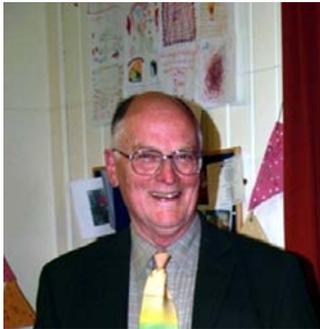


Wadhurst Astronomical Society Newsletter August 2012

MICHAEL HARTE

The Society is very sad to learn that Michael Harte, a very long term and later, honorary member of the Wadhurst Astronomical Society has died after a short illness.



Michael joined the Society in 1997, shortly after it was formed, to learn more about astronomy, something that had always fascinated him, and he quickly became involved in many ways. It was Michael who designed the Society's logo incorporating the "W" shaped stars in Cassiopeia. He also incorporated our webpage in the Wadhurst and Ticehurst website for which he was the webmaster.

For very many years he invited members and friends of the Society to Greenman Farm each August where we held our annual barbecue. He was always the perfect host and on the occasions when the weather prevented us from looking at the night-sky following our barbecue he would entertain everyone either in his kitchen or on one occasion he showed us round his fascinating home which he had renovated and which had originally been three very old houses.

He was also a very active Chairman of the Wadhurst History Society and an accomplished singer, performing in the local choir.

We will miss Michael in so many ways; he was always there to help and most of all he was a good friend. We extend our condolences to his wife Claire and his family.

MEETINGS

JULY MEETING

Phil announced that anyone joining the Society now could join for just £7.00 for the rest of the year which includes meetings, tea or coffee and biscuits and mince pies at the December meeting.

He also said that our Director of Observations is asking how many members would be interested in learning more about the use of web-cams for astronomy and the use of Registax, the free software enabling processing of webcam results. Brian can be contacted either through the Committee's email address or by calling him on 01732 832 691. Brian also asked if anyone is

interested in getting involved with some upcoming occultations. Again, he can be contacted as above.

Phil then introduced tonight's speaker, a keen amateur astronomer who has specialised in one aspect of the subject.

Introduction to Amateur Astronomical Spectroscopy

John Strachen

To begin John's talk he said that when you look at a star, all you can resolve is a point of light and from that you have to discover as much as possible using a number of techniques, and spectroscopy is just one of them.

He described light as being composed of photons with wavelength and energy at that wavelength.

Light from the Sun for example can be split into separate wavelengths by using a prism, raindrops (a rainbow) or a diffraction grating (e.g. a CD).

We were shown that when light is refracted as it passes from air into glass. Longer wavelength red light is refracted least and at the other end, short wavelength blue light is refracted much more. When it leaves a prism the light has separated into what we see as the visible spectrum.

John explained that a diffraction grating is a series of extremely narrow gaps through which light passes. Having passed through these parallel gaps, the light emerges and spreads as curves through each one and these interfere with each other to form peaks and troughs as the waves add and subtract in amplitude. The peaks line up at an angle to the direction of the original light as it is diffracted; different wavelengths diffracting unique angles and producing the spectrum. The same effect is produced using a reflecting grating such as a CD.

Wollaston and Fraunhofer built spectroscopes to observe the Sun in the late 18th and early 19th century and were surprised at what they saw.

Using a narrow sharp-edged slit, a glass prism and a combination of lenses, they discovered the spectrum was not continuous but had dark lines in it.

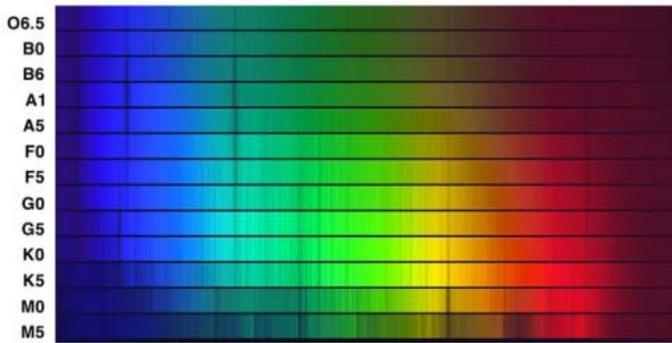
By the start of the 20th century a number of astronomers had found that each star had in the main its own unique spectra and there was a big effort to classify the spectra of stars.

