

Wadhurst Astronomical Society Newsletter May 2015

MEETINGS

APRIL MEETING

Phil Berry opened the April meeting of the Society and after welcoming members and visitors he gave a summary of the evenings programme. He then introduced our speaker, Nik Szymanek for another of his welcome talks on astro-photography.

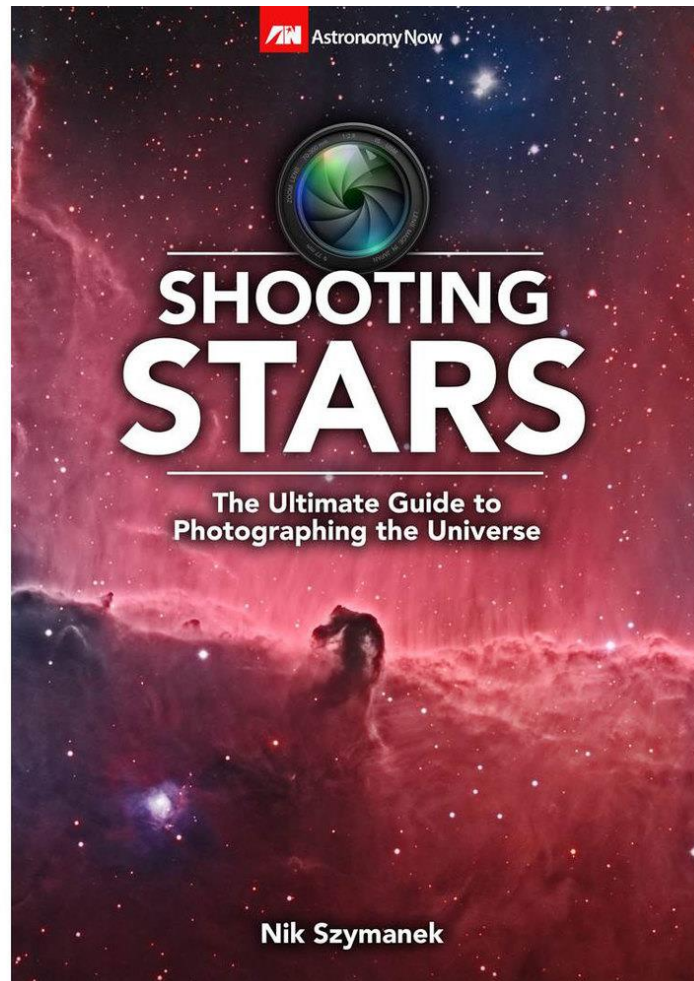
Shooting Stars – The Ultimate Guide to Photographing the Universe

Nik Szymanek

Nik is a British Amateur Astronomer and Astrophotographer and well known for his deep sky CCD images. He collaborates with professional astronomers and even works with some of the big telescopes at La Palma Observatory on the Canary Islands. He also has connections with our own Ian King.

He has received a number of awards in recognition of his achievements and is a regular contributor to the Astronomy Now magazine.

Nik has written books and the latest one is published by Astronomy Now costing £7.99 and has the title given to this talk. – “Shooting Stars – The Ultimate Guide to Photographing the Universe”.



His talk was based on this book and we were taken through a number of the chapters dealing with techniques and tips for astrophotography.

We were introduced to which telescopes are available and told how recent interest in the subject had lead to a proliferation of equipment in all price ranges but particularly the more affordable sector.

Nik recommended that the beginner start with refracting telescopes and work up. He spoke of his early days and how much easier it is to start up now than it was back then.

He spoke briefly about the cameras, both DSLRs and astro-CCDs and what was available and at what price. We were told that some DLSRs now come pre-modified for astrophotography by manufacturers, again resulting from growing interest in the subject.

Nik then went in to some detail about CCDs cameras and mentioned that about 60 – 70% of the light available can now be captured compared to only about 10% using the old film cameras.

Next, he covered the various mounts available, their prices and suitability and which features were “nice to have” and which ones were more or less essential. He also covered targets and suggested that the Orion Nebula – probably the most popular imaging target, was indeed a very good place to start.

We looked at various filters (RGB and Luminescent RGB) and showed the pictures resulting from the used of different combinations. Galaxies responded very well to LRGB imaging.

Next Nik gave a lengthy demonstration of how to stack and amend images mainly using Adobe Photoshop which he thought was the most suitable for new enthusiasts and old hands alike. He said the instructions and guides in the use of the levels and curves featured in Photoshop was probably the most important part of his book.

The talk was very well received and many of his audience commented on how useful and informative they found it.

The Solar Eclipse

Phil Berry

Phil then talked about his recent trip to observe the solar eclipse. He sailed around the Shetland Islands, the Norwegian coast and the Faroe Islands and after some nifty work by the ship’s captain, they had a good view of the total eclipse in near clear conditions or at most hazy cloud.



