Autumn 2022 Number 37

Kielder Observatory Newsletter

EDITORIAL

We were lucky to have a spectacular auroral display at the start of October, which made the BBC News. With the current solar cycle still on the rise for the next couple of years, hopefully there will be more to see! We are currently crowdfunding for a new wind turbine - see the News section. Elsewhere in this edition we continue our occasional series on the constellations, looking at Cygnus the Swan. We also take a further look at what the JWST has been producing.

As ever, if you are thinking of visiting the observatory in the next few months then book as soon as you can. As I write this there are only a handful of places left in November and very few in December.

Nigel Metcalfe

Editors: Nigel Metcalfe & Robert Williams

Kielder Observatory Astronomical Society

Registered Charity No: 1153570.

Kielder Observatory Astronomical Society is a Charitable Incorporated Organisation. Its aims are to

* Promote interest in the science of astronomy to the general public
* Facilitate education of members of the public in the science of astronomy
* Maintain an astronomical observatory in Kielder Forest to support the above aims

https://kielderobservatory.org

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KIELDER OBSERVATORY
Infinite Inspiration

Front cover: The recent aurora (Dan Monk).
Rear cover: Our customers enjoy a good night!

Small Visitor Attraction of the Year

North East England Tourism Awards 2022

Gold Award Winner

We have said goodbye to our longest serving trustee, Jürgen Schmoll. Jürgen has been a trustee since we became a CIO (Charitable Incorporated Organisation) at the end of August 2013, and has now served his maximum 3 x 3 year terms as permitted by our constitution. Jurgen is a Senior Optical Engineer in the Centre for Advanced Instrumentation in the Physics department at Durham University. As such, his telescope skills are much appreciated, and he will be continuing on as a volunteer helping to keep our instruments in tip-top condition. We asked him for a few words ...

"*I remember the 2008 inauguration of Kielder Observatory with Sir Arnold Wolfendale snipping the ribbon. Back then, the later called Patrick Moore observatory was not finished yet as the builders were running a bit late. But in the next few months everything completed and ran in. I helped as a volunteer in a small group, doing the odd public event. Usually after delivery, when the public went, we continued observing or in bad weather socialised before inflating our air mattresses to sleep and to wake up in the cold as the fire had gone out.*

Times have moved along a lot, with changes of equipment and staff. At one point I suddenly had the word "Trustee" next to my name and I remember I had to look up what it meant! Of course this new role was a bit different with management tasks and difficult decisions in hard times. Kielder Observatory managed the pandemic and while some of the expansion plans of years ago are history now, the organisation continues to astronomise the public with its unique experience. Let the sky stay dark and hope for many clear nights!"

Several trustees joined the Observatory staff at their 'team day', which was held at Slaley Hall in Northumberland at the start of October. Fortunately everyone seems to have survived the knife throwing and archery, which followed the day's official business!

STOP PRESS: the trustees would like to congratulate our female staff for winning the Women in STEM category at the Women Inspiring North East Awards, and to our CEO, Catherine Johns, who was Highly Commended in the Leadership category!!

Nigel Metcalfe
Secretary

OBSERVATORY NEWS

After 15 years, we are in need of a new wind turbine ...

... so we are crowdfunding to raise money to help us buy a new wind turbine, making our observatory even more environmentally friendly. We are completely off-grid with our energy supply so we rely on a wind turbine to help keep the observatory running. The new turbine will cost about £30,000, so any pledge towards our target is much appreciated. We know not everyone is able to donate at this time, but you can donate as little as £2, and if you're not able to do that but do wish to support our campaign, then you can share our page on social media and encourage your friends and family to do the same! You can donate via our Spacehive Project Page : https://www.spacehive.com/kielder-observatory-wind-turbine

Hot off the press, we are delighted to annouce that we have been awarded a VisitEngland Welcome accolade for 2021/22. The winning attractions, which include our Northumberland friends at Roman Army Museum, The Vindolanda Trust and The Alnwick Garden, gained the accolades based on scores received

following their annual VisitEngland Visitor Attraction Quality Scheme assessments. So well done to our team!

In the skies, a spectacular movie of the Nothern Lights, captured from the Observatory by our own Dan Monk at the start of October, made it onto the front page off the BBC News website. Aurora are not particulary rare from Kielder, but this display was exceptional, and could easily be seen with the naked eye.

Since our last edition, Ishbel Wright has joined our Science Communication team. She has recently finished a Master's degree in Astrophysics at St Andrews university. Ishbel is thrilled to have a job which has enabled her to continue her pursuit of understanding the Universe.

Ishbel Wright, who has joined as a Science Communicator.

OBSERVATORY NEWS

Helana Cochrane, of Helena's Astrophotography fame, also joined us as a Digital Content Creator Intern. She has produced a series of three beginner's guides to stargazing which can be seen on YouTube.
https://www.youtube.com/watch?v=ibL91sASgKQ
https://www.youtube.com/watch?v=2wRDRaw6yyo
https://www.youtube.com/watch?v=GzDETj4wbYc

There have been two new Podcasts since the last newsletter. We have an interview with Chris Lintott, a Professor of Astrophysics at Oxford University but known to millions as a current presenter on the BBC's The Sky At Night, and Martin Ward, Temple Chevallier Chair of Astronomy at Durham University, tells us all about Black Holes. Check them out at https://podfollow.com/kielderobs/view

Maintenance work has been continuing, and the end wall of the Gillian Dickinson building now has a nice chalkboard appeareance!