By 1866 Secchi had looked at 4,000 stars and by 1897 Pickering and his women 'computers' had analysed about 220,000 stars.

John said that this was only the start of the story and even today, this classification is still continuing.

He then described how the classification has been refined over time. One method is to look at the colour temperature of the star. He then showed how basically they are classed as O, B, A, F, G, K, M and these are subdivided into 0 to 9. The other method is to use the luminance of the star:

- O – hyper giant
- Ia – bright super giant,
- Ib – super giant
- II – bright giant
- III – giant
- IV – sub giant
- V – dwarf



Stellar Spectral Classification

Why do amateur astronomical spectroscopy? John said that probably only 200 at most amateur astronomers are actively taking part in spectroscopy and that professional astronomers do use the data they obtain, saying it was certainly an excellent way of learning more about stars, and one advantage is that spectroscopy can be done in light-polluted skies.

He then discussed what one needs to take part in astronomical spectroscopy, beginning with the cheapest option, enabling the capture of star and bright supernovae spectra. Here any telescope f4 or slower will do, using a webcam to capture the light through a grating. John suggested a Star Analyser costing about £100. A computer to running something like Windows XP can be used with various free software programmes to process the results.

If it is intended to take part in Pro-Am campaigns, more detailed spectral analysis is needed and here the larger the telescope the better, with an accurately driven mount and with a good transmission diffraction grating or prism arrangement. A good CCD camera attached to the telescope which is driven using a guide camera also improves the results.

As an example of what can be achieved John showed an image of a supernova in M101. The resulting spectra showed a strong dip at 6150 Angstroms at Si II showing that this was a type 1A supernova.

We were shown various other examples including some taken close to the Olympic stadium in east London with all the light pollution that suggested.

Various examples of amateur set-ups showed how some amateur observatories were equipped, including John's own set-up which was meant to be very portable.

The next part of John's talk was about the preparation for collecting an evening's data, beginning with the reason, such as following a campaign or resulting from the discovery of a supernova. Further preparation is to determine the coordinates and estimate the exposure time needed; details about this are usually found on-line.

Dark frames and bias frames are created to counter effects on the CCD chip of the camera (these John keeps on file) and then the spectral scale is calibrated. Here, John holds a gas discharge lamp of known spectra in front of his telescope to align his scale. After creating the spectral data, he uses an on-line processing programme.

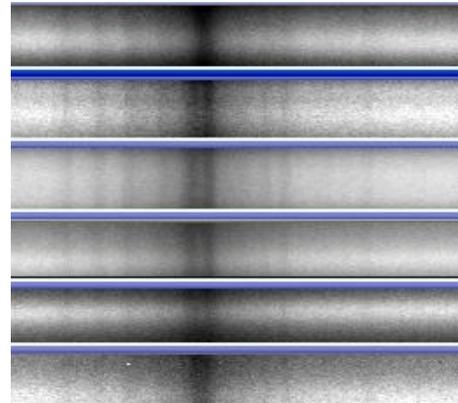
We were then given a short introduction to some of Kirchhoff's work. Kirchhoff used the spectra of heated gases under high pressure and proposed three laws. The first was about continuous spectra (physicists have found that all stars emitted a continuous spectrum almost like a black body radiator). The main colour indicated the temperature.

Kirchhoff's next law was related to low pressure gas emission whose lines depended on the composition of the gases and acted as a "finger print" of the star. Using what he had established in the laboratory, it was now possible to recognise gases present through their emission lines.

Finally, he found that if light from a hot body passed through a gas cloud, absorption lines indicated what gases were present. If this light already had emission lines in it, this had to be taken into account.

From comparing known spectral absorption lines it is possible to detect and measure the Doppler shift of light from a body; if the body is moving away, lines move towards the red end of the spectrum and towards the blue end if approaching

Using this technique, John showed the spectrum of Mizar in the Plough and this clearly showed that certain absorption lines split, indicating that it is a double star; two stars orbiting each other.



