

Autumn 2017 Number 17



# Kielder Observatory Newsletter

Observatory  
expansion  
underway!

## NEWS

New building

## SCIENCE

The Pan-STARRS  
project

## OBSERVING

Highlights  
Nov/Dec/Jan

## US ECLIPSE

Robert Williams  
travelogue



## EDITORIAL

The darker skies are here again, and with them the opportunities of even more observing! At Kielder we are all excited to see the new observatory taking shape. In August, Robert Williams was lucky enough to make it to the solar eclipse in the US and relates his experiences for us here. We also take a look at the Pan-STARRS project, which spent over three years imaging three quarters of the sky over fifty times.

*Nigel Metcalfe*

**Editors: Nigel Metcalfe & Robert Williams**

*newsletter@kielderobservatory.org*

### Kielder Observatory Astronomical Society

Registered Charity No: 1153570.

Patron: Sir Arnold Wolfendale 14th Astronomer Royal

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

<http://www.kielderobservatory.org>

E-mail: [chairman@kielderobservatory.org](mailto:chairman@kielderobservatory.org)

[secretary@kielderobservatory.org](mailto:secretary@kielderobservatory.org)

[membership@kielderobservatory.org](mailto:membership@kielderobservatory.org)

[admin@kielderobservatory.org](mailto:admin@kielderobservatory.org)





## DIRECTOR'S CUT

Recent visitors to the observatory will have noticed that the new construction is well under way. The end of September saw the groundworks completed and the



superstructure started, this is when we really start to see the structure rise. In the image above you can now clearly see the piers that will hold the telescopes rising from the concrete base. Evolving around them, the walls are beginning to be formed.

Since this image was taken the works have progressed well and on time, we are still anticipating an opening in early winter. The observatory itself has a room where the roof rolls back to expose the instruments. I am still in consultation with the staff as to what instruments we will be using in there and why, however I can say that I have decided to mount another 16" RC on a Paramount MEII. It's a great choice and I wanted the whole observatory including our present one to

be cross compatible with operating systems; (SKY X) and Paramount. The mount remaining will have the MX+ Paramount with a reduced load bearing capacity; it gives us options to involve regimes in focal lengths that we don't currently have (500mm to 2000mm). We are getting close to deciding what all of the instruments will be on this mount, however we have purchased a 2000mm 10" RC...so we are getting there slowly. A decision has also been made to incorporate a small control room in the facility to house the computers that will run the observatory and its telescopes. It will be a small room that will fit 4 people and a lot of hardware!



In this image you can now clearly see the structure taking shape with the observatory section closest and the warm room / canteen furthest, also visible is the path that leads into the observatory. The positioning of the observatory means that



## DIRECTOR'S CUT

we will have a large area to the front and sides of the observatory that will be used for photography and observations - we will probably deck this area and create an open space for visitors. The lower mid section is designed in that way to allow for the roof to retract back and expose the instruments to the whole sky. The doorway you see closest is the door into the control room.

In the final image you can see the 2 piers and at ground level the cable runs from where all of the cables and electricals will be located. As I said earlier the



instruments are designed to be interconnected and operated from the control room, so to do this we need to connect

through USB all of the hardware and instruments. The larger 16" instrument will be the one to relay the images to the projector normally however we will hold the capacity to interchange between instruments dependent on the observations and necessary field of view requirements. The piers do appear high as we had to design the facility to consider many restraints, we will ultimately lose a bit of the sky ~15-20 deg however due to atmospheric and local conditions it is generally unobservable there...cue comet!

Onto the main business. The observatory's bookings are soaring still and we are fully booked out now on a regular basis. To help with this demand which is constant we have taken on a new member of staff, Adam Shore. I'm sure some of you have met him but if you haven't you won't be disappointed as he is already a superb team member. Also Matt Robinson who was, of course, part of that team has now moved on from us and is now no longer part of the delivery team. Eyes to the skies folks and I hope to see you all soon whereupon further updates will be given on the performance and development of this wonderful organisation.