He showed us lots of his holiday snaps – not too many people left at this point – and the one good image he managed to get of totality and shown above.

He excused the lack of other images on the difficulty of obtaining long exposure photographs when on board a ship that is pitching and rolling constantly. A distinct lack of sympathy was apparent but also since no one else had seen the total eclipse – or even the partial one since most of the UK was under heavy cloud, Phil was to be congratulated.

Report thanks to Jim Cooper

MAY MEETING

Wednesday 20th May – Konrad Malin-Smith talks about “Hydrogen in the Universe”.

The meeting begins 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 in the past will be 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 £3 towards costs.

FUTURE MEETINGS

Wednesday 17th June - Our Chairman, John Vale-Taylor, updates us on his journey of discovery in astrophotography

Wednesday 15th July - Our Observing Director, Brian Mills FRAS, goes back to basics with “Astronomy from the Ground Up”

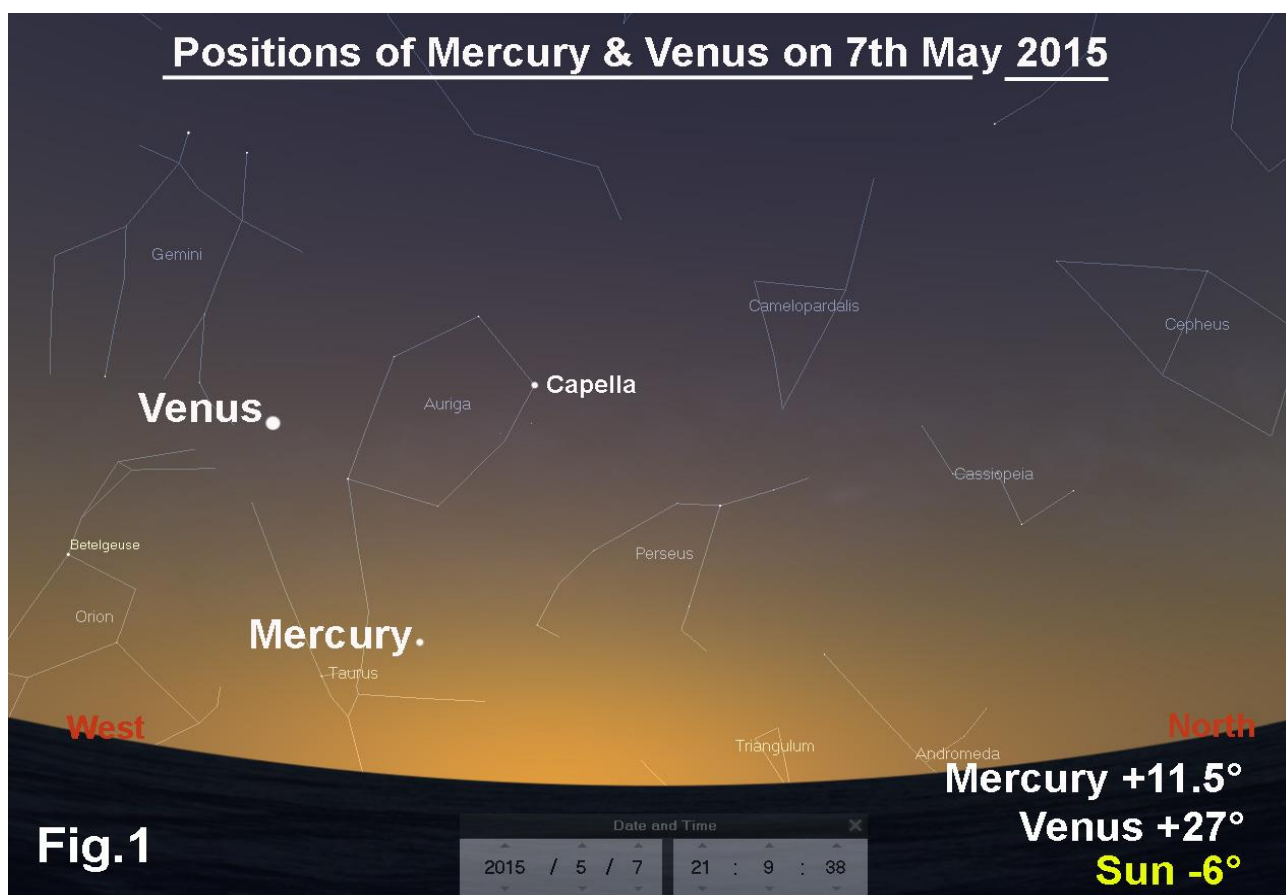
Saturday 29th August – Astro-barbecue. (further details to follow)

