

Wadhurst Astronomical Society Newsletter January 2013

*Wishing everyone a prosperous New Year
with lots of clear skies with perhaps in 2013
two bright new comets to see...*

PATRICK MOORE

Patrick Moore died on the 9th of December 2012.

Sir Patrick Moore 1923 - 2012



Patrick Moore with from the left, Phil Berry, Brian Mills and Ian King during a recent visit to Patrick's home

The public in general and astronomers in particular will have felt a collective sadness when the death of Patrick Moore was announced on Sunday November 9th 2012. He was 89.

He was born Patrick Alfred Caldwell-Moore on March 4th 1923 at Pinner in Middlesex, an only child who moved with his parents to Bognor Regis and then East Grinstead. His interest was sparked by a book he read during a period of incapacity caused by a heart problem. This was followed by what he himself termed "a slice of luck" - meeting an astronomer who also lived in East Grinstead and then being allowed to run his observatory. He spent the war navigating in bombers and although he made it through, sadly his fiancée did not and died in the London blitz. He began his career by writing books, mostly non-fiction although he did try his hand at boy's fiction with some success. He first appeared as the host on "The Sky at Night" on April 26th 1957, although previously he was involved in a program about "flying saucers" when he argued the case against. He only ever missed one program (July 2004) and that was due to serious food poisoning from a decidedly dodgy egg!

Patrick was a warm and generous host if you visited him at home. He kept all the local take-away menus close to hand and would always get you to choose whatever your fancy was on that particular evening. The last time I saw him was in February 2012 at his home "Farthings" (he claimed it was a play on the words "far things") in Selsey. It was clear then that he was quite unwell but he remembered the last time that we met, which was on a plane coming back from the Arctic Circle. We had just left the airport and levelled out when Patrick's voice was heard over the intercom to tell us there was an Aurora outside. He

obviously used his charm on the flight deck because not only were all the lights (other than navigational ones) switched off but he got the pilot to turn a full 360 degrees so that everyone got a view of the Northern Lights.

That night in Selsey we sat firstly in his study where the programmes are made and then in the dining room to eat our take away. Around the walls of both rooms were numerous trophies, certificates and pictures - all of them testament to the esteem in which he was held both by the astronomical community and the public at large. Such were the quality of his observations of the Moon that the Russians and Americans made use of them to choose landing sites for their missions. Patrick had met many interesting people in his long life. There was Orville Wright, Albert Einstein (who is in a photograph on the dining room wall playing the violin whilst Patrick accompanied him), Neil Armstrong and Buzz Aldrin.

He earned his living by broadcasting and writing but he always maintained firmly that he was an *amateur* astronomer. That may well be right, but amongst amateurs he was truly a consummate professional.

Brian Mills

MEETINGS

COMMITTEE MEETING

Members of the Committee are respectfully reminded that there is a meeting of the Committee on Monday 7th of January 2013 to be held at Phil Berry's house and commencing at 1930.

Any member of the Society is always welcome to come along, but please let Phil know before hand.

DECEMBER MEETING

Members and visitors were welcomed by Phil Berry. He said how sorry we all were to hear of the sad death of Patrick Moore whom he had visited recently with others from the Society.

Further to Phil's survey into light pollution in the surrounding district, he has been invited to attend a meeting of the Parish Council tomorrow night.*(see end of Newsletter)

He went on to say that recently light beams had been seen in the Skies over Tunbridge Wells and showed us a horrendous picture he had taken. He discovered that the beams were coming from a Christmas Market in Calverley Ground but on further investigation he also discovered that they were being used without council permission. On his next visit, not only had they been switched off but had also been removed. May clear skies rule! On the other hand, the market, without sky beams was very seasonable.

He then introduced our speaker for the evening, Paul Treadaway; a member of the Society's committee.

Amateur Telescope Making

Paul Treadaway

A couple of years ago, Paul Treadaway brought along an oil drum and grinding equipment to talk about making a primary mirror for a Newtonian telescope he is constructing called the T200. He introduced some of the techniques he would be using

to make a 200 mm mirror. This was going to be at the same time as resurrecting a Ford Escort, so his time was going to have to be very carefully divided between the two.

Paul began his talk tonight by going into how the human eye perceives an image and then he covered the theory of lenses and mirrors.

Of the total electro-magnetic spectrum the human eye can only resolve an extremely small fraction from red at about 700 nanometres to violet at about 400 nanometres.

Light is focussed onto the back of the eye where colour receptors work on the higher light levels and black and white receptors which work in lower light levels. These collect the light and pass the image via the optic nerve to the brain for processing. Paul did mention that in the human eye, light has to pass through a web of blood vessels and nerves. The squid on the other hand has receptors in front of the vessels and so can see better than we can.