We're in the process of improving safety and accessibility. Recently we opened a new composting toilet, and soon there will be a ramp installed to make this accessible for all users. We're also looking into lighting solution; at the Observatory we use red lights to preserve dark adapted vision whilst stargazing. The red lights that guide visitors up and down the track will be replaces and improved, and we're also looking into installing red strip lighting around the facility to improve visitor experience and safety.

OBSERVATORY NEWS

Through collaboration with Forestry England we now have a scale model of the solar system on the track that leads to the Observatory! On your next visit look out for the signs that feature each planet in our solar system, starting with Neptune in the bottom car park and finishing with the Sun at the top of the hill. The signs give you some interesting facts and information about each body, and the distances have been carefully measured to give you a real sense of scale on your way up Black Fell.

And last, but not least, Christmas is fast approaching and the Kielder Observatory 2023 A3 wall calendar is now in stock! Filled with 12 beautiful images, information on moon phases, celestial events and birthdays of notable figures in the world of astronomy, cosmology and physics, the calendars can be ordered from our online shop for £10 + postage. Don't delay, get yours today!

Some of our winners of the Women in STEM award celebrate!

FRANKS FELLOWSHIP

Four artists, aged between 14 and 18, were given £250 each and access to Kielder Observatory for inspiration thanks to Frank's Fellowship, which was established following a generous legacy from the late Frank Fortescue. There were no restrictions on which artform could be the subject of a bursary and entrants did not need to be formally studying their chosen artform.

Ethan Jewitt, 15, Sarah Dickinson, 14, Jacob Harrison, 17 and Jemima Green, 17 all live in Northumberland, attended a 'fellowship day' where they showcased their finished work and met with each other to talk about their art, which took the form of acrylic paint, mixed media and textiles.

Clockwise from top left: Jacob, Sarah, Ethan and Jemima show off their Frank's Fellowship artworks.

Our Dark Cosmos - September

"We were at the Dark Cosmos event earlier this week and it was just fantastic. Very informative and interesting, we were very lucky that there were breaks in the cloud cover and we got to see Saturn through the telescope. Thank you for a great evening"

Dane, Manchester

SOLAR ECLIPSE

Here are a few shots of the partial solar eclipse which took place on October 25th...

Our own Dan Monk took this from his back garden.

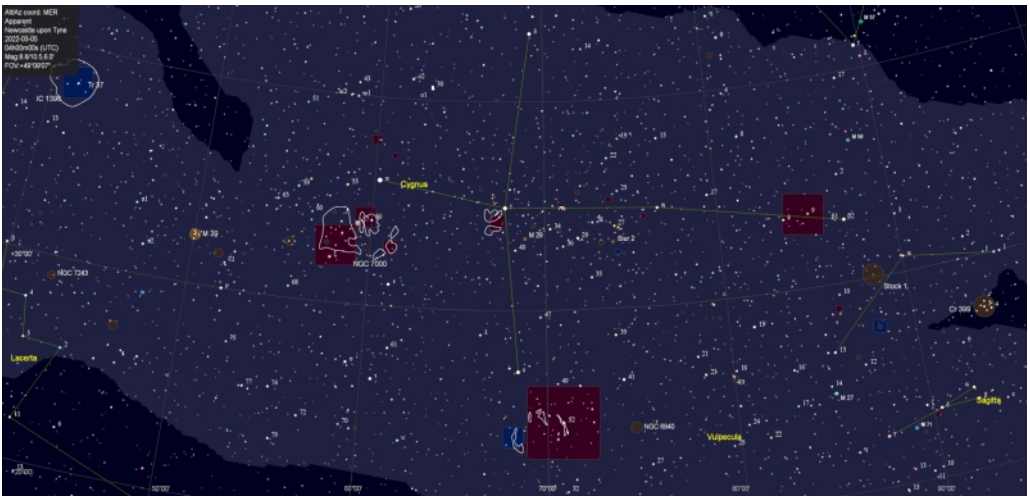
101 uses for an iphone? Dr John Lucey took this on Seaham beach.

Volunteer Sophie Carroll took this, captured with a phone.

Double vision! Duncan Hale-Sutton took this projected through binoculars from his home in Norfolk.

OBSERVERS' SLOT

The Constellation of Cygnus



Cygnus is one of the most familiar constellations of the Autumn sky. The reasons are as follows:

1) It forms a significant signpost within the Autumn Milky Way

2) It contains some splendid stars, clusters and nebulae but is – practically – devoid of galaxies

3) It contains some interesting double and variable stars

So lets take a look at this constellation in more detail:

Cygnus is outlined by 5 principle stars along with two others that form the main body of the 'Swan'. In addition there are another 10-or-so that – if the sky conditions are good enough – can be glimpsed with the unaided eye or a pair of binoculars.

The principle stars are:

1) Deneb – Alpha Cygni – the 'tail' star of the Swan. It is 1st magnitude and – together with Vega in Lyra and Altair in Aquila – forms the 'Summer Triangle' asterism. Deneb has an A2 spectrum, which makes it almost pure white. With an absolute magnitude of -7.2 it is around 20,000x more luminous than our Sun, in real terms. It is placed at around 1700 Ly away from us.

2) Alberio – Beta Cygni – is located at the opposite end of the main bar of the cross, forming the 'eye' of the Swan. It is a 3rd magnitude star with a K5 spectrum – distinctly orange. With an absolute magnitude of -2.3 it is around 100x more

brilliant than our Sun in real terms. More significantly, it is one of the best and easiest colour-contrasting double stars to view, either in binoculars or a small telescope, where is shows a blueish 5th magnitude secondary star. The components are separated by 34.4 arc seconds.