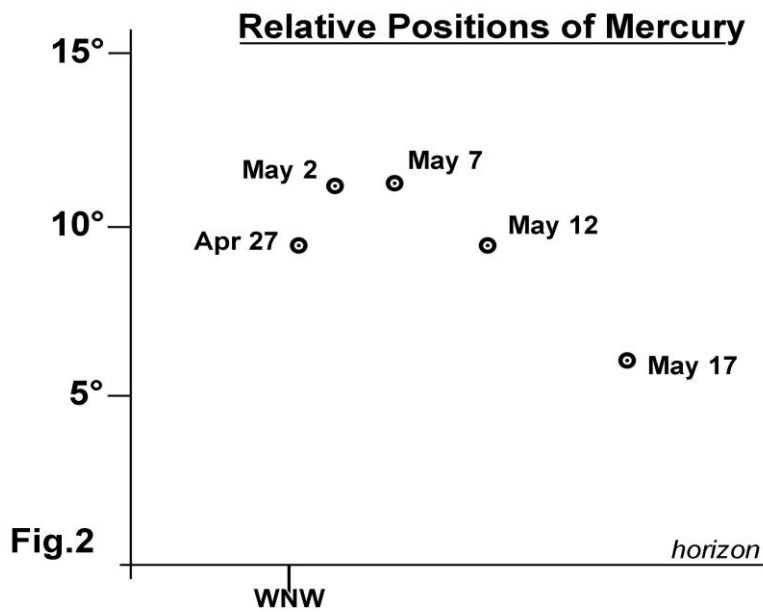
Wednesday 16th September – Mike Maunder gives us his impression of “Observatories of the World”.

SKY NOTES FOR MAY 2015

Planets

Mercury reaches greatest eastern elongation (21°) on the 7th when it will be 11.5° above the west-north-west horizon at the start of nautical twilight. This is shown in fig. 1 whilst the relative position of the smallest planet, with respect to the horizon, is illustrated in fig. 2. It is a sad fact that maximum brightness does not coincide with maximum elevation, as Mercury is at its brightest when it is much too close to the Sun for observation.





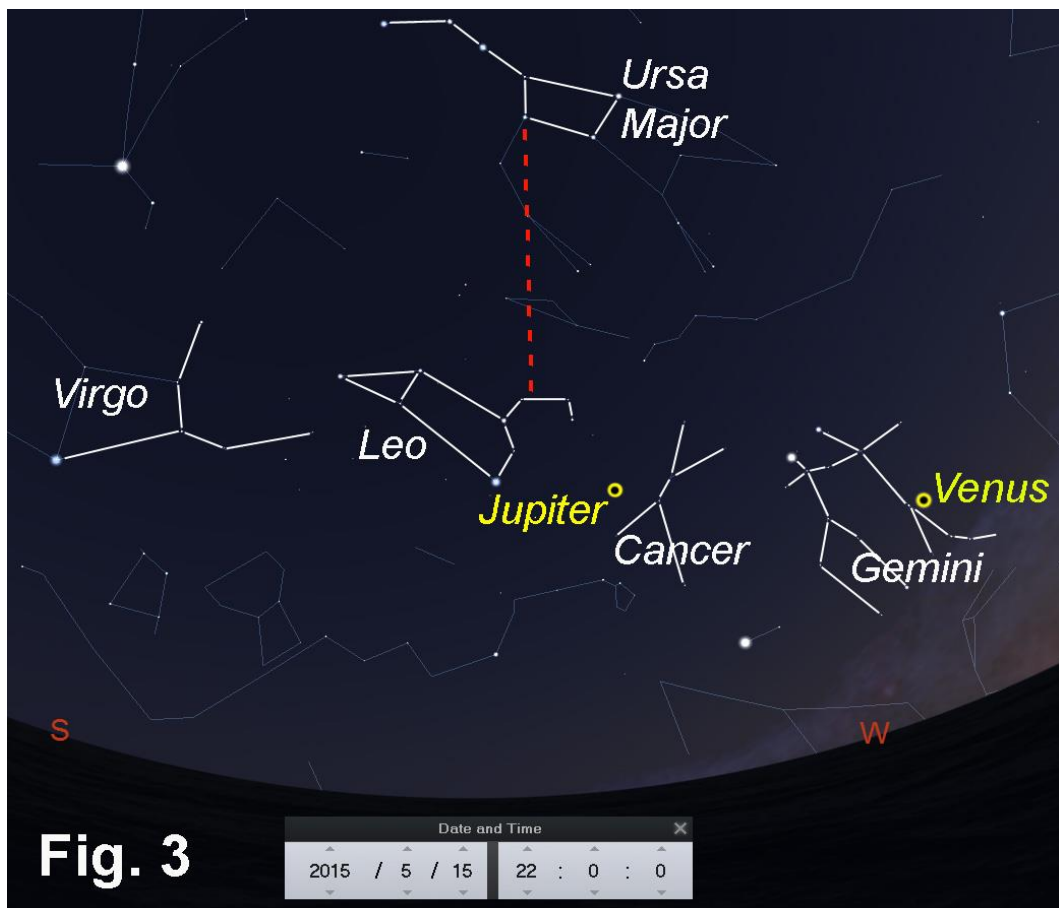
Brightness of Mercury

<u>Date</u>	<u>Magnitude</u>
April 27th	-0.8
May 2nd	0.0
May 7th	+0.4
May 12th	+1.1
May 17th	+2.1

