tail has been short and not noticeable for more than three or four degrees. It could, however, for a time (about the latter part of September) be traced for a distance of ten degrees—but very feebly.

On several dates—notably on September 26—the nucleus was star-like to the naked eye and on the above date its brightness was equal to that of χ Ursa Majoris, for which magnitude 3.85 is assigned in the revised Harvard Photometry. The combined light of the head, however, has been but little less than the third magnitude.

On several dates—notably on September 26—the nucleus was star-like to the naked eye and on the above date its brightness was equal to that of χ Ursa Majoris, for which magnitude 3.85 is assigned in the revised Harvard Photometry. The combined light of the head, however, has been but little less than the third magnitude.

I have already (POPULAR ASTRONOMY for October 1914) called attention to the fact that the comet has two tails with an angle of some 30 degrees between them, that the light of the tail was slow in its action on the photographic plate, and that the northern tail was full of structure. These peculiarities have been marked features in all the later pictures. The northern tail is also the brighter and longer of the two on the photographs. In locating the tail among the stars with the naked eye I was struck with the fact that what was seen was not the longer and brighter north tail, as shown on the photographs, but the shorter and fainter south tail. No trace of the northern one could be seen at any time. This seemed to imply that the light of the two tails was quite different in physical nature—the north one being the bluer. Two small lantern lenses of nearly the same light ratio and aperture

A description of the Comet is given by Barnard in the November 1914 Issue of Popular Astronomy. Notice the two tails in the photograph.



are attached to the Bruce telescope. On September 29 and subsequent dates one of these was used with a yellow color filter and a Cramer Instantaneous Iso plate, while with the other an ordinary plate was used. The results seem to show that the screen cut out the north tail, but shows the south one fairly well. This would seem to indicate that the two tails are really shining with light quite distinctly different—the south one being less actinic—as was implied by the visual observations.

This quite agrees with my previous results in photographing comets—the tails that show the most structure are the quickest in photographic action. At the same time, neither of these tails is photographically quick, the northern being only relatively so.

Some of the photographs of this comet are very beautiful. This is due to the peculiarities of the two tails; one long and straight, the other diffused and strongly curved. I have not seen this combination before in the photographs of an individual comet. These features are well shown in the plate accompanying this article.

Yerkes Observatory,
Williams Bay, Wis., 1914 Oct. 19.



Description	
Rating	★★★★★ Based on 0 rating(s)
Collection Call Number	UA36
Collection Title	Lick Observatory Records
Series Title	Glass Plates
Creator	Barnard, Edward Emerson, d. 1923, photographer
Title	Delevan's Comet
Date	September 28, 1914
Subject.LCSH	Astronomical photography Delevan comet
Type	Image
Original Format	Glass Plate
Original Size	3.25 x 4.25 in
Image Orientation	Vertical
Notes	Note on plate: "Delevan's Comet 1914 Sept. 28, 15h 13m C.S.T. Exposure 2h 47m 6-inch Bruce Telescope - E.E. Barnard"

Aug 11/14 Mr Parker Mr Varley & I Judy recorded
20 shooting stars from Perseus.

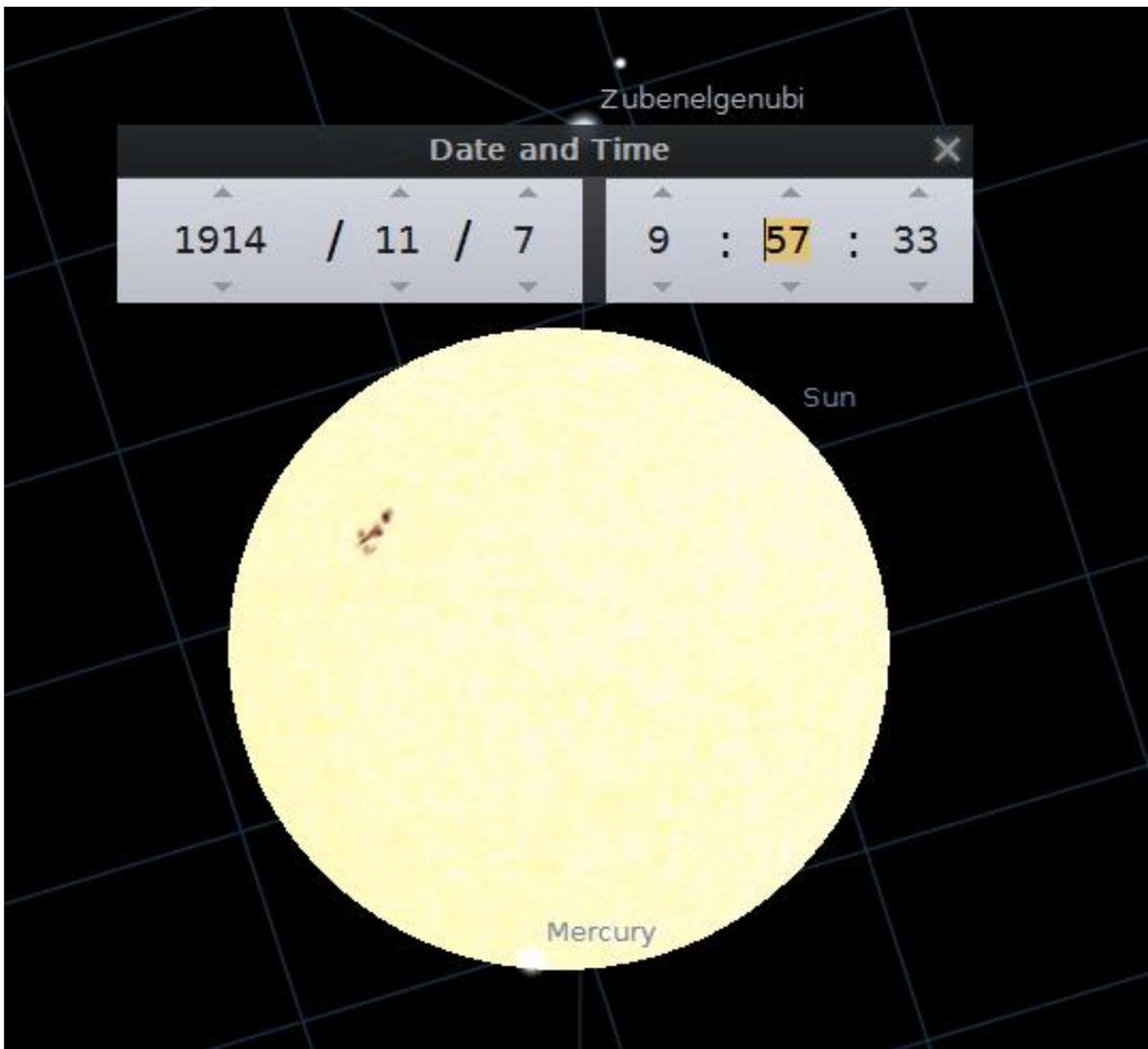
Records of double stars, star clusters in Hercules,
Cancer & Perseus, Nebula in Andromeda & Orion.
colours of stars are in many instances recorded.

Of all celestial beauty & wonder none exceeds
that of the Sun & moon. Many drawings & sketches
have been made & many interesting records made
of Sun Spots, Solar Eclipse, Transit of Mercury, and
the features of Lunar Landscape, etc it is impossible
to deal with the majority of records I submit the
observations which are most essential.