3) Delta Cygni – RHS star of the cross – this is a 3rd magnitude star with an A0 spectrum and is about 30x more luminous than our Sun. It is located at ~170 Ly away.

4) Epsilon Cygni – LHS star of the cross – Gienah – is a 2nd magnitude star located only 90 Ly away from us. With K0 spectrum it is very slightly cooler than our Sun, and has almost the same true brightness as well.

5) Gamma Cygni – central star of the cross – Sadr – is a 2nd magnitude F8 class star some 5000x more luminous than our Sun. Around it is a nebula which is a good target for amateur imagers, but the brightness of Sadr makes for quite a challenge to get good views of the much fainter nebula around it. Close by is Messier 29 – a bright open cluster.

6) Eta Cygni located almost midway between Gamma and Beta Cygni. Eta is a 4th magnitude Sun-like star, and is located about 170 Ly away.

7) Stretching from Delta is a line of fainter stars – including Iota and Kappa Cygni. Mixed in between these are three variable stars – see below.

8) Stretching from Epsilon are a group of fainter stars – Zeta, Mu, Nu, Tau, Sigma, Rho and Pi Cygni. Close to Epsilon are two interesting variable stars – see below – as well as a supernova remnant [NGC6960].

9) Located near Deneb is one of the best photographic objects – NGC7000 – the North America Nebula, together with several more targets. Again further details below.

In total there are more than 80 stars brighter than 6th magnitude in Cygnus.

Variable Stars

Cygnus is home to a wide variety of variable stars:

1) CH Cygni – which is located at the apex of an equilateral triangle with Iota and Theta Cygni – is a Z-And type variable ranging from 6th to 8th magnitude over a period of 50 days with a B-class and M-class binary pair.

2) SS Cygni – the primary member of its class – varies from 8th to 12th magnitude over a period of about 50 days and changes colour [A to G type] during that time.

OBSERVERS' SLOT

A wide-angle view of the nebulosity around the star Gamma Cygni (Sadr). Taken from Kielder with a Canon 60Da with 100mm lens, on an Astrotrack mount.

Credit: Robert Williams

3) R, RT, Chi, CN, U, V and WY Cygni are Mira class variable stars which range from typically 6th to 12th magnitude over period of around 200 to 400 days – of these, Chi Cygni has one of the largest ranges known [3rd to 14th magnitude over 407 days] and is also – with an S-class spectrum – one of the 'coolest' stars known.

Double Stars

1) Alberio – Beta Cygni – is the standout double star. The blue and yellow components [3rd and 5th magnitude] are easily split with a small telescope. Currently they are separated by 34 arc seconds at position angle 54°.

2) Delta Cygni - a 3rd and 6th magnitude binary, separated by 2.4 arc seconds with a position angle of 225° and an orbit of 828 years.

3) Psi Cygni – has 5th and 7th magnitude components separated by 3.2 arc seconds at PA 178°.

4) Gamma Cygni - 2nd and 10th magnitude components separated by 41.2 arc seconds at PA196° [Component#2 also double].

5) 61 Cygni - has 5th and 6th magnitude components separated by 29.9 arc seconds at PA148°.

6) Tau Cygni - 4th and 6th magnitude components separated by 0.5 arc seconds at PA015° – a Binary System with a 50 year orbit.

7) Mu Cygni - 5th and 6th magnitude components separated by 1.6 arc seconds at PA300° – also a binary system with a 507 year orbit.

Open Clusters

Cygnus – being in the Milky Way – is rich with bright open Clusters. See the table below:

Planetary nebulae

1) NGC6826: 10th magnitude, 30x140" – 'Blinking Planetary'.

2) NGC7027: 10th magnitude, 16x12" – 'Jewel Bug Nebula'.

NGC7048, a rather attractive planetary nebula. Despite the name, they have nothing to do with planets. They are, in fact, formed from gas thrown off by dying red giant stars.

Credit: Nigel Metcalfe

NGC6811	7th magnitude	70 stars
NGC6819	7th magnitude	
NGC6834	8th magnitude	50 stars
NGC6866	8th magnitude	80 stars
NGC6871	5th magnitude	20 stars (quite 'loose')
NGC6910	7th magnitude	50 stars
M29 (NGC6913)	7th magnitude	50 stars
NGC6939	8th magnitude	80 stars
NGC7067	10th magnitude	20 stars
M39 (NGC7092)	5th magnitude	30 stars

A selection of open clusters in Cygnus.

The northern region of Cygnus. Deneb is out of shot to the bottom right. The Cocoon nebula (IC5146) can just be seen as a small red glow at the left end of the prominent dark lane in the lower right. Just below centre is the star cluster NGC7209. Again taken from Kielder with a Canon 60Da and 100mm lens.

Credit: Robert Williams

3) NGC7048: 11th Magnitude, 61" – 18th Magnitude WD star.

Nebulae

Cygnus is host to many wonderful nebulae. Here are a few of the brightest:

1) NGC6888: Crescent Nebula – located almost midway between Gamma and Eta Cygni - 7th magnitude.

2) NGC6890/6992/6995: collectively comprise the Veil Nebula [Supernova Remnant] – located midway between Epsilon and Zeta Cygni.

3) NGC7000: North America Nebula – along with IC5067/70 Pelican Nebula – located near Deneb – two of the most photographed objects of the northern night sky.

The Cocoon Nebula (IC5146) left, and part of the Veil Nebula (NGC6992) right.

Credit: Nigel Metcalfe

The area around the North America nebula (NGC7000). Canon 1000D + 55-250mm lens at 100mm. 30x1 minute exposures.