Spectrum from Mizar, showing that two stars are orbiting each other

Another measurement that can be achieved is of Stellar Wind, produced when a giant star is becoming unstable and throwing off huge amounts of gas. One such star is Deneb and John showed how it is possible to process the spectral readings to observe this.

Finally he said that all the data available is being used to build and improve Stellar Models of stars. This synthetic model is continually being compared with the results from actual stars and the model being changed and improved. John showed work he himself had done on Vega and compared it with the stellar model available on the internet to show a very close match.

Here are some useful references and links John left us with:

Online forums:

Spectro-I Group:

<http://tech.groups.yahoo.com/group/spectro-i/>

Astronomical Spectroscopy Group:

<http://tech.groups.yahoo.com/group/astronomicalspectroscopy/>

Star Analyzer Group:

<http://tech.groups.yahoo.com/group/staranalyser/>

List of Spectroscopy Books:

<http://www.shelyak.com/dossier.php?id> dossier=3

Link to BESS database where you can upload your spectra :

<http://basebe.obspm.fr/basebe/>

John's email address if you have queries: jsandse@live.co.uk

Ken Harrison has written two books for amateurs:

"Grating Spectroscopes and How to Use Them"

"Astronomical Spectroscopy for Amateurs: How to Build and Use Spectroscopes"

SCIENTIFIC TITBITS

Another of John Waytes enjoyable pieces of Scientific titbits followed.

John Asked us how many moons has Pluto got. The answer he has discovered is 5!

Charon is well known and was discovered in 1978 with a diameter of 1,207 Km. Two more were discovered in 2005;

Hydra with a diameter of 61 to 167 Km and Nix with a diameter of 46 to 137 Km.

But in 2011, two more were discovered; P4 with a diameter of 13 to 34 Km and P5 with a diameter of 10 Km to 25 Km.

The second titbit John found is about the discovery of some 3-dimensional crystals that can be programmed with a memory that will survive in the lowest possible temperatures. According to Quantum Mechanics they could survive for the next 100 billion years or so until all the energy is spent from our universe, and give information about this universe to the next universe...!

He left us to ponder if there isn't a crystal computer already out there – perhaps at "Milliways", the restaurant at the end of the Universe.

AUGUST ASTRO-BARBECUE

There is no meeting of the Wadhurst Astronomical Society during December, but there is to be an Astro-barbecue on Saturday the 25th of August when members can bring along telescopes or use telescopes that will already be there.

In the past, this has been a very enjoyable and social evening with a chance to look at the night sky and take a tour of objects such as the Moon, M31 – The Great Andromeda Galaxy and perhaps the Ring Nebula in Lyra; clouds permitting.

It is well worth putting in your diary! This year, Brian Mills has very kindly offered to hold the barbecue in his garden.

Any member is welcome with friends. They will need to bring something to cook on the barbecue, the means to eat it, something to drink and perhaps something warm to wear since it can be cold towards the end of August.

Brian suggests arriving anytime from 1900 onwards.

He lives at 37 Ashley Road, Hildenborough. For those with Sat-Navs the post code is TN11 9ED.

Directions: The main road between Tonbridge and Sevenoaks is Tonbridge Road (B245) and 1½ miles north of Tonbridge is a pub called the Flying Dutchman on the east side of the road. Take the road opposite the pub, Leigh Road (B2027) and 400 yards on the left is Broadmead. Take this and 200 yards on the left is Ashley Road which goes round in a loop. Brian lives round the far side at number 37.

FUTURE MEETINGS

Wednesday 19th September 2012 – Ian King is giving a talk called "The Evolution of the IKHAROS Telescope".