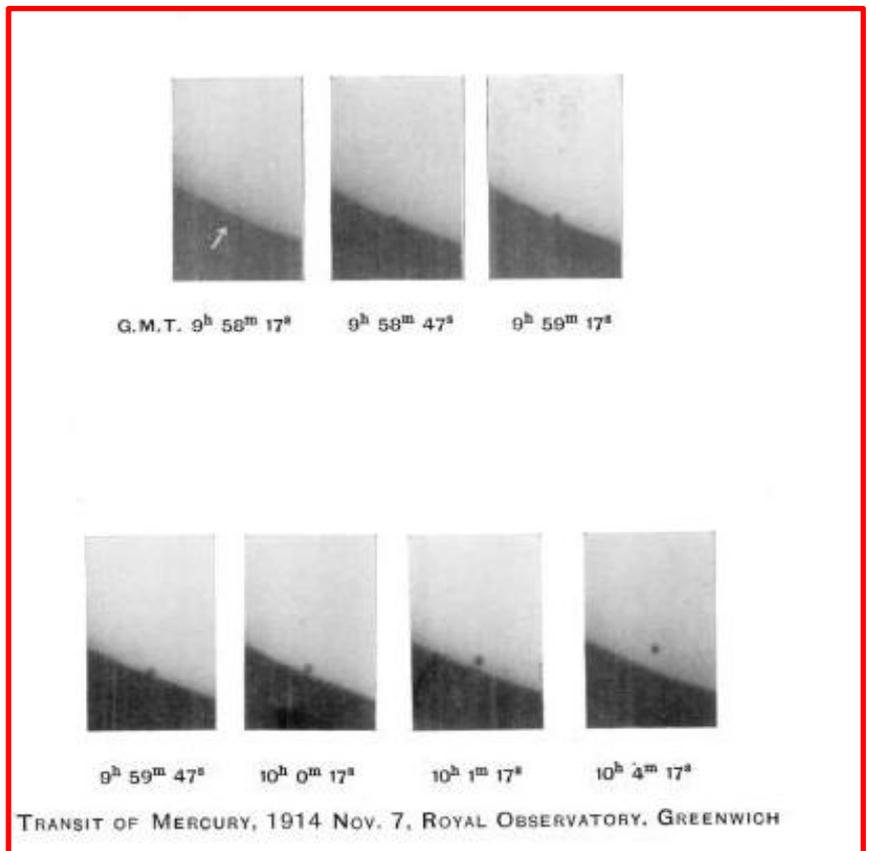
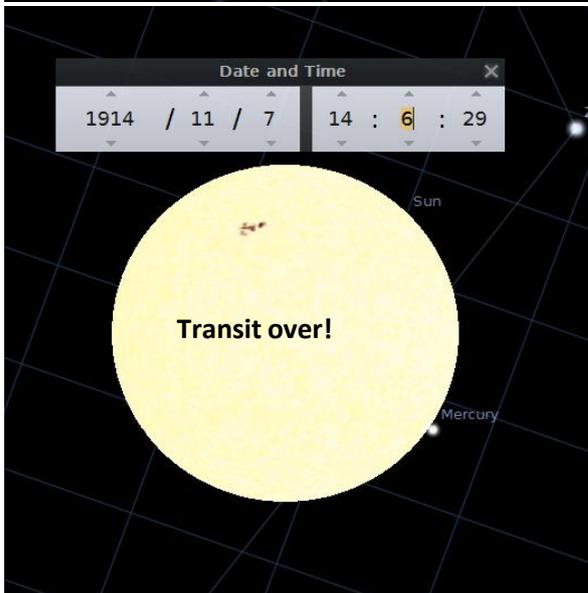
On Aug 21/14, we had a partial solar eclipse, Mr Parker, Dewhurst, Gundy were at the Observatory, the first contact took place 10^h 53^m. The large spot (which by the way was a persistent solar spot had been visible for weeks) was obliterated by the moon at 11^h 18^m. At 12^h 3^m the moon had blotted out $\frac{2}{3}$ of the Sun's surface, 1^h 14^m was the last contact. The phenomenon was a success although the earlier part of the eclipse was some-what cloudy.



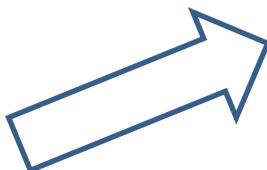
On November 9/14. We observed the transit of Mercury across the Sun's disk, the observers made use of the Wal Telescope, the first contact of Mercury on the solar disc was 11^h 15^m. The interest being the contrast of Sun-spots & their Umbra & the dark spot of Mercury. This observation was partial successful, the later part of the transit being obscured by cloud.



The start of the Transit at 09:57 using Stellarium. George Grundy reports the start at 11:15 which is strange.



Monthly Notes RAS



Notice the references to craters being Volcanic in origin rather than being impact craters.

During the last 12 months 30 observations have been made of the moon, on April 26/14 we observed the new moon on the 1st 9th dd. This being the earliest record of ours for a new moon. Sketches have been made in the observation book by the Observers. amongst them are the lovely seas, The sea of Serenity. the sea of Tranquillitatis, mare Imbrium or the sea of Showers & mare Crisium. As I sit looking at the various drawings of the lunar surface I feel that I am looking at the sketches of a land of mystery. no wonder at it being the favoured object of those that use the ~~my~~ telescope, you may wander at will through the long lunar valleys; you may cross the parched plains, you may in imagination climb the highest peaks and watch the sun rise or sun set. If you are interested in volcanic craters you have on the moon some-thing like 200,000. Scores of craters distinctly show the pipes of the extinct volcanoes, and in the case of ^{action} Copernicus we have seen 9 different columns of ^{which have been by volcanic} rock built up in the centre of a crater whose diameter is 56 miles and whose walls stand above the surface of the moon some-thing like 15,000 ft. I must also refer to the sketches made by Mr Deakurst of 3 craters where he has drawn to great effect the shadows of the craters walls on the eastern outside edge of the crater & the broad dark ~~shows~~ shadow from the western wall which gradually creeps down ~~the~~ crater as

the observer sketches. He has also drawn inside these craters the volcanic pipes & the long shadows cast inside the craters. So one who has seen the moon & studied some of its wonderful features the sketches are very wonderful.

On Sep 10th 12 O'clock mid-night there was occultation of Pleiades first star disappeared 11 10th reappearance of stars from behind the dark limb of moon 11 53. 9 Jurdy observer.

The conclusion of this report deals with the Sun. We have made fifty Observations of the Sun, and made 37 sketches of Sun spots. I think I shall be well inside the mark when I say that we have recorded more than 100 Solar spots. Some of these have been the persistent spots & come round again as the Sun rotates on his axis. The sketches show in many instances the change that takes place in a few days. Throughout the past 12 months the Sun has been more or less displaying these spots, all the large spots we have recorded have shown a penumbra. Our last record was taken on March 7/15 and we observed 5 spots all showing penumbra. These observations have been made by Mr. Norton, Dewhurst, Parker & Gundry using the 4" & the Walm's telescope.

The Sun has been the means of finding pleasure in studying its granular surface & realize if you can the immense distance of 3,000,000 miles. The wonder is that one can observe Solar storms that are surely in evidence. What would our humble planet be without the Sun. Life is everywhere, from the bottom of seas, from the valleys & mountains, from the vegetation that carpets the soil, from the soil of the fields & woods, from the air we breathe, arises an immense, prodigious, and perpetual murmur, lesser; it is in the great voice of nature, the sum of all the unknown & mysterious voices that are for ever calling. From the jewelled sun-lit foam which flows from the ships bows, from the hills of snow which for ever rise & fall on the inscrutable bottom of the Atlantic. From the forest winds, from the 300,000 insects ~~that~~ kinds of insects that swarm everywhere, and make the globe on which we live a universe of fantastic life, a drop of water contains thousands of curious creatures, a grain of dust from any of our city streets may be the home of thousands

of Pater's. What can one say of the myriads of insects that fly in the Sun, the singing birds, the marvellous evolutions of the swallows, the colours of Sun-sets, the dawn of day, the ripple of human laughter, the babble of a rannel, the changing seasons, Our Earth is a mere speck to the Sun, the Sun is a star that forms part of that vast mysterious arch of Diamond dust that we call the milky way. We are part of a system, wherein the suns may be counted by the million, our Earth is a star a planet as bright and beautiful as Venus shining in an evening purple sky.



PALE BLUE DOT

I wonder what George Grundy would have thought of this image of the Earth from Voyager 1

[Details here](#)

Courtesy of NASA/JPL

BAS Meeting on 20th November 2012



The meeting room was packed to the rafters to hear a number of speakers - note the new member (Dobson) at the back

Gerald Bramall demonstrated the critical importance of taking flat and dark frames to calibrate an image.



David Ratledge demonstrated his new Lifecam Cinema webcam.