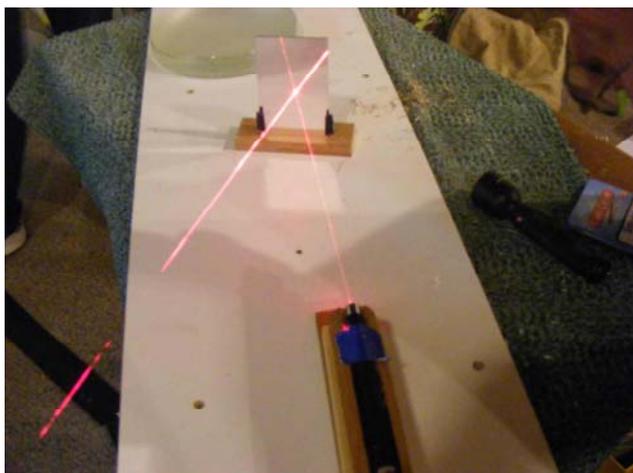
It was explained that the colour receptors tend to be mainly concentrated at the centre of our vision while the black and white receptors are mainly away from this point so when seeing in low light levels, more sensitivity is achieved by just looking a few degrees away when viewing a faint object.

The naked human eye can see a star down to about magnitude 6 in clear conditions. With binoculars we can expect to see down to about magnitude 9 and with an 8-inch telescope which is what Paul is making, down to about magnitude 13.

In a telescope, there are two main ways of gathering the available light together; the lens and the mirror. It might be possible for the amateur to make a plano-convex lens but a mirror is far easier to work and figure, avoiding or reducing chromatic and spherical aberration. As Paul said, a mirror needs to be surface silvered to reflect light, and to avoid spherical aberration it needs to be figured to a parabolic curve.

Paul said there is less light loss using a mirror but looking at a diagram of a Newtonian reflecting telescope we were able to see why there is a slight light loss due to the central flat mirror directing the image to the eyepiece through the side of the telescope tube.

Then by means of an optical bench Paul gave a practical demonstration of what was needed to achieve a ground mirror of the right shape. Using a red laser and smoke provided by one of Trevor Grey's bad habits – smoking, it was possible to see how light was reflected back from the surface of a mirror.



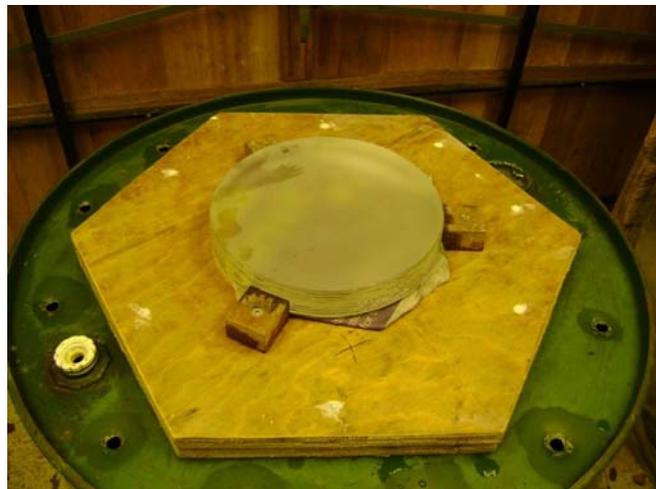
Demonstration of light reflected by a plane mirror

Then by using a series of plane mirrors in a curve, he showed how light could be brought to a common focus by positioning each mirror to mimic the shape needed from a full curved mirror.

The actual curve will need to be very accurate. The wavelength of green light for instance is about 500 nanometres (half of $1/1000^{\text{th}}$ of a mm) and Paul said that it is necessary to achieve an accuracy of $1/8^{\text{th}}$ of a wavelength; better than $1/10,000^{\text{th}}$ of a mm! The reason for needing to be so accurate

is that if it was just within one wavelength, the wave-fronts could interfere with each other, resulting in reduced light levels and different colours.

How to do this in Paul's garage? If two flat glass blanks are brought together with a grinding medium in between and then one of them ground against the other and rotated, the surfaces will always be in intimate contact at any point and so a spherical curve will be achieved; the top one being concave and the bottom one being convex.



The two Pyrex blanks ready for grinding

As a stable platform Paul used a large oil drum partly fill with water to give it greater stability. He had also drilled holes in the top of the drum to allow water used in the grinding process to drain away. Firmly fixed to the drum is one of the Pyrex glass blanks – the "tool". On top is the mirror to be ground, using fine carborundum as the grinding medium in between.