**Gary Fildes (FRAS MSc Hon.Caus.)**





## KOAS NEWS

### TRUSTEE NOTES

The trustees met twice in July and again at the end of August to finalise the budget for next year. The finances are looking very healthy, and the observatory is going from strength to strength, with increased visitor numbers over the last year. In fact, in the last financial year, the observatory sold a remarkable 96.8% of all the seats we had available. We are all looking forward to the completion of the new building which will give us more space to grow. Planning is in hand for a new late night event to be run in the new observatory on Friday and Saturday nights, with a more 'science' feel to it. There has already been some thought as to what comes next, with staff accommodation (the trustees are particularly keen to progress this, if and when funds allow) and a small planetarium high on the agenda.

Unfortunately, Fiona Standfield, who joined us at the beginning of the year, has had to resign for personal reasons. Fiona was very enthusiastic about the observatory and her departure is a great loss. On the plus side, we have gained Tim Care as a new trustee. Tim is originally from Kent, but moved to the

North East in 1988 with his wife, Alison. He is a commercial lawyer and is currently a partner at Ward Hadaway, Law Firm, specialising in health and education. His two children are both students now, but when his son was at junior school, Tim can remember helping him with his solar system project and can still recite the mnemonic to remember the order of the planets. In his spare time Tim plays the keyboard at church, sings in a choir and is Chair of Governors at Newcastle School for Boys.

The trustees meet again in October and December.





## OBSERVATORY NEWS

As you will have seen from the Director's Cut, work on the new observatory building is now well under way, with completion now expected around the end of the year. The planned new equipment will make it



possible to do more advanced astronomy such as the detection of distant planets around far away stars, known as EXO-planets, do supernova searches and track

asteroids.

We can also announce that the Gillian Dickinson Trust has awarded £50,000 towards the cost of the new observatory. James Ramsbotham, Chief Executive of the North East England Chamber of Commerce and a Trustee of the Gillian Dickinson Trust, said: "The Gillian Dickinson Trust is delighted to be able to support the Kielder Observatory as it works to inspire young people from across the North East with the beauty and the science of the heavens.". As mentioned in the last newsletter, we are collaborating with Sunderland University in the running of a PhD, and the first student will be coming up to the observatory in October. We were also anticipating the arrival of a new science presenter, Adam Shore, and as expected, he started in August. Adam joins us having recently completed a BSc in Physics with Astrophysics at York University, where he gained experience running public open nights on the University's Astrocampus. We can also announce that another new science presenter, Dan Pye, will be joining us in November. Other recent additions to the observatory are a 10" RC telescope and a Paramount mount!

On a completely different tack, the observatory has been appearing in some



## OBSERVATORY NEWS

unexpected places over the summer. Not only did we feature in an AQA A Level physics question about which of two telescopes produces the brighter image (yes, really!), but we also turned up in a question on ITV's Tipping Point quiz!



***Tipping Point. Sadly the correct answer is not Kielder!***

While on the subject of television, towards the end of October ITV are going to be filming with us for a show entitled "Britain's 100 Best Walks".

Back in July, but too late for the last newsletter, our director Gary Fildes picked up an Honorary Fellowship of the University of Sunderland, apparently made all the more special as it was awarded at the Stadium of Light (can't see why - ed.!). And on another personal note, congratulations to our operations manager John Holmes on completing a 300-mile ride through North West Romania to raise funds for underprivileged children.



***We hosted an engagement at the observatory over the summer. Congratulations to Rakesh and his fiancé Natasha!***

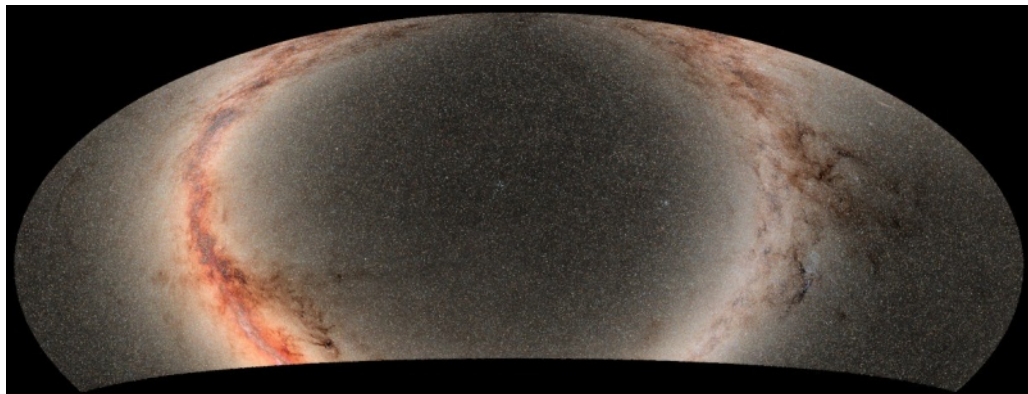
Please be aware that bookings over the autumn/winter period are always very high - the popular half-term Space Kids events are already sold out - so please plan your visit well in advance. It also pays to keep an eye on the observatory's Facebook page (<https://en-gb.facebook.com/KielderObservatory/>) as any places which become available due to last minute cancellations are advertised here. And with Christmas looming on the horizon, keep a look out in the observatory on-line shop (<http://www.kielderobservatory.org/shop>) for this year's Kielder Observatory calendar. Always a good stocking filler!

