



ASTROCAMP

AUTUMN 2021

WELCOME TO ASTROCAMP

Thank you for booking and welcome to the Autumn AstroCamp!

We know what a difficult 18 months this has been for everyone and we've agonised long and hard about the rights and wrongs of running an astronomy event during a lingering pandemic, but we feel the time is right to tentatively reopen the doors in a responsible way to AstroCamp in Cwmdu - which remains small, friendly and therefore perhaps the most exclusive (and safest) starparty around.

AstroCamp has gained a reputation as the friendliest and most helpful star party there is. And with common sense and respect for others firmly in mind we hope to still live up to that reputation and ensure everyone stays safe and at ease.

If you're feeling sociable, you are still welcome to come and set up around 'The Common', near the reception and the AstroCamp HQ tent. This is also where you'll find the organisers if you have any questions while you're here. If you're new to astronomy or don't have your own telescope and want to look through a range of scopes and ask questions, 'The Common' is the place to come.

Of course, those that want to find a dark and quiet corner for some observing or imaging in blissful seclusion have everything they want in this weather protected valley under the dark skies of the Brecon Beacons International Dark Sky Reserve.

We are not setting out any covid rules above those set out by the government ([gov.uk/coronavirus](https://www.gov.uk/coronavirus)), but we do ask that everyone considers the comfort levels of others, even outside. If you're not sure what others feel about proximity or contact with their astronomy equipment, it's always best to ask. Of course, it's good etiquette to ask before looking through someone else's scope - though I've yet to find anyone who isn't happy to share their views.

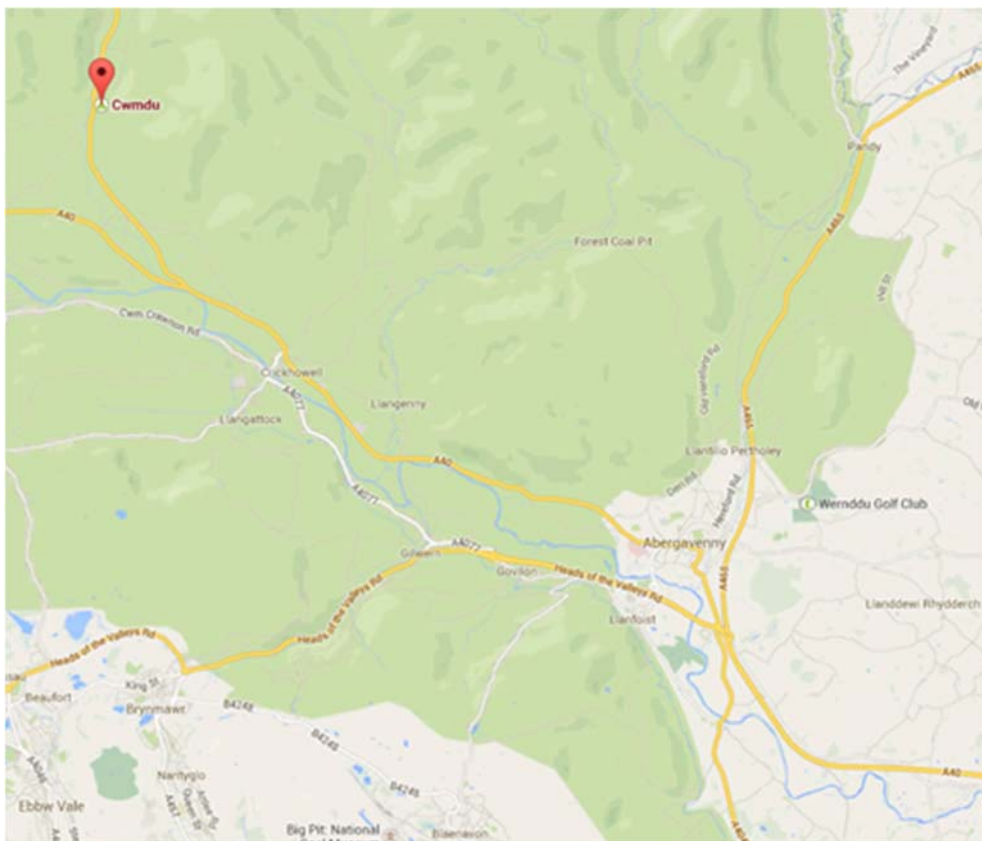
In this pack, you'll find a guide to what you can expect this AstroCamp and we've decided that a safe AstroCamp is better than no AstroCamp at all. So while we think it would be irresponsible to run the usual talks, quizzes and communal get-together in our indoor pop-up pub (The Spiral Arms), we will still have the opportunity for you to win astronomy prizes. For those joining us for the first time, we apologise that you're not seeing the usual communal activities we run, but we'll leave socialising to your own comfort levels while not deliberately encouraging proximity.

In this guide, we've each listed five objects or activities, as a starter for planning your observations or getting started in imaging over the weekend. All the observation times are listed in UK local time.