Credit: Nigel Metcalfe

4) IC5146 – Cocoon Nebula – located near M39 and on the border with Lacerta – a combination emission and dark nebula with a small Open Cluster embedded within.

Robert Williams

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NIGHT SKY

NOVEMBER 2022 (times in GMT)

Lunar phases

First quarter	01/11/2022	06:37
Full moon	08/11/2022	11:02
Last quarter	16/11/2022	13:27
New moon	23/11/2022	22:37
First quarter	30/11/2022	13:46

PLANET SUMMARY

Mercury and Venus are too close to the Sun to view this month. Mars is visible from 19:00 until 06:00. Jupiter is an evening object visible from 18:00 until 00:30. Saturn is also an evening object visible from 18:00 until 20:30. Uranus is close to opposition and so is visible from around 18:00 until 05:30.

THE STARS AT 8PM

North – Cepheus is high overhead, with Draco and the two Bears nicely placed.
East – Cassiopeia and Andromeda are high up with Perseus nicely placed. Taurus is near the horizon and to its top RHS is Aries.
South – Pegasus is nicely placed with Pisces. Aquarius is low down and you can find Formalhaut in Pisces Austrinus – a bright star that is the most southerly placed bright star we can see from the UK.
West – Cygnus dominates this view along with Sagitta, Vulpecula and Lyra. Low down you can find Hercules.

METEOR SHOWERS

November hosts two meteor showers:
1) Taurids – around the 1st to 6th of November – this is a short shower but the particles are quite 'large'. The Taurids tend to be few in number but they make up for this by being bright slow moving and often quite colourful, with occasional fireballs. In 2022 a waxing Moon will set at around midnight heralding a moonless sky to view this shower close to its peak. Editors note - the brightest Taurid I have seen was in 1999 when a magnitude -10 [as bright as the Full Moon!] fizzed across the sky as viewed from Sinai Desert, Egypt.
2) Leonids – on the 16th , 17th and 18th November – another annual shower that usually puts on a good show of 50 to 100 meteors every hour. These particles are fast moving and 'small' and so the meteors are quite faint. A last quarter Moon will interfere with viewing this shower in 2022.

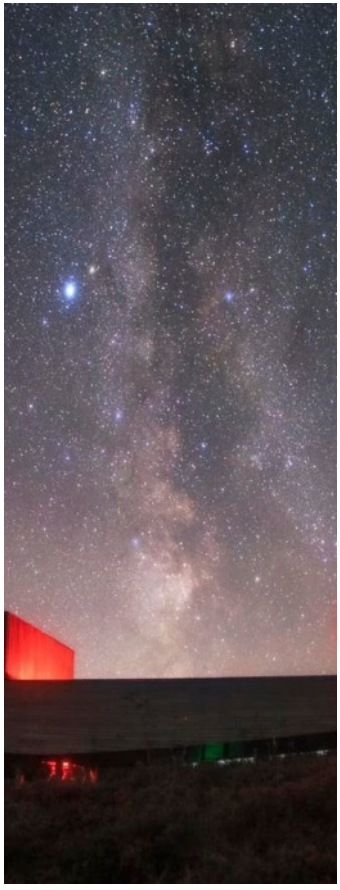
The Planets 15/11/2022

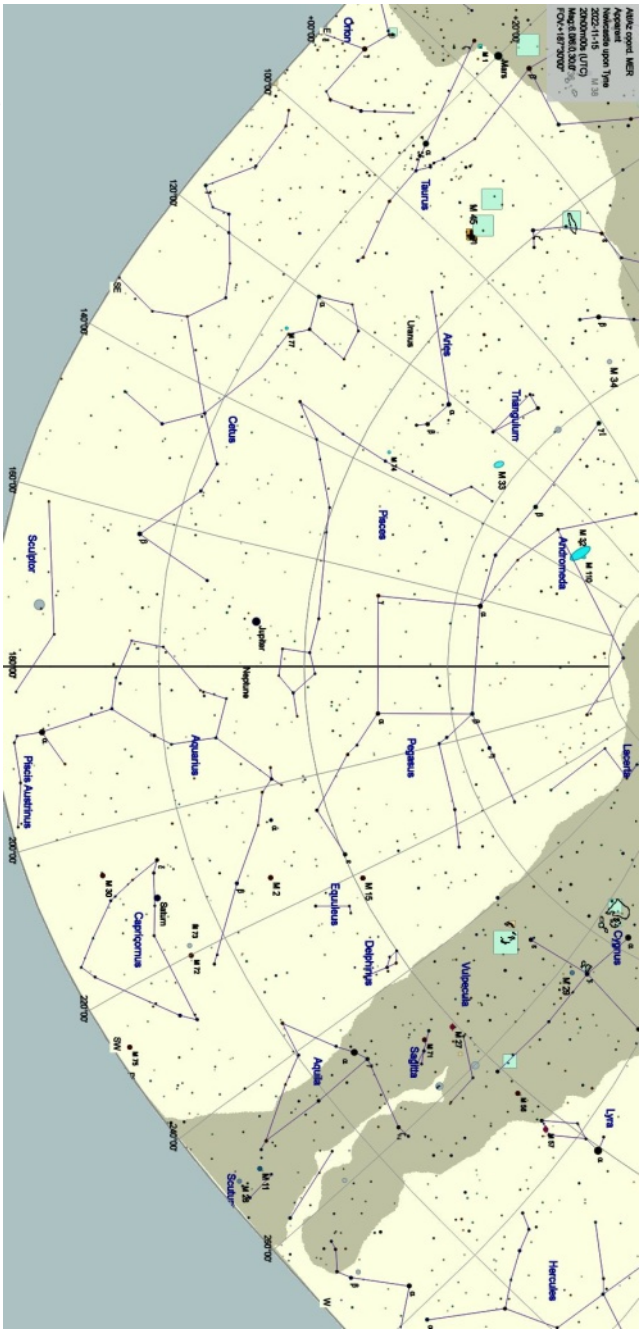
	Sun	Moon	Mercury	Venus	Mars	Jupiter	Saturn	Uranus
Rise	07:37	20:16	08:06	08:11	17:13	14:31	13:28	15:38
Set	16:01	13:55	16:04	16:16	10:49	02:17	22:18	07:05