The Chairman even managed to image Saturn live using the webcam



Carl Stone demonstrated the new location of the Society Journal – “The Bolton Astronomer” on the website



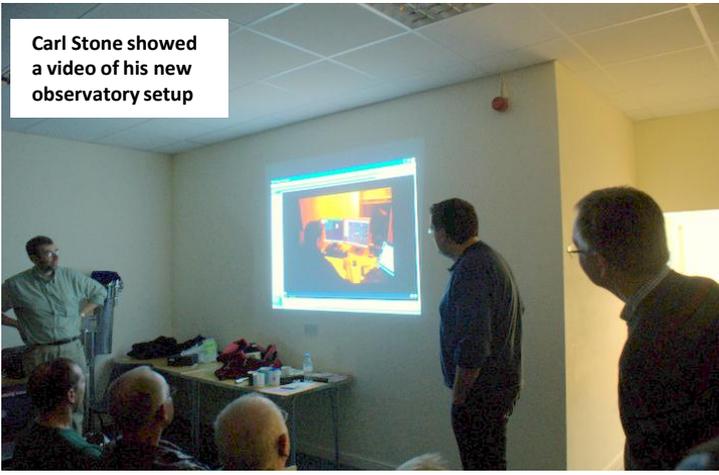
Ross Wilkinson showed us all how to make a magnetometer



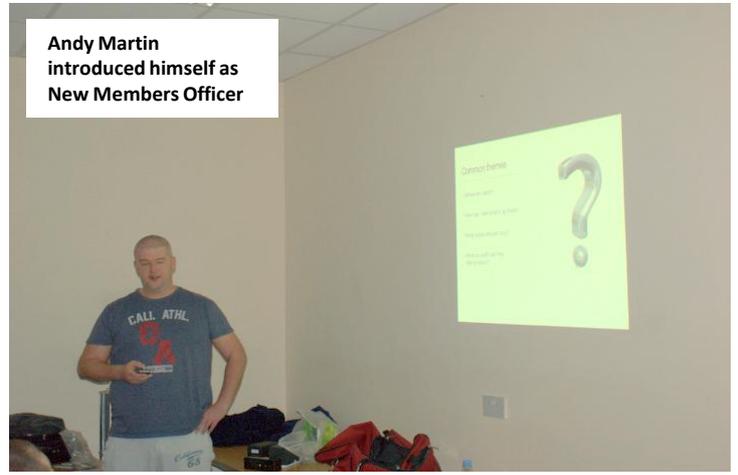
Dean Kos told us all about the Loans Procedure and the equipment available for loan.



Carl Stone showed a video of his new observatory setup



Andy Martin introduced himself as New Members Officer



Ros Flynn described some new courses on Astronomy



The Bolton Astronomical Society new 16" Dobsonian telescope acquired using a Big Bolton Fund grant.



Members had the opportunity to look at the telescope at the meeting.

November 2012 Observations

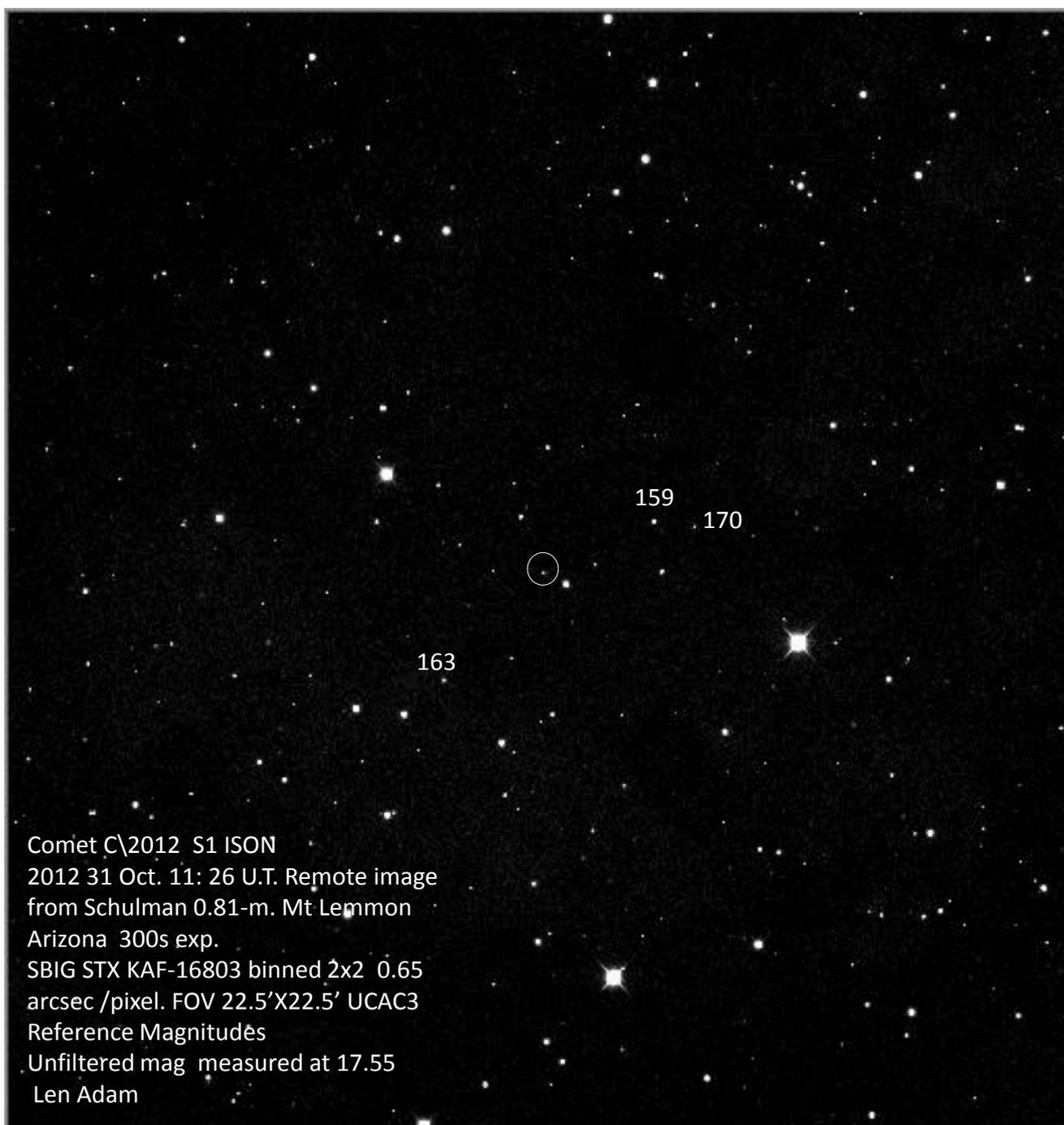
Len Adam

A 6 page sample of my November Observing Log. Full log (76 pages) can be found on this link [here](#) on my website for download. Do you have an observing log for next month's issue? Any observations welcome.

Will this really be a daylight comet?