Beyond the campsite, the local pub (the Farmers Arms) provides good food and a warm welcome. The cafe (the Mynydd Ddu Tea Rooms) do exceptional breakfasts and both can be found on the main road through Cwmdu, the A479. Most AstroCamp regulars or the organisers will be happy to point you towards their favourite walk, local landmark, historic building, mountain to climb or village to visit.

Finally, we've once again asked the council to turn off the street lights in Cwmdu for the duration of camp to preserve the splendour of the night skies for us.

HOW TO GET TO ASTROCAMP



By Train: The nearest train station to Cwmdu is Abergavenny. Bus services run weekly to Cwmdu so booking a taxi from the train station is recommended. Taxis cost around £25 each way, but most operators seem to be happy to negotiate a fixed price if you guarantee that you will use them for the return journey.

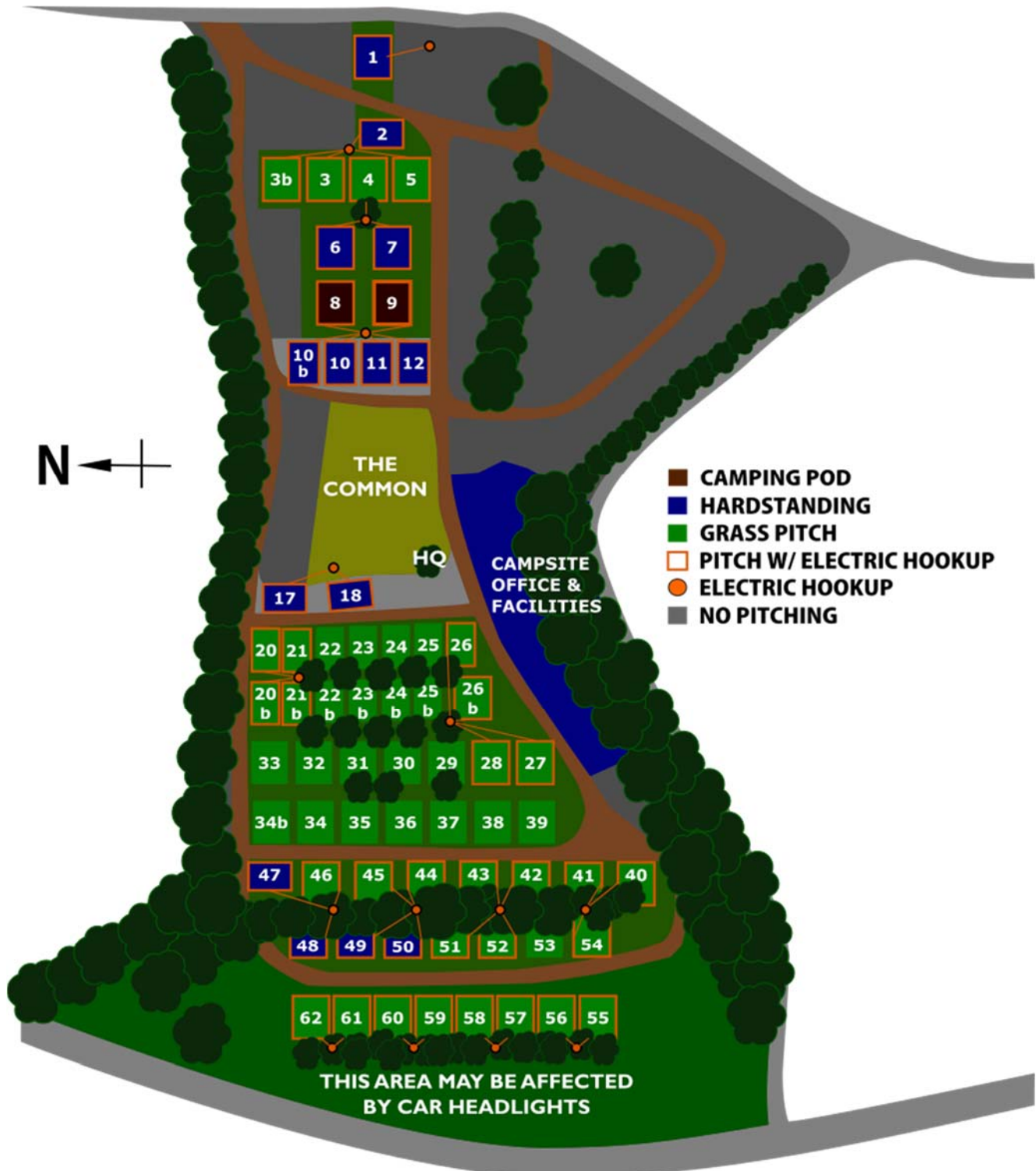
By Car: Cwmdu Caravan & Camp site is located four miles north of Crickhowell just off the A479 Turn right at the Farmers Arms public house in the small village of Cwmdu and follow the signs for 300m.

PLEASE NOTE: While SATNAV may bring you successfully to the area it may NOT deliver you to the campsite. Please follow the "camping" road signs from the Farmers Arms public house for the final 300m to the campsite.