Venus is a brilliant evening object in the western sky as soon as the Sun has set. In the month of May it is 25° in altitude and almost due west at end of civil twilight, setting almost 3½ hours after the Sun. By the end of May it has lost a few degrees in height above the horizon and sets 30 minutes sooner, but by way of compensation, it has brightened to magnitude -4.3. Its phase (the amount of the illuminated hemisphere visible to us) is decreasing although its apparent size continues to increase towards inferior conjunction. Its position is shown on the Mercury map in fig.1 although it is so bright it is impossible for Venus to be confused with anything else.

Mars is becoming increasingly difficult to observe with its angular distance from the Sun decreasing from 11° to just under 4° during May. It is heading for a June conjunction with the Sun after which it moves west to become a morning object and should be visible in late August or early September.

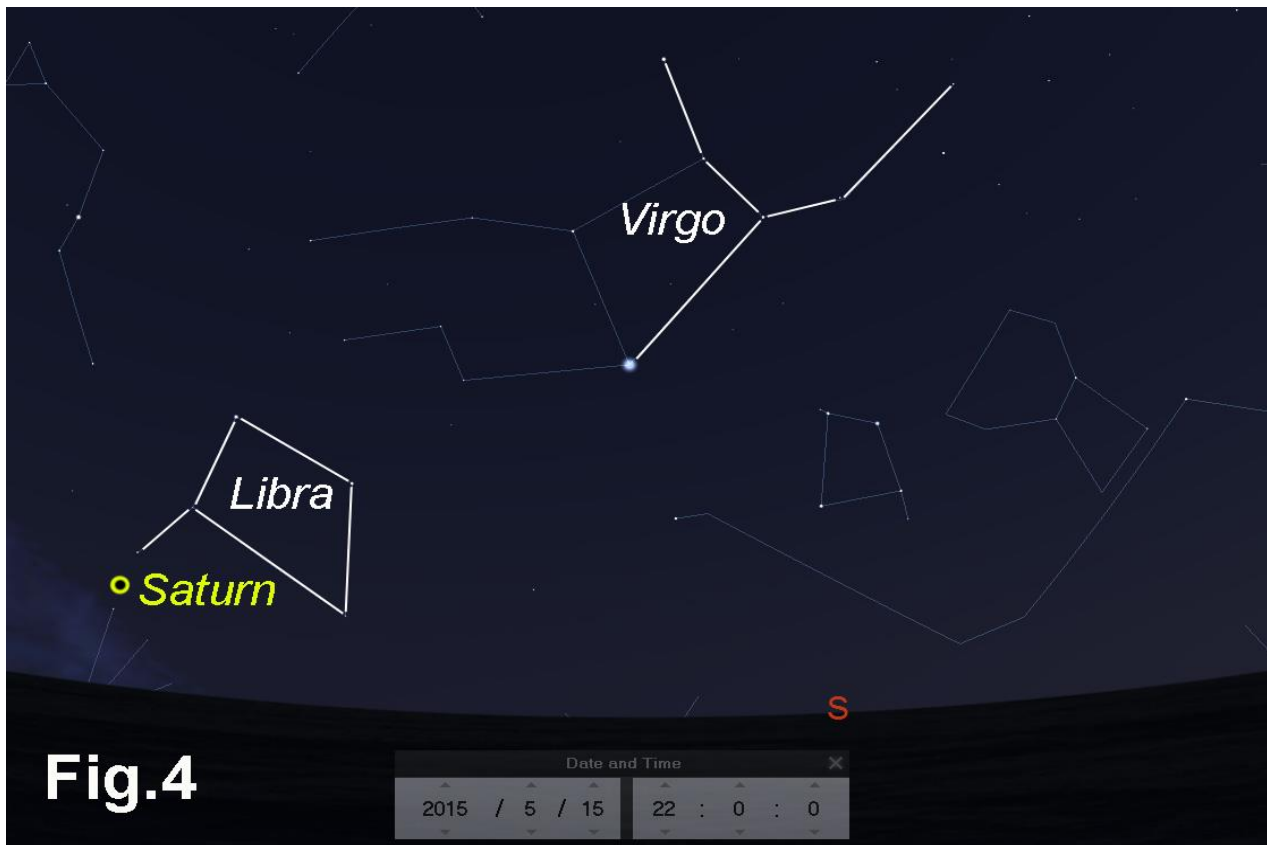
Jupiter has completed its retrograde loop and is moving direct (eastwards) in Cancer once more, although it will be mid June before it crosses the border into neighbouring Leo. Its magnitude is decreasing gradually (from -2.1 to -1.9) whilst its apparent size drops from 37.1 to 34.8 arc seconds. Its period of visibility is noticeably shortening with the gas giant setting at 01.00 by the end of the month. As I've mentioned before, Jupiter's four Galilean moons are an easy target for binoculars, a task made easier still if you can mount them on a tripod or support them in some other way. Without that it is extremely difficult to see them, let alone observe their gradual changes over the course of the night. Jupiter's position is shown in fig.3.