Wednesday 17th October 2012 – Bob Seaney is giving a talk on "The Lick Observatory"

Wednesday 21st November 2012 – Jan Drozd talks about "Early Pioneers in Astronomy"

Wednesday 14th of December – Member Paul Treadaway continues his story of building his own telescope. His talk is called "The T200 Telescope First Light"

OTHER NOTES AND INFORMATION

SKY NOTES FOR AUGUST

Planets

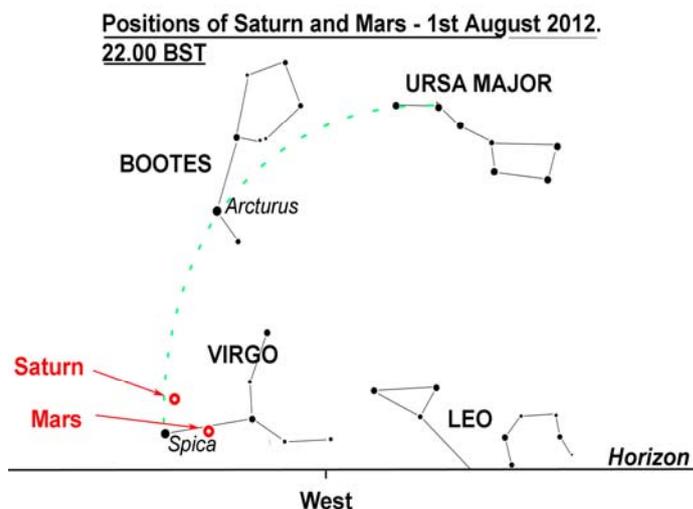
Mercury suffered an inferior conjunction on 28th July. It is now moving to the west of the Sun, meaning it is a morning object (it rises ahead of the Sun). It reaches greatest western elongation on August 16th when it will be magnitude +0.1. Its position at 05.10 hrs on that day is shown below via a screenshot from "Stellarium". There is a very thin waning crescent Moon just below Mercury, with the Sun 6° below the horizon (the beginning of civil twilight). After this it moves back towards the

Sun brightening as it does so, and by August 21st has reached magnitude -0.6 and may be visible then to early risers.



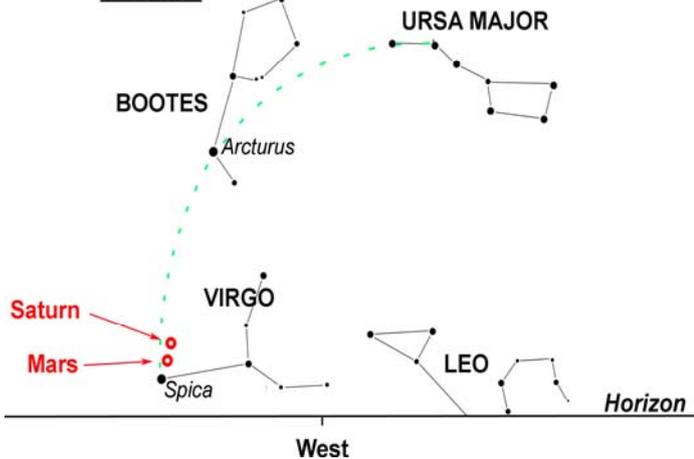
Venus reaches greatest western elongation on the day before Mercury - on the 15th. It is a brilliant morning object at magnitude -4.1 rising nearly four hours before the Sun in the middle of the month. Venus begins the month in Taurus, passes briefly through the northern part of Orion (although Orion is not one of the signs of the Zodiac) and ends the month in Gemini. The planet will remain a morning object for the rest of this year.

Mars is still visible low down in the south west after sunset. At the beginning of the month it sets two hours after the Sun, but at months end this has decreased to an hour and a half despite its brisk eastward motion. The first map shows its position relative to the stellar background and Saturn at the beginning of August. On the 14th of the month, Mars, Saturn and the bright star Spica will all be in a line in the constellation of Virgo (see second diagram). Due to the ecliptic being very low at this time the grouping will only be 10° above the western horizon. The easiest way to locate them is to use the tail of the Great Bear as shown in the diagrams, by drawing an imaginary arc through the stars in the tail and on through Arcturus and continuing it until it reaches Spica.