Campsite Address: Cwmdu Campsite, Cwmdu, Crickhowell, Powys, NP8 1RU

CAMPSITE LAYOUT

Please pitch in your allocated area according to the map below. Please only park your car by your tent if it fits well within the dimensions of your chosen pitch (5x5m small, 8x8m large). Otherwise please park your car in the empty bottom field after unpacking and pitching up. Your neighbour will thank you for it!



ASTROCAMP EVENT SCHEDULE

Saturday 2nd

En route to Cwmdru, take a listen to Awesome Astronomy's October 1st podcast episode recorded by the organisers of AstroCamp. There's a special feature on starparties. Just look for 'Awesome Astronomy' on your preferred podcast app or go to awesomeastronomy.com/getpodcast

- 13:00 Arrive at campsite, pitch up & set up.
- 15:00 Meet & Greet. Come to the gazebo on The Common to meet new friends, share stories & a drink or two.
- 16:00 John's collimation tutorial. If you have a reflecting telescope and want help making sure your mirrors in your scope are in tip-top alignment before the stars come out.
- 21:00 Paul's starhopping & navigating tutorial on The Common. Learn how to find your way around the sky and pick out a few treats in the cosmos.

Sunday 3rd

- 10:00 Solar SUN-day - solar observing in white light and hydrogen alpha on The Common.
- 12:00 AstroCamp quiz (included in your admission) on The Common for the chance to win binoculars and a tripod

Monday 4th

- 14:00 Tea on 'The Common'. Bring food, drinks, (musical instruments are not unheard of), chairs & tables if you have them, for this social gathering that proves so popular each year.
- 15:00 A raffle (included in your admission) on The Common for the chance to win a beginner goto telescope.

Tuesday 5th

- 12:00 Leave campsite for Autumn 2021.

The Common (in the middle of the campsite) is the area we've created for socialising and observing together. There's always lots gathered here to share eyepiece views and learn new astronomy tricks from others.

Join us in the AstroCamp family at The Common *but please do respect the proximity comfort of others.*

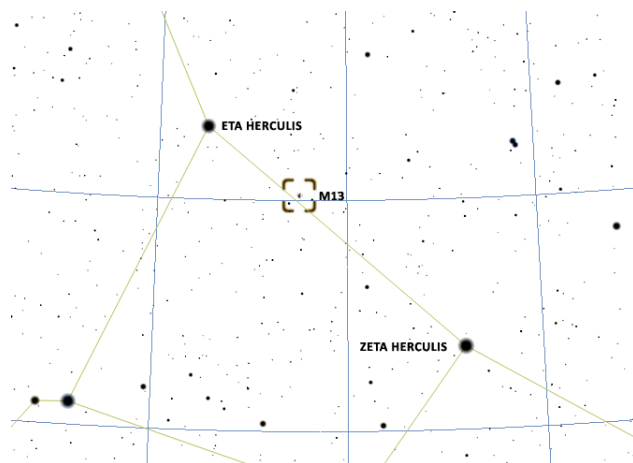
RALPH'S SKY PICKS

My easy amateur picks are all visible in a 3" (76mm) scope or binoculars and can be imaged in 1 minute exposures with or without a tracking mount. With a good polar alignment, you may be able to take 3 minute exposures or longer. But look at them carefully and if the stars look like they're smearing, discard them and take slightly shorter exposures or refine your polar alignment.

Come and ask me if you have any imaging questions and any of the imagers on site will be happy to give you pointers if you're new to astrophotography.

M13 - THE GREAT GLOBULAR CLUSTER IN HERCULES

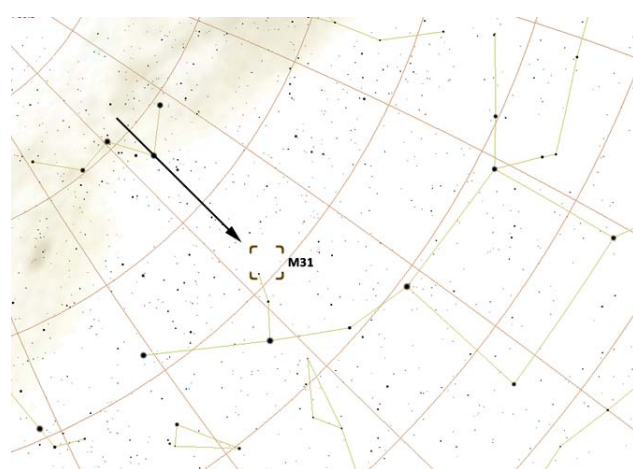
If we're doing a tour of globular clusters, how can we ignore The Great Globular Cluster in Hercules – simply put, we can't. This is probably the most spectacular glob for northern hemisphere observers; packing more than half a billion stars into a 20 arcminute patch of sky, which makes it shimmer at a naked eye visible magnitude 5.8. Find the keystone asterism in Hercules. It can be quite hard to find when in darker skies as you'll identify quite a few starry parallelograms! Two thirds the way from Zeta Herculis (in the bottom right corner of the keystone) to Eta Herculis (in the top right hand corner) sits this glob. For the best views, try to catch it before midnight. You can also pop over to John's Dobsonian on The Common for more spectacular views.