Saturn rises at 22.00 BST at the start of the month as it heads towards opposition on May 23rd. On that night it culminates (crosses the meridian) at 01.00 BST at a rather disappointing altitude of just 20°. This is a situation that will not improve at subsequent oppositions with it being only 18° high in 2016 and 17° in 2017 after which it begins to recover.

Saturn's magnitude is stable at 0.0 throughout May, whilst its apparent diameter reaches its maximum of 18.5 arc seconds, as would be expected, around the date of opposition. The planets retrograde motion carries it across the border from Scorpio into Libra, on May 12th, where it stays until mid October. The rings are still well presented due to Saturn's north pole being tilted towards us at 24.5°. This angle is decreasing slightly and will continue to do so until July, after which it increases until by the end of December it is more than 26°.

The diagram in fig. 4 shows Saturn's position in the middle of the month at 22.00 BST.



Lunar Occultations

In the table below I've listed events for stars down to magnitude 7.0 that occur before midnight although there are many others that are either of fainter stars or occur at more unsociable hours. DD = **d**isappearance at the **d**ark limb and RD = **r**eappearance at the **d**ark limb. The column headed "mm" (millimetres) shows the minimum aperture telescope required for each event. Please remember that the Society has telescopes that members can borrow, all of which are suitable for such events. **Times are in BST.**

May	Time	Star	Mag	Ph	Alt °	% illum.	mm
May 24 th	22.52	ZC 1429	6.8	DD	13	43	70
May 26 th	22.40	ZC 1624	6.8	DD	22	61	70
May 27 th	23.55	ZC 1735	6.3	DD	15	71	70

Phases of the Moon for May

Full	Last ¼	New	First ¼
4 th	11 th	18 th	25 th

ISS

Below are details for passes of the International Space Station (ISS) that occur before midnight and are magnitude -2.0 or brighter. The details of all passes, including those visible after midnight, 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 at least five minutes beforehand. **Times are in BST.**

May	Mag	Time	Alt°	Az.	May	Mag	Time	Alt°	Az.
29 th	-1.7	23.36	21	ESE	31 st	-3.2	23.19	46	SSE
30 th	-2.0	22.39	19	SE					

Iridium Flares

The flares that I've listed are magnitude -2.5 or brighter although there are a lot more that are fainter or occur after midnight. 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 before and after the "flare" although, of course, it will be much fainter at those times. There are a number of bright events this month which are well worth trying to observe. **Times are in BST.**

May	Time	Mag.	Alt°	Az.°		May	Time	Mag.	Alt°	Az.°
1 st	23.48	-3.8	35	235 (SW)		21 st	22.43	-3.9	21	179 (W)
2 nd	20.49	-4.2	69	78 (ENE)		22 nd	22.46	-2.6	18	283 (WNW)
3 rd	20.44	-6.4	69	79 (E)		23 rd	22.40	-3.5	19	284 (WNW)
4 th	20.38	-5.3	71	82 (E)		23 rd	23.47	-5.9	42	238 (WSW)
4 th	23.39	-2.7	32	242 (WSW)		24 th	22.43	-5.8	16	288 (WNW)
5 th	23.33	-6.8	33	244 (WSW)		24 th	23.41	-5.0	42	240 (WSW)
9 th	23.18	-6.0	31	252 (WSW)		25 th	21.55	-5.0	14	346 (NNW)
12 th	23.09	-7.0	29	259 (W)		25 th	22.46	-3.1	14	292 (WNW)
15 th	23.00	-3.3	26	266 (W)		27 th	23.32	-3.5	39	247 (WSW)
16 th	22.54	-3.5	26	268 (W)		28 th	21.27	-5.8	20	343 (NNW)
18 th	22.51	-5.8	23	273 (W)		28 th	23.26	-7.6	39	249 (WSW)
20 th	22.48	-2.7	21	278 (W)						

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

In the east some of the less inspiring summer constellations have now become visible, with Ophiuchus, Sepens, Libra and Hercules taking up a large portion of the sky in that direction. In mythology, Ophiuchus (the serpent bearer) is drawn holding the snake such that its head lies to the west and the tail to the east. For modern day astronomers who had to draw up charts it meant that Serpens would be the only constellation in the sky that was composed of two non-contiguous parts, that were divided by the body of Ophiuchus.