COMETS

For further news on upcoming bright Comets please browse the website https://in-the-sky.org/data/comets.php

The sky chart for Newcastle looking S at 8pm on 15/11/2022.





NIGHT SKY

DECEMBER 2022 (times in GMT)

Lunar phases

Full moon	08/12/2022	04:08
Last quarter	16/12/2022	08:56
New moon	23/12/2022	10:16
First quarter	30/12/2022	01:20

PLANET SUMMARY

Mercury and Venus will be difficult objects visible low in the morning twilight before sunrise. Mars is still close to opposition so will be visible from 17:30 until 06:00. Jupiter is an evening object visible from 17:30 until 23:00. Saturn will be a challenging object visible briefly during the evening twilight in the sunset. Uranus will be visible from 17:30 until 03:30.

THE STARS AT 8PM

North – Cepheus is overhead, with the two bears nicely placed. Hercules is low in the NW and Cancer low in the NE.

East – Perseus is overhead, with Auriga nicely placed. Taurus, Gemini and Orion are well placed for observation.

South – Triangulum and Aries are overhead. Pisces and Cetus are nicely placed. Aquarius is low down in the SW.

West – Lacerta is overhead with Cygnus nicely placed for viewing. Pegasus is nicely placed in the SW. Hercules and Lyra are low in the SE.

METEOR SHOWERS

The main meteor shower of December is the Geminids which are visible on the night of the 13th /14th December with some activity a few days either side. This shower is unusual in that it originates from an Asteroid – Phaethon. With a waning gibbous Moon this will drown out all but the brightest of the Geminids.

Later in the month – on Christmas Day the Ursids are active. Expect up to 5 per hours form this weak shower. It will be visible all night but best seen after midnight. A New Moon on the 23rd will make it – fairly – easy to view this shower in 2022.

COMETS

Comet 81P/Wild is a morning telescopic object, brightening to ~11th magnitude as it nears its closest approach in January 2023.

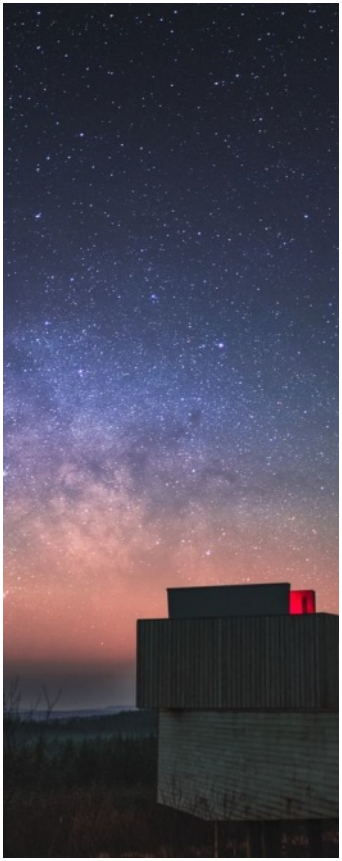
Comet C/2020 V2 is 10th magnitude comet that can be tracked down as it too reaches peak brightness in January 2023.