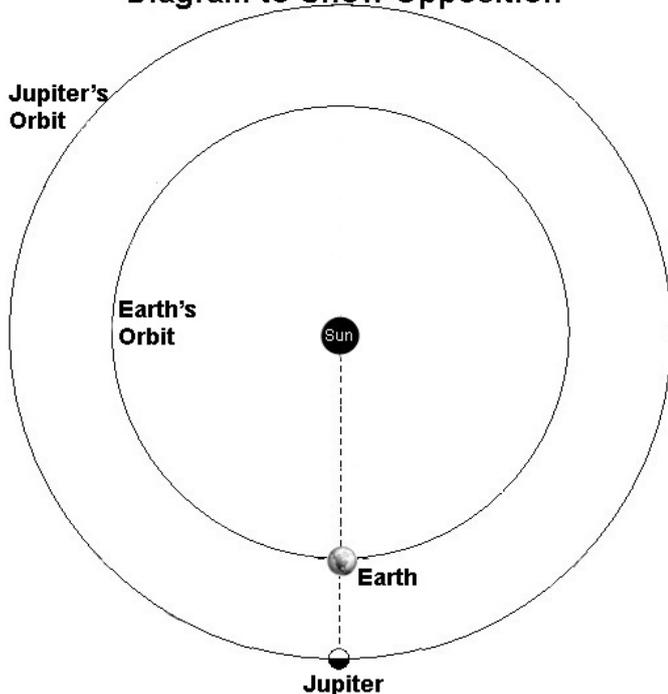
Positions of Saturn and Mars - 14th August 2012.

21.00 BST



Jupiter is a morning object in Taurus at the beginning of the month rising at 01.00 hrs, although by months end it has become an evening object rising around 23.15 hrs. It is steadily brightening as it heads towards opposition on December 3rd when it will shine at magnitude -2.8. Opposition is the time when Jupiter is “opposite” the Sun in the sky and is therefore best placed for observation. At that time it will be visible all night because as the Sun sets, Jupiter rises with, of course, the opposite being true in the morning.

Diagram to Show Opposition



Saturn is currently in Virgo at magnitude +0.8 but is gradually being overtaken by twilight as it moves towards a superior conjunction on October 25th. Its position is shown in the diagram above for Mars. The good news is that the tilt of the rings is gradually increasing so that when the planet reappears as a morning object the view of the ring system will be even better than currently.

Lunar Occultations

Unfortunately there are only three reasonably bright occultations that occur before midnight this month although there are many others that are either of fainter stars or take place at more unsociable hours. I have added an extra column headed “mm” (millimetres) to show the minimum aperture telescope required for each event. DD = disappearance at the dark limb. **Times are in BST.**

Aug	Time	Star	Mag	Ph	Alt °	% illu	mm
23rd	20.39	Iota Librae	4.5	DD	11	41	40
23 rd	21.08	25 Librae	6.1	DD	8	41	50
26 th	20.28	14 Sagittarii	5.5	DD	17	75	50

Phases of the Moon for August

Full	Last ¼	New	First ¼
2 nd	9 th	17 th	24 th
31 st			

Blue Moon

This quarter there are four full moons instead of the usual three, the extra one being called a “Blue Moon”.

ISS

Below are details of passes of the International Space Station (ISS) that occur before midnight and are magnitude -3 or brighter. The details of all passes including those visible from other areas can be found at:

www.heavens-above.com

Please remember that the times and directions shown below are for when the ISS is at its **maximum** elevation, so you should go out and look a few minutes beforehand. **Times are in BST.**

Aug	Mag	Time	Alt°	Az.
7 th	-3.0	23.05	48	SSW
8 th	-3.0	22.13	42	SSE
9 th	-3.5	22.56	85	SSE
10 th	-3.4	22.03	66	SSE
11 th	-3.0	21.10	46	SSE
11 th	-3.3	22.47	81	N
12 th	-3.4	21.54	89	S
13 th	-3.4	21.01	71	SSE
13 th	-3.3	22.37	79	N
14 th	-3.3	21.44	79	N
15 th	-3.4	22.27	89	NNW
16 th	-3.3	21.34	80	N
17 th	-3.4	22.18	68	SSW
18 th	-3.4	21.25	87	SSW
20 th	-3.2	21.15	63	SSW