Above Ophiuchus lie Hercules, Corona Borealis and Boötes all of which can be found by starting with our old friend, the asterism that we know as "The Plough". A curved line drawn through the handle of the plough and continued onwards will arrive at the bright star Arcturus in the constellation of Boötes. To the east of Arcturus (direction will depend on time of viewing) can be seen the obvious semi-circle of stars that makes up Corona Borealis. A line drawn from Arcturus through the brightest star in Corona, Alphekka, and continued will reach a faint quadrilateral of stars known as "The Keystone" which makes up part of the body of Hercules. This is shown in graphical form in fig. 5, but be aware that the plough will be almost overhead (the zenith is marked) so you will have to orientate the map depending on which way you are facing.

As we look south, Virgo and Leo are prominent with the small constellations of Crater and Corvus riding on the back of Hydra, the mythological water snake, whose head lies immediately below Cancer.

Towards the west the last of Orion's entourage Canis Minor, Gemini and Auriga will soon be lost to view. Despite this, Capella, the brightest star in Auriga and the sixth brightest star in the night sky, is still 25° above the north western horizon.

In the north Ursa Major holds the zenith whilst its smaller relation points up towards that overhead point. Cepheus and Cassiopeia, the latter being the well known "W", are as low as they can get to the horizon. Draco, the dragon, begins its tortuous journey between the plough and Polaris and makes its way around Ursa Minor before turning sharply eastwards towards Hercules. Just below the head of the dragon we see that two of the three Summer Triangle stars, Deneb and Vega, are now easily visible above the north-north-eastern horizon.

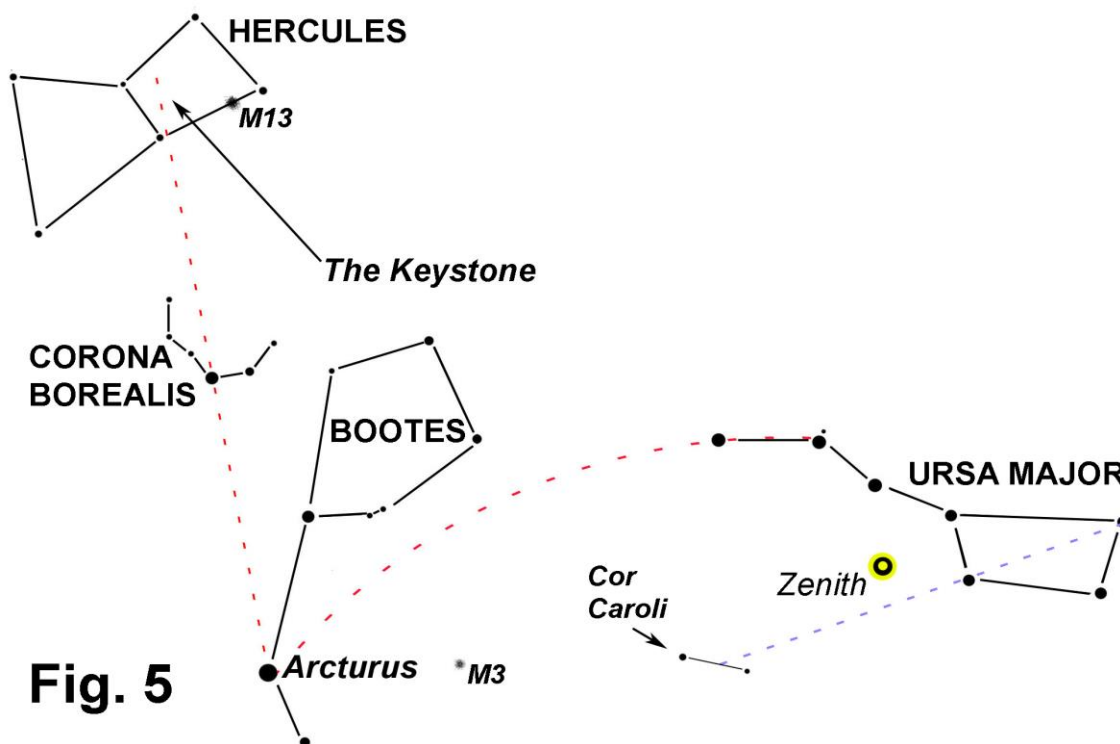


Fig. 5

What Objects Can I Look For This Month?

1. Cor Caroli is a double star in the constellation of Canes Venatici, the hunting dogs, with a separation of almost 20" (20 arc seconds). The pair, of magnitudes 2.9 and 5.6, can be easily resolved in small telescopes. The faint and shapeless group was added by Hevelius in 1687, although the brightest star, alpha (Cor Caroli), is the only one above magnitude 4.0. To find Cor Caroli use the two corner stars in the bowl of the plough as pointers as shown in fig. 5.