We then saw that by moving the mirror backwards and forwards and also moving around, the mixture of carborundum and water between the two blanks slowly ground the top blank into a spherical concave shape.

Paul said there was a website that demonstrated very well the grinding process at:
www.youtube.com/watch?v=BJ3SeL4G8y4

To check how accurate the shape is, finer and finer carborundum is used to finally polish the surfaces. Only then can the mirror be tested using a method called the Foucault Test. To demonstrate this, Paul used a point light source to reflect of the surface of a known good mirror and viewing the reflection over a razor-sharp edge, showing how the result was even illumination. He then compared that with a shaving mirror but unfortunately the video camera we were using used automatic exposure, making it difficult to see how uneven the reflected pattern of light was but it gave some idea of how the Foucault Test worked.

Paul said that it is necessary to carry out this procedure a number of times to achieve the perfect mirror, polishing each time, testing and then grinding again.

The mirror will be used in a telescope to look at stars which are virtually at an infinite distance so ideally the mirror needs to have a parabolic curve. This uses a slightly different technique in the final polishing of the mirror and to test this using the Foucault Test, the viewing position is moved further and further back as successive parts of the mirror are tested towards the edge. As Paul said, the differences are very small indeed, but the resultant test needed to be evenly lit from around that part of the mirror as the edge is approached; the test result would resemble an evenly lit doughnut.

And talking of food, he stopped at this point and we had our break for coffee and mince pies.

Paul said that he still has work to do on the mirror and will update the Society as things reach their final stages.

John Wayte's snippets from the world of science

Once again, John had found a few more snippets of interest in the Scientific World.

He began with an image from the Hubble Space Telescope which showed the effect of a giant flare from a star 63 light years away. The flare had ripped away some of the star's gas-giant planet's atmosphere,

The planet known as HD 189733b circles its sun and crosses in front every 2.2 days. The observers were able to witness a strong X-ray flare from the star and soon afterwards saw a vast plume of gas streaming outwards at more than 480,000 km per hour. They have calculated that the planet lost at least 1,000 tonnes of gas every second.

As John says, we hope the same thing doesn't happen to our Sun since we have just survived the end of the Mayan calendar.

Sometimes while sitting all lonely and cold on a dark night waiting for something to observe we must all have wondered is there any point to this. What can we achieve that the experts with their hugely expensive observing apparatus can't do a thousand times better?

John asked if anyone had heard of Tom Boles. He is an amateur astronomer who has discovered an incredible 150 Supernovas. His latest discovery was only 8 days ago. His observatory is at Coddendam in Suffolk.

The observatory is equipped with 3 off C-14 Celestron Schmidt Cassegrain reflectors all equipped with CCD devises and all computer-controlled.

So there is a place for amateurs to do some really useful work.

For more information go to:

www.coddendamobservatories.org

Our Director of Observation, Brian Mills added to this by saying that Tom Boles had in fact been his boss when he worked for a company called NCR. He said that Tom runs everything electronically and the only thing he does manually is to open the run-off roof. To look for supernovae he uses the software equivalent of a blink-comparator to identify quite small changes between images of the same area of the sky taken on different occasions.

It might be appropriate to mention at this point that as an amateur astronomer, Brian himself does contribute a lot with his work on occultations.

Beginner's Talks: Ten simple winter objects to look for

Brian Mills

To continue his series of talks for beginners, Brian introduced ten simple winter objects to be found in the night sky.

Orion

About this time of year the constellation of Orion can be found in the south east sky during the early evening. We were shown the two main nebulae; M43 close to the left hand star of Orion's belt and then just below and quite obvious is M42. Brian showed an image he had taken last year with a small refractor and a thirty second exposure. It showed some of the detail and also colour of the nebula.

We looked at the comparison of the top left hand red star, Betelgeuse and the bottom right hand blue star, Rigel. Betelgeuse is a huge red giant and Rigel, a blue-white star and with our Sun on the same scale looking more like a minute dot. Betelgeuse is predicted to become a super nova quite soon because of its size and the rate at which it is consuming fuel. In