M31 - THE ANDROMEDA GALAXY

The closest galaxy of them all here. M31 is a spiral galaxy similar to our own and is getting closer and closer until we finally merge in 4 billion years. M31 can fill the entire eyepiece in the dark skies of Cwmdu, but with a DSLR you'll reveal a bright core, a couple of dwarf satellite galaxies and maybe a dust lane or two in those spiral arms.

Getting better as the night goes on, M31 can be found by first locating the obvious W-shape of the constellation Cassiopeia. The three stars making up the right-hand side of the W shape appear like an arrow pointing downward (early in the evening) or to the right (later in the night). Follow the direction of that arrow for 15 degrees and you'll easily see the galaxy with the naked eye as a smudge of light.



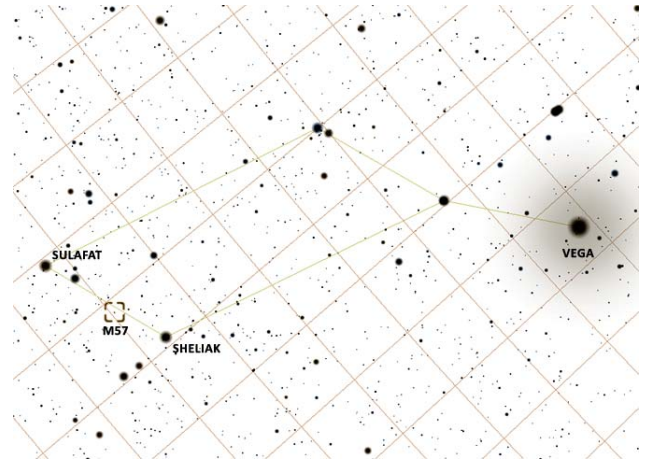
Short exposures, stacked in Deep Sky Stacker, are the best way to get lots of detail in the arms of the galaxy without using a guiding set up.

M57 - THE RING NEBULA

Directly overhead as soon as it's dark, The Ring Nebula is a very popular imaging target, 1: because it's relatively easy to image, 2: because it's a tight object that can be captured in its entirety and 3: because it's absolutely beautiful, like a smoke ring in the sky.

To find M57, look for the bright star Vega and the 2 stars at the bottom of the parallelogram pattern of its constellation Lyra. Exactly halfway between these two stars (Sheliak & Sulafat) is the Ring Nebula.

A one minute exposure using any sized telescope as your camera lens will reveal the nebula but, as always, if you take multiple exposures and stack them together in Deep Sky Stacker, you'll really see the benefit. Come and see me or any of the imagers at AstroCamp if you want to learn how to stack images together.



WIDEFIELD ASTROPHOTOGRAPHY

If you don't have a telescope & mount but have a camera and tripod, there are still ways to capture the wonder of night skies in areas as dark as Cwmdu.

Use manual focus on your DSLR camera to get nice tight round stars on your viewfinder or a short test exposure. The moon, a bright planet or one of the brighter stars (such as Vega or Arcturus) are great for getting a sweet focus.

Taking a 20 or 30 second exposure, with an ISO value of 800 or 1600 and your widest aperture setting, will reveal thousands of stars and even resolve some of the larger clusters, nebulae and galaxies as smudges of light. The seam of the Milky Way will be overhead too and that will blow your mind in widefield images taken this way!

If the stars look to be trailing (moving on your sensor) in your images, decrease your exposure time. You can zoom in for more detail or zoom out for wider-field images of the night skies but remember that the more you zoom in the shorter your exposures can be before the stars will begin to trail. You will also need to re-focus each time you change your zoom setting.

STARTRAILS

Some fabulous images can be created by deliberately exploiting the rotation of the sky to create beautiful circles of stars around the north celestial pole.

Point your DSLR north on its tripod and use manual focus on a bright star or planet.

Startrails look the best when you have a foreground object occupying 10-20% of the view - trees, unlit buildings or the Welsh valleys are perfect for this. But remember that long exposures really emphasise light so you want a truly unlit foreground object or they will be over exposed.

Then take a series of 5-10 minute exposures on your camera's 'bulb' setting with an ISO of 200 or 400 and your widest aperture setting. You should get images with nice arcing startrails. If you use a remote timer, you can leave your camera to take dozens of these shots

After you've taken a dozen or more of these images, import them into Photoshop as individual layers (Adobe bridge is the simple way to do this) and select the 'Lighten' blending option for each layer.