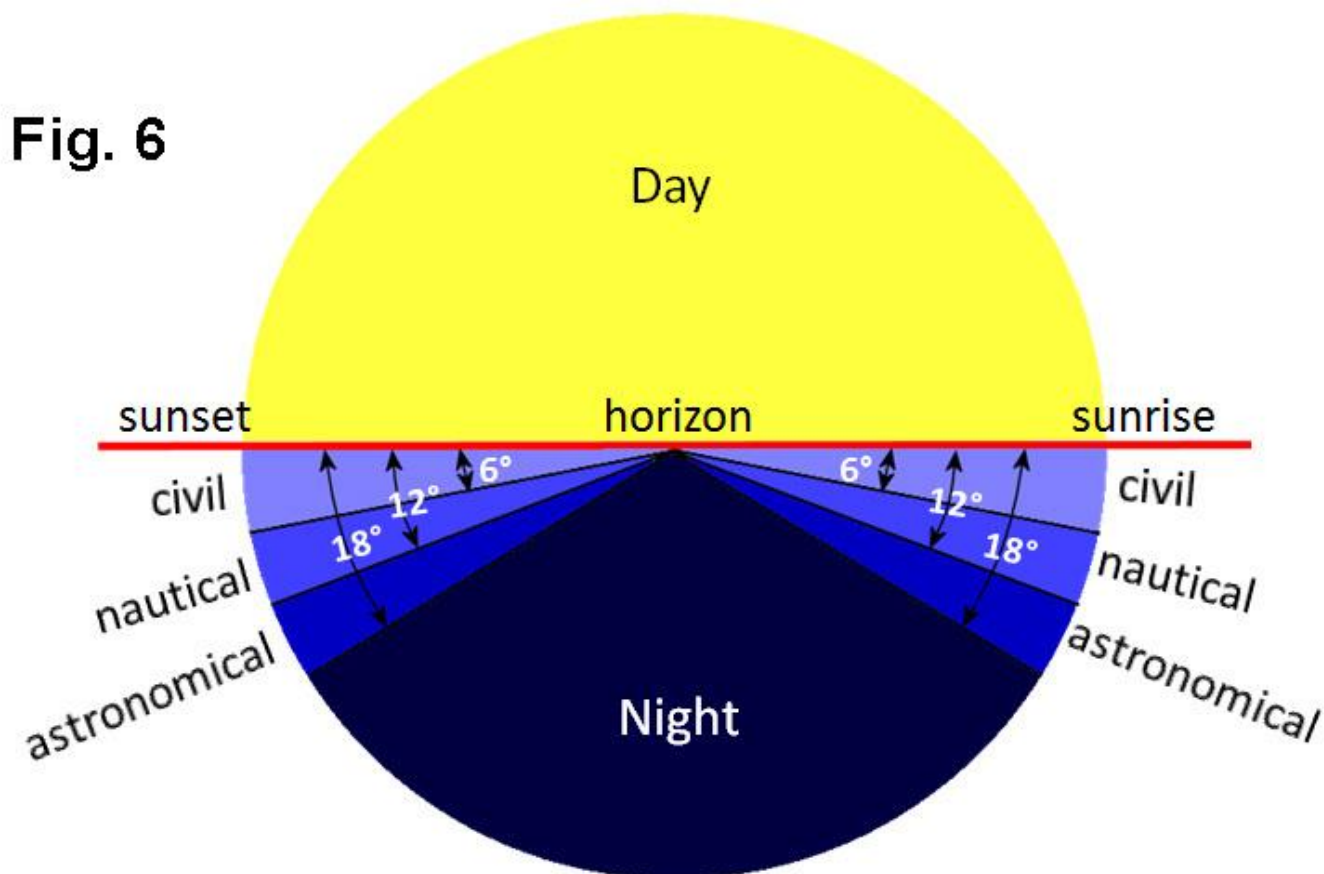
2. M3 is a magnitude 6.2 globular cluster in Canes Venatici which is often described as the second best of its type visible from the UK. The first is, of course, M13 in Hercules. M3 was discovered by Charles Messier in 1764, but it would be another twenty years before William Herschel was able to look with a telescope powerful enough to resolve the misty patch into individual stars, which we now know number half a million. To locate M3 draw an imaginary line from Arcturus to Cor Caroli. Approximately half way along that line will be the cluster.