\* \* \* \*



## SCIENCE SLOT

### The Panoramic Survey Telescope and Rapid Response System (Pan-STARRS)



***A colour image of the three quarters of the entire sky imaged by Pan-STARRS.***

*Credit: PS1 consortium/Rick White*

*In December last year, the Pan-STARRS project made its data available to the public. Here we take a look at this unique imaging survey of the sky, not least because your editor devoted the last 9 years of his professional career to it!*

Pan-STARRS is a telescope for wide-field astronomical imaging. It was designed to repeatedly scan 3/4 of the entire sky (all that is easily visible from Hawaii) every few months, with its primary mission being to detect Near-Earth Objects - asteroids/comets that threaten to impact upon the Earth. Originally there were to be four 1.8m telescopes scanning simultaneously, but in the end only two have been built, and only one was used

for the publically released data. This telescope was developed and operated by the Institute for Astronomy at the University of Hawaii, and funded by a consortium of astronomers and engineers from 14 institutions from six countries (including Durham, Edinburgh and Belfast universities).

The telescope is situated 10,000 feet above sea level at Haleakalā Observatories near the summit of Haleakalā, an extinct volcano located on the island of Maui, Hawaii. It is a Ritchey–Chrétien design (basically light bounces off the primary mirror back up to a secondary at the top of the tube, which then sends the light back down through a





## SCIENCE SLOT

hole in the primary and then via a series of correcting lenses to the camera), covering a huge (for a professional telescope) field 3 degrees across (i.e. 6 times the diameter of the full moon). At the business end is the world's largest optical digital camera, at 1.4 Gigapixels. It is this large field and camera which makes Pan-STARRS unique amongst current telescopes.

The public survey lasted about three and a half years, and photographed each point in the sky at least 12 times in each of five optical/near infra-red filters. In order to accomplish this, the exposure times had to be kept short, under one minute in each filter. Nevertheless, with a 1.8m metre mirror at your disposal you can go pretty faint even in this time! It then took a further two years to process all the data (I leave it as an exercise to reader to work out how many hard drives you need to store 1.4 Gpixels every minute for 3 years!) and catalogue the roughly one billion astronomical objects that Pan-STARRS detected.

To search for asteroids, each time the sky was re-imaged it was compared with the previous shot to see if any objects had changed position on the sky. In years

gone by astronomers used to do this by eye, by 'blinking' two photographic plates, but now it is all done automatically by computers. It still needs an astronomer to take look at the results though, just to check that the objects found are real and not artefacts of the camera. In this way Pan-STARRS has become the world's leading detector of comets and Near Earth Objects. It has also proved very efficient at detecting things which vary in brightness, such as supernovae (exploding stars).



***Your editor in front of the Pan-STARRS 1 dome on the summit of Haleakalā.***



## SCIENCE SLOT

Although primarily designed for detecting things which move and things which flash, using techniques very familiar to amateur astrophotographers, it has also been possible to stack the individual images



***Looking down onto the 1.8m primary mirror. The grey cylinder is a baffle to stop stray light interfering, as the telescope is open at the sides.***

together to produce a single, deep image of the sky, covering a larger area and showing fainter objects than any previous optical survey. This is being used for scientific studies of the stars within our galaxy, all the way out to quasars near the edge of the Universe.