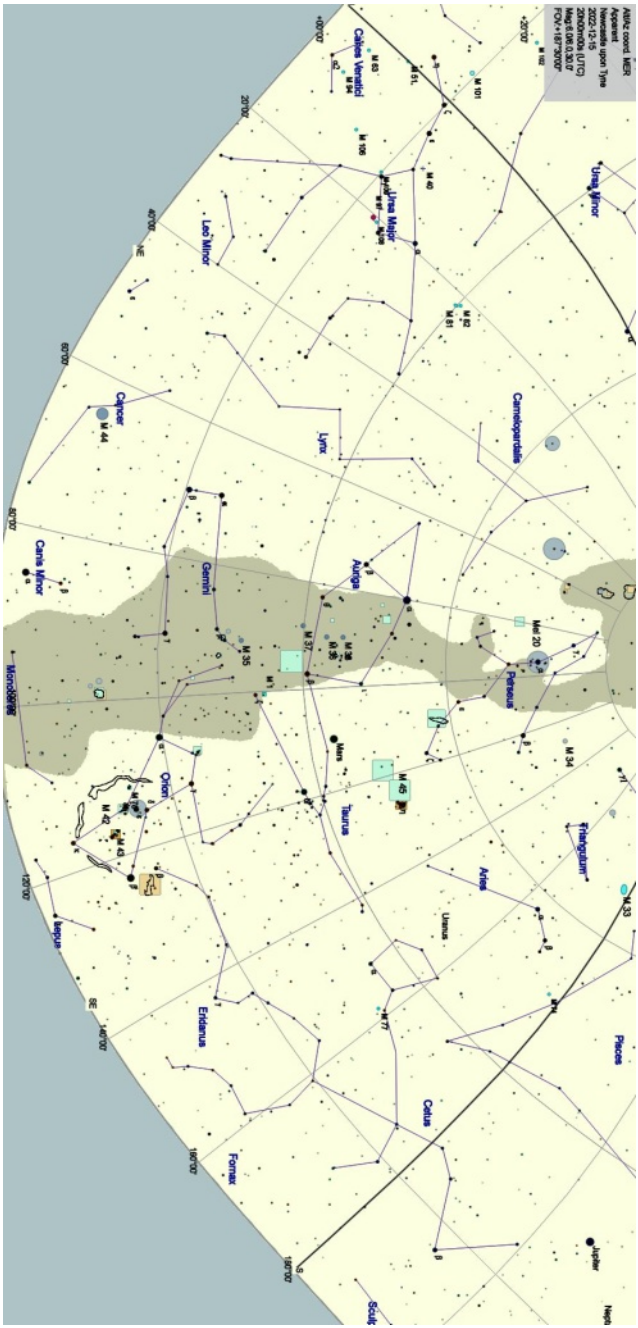
The Planets 15/12/2022

	Sun	Moon	Mercury	Venus	Mars	Jupiter	Saturn	Uranus
Rise	08:23	21:49	10:04	09:31	21:49	12:33	11:33	13:38
Set	15:37	12:37	16:41	16:23	08:05	00:23	20:32	05:01

Finally, keep an eye on comet C/2022 E3 ZTF - this could be a very special comet this winter. It is anticipated to reach 5th magnitude in February 2023.

The sky map looking E from Newcastle at 8pm on 15/12/2022.





NIGHT SKY

JANUARY 2023 (times in GMT)

Lunar phases

Full moon	06/01/2023	23:07
Last quarter	15/01/2023	02:10
New moon	21/01/2023	20:43
First quarter	28/01/2023	15:18

PLANET SUMMARY

Mercury will not be visible this month. Venus will be difficult object visible in the evening twilight after sunset. Mars will be visible from around 18:00 until 04:00. Jupiter is an evening object visible from 18:00 until 21:00. Saturn will be visible very low down in the west after sunset. Uranus will be visible from 18:00 until 01:00.

THE STARS AT 8PM

North – Draco is prominent splitting up the two Bears. Hercules is low in the NNE. Cepheus is nicely placed in the NW with Cygnus just below it.

East – Auriga is overhead with Gemini nicely placed. Orion is prominent in the NE with Lepus – the Hare, Monoceros the Unicorn and Canis Major – and Minor - beginning to show themselves again.

South – Taurus and Orion are well placed for observing. Eridanus and Cetus are low down. Aries and Pisces are high up in the SW.

West – Andromeda is overhead with Lacerta just below it. Pisces, Pegasus and Cygnus are well placed as is Pisces – with Mars.

METEOR SHOWERS

The major meteor shower of this month are the Quadrantids on the 4th January. Muralis Quadrans was a constellation introduced in the early 17th century, but as the use of the quadrant circle diminished it was absorbed back into Bootes. The Quadrantids meteors shower is a very short – sharp – peak of very bright and often colourful shooting stars. It may only last for a few hours but if you catch a Quadrantid fireball then it will be worth the wait. These particles can be both bright and colourful but the shower may only last a few hours around midnight on the 3rd or 4th of January. A near-full Moon on these nights will make observing this shower a challenge in 2023.

The Planets 15/01/2023

	Sun	Moon	Mercury	Venus	Mars	Jupiter	Saturn	Uranus
Rise	08:20	00:43	07:03	09:24	12:01	10:35	09:37	11:35
Set	16:08	11:17	15:04	17:55	05:35	22:43	18:48	02:56