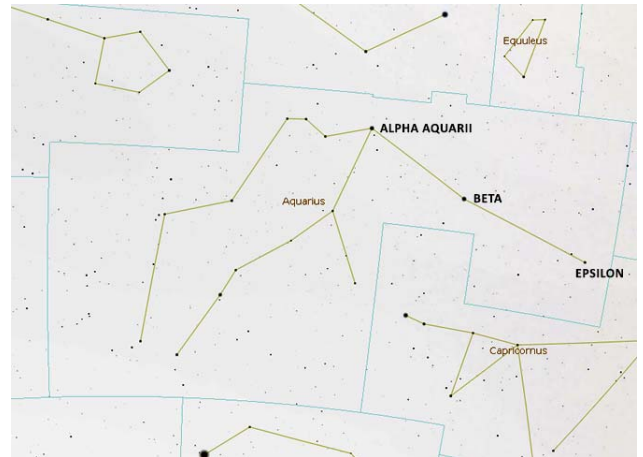
If you don't have Photoshop, come and see one of the organisers and we'll combine your images for you.

PAUL'S VISUAL DSO HUNT

This tour is all about the water carrier, Aquarius, which will be sitting in one of the best parts of the sky during camp as you look south around 11. There you will find this constellation nestled below Pegasus and following Sagittarius, Capricornus and Aquila. If you look for Altair in Aquila and draw a line to Fum al Samakah or Beta Piscium then almost everything between them is Aquarius, with the line just passing between the two brightest stars, Alpha and Beta Aquarii, or Sadalmelik and Sadalsuud, with Beta actually being the marginally brighter of the two and it is here that the tour begins.

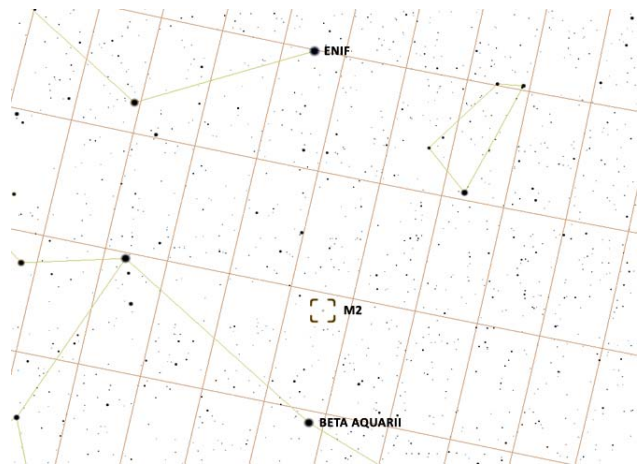
BETA AQUARII - SADALSUUD.

This is the brightest star in the constellation and is also one of the anchor stars for the study of stellar spectrum. 50 times wider than the sun and 2,300 times more luminous, you should see a warm yellow hue to this G type star. This is one of a group of three stars that appear to be moving perpendicular to the plane of the galaxy, the others being Alpha Aquarii and Eta Pegasi. When you swing your scope onto the star, after you have appreciated its colour, take a look for its companions. There are two faint optical companions, both magnitude 11 and separated by 35 and 57 arc seconds. A tough challenge to start but if the sky or magnification doesn't work for you will have still taken a look at distinctive and unusual star.



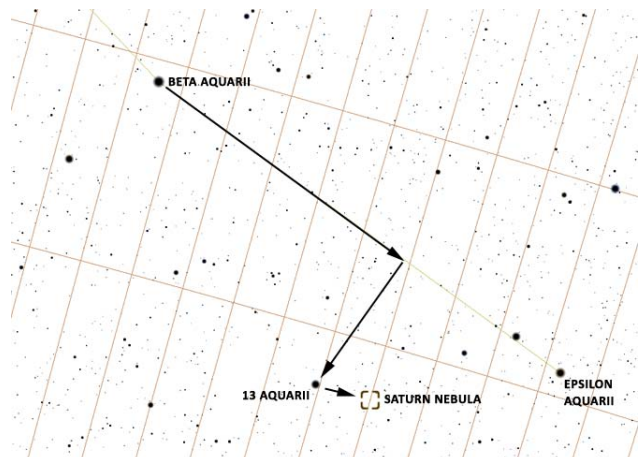
GLOBULAR CLUSTER M2

The next stop is an easier find and should be a simple matter of moving one average finder scope diameter north from Sadalsuud. If we have one of those perfect Cwmdu nights, then you should see a small fuzzy star in your finder scope. In the eyepiece you will find a globular cluster 175 light years across, which is about 40,000 light years from us and is thought to be one of the largest globular clusters known. It is an interesting glob to look at, in larger scopes it appears elongated on a northwest-southwest axis and appears to be surrounded by streamers. Rack up the magnification and on a good night you will see many spurs of stars and possible even dark patches or lanes across the glob itself.