Pan-STARRS was a new concept, and like all such projects had its fair share of teething difficulties. However, it has paved the way for the Large Synoptic Survey Telescope (LSST), which is basically Pan-STARRS on steroids! This 8.4m telescope, due to see first light in two years time, will have a similar field of view to Pan-STARRS but a bigger, 3.2 Gigapixel camera, and, due to its much improved light grasp, will be able to scan a similar area of sky in just a few nights instead of a few months!

You can download Pan-STARRS images yourself from <http://ps1images.stsci.edu/cgi-bin/ps1cutouts>

*Nigel Metcalfe*

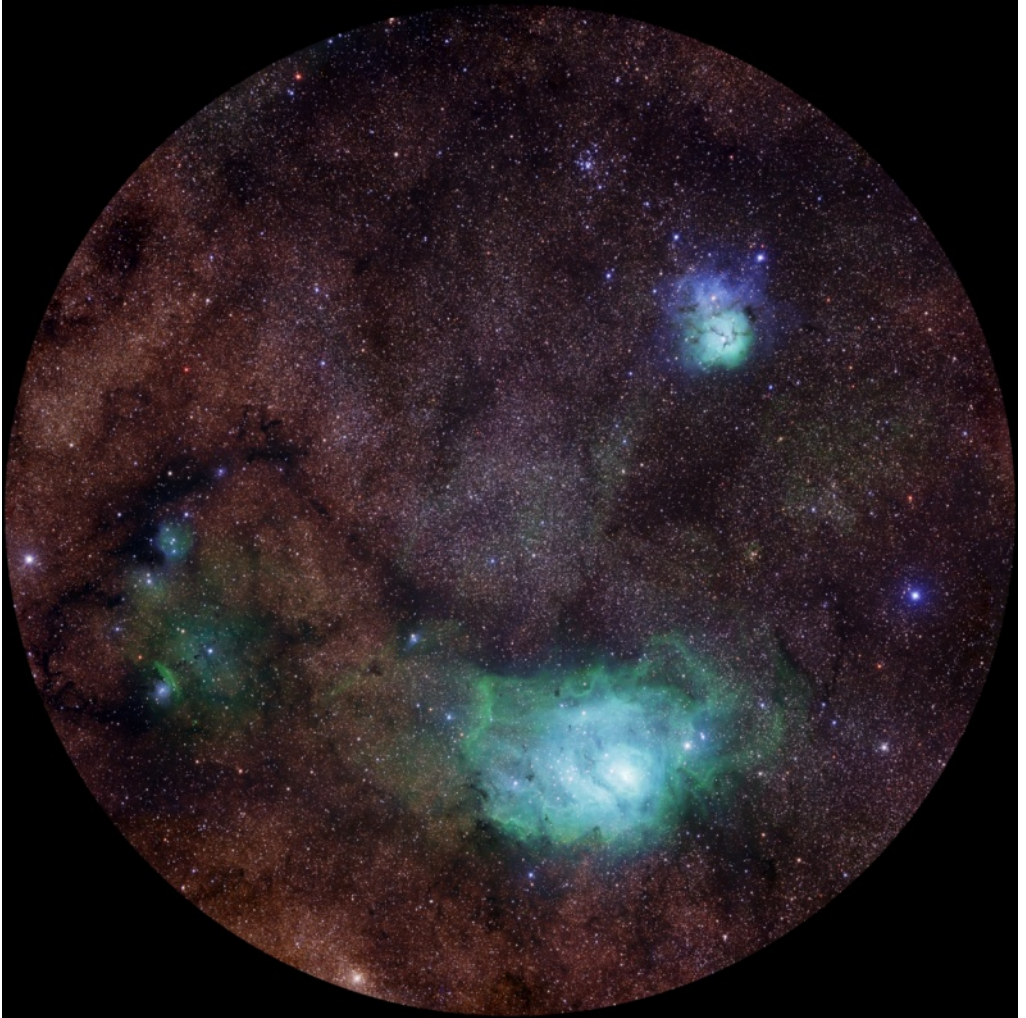
"Event team were exceptional. Obviously very clever guys in their fields but put everything across in a simple way that brought it all to life. A really exceptional evening.

Don't change a thing. It was as perfect."