Twilight

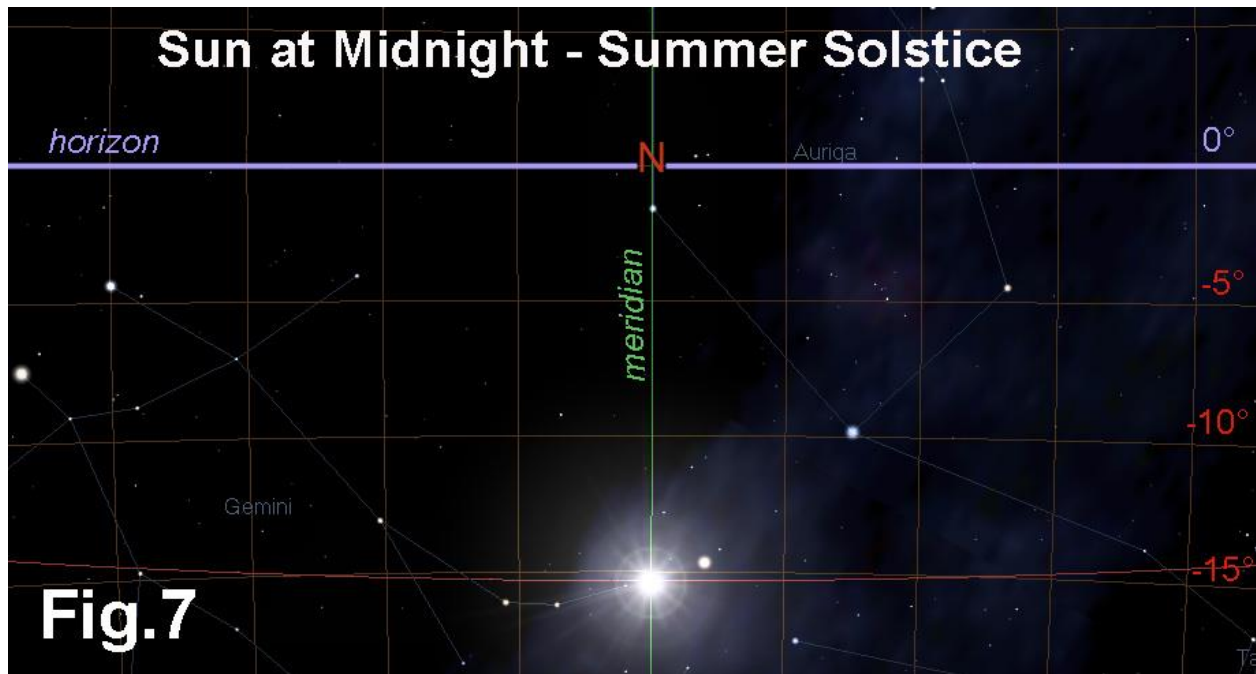
I very often mention twilight in these sky notes and thought it was time that I reminded new readers of how we define it. There are three flavours of twilight, and they are:-

- Civil Twilight. This exists from the moment of sunset until the centre of the Sun is 6° below the horizon.
- Nautical Twilight. This takes over where civil twilight left off and continues until the centre of the Sun is 12° below the horizon.
- Astronomical Twilight. This begins with the Sun's centre 12° below the horizon and lasts until it reaches 18°.

The diagram at fig. 6 shows this graphically. The exact opposite of what I've just described occurs prior to sunrise.



Of course it follows that if the centre of the Sun doesn't reach 18° below the horizon at any time of the night, then it will never become astronomically dark. This is what happens from around May 26th until July 20th each year which is the period either side of the summer solstice. At the time of the solstice the Sun reaches its most northerly declination, and thus is at its maximum elevation around midday (GMT). If this is the case, then at midnight (GMT) on the same day, the Sun will reach its minimum negative elevation below the horizon as is shown in fig. 7 which is just over 15°. Therefore, in the period mentioned above, the nights will all be blighted by astronomical twilight.



Happy 25th Birthday to the Hubble Space Telescope

The Hubble Space Telescope (HST) was launched on April 24th 1990 following some delays, the most serious of which was the loss of the Shuttle "Challenger" just over a minute after lift off in January 1986. Once the telescope had been placed in orbit it soon became obvious that it was suffering from an optical problem known as spherical aberration. This problem was overcome in a variety of ways leaving the HST to go on and make groundbreaking discoveries and take iconic images that could only have been previously dreamt of. Below are a list of just a few of its highlights.

- 1992 – Detected a galaxy 10 billion years old
- 1994 – Shoemaker-Levy 9 strikes Jupiter
- 1995 – "Pillars of Creation" image taken
Hubble Deep Field image taken (200 hours worth of pictures)
- 1997 – Confirmed that all large galaxies have a supermassive black hole within their core
- 1998 – Detected galaxies 12 billion years old
Supernova observations contributed the discovery of dark energy
- 2001 – First direct measurement of an exoplanet atmosphere
- 2004 – Detected galaxies 13 billion years old
- 2006 – Evidence of dark matter found in galaxy mergers
- 2012 – eXtreme Deep Field (XDF) image taken to show galaxies around 500 million years after the Big Bang (exposure of 2 million seconds)

Brian Mills

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SAGAS web-site www.sagasonline.org.uk

Any material for inclusion in the June 2015 Newsletter should be with the Editor by May 28th 2015