Iridium Flares

The flares that I've listed are magnitude -3 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:

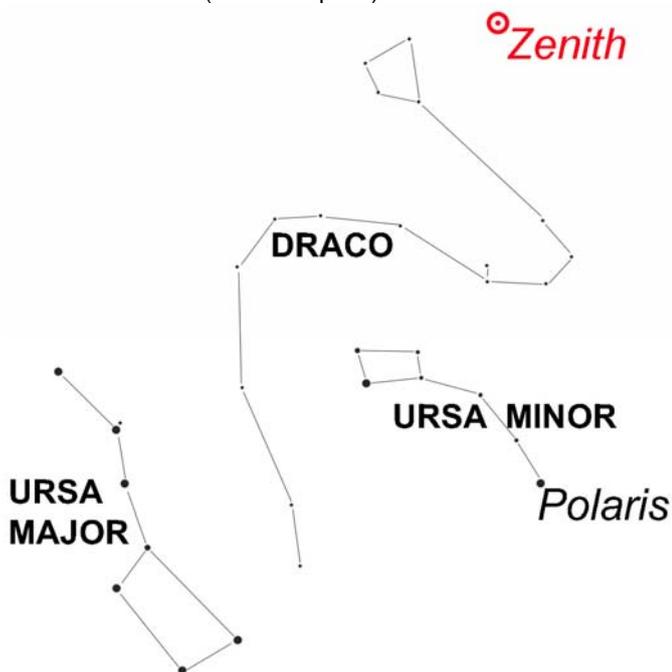
www.heavens-above.com

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 BST.**

Aug	Time	Mag	Alt°	Az.
5 th	21.14	-4	26	NNW
6 th	23.34	-6	30	WSW
7 th	23.29	-3	30	WSW
9 th	23.26	-7	26	WSW
11 th	23.22	-7	23	W
13 th	23.19	-4	20	W
14 th	23.23	-6	17	W
15 th	23.26	-3	15	W
20 th	23.15	-6	16	W
24 th	21.32	-3	18	N
25 th	21.26	-3	19	N
28 th	20.58	-5	27	N

The Night Sky in August (Written for 22.00hrs BST mid month)

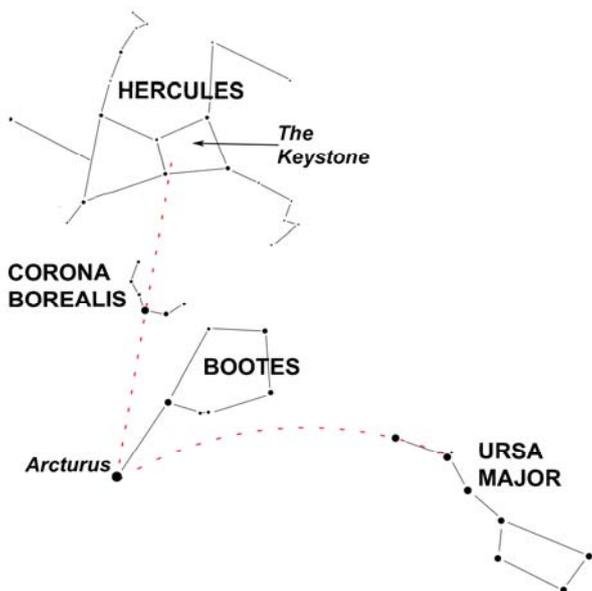
As the Great Bear points down towards the northern horizon, the bright star Capella (in Auriga) is beginning to climb away from it. Cassiopeia lies at roughly the same altitude (as Ursa Major) but on the opposite side of the meridian. The Little Bear is standing on its tail whilst the head of Draco lies very close to the zenith (overhead point).



Looking east, Pegasus and Andromeda are now fully risen whilst Aquarius and Capricornus are only just above the horizon.