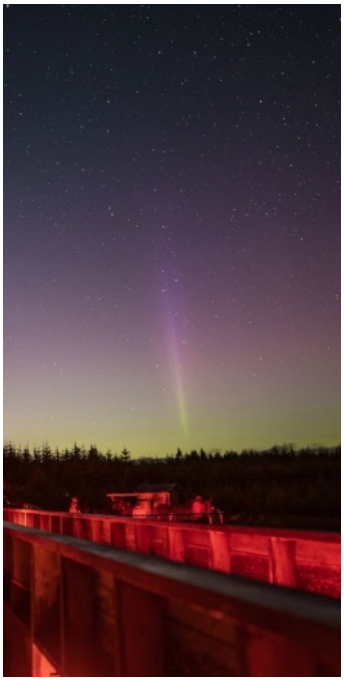
COMETS

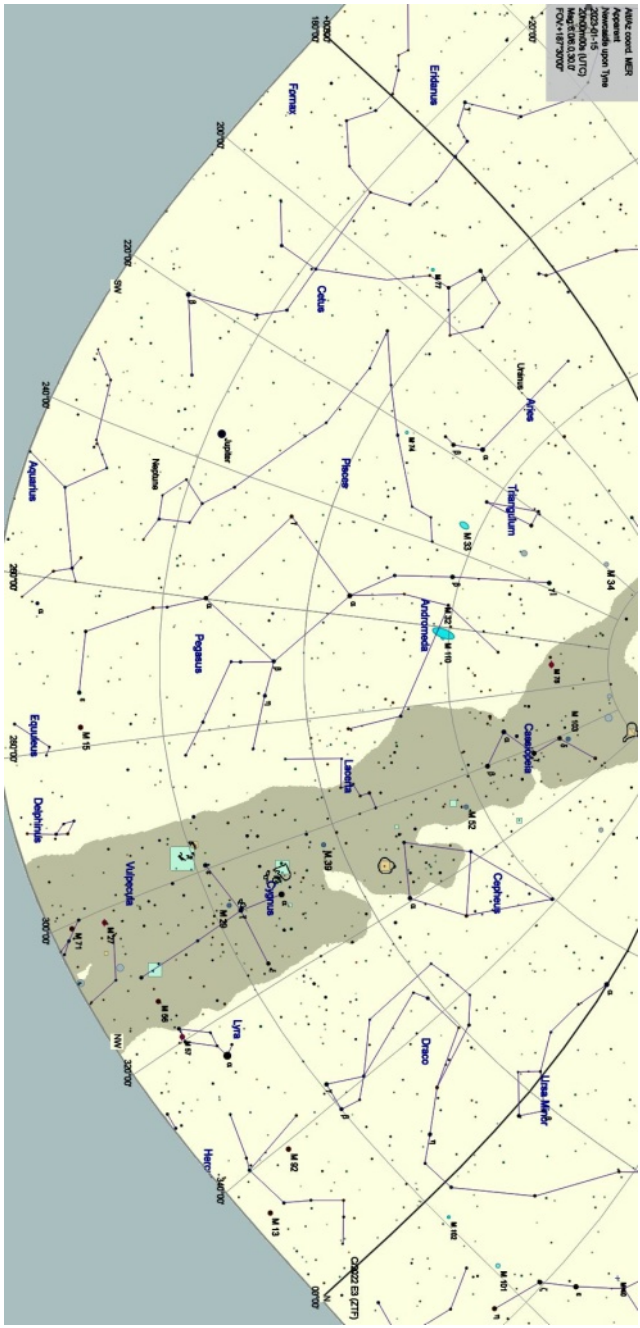
If all goes to plan, comet C/ 2022 E3 ZTF should be on the verge of naked eye visibility this month, tracking northwards between Hercules and Bootes.

The sky map looking W from Newcastle at 8pm on 15/1/2023.

Night Sky credits:

Data sourced from Cartes du Ciel, https://www.timeanddate.com/moon/phases/ and https://in-the-sky.org/





SCIENCE SLOT

James Webb Space Telescope: First Images - part 2

The James Webb Space Telescope continues to send back some amazing images. So following on from our last edition, we take a look at some more 'goodies' ...

1) NGC3324 – a large star-forming nebula in the southern constellation of Carina. Carina is home to some of the largest and most exotic stars in our Galaxy. Though not visible from Northumberland, Carina contains a variety of stellar and deep sky objects, which rival similar features in more familiar constellations – of the northern hemisphere - such as Orion, Taurus or Cygnus. JWST, since it operates at wavelengths just longer than visible light – can peer through visible-light obscuring dust to see what's 'cooking' in these many and varied stellar nurseries. The JWST image of NGC3324 shows hundreds of stars recently released from their birthing cocoons alongside more than 1000 young stars and in many ways it can be described as similar to the Pleiades cluster, though probably much younger in age.

The image shows objects known as 'Elephants Trunks' and

Propylids' [Protoplanetary discs] around many of these stars. In reality the view of the 'inside' of a bubble being excavated through the dusty cloud by the starlight from a massive star just off to the top rhs of the image.
Although nowhere near as detailed as the JWST image please compare it with a – long exposure [DSLR 2h30m total] of the nearby region taken from Namibia in June 2022.

2) Stephan's Quintet – an area of the night sky frequently imaged by amateurs – shows the benefit of JWST's resolution capability taken using almost 1000 separate images. The field of view is about 5 arc-minutes – about 1/5th of the diameter of the Moon in the sky. It shows the chaos caused by the interaction of a single galaxy [NGC7318B] as it ploughs through the space between the other 4 galaxies. For your next challenge please count how many galaxies you can see in this image. Start from somewhere near a thousand an upwards.

3) The Pillars of Creation - made famous by the Hubble Space Telescope, and now a favourite amongst amateur astrophotographers, the Pillars of Creation are part of the Eagle Nebula (Messier 16)

SCIENCE SLOT

in the constellation of Serpens. This view is taken by JWSTs NIRCam camera. Similar in appearance to NGC3324, this again is an area where new stars are being born.

6) The Cosmic Tarantula – The Tarantula Nebula – NGC 2070 – Also known as 30 Doradus – is a giant star forming furnace in the Large Magellanic Cloud. It is forming stars at significantly higher rate than in Messier 42 in Orion. Also many of these stars are Blue Hyper-giants similar to Eta Carina. The JWST shows the turbulence on the nebular caused by the interactions of the powerful stellar winds of these massive – and relatively short lived stars.

7) And finally – for now – the amazing star WR140, in the constellation of Cygnus. WR140 is a very special type of star – a Wolf-Rayet star. Wolf–Rayet star - Wikipedia . In essence these are – or rather were – very massive O-class stars with sizes in the region of 30 to 80 solar masses. They have very strong stellar winds and surface temperatures in the region 20,000 to 210,000 Centigrade, causing them to evolve into W-class stars. They have blown off their hydrogen envelope and are now frantically

converting Helium and Carbon into heavier elements. As a consequence they are short-lived as stars go [typically lifetimes <5 million years] before they undergo death by Supernova [normally type 1b or 1c], depending upon what fraction of the star is lost to its stellar wind before it becomes unstable, collapses and triggers the supernova. Ultimately these explosions form Black Holes with masses of about 5 to 10 Ms. If the WR star has a companion, it will be ejected as a Hyper-velocity Star [see previous Newsletter article], when the BH is formed. Another well known star of this type is WR136, which is also in Cygnus and creates the Crescent Nebula – a popular imaging target. In the case of WR140, the JWST has snapped the star – which is actually a binary star system, during a period of 'mass-loss' indicated clearly by the multiple shells of materiel in the recent JWST image.