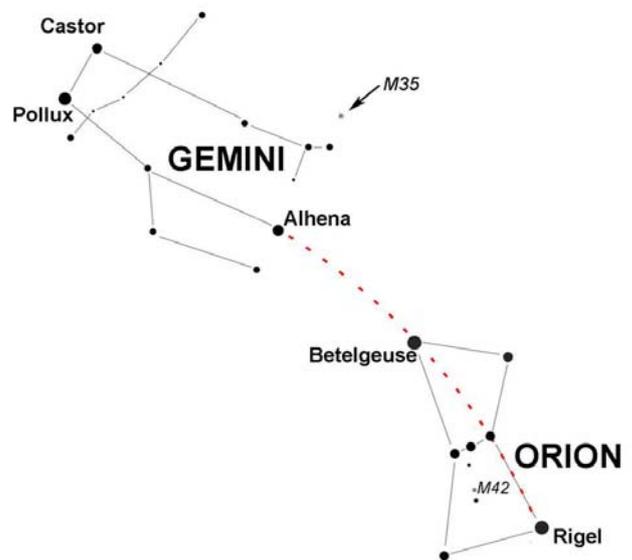
fact it is possible that it has already become a super nova but since it is 640 light years we wouldn't know about it yet.

Eridanus

Beginning near the bottom right hand of Orion is a meandering constellation named Eridanus, the river, although the other end is below the horizon.

The twins

A curved line from Rigel in Orion, up through the right hand star of the belt and on through Betelgeuse takes us to the constellation of Gemini. There are two bright stars on the left of the constellation called Castor and Pollux. Brian related an interesting story that Castor is the brighter of the two but is in fact named β (beta) Gemini owing to a mistake made when the star catalogue was being made.



M35

M35 is a large open cluster in Gemini with a collective magnitude of 5.1 and is a fairly easy object for binoculars.

The Pleiades

Using the three stars of Orion's belt and continuing up to the right we come to Aldebaran, then the faint Hyades and finally, the bright and easy to find group of stars called the Pleiades. They are often referred to as the Seven Sisters; although Brian said there are considerably more stars than that but are fainter.

Stars in the Pleiades are often occulted by the Moon and in fact the brightest star, Alcyone was occulted by the moon only last year and eventually the Moon will pass in front of all these stars at time.

M31

Brian has previously introduced us to the Square of Pegasus, and by star-hopping up left from the top left hand star of the square, we come to the second star in a faint line of stars. From here, turn right to an even fainter star and close by we find M31; the Andromeda Galaxy with a collective magnitude of 3.4. It is a very big object so the brightness is spread over a large area of sky and is just at the edge of naked eye visibility. Phil Berry mentioned that the galaxy as seen from Earth subtends an angle of about $3\frac{1}{2}^\circ$ and Brian agreed saying only the central area is what we see by eye and with binoculars.

JANUARY MEETING

Wednesday 16th of January 2013, – The meeting will begin with the Society's Annual General Meeting after which Phil Berry is giving a talk about astronomical "apps". With smart phones gaining in popularity Phil proposes to introduce some of the impressive applications now available for use in astronomy and intended for Android mobiles.

Meetings begin at 1930 although members are invited to arrive anytime after 1900 as this is a good time to exchange ideas and discuss problems and also relax before the meeting.

The venue as always is held in the Upper Room of the Methodist Church at the east end of Wadhurst Lower High Street, opposite the entrance to Uplands College. (For those with SatNav – the post code is TN5 6AT)

Anyone is welcome but non-members are asked if they wouldn't mind contributing £2 towards costs.

FUTURE MEETINGS

Wednesday 20th February 2012. Jan Drozd, a Society member, is giving another of his enjoyable talks about the background history of astronomy. His talk this time is called "Astronomy, Astrology and Pseudo-science".

Wednesday 20th March 2013. Details to follow.

OTHER NOTES AND INFORMATION

ANNUAL SUBSCRIPTIONS

We have now entered the Society's new session, and again, the subscriptions remain the same as in recent years. Membership for the year is still £15.00 and £20 for two members within the same family at the same address. Children and students are free and are always welcome.

Subscriptions can be made at the meetings, preferably by cheque payable to "Wadhurst Astronomical Society" or can be posted to our Treasurer, Michael Wyles at:
31 Rowan Tree Road
Tunbridge Wells
Kent
TN2 5PZ

Visitors to meetings are asked to donate £2 as a contribution towards costs.

DATES OF THE MEETINGS FOR 2013

Here is a note of the dates of the Society's meetings in 2013 for your new diaries.