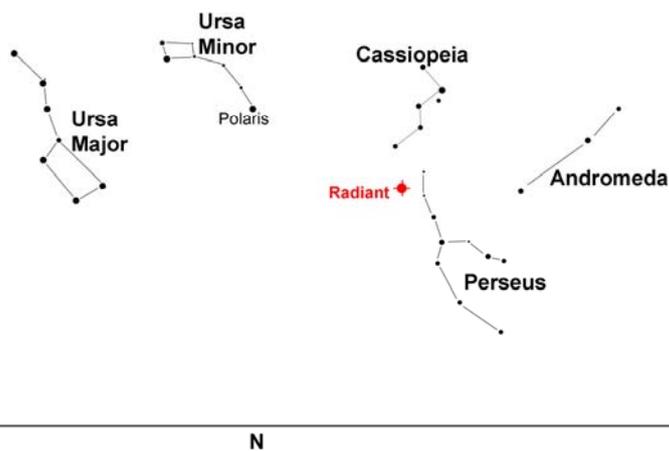
In the south the “teapot” asterism in Sagittarius is clear of the horizon although rather low down. Just to the west of it lies the bright star Antares in Scorpio. Closer to the zenith we find the brilliant star Vega in Lyra (part of the Summer Triangle) with the rest of the asterism just to the east of the meridian.

Looking west, the constellation of Virgo is setting taking with it the bright star Spica along with Saturn and Mars. Arcturus (the brightest star in Boötes) lies due west and can be found using the tail of the Great Bear as shown. Once this has been found it can be used to locate Corona Borealis and thence the “Keystone” asterism (a quadrilateral of stars) in Hercules.



Meteors

This month sees the maximum of one of the years most prolific showers - the Perseids, so called because the meteors appear to radiate from the constellation Perseus. The shower began on July 23rd and runs until August 20th with maximum predicted for midday on August 12th so it would be wise to look on the nights of 11th/12th and 12th/13th. Moonrise is just after midnight on the 11th/12th and roughly an hour later the following night. Meteor numbers of around 60 per hour are expected at maximum with the chances of seeing a good display improving after midnight as the Earth's rotation carries it into the direction of meteor travel. The position of the radiant is shown on the map although the meteors, which can be very fast and bright, can be seen over a large portion of the sky.



Forthcoming Occultations

There are some occultations of reasonably bright stars, in the coming months, that I have listed below. If you are interested in joining us to observe some or all of them (possibly on Ashdown Forest) please let me know if you haven't given me your details already. The Society has some telescopes and digital stopwatches available for members (or visitors) to use.

Times are in BST.

23 rd Aug 2012	20.39 hrs	mag 4.5	moon is 41% and 11° high.
23 rd Aug 2012	21.08 hrs	mag 6.1	moon is 41% and 8° high
26 th Aug 2012	20.28 hrs	mag 5.5	moon is 75% and 17° high.
26 th Sept. 2012	22.30 hrs	mag 5.1	moon is 89% and 30° high
18 th Oct. 2012	18.09 hrs	mag 4.4	moon is 14% and 10° high.
19 th Oct 2012	18.57 hrs	mag 6.3	moon is 24% and 11° high.
21 st Oct. 2012	17.54 hrs	mag 5.7	moon is 45% and 20° high

Possible Comet for 2013 - A Report in the BAA Journal

A comet classified as 2011 L4 has been discovered as a 19th magnitude object at a distance of 8AU (eight times the Earth/Sun distance). It is predicted to reach perihelion (its closest to the Sun) in March 2013, when it will be just 0.3AU away from our parent star. Early suggestions are that it could become a relatively bright evening object visible from the northern hemisphere in the Pisces/Andromeda area. More information as it becomes available.

Brian Mills

CONTACTS

General email address to contact the Committee
wadhurstastro@gmail.com

Chairman John Vale-Taylor

Secretary & Events Phil Berry
01892 783544

Treasurer Mike Wyles

Editor Geoff Rathbone
01959 524727

Director of Observations Brian Mills
01732 832691

Paul Treadaway

Wadhurst Astronomical Society website:
www.wadhurst.info/was/

SAGAS web-site www.sagasonline.org.uk

**Any material for inclusion in the September 2012
Newsletter should be with the Editor by August 28th 2012**