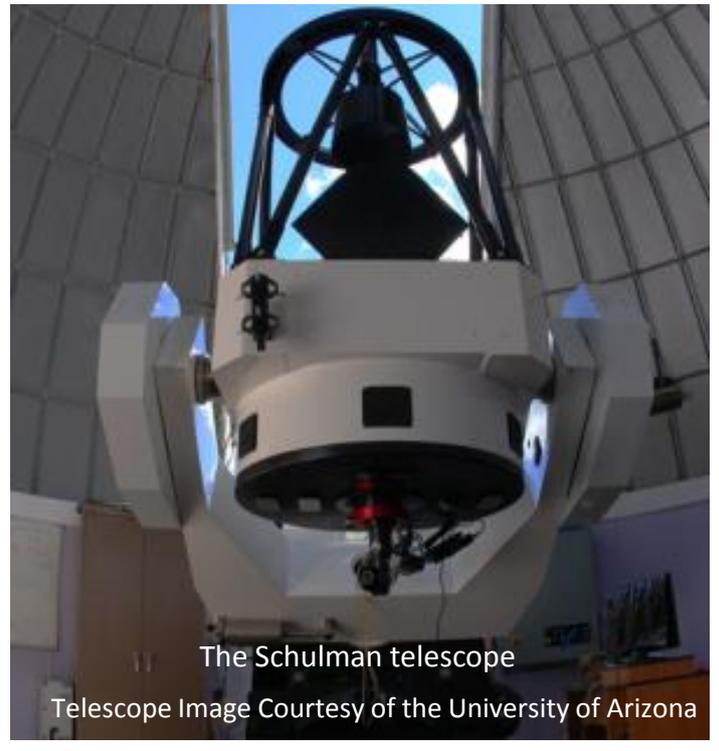
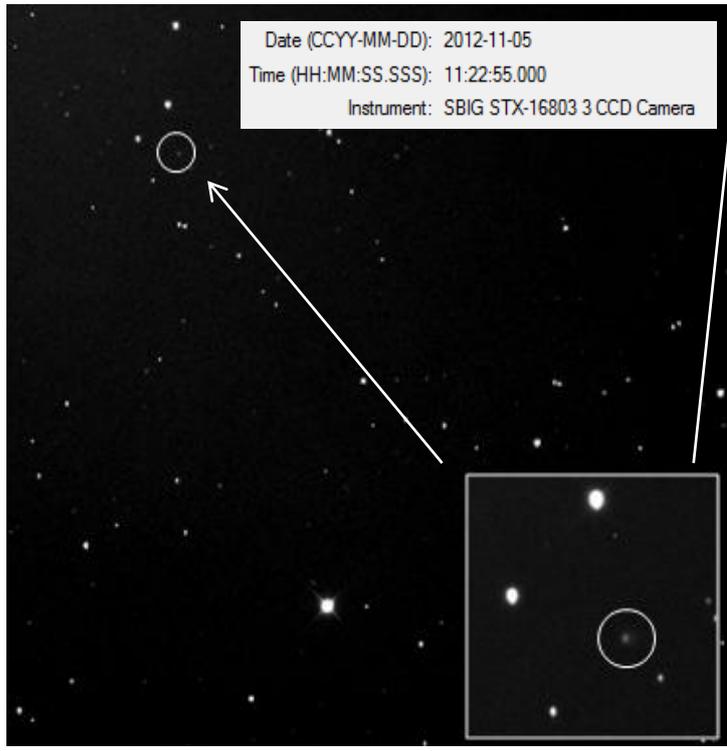
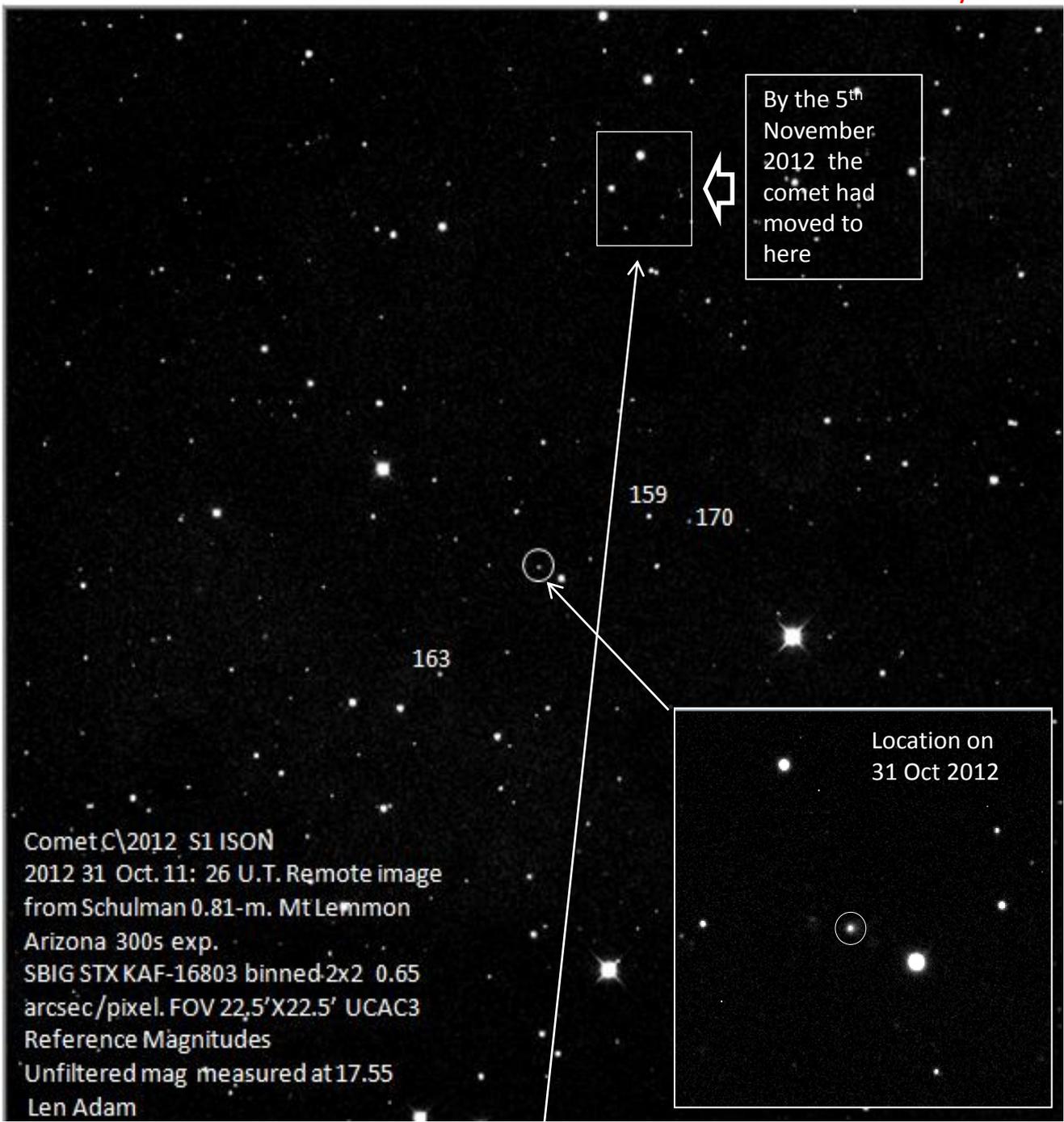
I have just downloaded the image of the field of Comet C/2012 S1 (ISON) that is predicted to be a naked eye object in Autumn 2013. I used the 32 inch Mount Lemmon Telescope belonging to the University of Arizona that is part of the Sierra Stars network to make the exposure. It was a 5 minute exposure taken yesterday at 11:26 U.T. There is an object at the precise spot indicated by the SKyX chart for the comet that I have circled in the image below. Reference magnitudes would indicate that the comet is around mag 17. I plate solved the image in the SKy6 and measured the magnitude using the CCDSoft/Sky6 photometry facility at 17.55.

(See the image on the next page - bottom left - taken a few days later (very close to the moon) that confirms this is the comet showing exact positions corresponding to predictions)

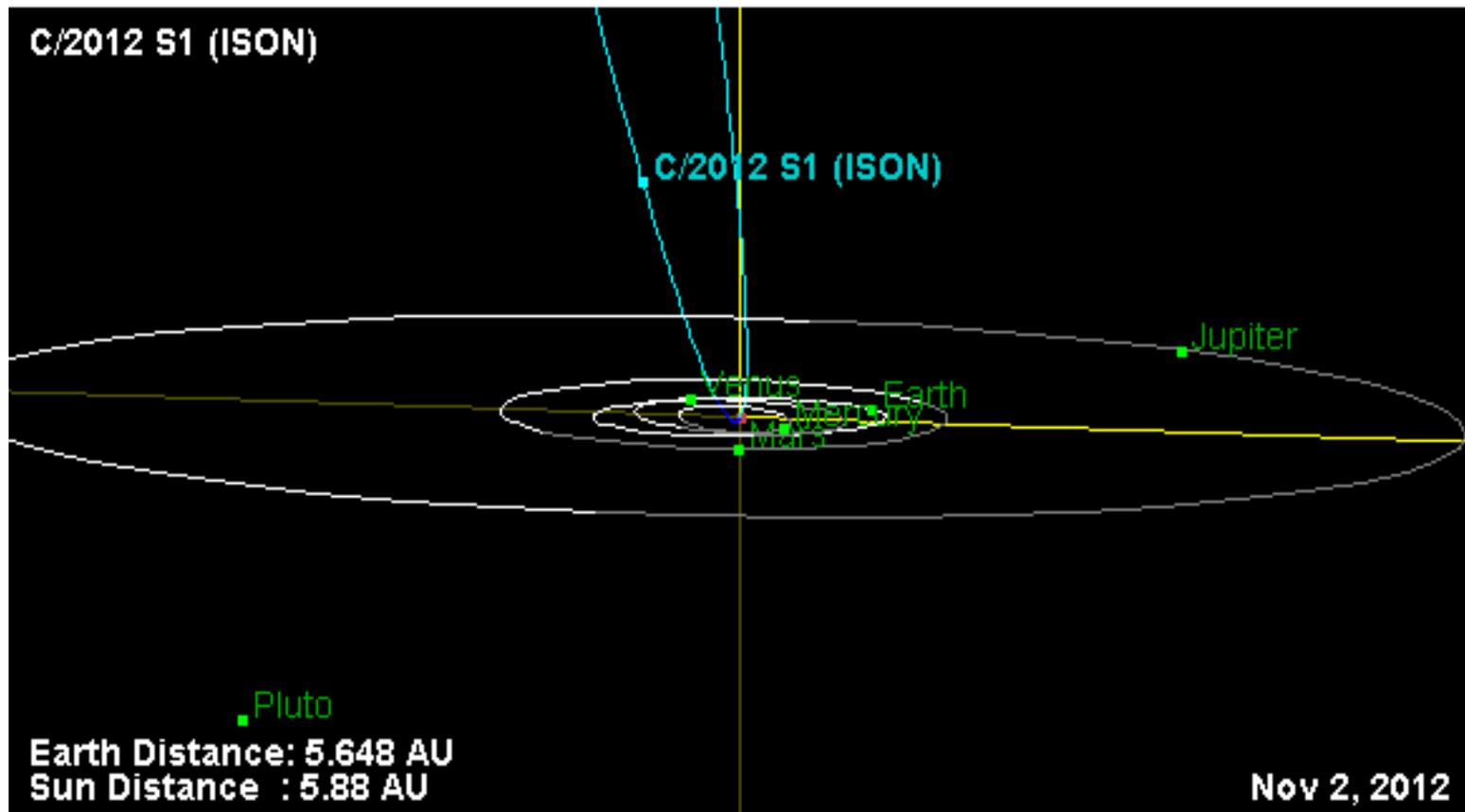


Comet C\2012 S1 ISON
2012 31 Oct. 11: 26 U.T. Remote image
from Schulman 0.81-m. Mt Lemmon
Arizona 300s exp.
SBIG STX KAF-16803 binned 2x2 0.65
arcsec /pixel. FOV 22.5'X22.5' UCAC3
Reference Magnitudes
Unfiltered mag measured at 17.55
Len Adam