Wednesday 16th January

Wednesday 20th February

Wednesday 20th March

Wednesday 17th April

Wednesday 15th May

Wednesday 19th June

Wednesday 17th July

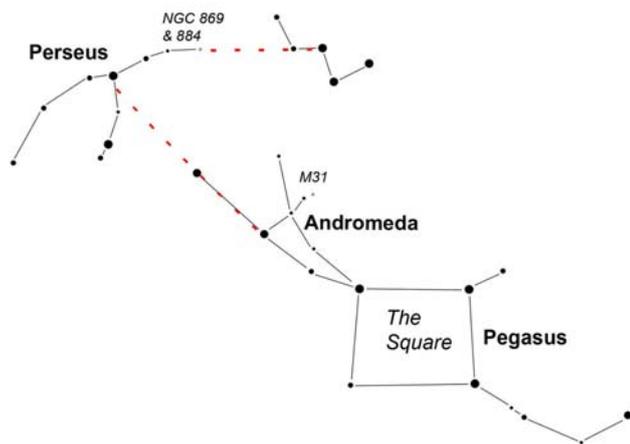
No meeting in August

Wednesday 18th September

Wednesday 16th October

Wednesday 20th November

Wednesday 11th December – The 2nd Wednesday



Double cluster in Perseus

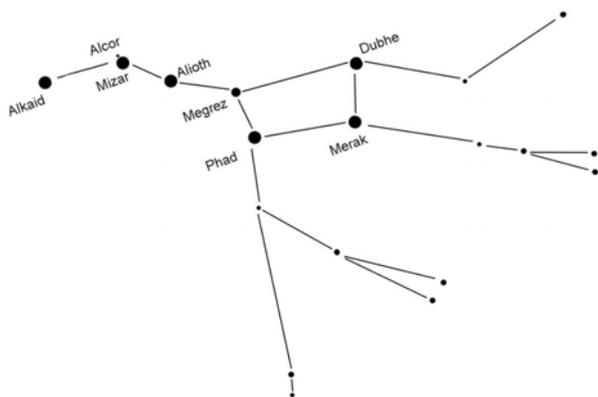
The next of Brian's objects was NGC 869 and 884, a double cluster between Perseus and Cassiopeia. They can only be really appreciated with binoculars and he says is a very nice object to observe.

Algol

Just left of the double cluster in Perseus there is a bright star, Mirphak and just below this is another star, Algol, a variable stars which varies between 2.1 and 3.4 in just under 3 days. It is in fact a pair of stars orbiting one another. The fainter star moves in front of the brighter one then the brighter moves in front of the dimmer star and so on. Brian showed a graph demonstrating the intensity of the stars where dips in the brightness indicated the difference in their brilliance.

The Alcor/Mizar Double

The brightest star in the handle of the Plough is Mizar very close to a fainter star named Alcor.



Being able to distinguish the gap between the pair used to be used as a measure of the clarity of the atmosphere. Mizar has a magnitude of 2.3 and Alcor, 4.0 though Brian told the meeting that they were not related because the difference in distance from us is considerable yet interestingly, both are spectroscopic binaries. In fact the very first binary to be discovered was Mizar.

Jupiter's Galilean moons

With binoculars it is rewarding to see the 4 brightest moons orbiting around the planet Jupiter. In just half an hour it is possible to see how they change position in their orbits. Brian said that the inner 3 moons are in resonance.

Brian then gave the Sky Notes for the coming weeks. More of the Sky Notes later in the Newsletter.

SKY NOTES FOR JANUARY

Planets

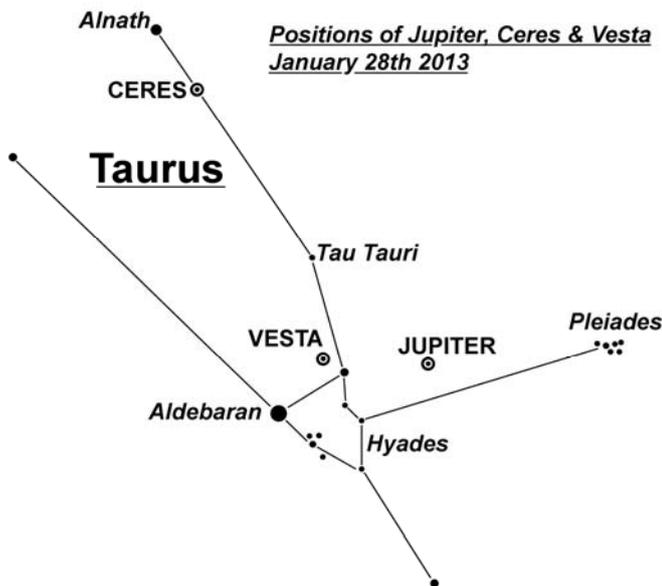
Mercury suffers a superior conjunction on the 18th of this month and is therefore not visible.

Venus might just be glimpsed early in the month above the south eastern horizon, but it will quickly be lost in the solar glare as it moves towards a superior conjunction in March.