PLANETARY NEBULA NGC 7009 'SATURN NEBULA'

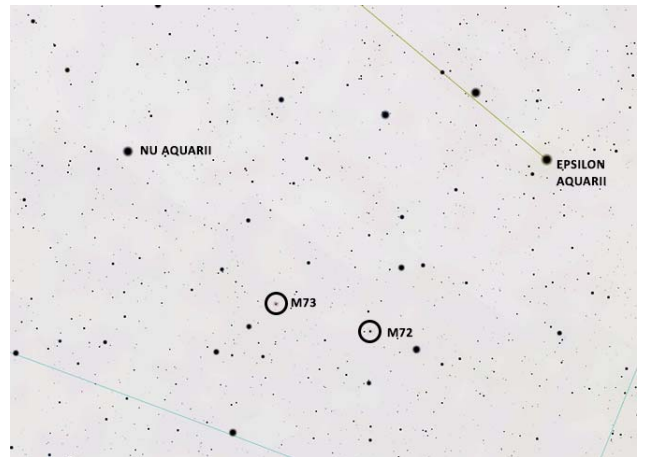
The next targets are a little harder to hop to but worth the patience and perseverance. Working back to Beta you need to look west and find the close pairing of Alpha and Beta Capricorni, which is pretty distinctive and about to clenched fists width, or 20 degrees away. If you look back towards Beta you should find another fainter pairing, perpendicular in orientation and this is Epsilon and Mu Aquarii. Moving south and east about a finder scopes diameter you should find Nu Aquarii and from here you are just a degree away from the Saturn Nebula, a planetary nebula that is a William Herschel discovery but named by Lord Rosse who could discern the Saturn like shape of the nebula. It needs good magnification



to see to the 'rings' but even without them NGC7009 is a beautiful blue-grey planetary and worth tracking down even in small scope.

GLOBALAR CLUSTER M72 AND A MESSIER 'PHANTOM' M73

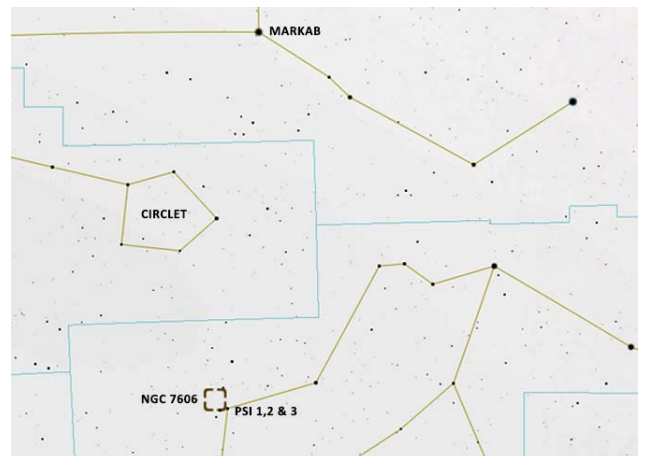
We are back to globulars to grab another messier and to take a quick look at a mistake. M72 is difficult for small scopes as unlike M2 it is a small cluster, only around 40 light years across and at least 50,00 light years away, compare this to M13 which is less than half the distance and more than twice the diameter. Move your scope slowly to the west and south of the Saturn Nebula, heading for Beta Capricorni. You should find the faint star that is actually a globular cluster after moving about 2 ½ degrees. M72 has no bright core and appears even under high magnification as an almost uniform disk of stars.



On your journey to M72 you will have passed M73, a subject of long debate in astronomy. This small grouping of four stars was reported as an open cluster with nebulosity by Messier, who must have been at the wine because nebulosity has never been seen since and starting with John Herschel there has been doubt over whether this was an open cluster or an asterism. The debate was settled in 2002 when spectral analysis showed the stars were at different distances and unrelated. But it stands in the Messier catalogue still as one of three 'mistakes', along with M40 and M24.

GALAXY NGC 7606

This is the brightest galaxy available in Aquarius, but you're going to have to slew that scope over the other side of the constellation. Find Markab at the bottom right of the great square of Pegasus and look down for the circlet in Pisces, an easy asterism of five stars. Below this in a line down from Markab that passes to the right of the circlet you will find the star Phi Aquarii and below this a close group of three stars Psi 1,2 and 3. If you place your finder scope on these three, then move east a little over half a degree you should locate the spiral galaxy NGC7 606 at magnitude 11.5. It has a bright core and high magnitude in large scopes may tease out some structure. It sits around 90 million light years away, so while those around you are enjoying the spectacular M31, you can bask in the glory of finding a similar object 40 times further away, while the light in their scopes is early hominids, you are bathing in light from the Triassic.

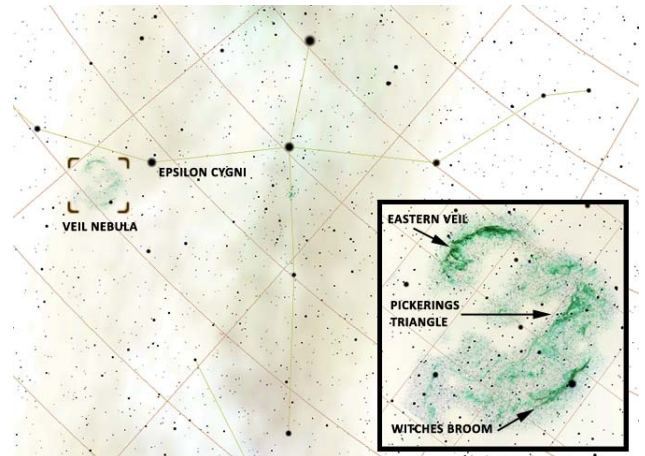


Have a great camp and hunt me down if you want a few more star-hopping pointers.