Including Magnified view

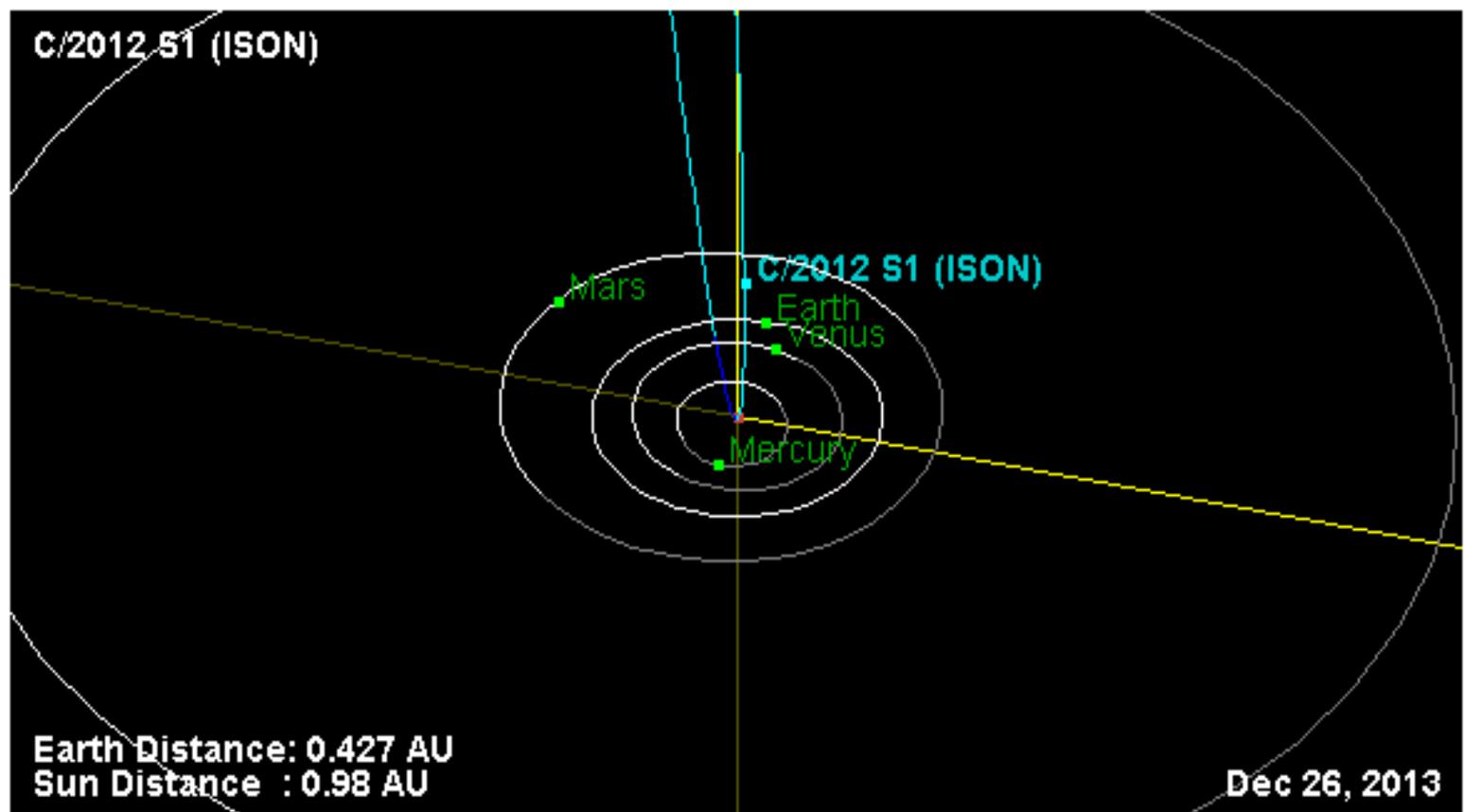


The orbit of the comet is shown below - it is heading for the Sun at a sharp angle to the plane of the ecliptic.



Courtesy NASA/JPL-Caltech.

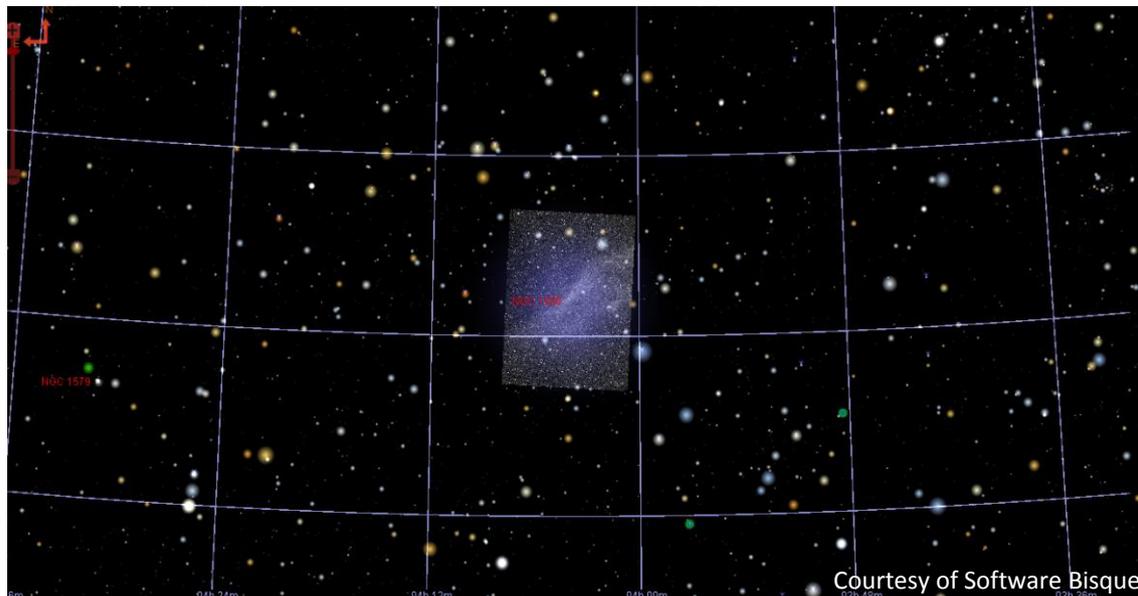
It is currently 5.6 AU from the Earth – i.e. Over 5 times further away from us than the Sun itself. Not surprising then that it is very faint at the moment . When it gets closer it will get brighter – the warmth of the Sun will begin to melt some of the icy content and a tail will develop. At its closest to the Earth it will be at a distance of about 0.43 AU - around 13 times nearer than it is now. It is predicted to be a daytime comet as bright as the full Moon and could be a good Christmas Comet.



Courtesy NASA/JPL-Caltech.

A busy morning and evening with observations and images of NGC 1499, 2 comets, 38 galaxies in Auriga, 20 galaxies in Cassiopeia, 42 galaxies in Cygnus and 4 galaxies in Triangulum.

I used the T20 iTelescope.net telescope to image the California Nebula (well part of it) in Perseus. I was looking for an emission nebula to image that was well away from the Moon to get further practice using IRIS



This is the SkyX chart of the California Nebula showing the Field of View of the T20 Telescope with the solved plate superimposed. North is up in this image



The final image after processing in IRIS is shown below



The final image with North towards the top to correspond to the solved image in the chart above is shown on the next page.