Earth reaches perihelion on January 2nd at 04.38hrs. This is when it will be at its closest to the Sun at a distance of 91.4 million miles.

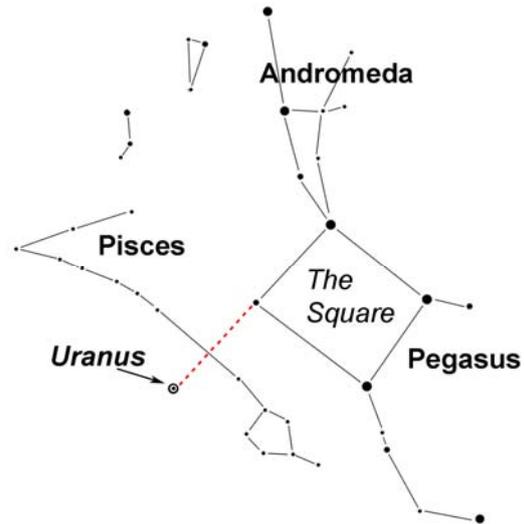
Mars also may just be visible, this time less than 10° above the south western horizon immediately after sunset.

Jupiter is still a brilliant evening object in Taurus and is visible all evening and throughout the night until 04.30hrs mid month. At magnitude -2.6 it is currently moving retrograde (east to west) and is joined by the dwarf planets Ceres (mag. 7.8) and Vesta (mag.7.4). The diagram shows the position of all three on January 28th when Ceres will lie exactly on a line from Alnath to Tau Tauri.



Saturn currently lies in the constellation of Libra, where it stays for most of 2013 apart from a period in the summer months when it retrogrades back into Virgo. It rises around 03.00hrs at the start of January, but by the end this has become 01.00hrs. By the end of February it will have become an “evening” object rising at just after 23.00hrs.

Uranus currently lies in the constellation Pisces at magnitude 5.7.



The map shows the position of Uranus on the night of January 1st when the planet will be in line with the two leftmost stars of the Square of Pegasus. Uranus moves very slowly against the stellar background because it is so far from us, so even by the end of the month it will have shifted its position almost imperceptibly to the east (left).

From a really dark site the planet should technically just be visible with the naked eye, although binoculars will be needed by most of us.

Lunar Occultations

In the table below I've listed events for stars down to magnitude 7.0 that occur before midnight although there are others that are either of fainter stars or occur at more unsociable hours. DD = disappearance at the dark limb. There is now a column headed “mm” (millimetres) to show the minimum aperture telescope required for each event. **Times are in GMT.**

Please remember that the Society has telescopes that members can borrow, all of which are suitable for the following events.

Jan	Time	Star	Mag	Ph	Alt °	% illu	mm
18 th	20.33	Pi Piscium	5.5	DD	38	48	40
18 th	20.49	ZC241	6.8	DD	36	48	60
21 st	23.10	ZC614	5.5	DD	42	76	40
25 th	22.12	ZC1141	5.4	DD	54	98	60

Occultation Observing

Phil has arranged for us to use Uplands College in Wadhurst on the evening of the 18th from 19.30 until 21.30. This is for anyone who cares to join us to bring their telescopes and observe the two occultations that are listed above for that date. We will attempt to time both events using stopwatches and possibly video cameras. Please bring a stopwatch if you have one, although the society has a few digital ones that members can use. If you need to borrow a telescope please let me know in advance. We will use the tennis courts that are on the left hand side after the first group of buildings. Phil is liaising with the College to get the external lights turned off for a few hours. If the weather is cloudy we will still attend but if it is actually raining then the event will be cancelled. Please let me know if you will be taking part.

Phases of the Moon for January

Last ¼	New	First ¼	Full
5 th	11 th	18 th	27 th

ISS

There are no evening passes of the International Space Station (ISS) that occur before midnight this month although there are a large number in the early hours of the morning. The details of all passes including those visible from other areas can be found at www.heavens-above.com.