JOHN'S DOB DELIGHTS

EASTERN & WESTERN VEIL

Due South at around 21:30 the Veil nebula is clearly marked by the lower wing of Cygnus. From Deneb, the top left of the Summer Triangle head towards everyone's favourite double star Albireo. The first bright star you come to on this line is Sadr in the body of the swan. From here head towards the horizon following the lower wing of Cygnus and half way between the next two stars, Gienah and Zeta Cygnus, about a moons width towards the head of the Swan, you'll find the Eastern Veil. 2 degrees to the west, centered on a magnitude 4.2 star, you'll find the Western Veil or the Witches broom. This Mag 7 Nebula should be manageable with a 4" scope but imagers will tease out all 5 separate components of this gigantic supernova remnant.

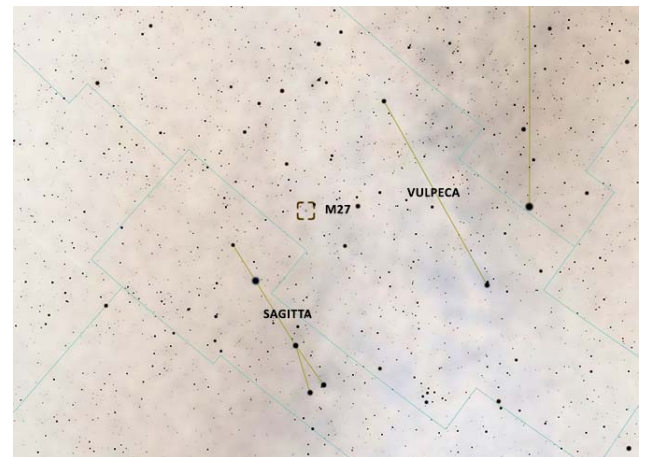


M27 - DUMBBELL NEBULA

This Planetary nebula in Vulpecula has an apparent magnitude of 7 and is visible in binoculars, but any medium to large telescope should start to pull out the shape that gives this nebula it's familiar name.

It's fairly easy to find as it lies within the Summer Triangle halfway between the constellations Vulpecula, the little fox (that popular asterism consisting of 2 stars, forming the little fox's back) and Sagitta, the Arrow

This ball of gas lies at an approximate distance of 1,360 light years and was the first planetary nebula to be discovered by Charles Messier.

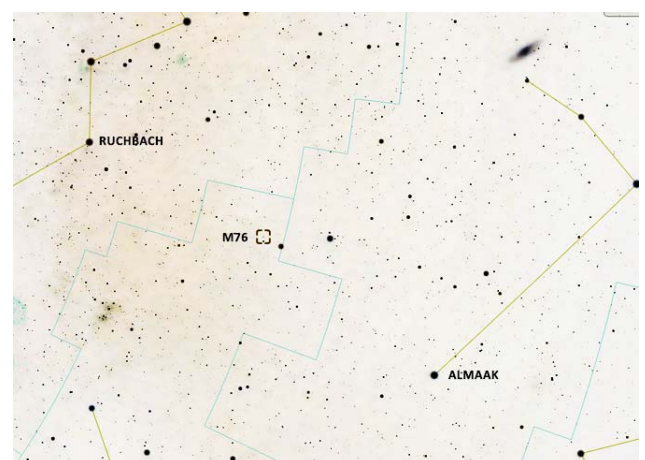


M76 – LITTLE DUMBBELL

Like its larger cousin the Dumbbell Nebula, this little object has 2 distinct lobes. Fainter, smaller and at twice the distance, it's still worth hunting down.

Positioned halfway between Ruchbah in Cassiopia and Almaak in Andromeda the Little Dumbbell should still be an easy find for anyone with a medium sized telescope,

but it's the imagers can who really tease the red ends out of the 2 blue balls of gas that make the Little Dumbbell.



SATURN**DIAMETER: 17.5" MAGNITUDE: 0.48**

A classic generator of "Ahhs" at camp, Saturn is visible in the early evening sky at camp at around 8pm. Although low in the sky, it's orientation should allow a good view of the rings. Use a blue filter to highlight the cloud bands and poles, yellow-green for the Cassini division.

Rise: 16:45 **Set:** 01:22**JUPITER****DIAMETER: 46" MAGNITUDE: -2.7**

You can catch the 'King of Planets' from sunset in the SW sky. Use a blue filter when viewing Jupiter to bring out rills, festoons and the GRS, or a dark blue filter for the belts and the Great Red Spot.