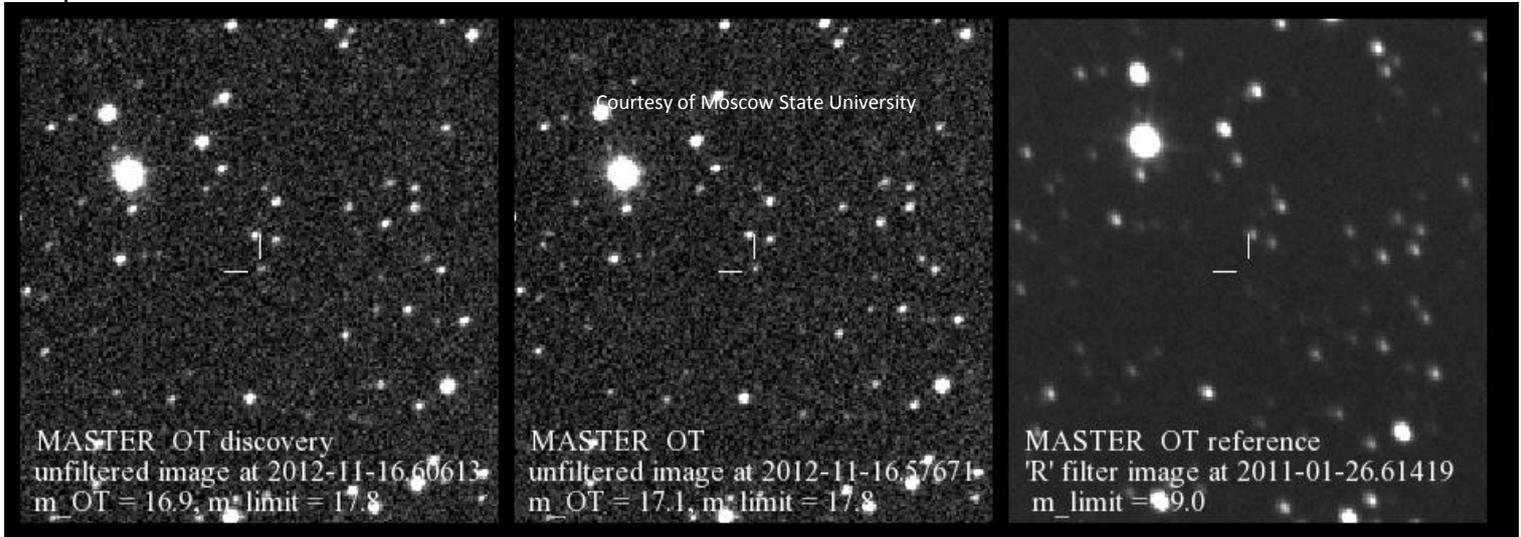


Monday 19th November 2012

MASTER OT J061017.75+414545.7

A new cataclysmic variable was reported in E2869 by Guy Hurst:

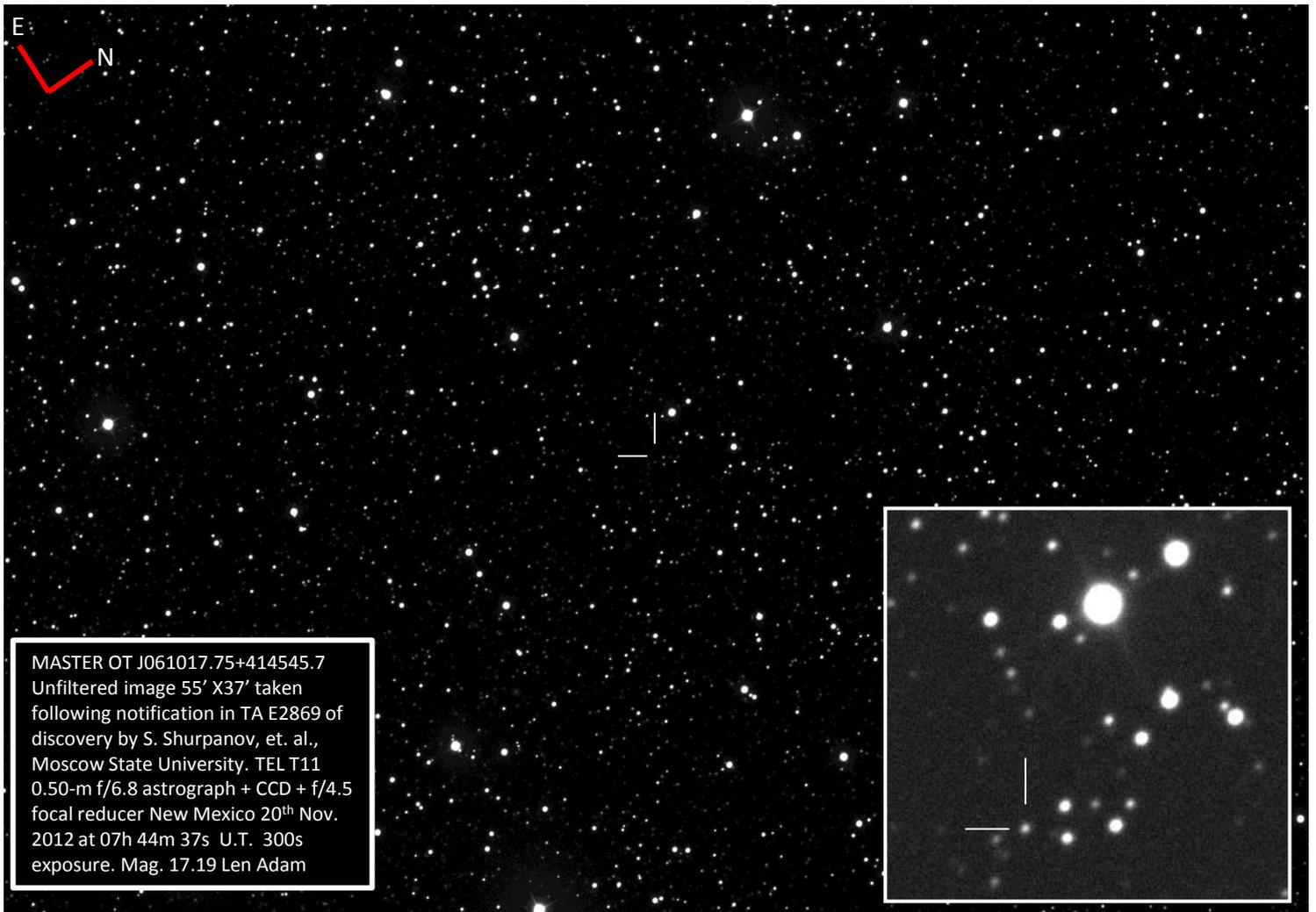
"S. Shurpanov, et. al., Moscow State University, SAI reports on The Astronomer's Telegram 4585 that MASTER-Amur auto-detection system discovered OT source..." (Discovery Image below) Follow up observations were requested.



I requested an image of the object to be taken with the Schulman telescope in Arizona but also used T11 in New Mexico. The T11 image confirmed the CV. The confirmation was published in TA E-Circular 2870.

MASTER OT J061017.75+414545.7 - new CV

This object, announced on E-Circular 2869, was imaged in confirmation by Len Adam on 2012 Nov 20 at 07h44m37sUT on a 300-sec exposure with T11 0.50-m f/6.8 astrograph + CCD + f/4.5 focal reducer in the remote facility of iTelescope.net in New Mexico. The magnitude was 17.19.



EQUIPMENT OF THE MONTH

BAS Equipment available on loan – a series of articles describing the available equipment. To be continued in future months. This information is taken from the full listing of equipment in the Forum on the web site.

We now have a compact 4" aperture Maksutov telescope with a 1300mm focal length.

1

Author:
Ross Wilkinson



It comes in a smart shoulder-bag, along with red-dot finder, star diagonal and 25 & 10mm eyepieces. And the eyepiece-holder is fitted with a T-thread, so it can be used with most camera accessories.

I've mounted it on a dovetail plate, so it can go on most existing mounts, including our own NexStar SLT or modified EQ2.

The long focal-length means that it's good for planetary observing (and imaging with webcams), yet it's so compact that it's easy to transport and quick to set up, and hence ideal for use at our group observing sessions and for loan to Members.



This is the first imaging experiment with our new 4" Maksutov. Compare it with the one which I took with my 8" SCT a few days earlier, and see how the steadiness of our atmosphere is more significant than telescope aperture!

After dazzling myself looking at the first-quarter Moon with it the other night, I dread to think how bright the fully-illuminated disc would be!