Iridium Flares

The flares that I've listed are magnitude -4 or brighter although there are a lot more that are fainter, occur after midnight or at a lower altitude. If you wish to see a complete list, or obtain timings for somewhere other than Wadhurst, go to:

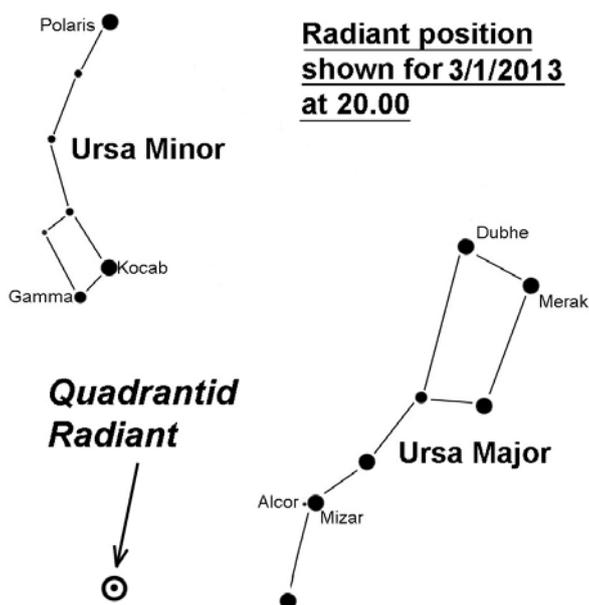
www.heavens-above.com

Remember that when one of these events is due it is sometimes possible to see the satellite in advance of the "flare", although of course it will be much fainter at that time. **Times are in GMT.**

Jan	Time	Mag	Alt°	Az.
2 nd	17.22	-7.0	27	SSW
3 rd	17.21	-4.3	25	SSW
3 rd	18.47	-4.9	33	SSE
4 th	18.41	-5.4	33	SSE
6 th	17.12	-6.3	23	SSW
11 th	-5.1	-5.1	17	SSW
12 th	18.02	-5.6	11	WNW
12 th	18.12	-4.1	34	S
13 th	17.48	-5.6	14	WNW
14 th	17.01	-4.6	12	SW
15 th	17.18	-4.0	20	WNW
16 th	17.56	-6.3	34	S
19 th	16.35	-6.4	28	W
27 th	17.16	-6.6	28	SSW
30 th	17.07	-4.1	26	SSW

Meteor Showers

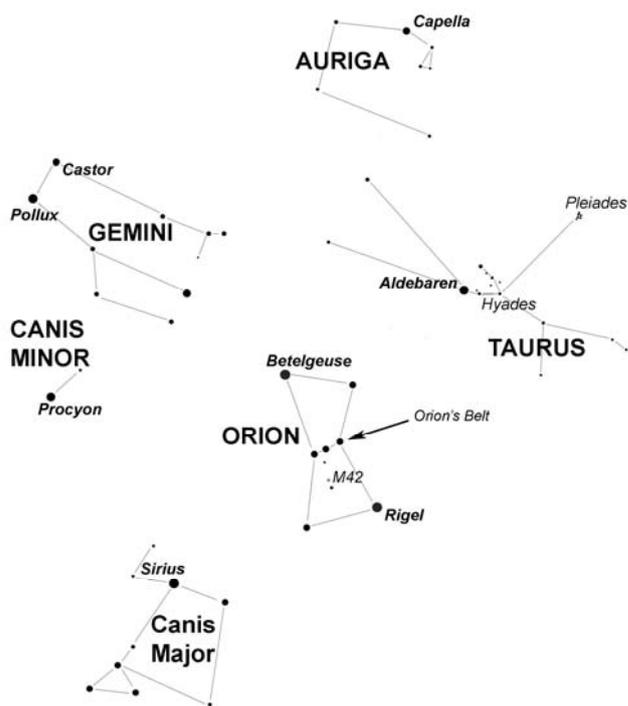
Quadrantids. This shower is active from January 1st to the 6th with maximum occurring in the afternoon of the 3rd, with a ZHR of 80, so you should start looking as soon as it is dark. A Moon approaching last quarter will rise at just after 23.00 on that night. The shower has had fairly consistent rates over the last few years with 2009 being especially strong with a ZHR of 140.



Meteor showers are named after the constellation from which the meteors appear to radiate which in this case is Quadrans Muralis. This is a now defunct constellation that was named originally by the French astronomer Jerome Lalande in 1795, but fell into disuse because it only contained a small number of faint stars.

The Night Sky in January

(Written for 22.00hrs GMT mid month)



Looking south, the great spectacle supplied by the winter constellations has reached its peak. The brilliant Orion with his retinue of hunting dogs plus Taurus, Gemini and Auriga (with Capella almost overhead) makes the summer offering seem very dull indeed.

In the east Leo, containing the bright star Regulus, has now fully risen along with the faint constellation of Cancer. The head of the water snake (Hydra) lies below Cancer whilst the rest of the constellation will not have fully risen at this time of night until mid March, such is its length.

Towards the west the Square of Pegasus is preparing to set along with Cetus and Pisces. Perseus is still high in the sky with the double cluster well displayed.