More from JWST to come in future newsletters.

Images credit NASA, ESA, CSA, STScI . More information can be found at https://www.nasa.gov/webbfirstimages and https://webb.nasa.gov/

Robert Williams

Not been to Kielder Observatory yet?
Then why not book one of our events for yourself and/or your family?
Advanced booking is essential. Weekend events can fill up several weeks in advance. Please book online at https://www.kielderobservatory.org/our-events/.
We can also be contacted at admin@kielderobservatory.org

GALLERY

We would love to display your images here, whether they are taken up at Kielder or not. Please send them to

admin@kielderobservatory.org

along with a brief description of how and when they were taken.

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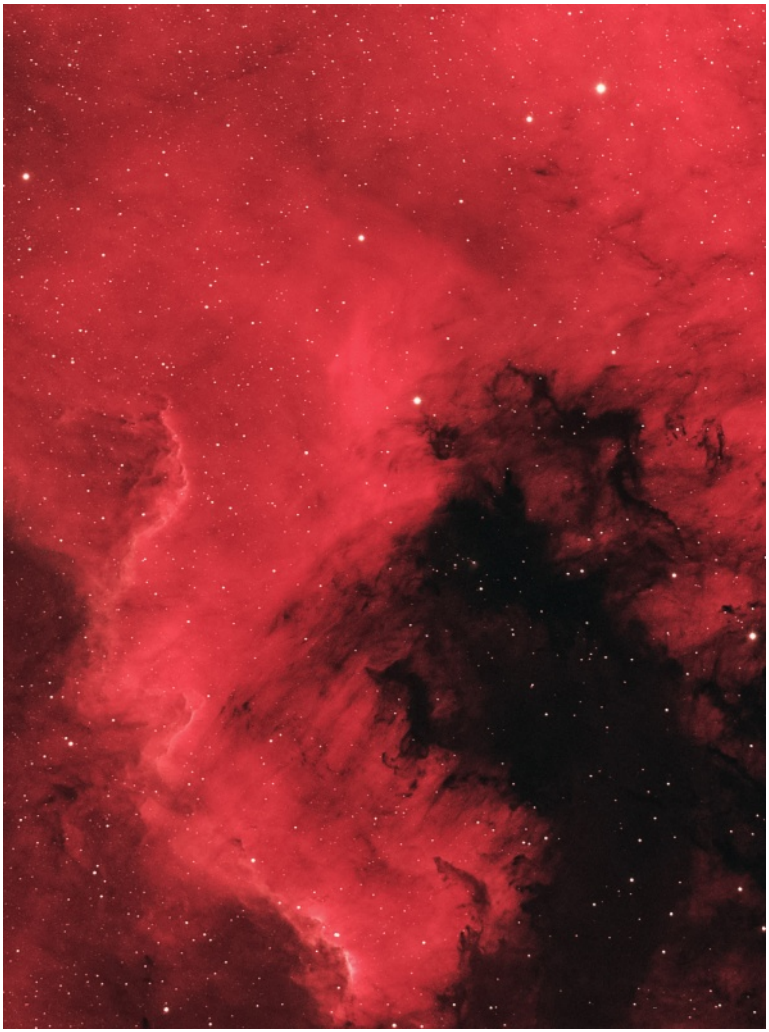

Following on from our article on Cygnus, here is the North America Nebula (NGC7000) in a different light, literally. This is a 50 minute exposure with one our telescopes taken through a Hydrogen alpha filter, which only allows light of a particular (red!) wavelength emitted by hot Hydrogen gas to reach the camera.

How times have changed, The inset shows the first photograph ever taken of the Orion Nebula, by Henry Draper in 1880. The main image was taken through one of our telescopes just using a mobile phone!

GALLERY

The crescent moon taken from the Observatory in September. The fact that the full face of the moon can be faintly seen is due to reflected light from the Earth. The bright star (top left) is called Al Jabhah in Leo and is over 1,000 light years further behind the moon!

Secret Lives of Stars - October

"A huge thank you to all the team for an unforgettable evening which made our Golden Wedding very special"

Mark, Eyemouth

Kielder mugs on tour are back!

Jim & Pauline Coan have sent us these pictures from Tromso, with the Arctic Cathedral in the background, and from Longyearbyden in Svalbard.

GALLERY

Not all the beauty seen from the Observatory comes at night!

Here's a photo of M13, the globular cluster in the constellation of Hercules, taken with an iPhone down the eyepiece of our 16" telescope. This is similar to what you're able to see with your own eyes.

Aurora - October

"Great evening, very stimulating, we are still thinking about it - and every time we see Jupiter up in the sky we will think of our time with you all."

Debbi, Northumberland

Relaxed Astronomy - October

Just a wonderful opportunity for the family to visit the observatory in a small, relaxed group setting. A great place to hang out and the overall package of the event was lovely. All the observatory staff and volunteers on hand were friendly, knowledgeable and great communicators. The range of activities was just right and the time flew by. Our party covered all bases of experience - complete novice, primary and secondary school kids, over-enthusiastic amateur (!) - and we all loved it and got so much out of it. We really want to thank you all again for giving us your time in such a fantastic setting. A really memorable night out.

Anne, Argyll & Bute

Kielder Observatory - a beacon for dark skies

https://kielderobservatory.org

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