So I've just made a variable-aperture mask to fit on the front:



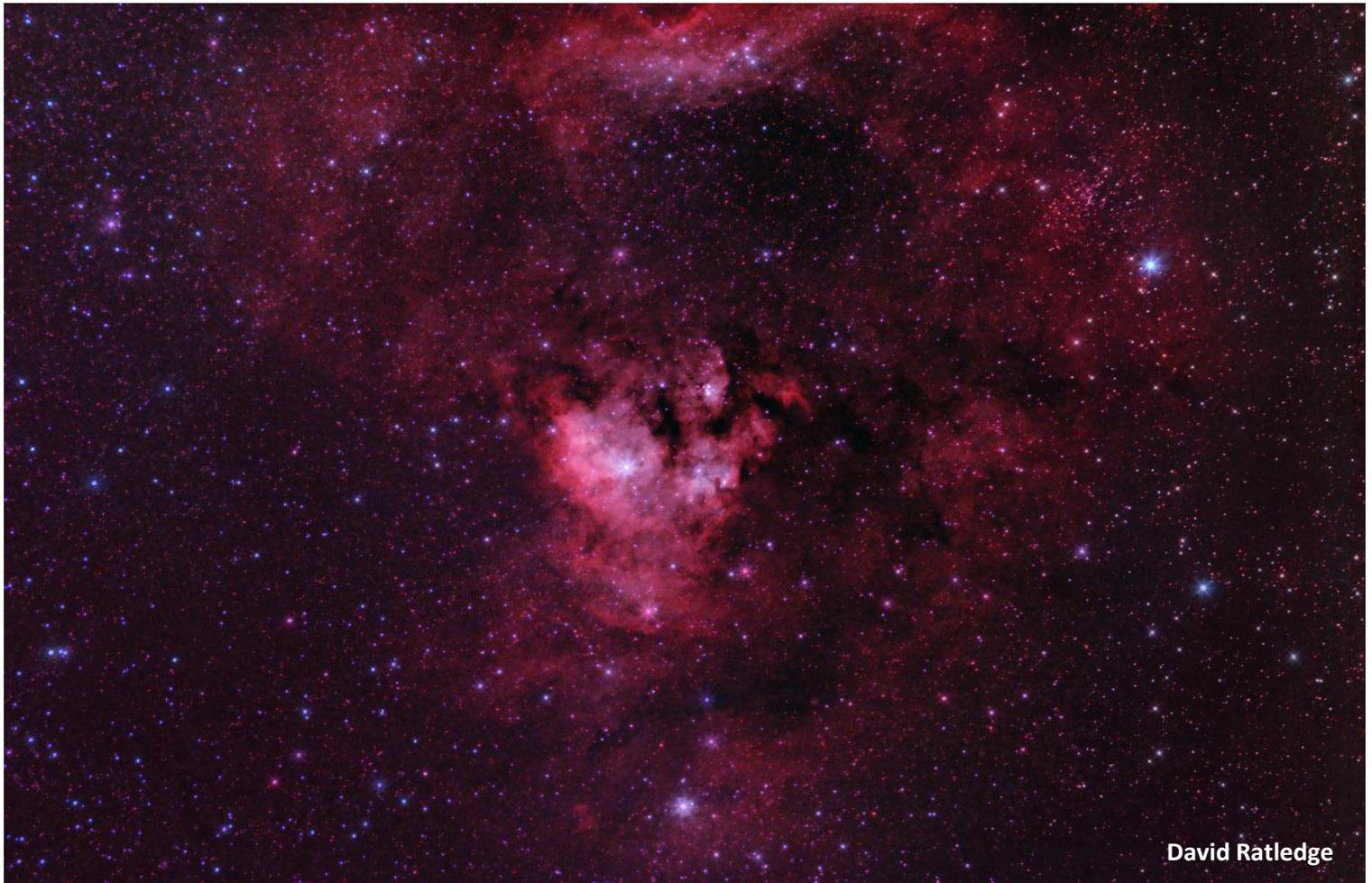
And while I was still in *Blue-Peter* mode, I also made a white-light solar filter using a small piece of *Baader AstroSolar* film:



Both of these items are now in the kit which is available for loan.

We've added a 40mm super-Plossl eyepiece to this kit, as it's often useful to have a wider field-of-view (e.g. for full-disk views of the Sun and Moon).

Images from society members



David Ratledge

Sharpless Sh2-171

Huge object or objects really. The brightest central portion is NGC 7822, the patch on the top edge is Cederblad 214 and the odd shaped cluster towards the top right is NGC 7762.
Pentax 300mm lens + Canon 40D.
David R.

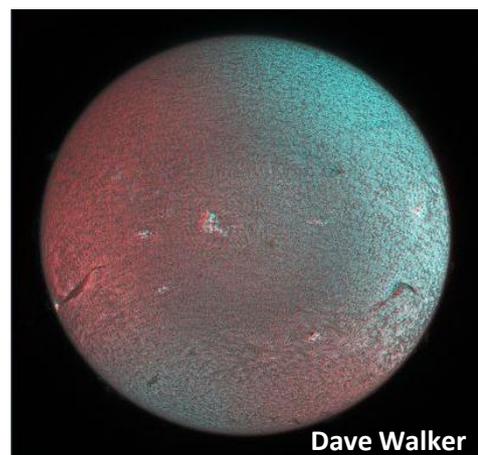


Ross Wilkinson

Jupiter & Europa

At last Jupiter is high enough to be visible above the trees.
I'd forgotten to pre-cool the telescope in the shed, so I had to wait an hour for the air in it to settle down enough to get decent images.

3D Sun
My first Anaglyph.
Made with Anamaker from two shots of the Sun taken 3 hours apart.
You'll need a pair of red-cyan glasses to view...



Dave Walker



Dean Kos

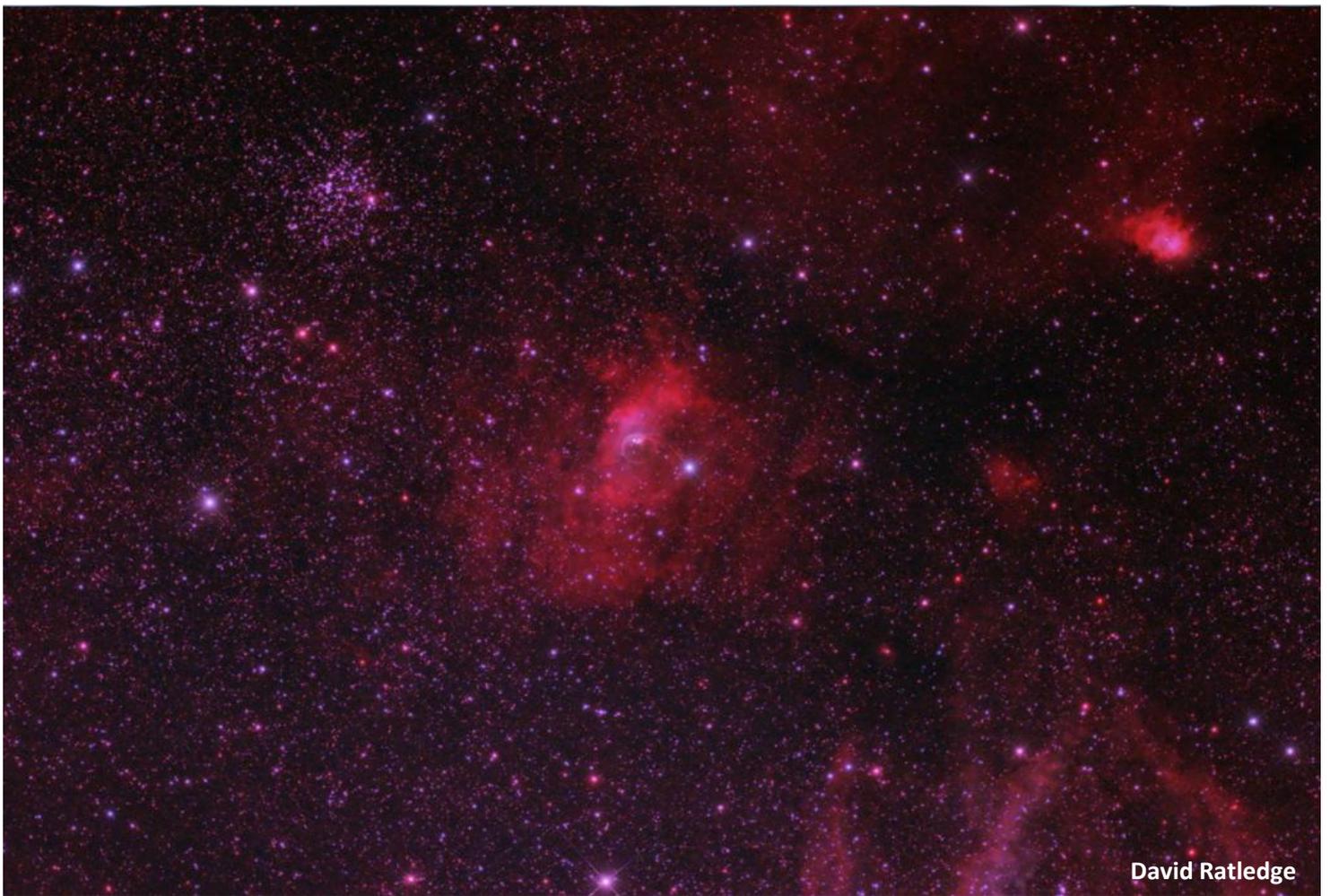
m45

yet another attempt through small refractor but this time with spikes !! (thanks dr) 28x3.5min exposures at iso 400 with canon 1000d, processed in iris.
I think this is the limit of quality now for this cheap scope.....starwave apo next, watch this space.