If you look north you may just see Vega skimming the horizon, whilst above it the head of Draco is as close to the horizon as it can get. Ursa Major lies to the east of the meridian, standing on its tail, with Cassiopeia and Cepheus on the opposite side with Ursa Minor in between.

Advance Warning for February

Mercury reaches greatest eastern elongation on February 16th. This is the most favourable evening apparition of this planet in 2013.

The Comets are Coming!

Observations suggest that two comets, still in the depths of space, could both become naked eye objects in 2013. The first, 2011 L4 (PanSTARRS) is expected to be visible in the UK evening skies during March. The second is 2012 S1 (ISON) which could **possibly** be a spectacular object from around mid-November 2013. Comets are fickle objects and notoriously difficult to predict, so we ought not to raise our hopes too early.

NASA SPACE PLACE

Partnering to Solve Saturn's Mysteries

By Diane K. Fisher

From December 2010 through mid-summer 2011, a giant storm raged in Saturn's northern hemisphere. It was clearly visible not only to NASA's Cassini spacecraft orbiting Saturn, but also astronomers here on Earth—even those watching from their back yards. The storm came as a surprise, since it was

about 10 years earlier in Saturn's seasonal cycle than expected from observations of similar storms in the past. Saturn's year is about 30 Earth years. Saturn is tilted on its axis (about 27° to Earth's 23°), causing it to have seasons as Earth does. But even more surprising than the unseasonal storm was the related event that followed.

First, a giant bubble of very warm material broke through the clouds in the region of the now-abated storm, suddenly raising the temperature of Saturn's stratosphere over 150 °F. Accompanying this enormous "burp" was a sudden increase in ethylene gas. It took Cassini's Composite Infrared Spectrometer instrument to detect it.

According to Dr. Scott Edgington, Deputy Project Scientist for Cassini, "Ethylene [C₂H₄] is normally present in only very low concentrations in Saturn's atmosphere and has been very difficult to detect. Although it is a transitional product of the thermo-chemical processes that normally occur in Saturn's atmosphere, the concentrations detected concurrent with the big 'burp' were 100 times what we would expect."

So what was going on?

Chemical reaction rates vary greatly with the energy available for the process. Saturn's seasonal changes are exaggerated due to the effect of the rings acting as venetian blinds, throwing the northern hemisphere into shade during winter. So when the Sun again reaches the northern hemisphere, the photochemical reactions that take place in the atmosphere can speed up quickly. If not for its rings, Saturn's seasons would vary as predictably as Earth's.

But there may be another cycle going on besides the seasonal one. Computer models are based on expected reaction rates for the temperatures and pressures in Saturn's atmosphere, explains Edgington. However, it is very difficult to validate those models here on Earth. Setting up a lab to replicate conditions on Saturn is not easy!

Also contributing to the apparent mystery is the fact that haze on Saturn often obscures the view of storms below. Only once in a while do storms punch through the hazes. Astronomers may have previously missed large storms, thus failing to notice any non-seasonal patterns.

As for atmospheric events that are visible to Earth-bound telescopes, Edgington is particularly grateful for non-professional astronomers. While these astronomers are free to watch a planet continuously over long periods and record their finding in photographs, Cassini and its several science instruments must be shared with other scientists. Observation time on Cassini is planned more than six months in advance, making it difficult to immediately train it on the unexpected. That's where the volunteer astronomers come in, keeping a continuous watch on the changes taking place on Saturn.

Edgington says, "Astronomy is one of those fields of study where amateurs can contribute as much as professionals."

Go to:

<http://saturn.jpl.nasa.gov/>

to read about the latest Cassini discoveries. For kids, The space Place has lots of ways to explore Saturn at:

<http://spaceplace.nasa.gov/search/cassini/>



Caption:

This false-coloured Cassini image of Saturn was taken in near-infrared light on January 12, 2011. Red and orange show clouds deep in the atmosphere. Yellow and green are intermediate clouds. White and blue are high clouds and haze. The rings appear as a thin, blue horizontal line.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

ONE LAST MINUTE NOTE

* Further to Phil Berry's meeting with the Parish Council, mentioned in notes on the December meeting, he has sent an encouraging update:

Just to let you know that the meeting with the Wadhurst PC went well and they all seemed pleased with the survey. I was asked to give a brief explanation of the reasons behind it all and there wasn't one dissenting voice.

It appears that they will be adopting the suggestions in the survey and make it a gradual transition in line with there normal budget. I will give you a better update at the January meeting

Phil

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Any material for inclusion in the February 2013 Newsletter should be with the Editor by January 28th 2013