Rise: 17:23 **Set:** 02:52**Great Red Spot Transits**Monday 4th: 00:22**DELTA AURIGIDS, EPSILON PERSEID, SOUTHERN TAURIDS AND AUTUMN ARIETIDS**

The Delta Aurigid and Epsilon Perseid meteor showers result from material shed during the passes of the comets Kiess C/1911 N1 and Swift-Tuttle, while the source of the Southern Taurids and Autumn Arietids is unknown. All four meteor showers are medium meteor showers with an hourly zenith rate of about 3-6 per hour at their peaks in early and mid October. While not being at full strength, over the years they have always treated us to a stunning fireball. Grab a comfy recliner and see if you can spot one or two!

THE SUN

The simplest way to safely observe the Sun is with a simple white-light filter made using Baader Solar Film, which comes with instructions on how to assemble a filter to fit your scope. White-light filters cut down the light entering your telescope to safe levels and allow you to observe the Sun's photosphere, the surface of the sun that we perceive to emit light.

The most obvious feature to look at are sunspots, which come in a variety of shapes and sizes. The larger spots will present a dark central area called the umbra, surrounded by a lighter, greyer penumbra. Sunspots are dynamic features and it is worth spending a few hours revisiting the sunspot group to see how it has changed.

Sunspots are often surrounded by faculae, these are brighter (and therefore hotter) regions of the sun and can best around the edges of the solar disc.

Finally there is solar granulation. The granules are just a few arcseconds across, so under poor seeing will appear as a coarse mottling of the solar disk. Under good seeing, and with a solar continuum filter, it is possible to make out the larger granules. Each of these granules is a convection cell bringing hotter material up from deeper inside the sun.

If you're lucky enough to have a hydrogen alpha scope available, you'll also be able to make out features in the Sun's chromosphere. There are a wide range of features to keep an eye out for, too many to mention right now, so here are a few to whet your appetite.

One of my favourite Ha targets are prominences, clouds of plasma arcing from the Sun's photosphere into the corona and are observed around the limb of the Sun. They are highly dynamic and make for great timelapses. When





prominences are viewed top-down, that is with the Sun in the background, they are referred to as filaments which appear as narrow, darker regions on the face of the Sun.

Next up we have plage, these are bright patchy areas that can be found in active sunspot regions. Plage are markers for areas of the Sun that have nearly vertical emerging or reconnecting magnetic field lines.

Finally we have spicules, smaller jets of gas that create the feathery effect that can be seen on the disk of the Sun in Ha at lower magnifications. Little is known about how they are formed, and remain an active area for researchers.

STAR CAMP ETIQUETTE

LIGHTS

Please only use red light torches at night. If you use a laptop, please cover the screen with a sheet of red acetate. Toilet block lights will be switched off or covered in red acetate during the dark hours. Please do not use laser pointers if it is dark and cloud free as they'll interfere with astroimaging and can be dangerous. Also, cigarette lighters produce light as well as heat. Please screen your lighter flame from astronomers. Please be aware that lights inside tents and caravans are also visible to people outside of them - red lights or no lights please.

This is the one piece of etiquette that will make offenders very unpopular - dark adaption takes up to half an hour to achieve but only a second of normal light will take you back to square one.

EQUIPMENT

People will be happy to let you look through the eyepiece at their scopes but please do ask the owner before taking a look. Be aware that telescopes are carefully aligned and assembled and as little contact to see through them is best.

Be mindful of astroimagers. Astrophotography requires very steady and unobscured exposures, so please don't touch or walk in front of a scope being used for imaging. We will try and set aside an area for astroimagers for this very purpose. I'm told they're still a very friendly bunch despite their obsession with long exposures!

CARS

No car movements are permitted after dark, so please arrange to arrive before this time. Remember that opening car doors or the boot always turns an interior light on so disable them if you can, or remove the fuse before sunset. Alternatively, cover them with opaque tape, including those in the boot. If a bright light is unavoidable call out: "LIGHTS IN 3 SECONDS" to give everyone time to turn the other way.

The best advice here is to remove everything you'll need from cars before nightfall and don't return to them.

CHILDREN

Children are welcome to the event, but please remember the field is dark, there are lots of very valuable bits of equipment and many people will have carefully aligned their telescopes. Also, tired astronomers are often glad of a lay in the following morning. Please keep your children and their volume under control.

NOISE

We want this to be an astronomy *party*, but please be considerate of others and refrain from any raucous behaviour, loud talking or music. Some people will want to catch up on some sleep for a few hours during the night and others will be sleeping during the day. Please be considerate of others trying to sleep when it is cloudy by not playing music late at night.

RUBBISH

The site is rich in wildlife and a very pleasant place to stay. We would like to keep it that way. Please keep your rubbish in a suitable container and dispose of it in the bins provided. Dark sites and loose trash do not mix well.

DOGS

Well behaved dogs are more than welcome to the event, but please remember the field is dark, there are lots of very valuable bits of equipment and many people will have carefully aligned their telescopes. Also, tired astronomers are often glad of a lay in the following morning. Please keep your dogs on a lead if they are anywhere near other people's equipment and their volume under control. Please also be mindful of others who might have a fear of dogs.