Len Adam

M42 5 minute exposure
iTelescope.com Remote telescope
T20 in New Mexico
[SBIG ST-8300C](#) One Shot Colour CCD
106mm Takahashi FSQ-ED telescope.



David Ratledge

M52 and the Bubble Nebula

Back to conventional colour images! The Bubble is dead centre and the wind from the central star is producing those hotspot concentrations where stars can form that we heard about on Tuesday. Imaged from Lancashire.
David R.

Jupiter & Ganymede

Jupiter and Ganymede on the night of the 23rd November 2012 at 2138. 3x Barlow lens and IR Filter used with the Opticstar PI-131C. Ganymede is just passing by the bottom of the planet, right of the image. GRS, Oval BA and Baby Red Spot are visible in this image along with turbulence caused by the GRS. Seeing wasn't great but steady enough from time to time. Mainly processed in Registax 6 and touched up in Serif Photo Plus X4.



Lee Renshaw



Dean Kos

moon through 'live view'

taken by capturing the live view stream from canon1000d through c8 then processed in registax in two halves and added together in microsoft ice. Each half was 1000 frames each.



Jupiter & Ganymede 22:12UT 28/11/2012 Celestron C8 + Microsoft Lifecam at f/20 DR

Jupiter & Ganymede 28/11/2012

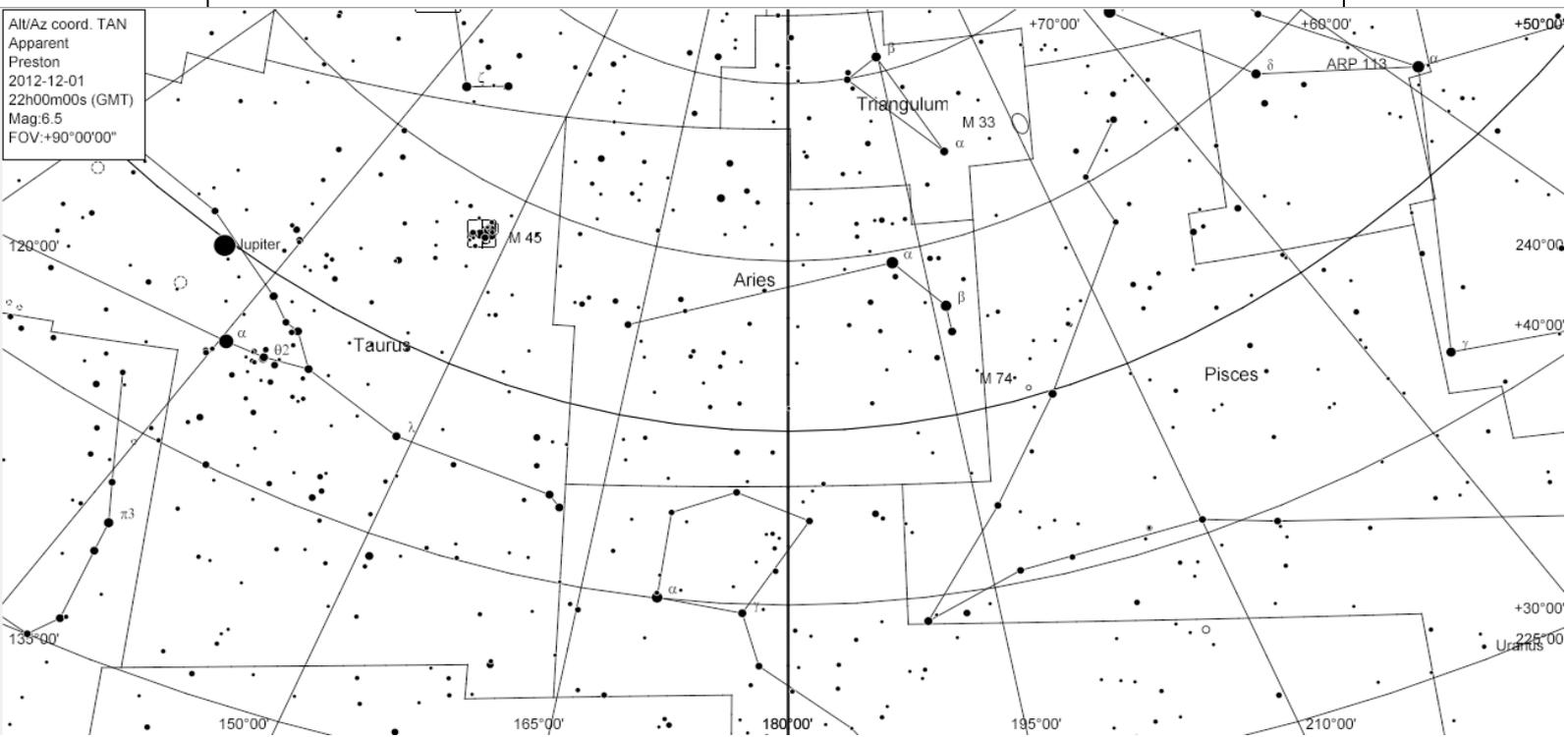
At last the red spot was around the front! Forgotten how cold it was outside! Taken 28th November 2012.
Best 2000 from 3000 frames with Celestron C8 and Lifecam.
David R



December Objects of Interest 2012



CARTES DU CIEL VIEW OF THE SOUTHERN SKY AT 10 P.M.ON 1ST DECEMBER 2012



TONIGHT'S SKY

highlights
of the
december sky
2012

Click on the image above to see the Hubblesite video of the November 2012 Night sky.

Meetings Schedule December 2012 to May 2013

Meetings are held each month on Tuesday evenings, commencing at 7:30pm and concluding around 9pm.

Our main meeting programme runs from September to May, and features a mixture of formal lectures and informal "Activity Nights". Activity nights will be posted on the website so keep an eye on that for details.

Admission is free to members, and visitors are welcome at £2 per visit.

Over the summer we also get together on the first Tuesdays of June, July and August.

The programme of our future meetings is shown below, but may occasionally be subject to late changes, so *if you're travelling from some distance, please contact the BAS Committee by email to boltonastro@gmail.com to confirm before making your journey.*

There are 9 issues of the Society Newsletter per annum with a summer break in June, July and August

The Newsletter is an online PDF that can be downloaded and printed if required.

Date	Subject	Presented by
4th Dec 2012	Members' Talk: "Star Parties 2012" Update on the Society's star-camp at Kelling Heath in September, plus a member's trip to the inaugural BSIA star party in Wales	Carl Stone Bolton AS
18th Dec 2012	Christmas Party End of season food, festivities and fun. Including Roy's popular Astro-Scrabble team game	BAS Committee Bolton AS
15th Jan 2013	Activity night: "Telescopes" No Presentations, no theoretical, just pure practical. Here we'll be showing how to use that telescope you got for Christmas.	BAS Committee Bolton AS
5th Feb 2013	Members' Talk: "Navigating the night sky" How to navigate the night sky using a map, laptop, phone app. or tablet device.	Dean Kos & Andy Martin Bolton AS
19th Feb 2013	Members' Talk: "The Mobile setup" Images and movies of star-trails, and lightweight astronomy equipment take on holiday to make those holiday photos more memorable.	Dave Walker Bolton AS
5th March 2013	Guest Speaker: "Moses Holden: 1777-1864" Following our History of Astronomy in Bolton , a talk on Moses Holden. Astronomer, Evangelist, and much, much, more.	Stephen Halliwell
19th March 2013	Members' Talk: "Observing and imaging Comets" With Comet PanSTARRS getting brighter Ross will be showing how to find comets and even image them.	Ross Wilkinson Bolton AS
2nd April 2013	Activity night: "Show and Tell" Five Minutes! Have a recent purchase you want to brag about, or share some of your own astro-images with us? Then you have five minutes to show and tell everyone. Okay you can have ten if you need.	BAS Committee Bolton AS
7th May 2013	Member's Talk: "Observatories" An update on the re-fit of the Broomes Farm Observatory and some tips on how to build your own.	Carl Stone Bolton AS
21st May 2013	Guest Speaker: "The Story of Elementary Particle Physics"	Fred Loebinger School of Physics and Astronomy The University of Manchester