Graham - Essex



## SCIENCE SLOT



***Apart from demonstrating the large field of the PS1 camera, there are some well-known objects (and some less well-known) in this Pan-STARRS publicity shot of a portion of the Milky Way in Sagittarius. See how many you can spot.***

***Consulting a star atlas is allowed!***

*Credit: PS1 consortium/Durham University*



## NIGHT SKY

### NOVEMBER 2017 (times in GMT)

#### Lunar phases

Full moon	04/11/2017	05:22
Last quarter	10/11/2017	20:36
New moon	18/11/2017	11:42
First quarter	26/11/2017	17:02

#### PLANET SUMMARY

Mercury is too close to the Sun this month as is Venus. Mars is a morning object and on the 15th of the month will get close to the Moon. Jupiter and Saturn are not visible this month. Uranus will be visible throughout the night.

#### THE STARS AT 8PM (GMT)

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' and hence the meteors from this stream can, sometimes outshine Jupiter or even the Moon. The Taurids tend to be few in number but they make up for this by being bright slow moving and often quite colourful. In 2017 there will be a waning gibbous Moon which will drown out all but the brightest of this shower.

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. Also, with the parent Comet having a 33 years cycle [since 1999] 2017 is expected to be one

#### The Planets 15/11/2017

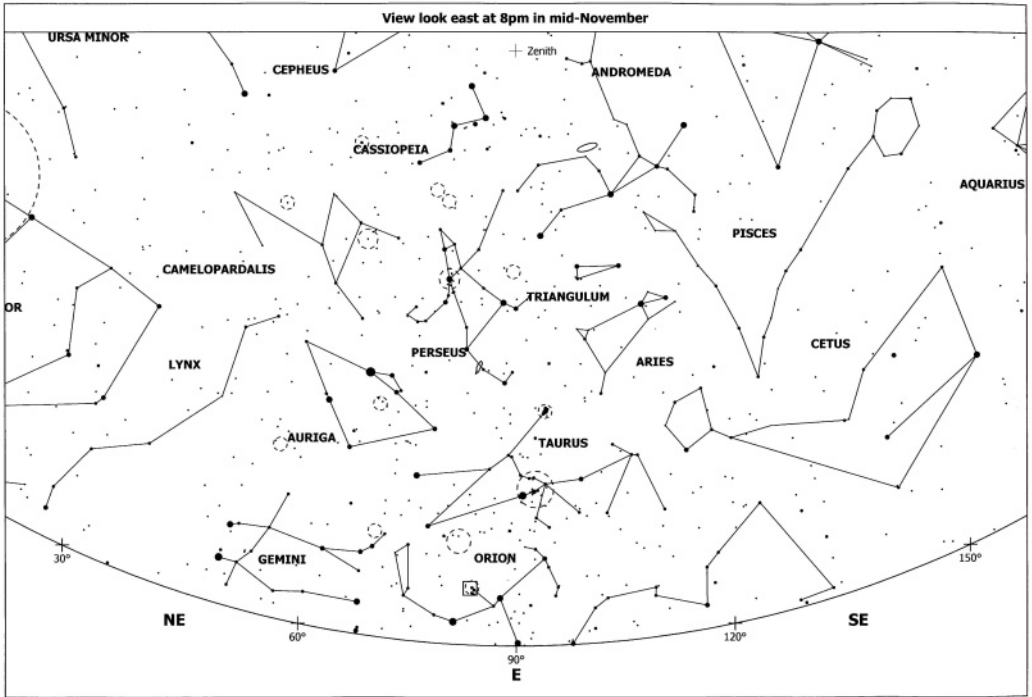
	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	07:33	09:45	06:12	03:44	03:48	06:01	10:22	15:08
Transit	11:52	13:16	11:00	09:42	09:25	10:51	14:11	22:02
Set	16:10	16:46	15:47	15:29	15:12	15:41	18:00	05:00





## NIGHT SKY

### November night sky looking east.



of the weakest return of this shower. But with a new moon the day before, it will be a good opportunity to view this shower in 2017.

### COMETS

There are no bright comets visible in November

### OTHER EVENTS

The Sun continues to surprise observers with brief eruptions so keep a look out for aurora.



***The Bubble Nebula, NGC7635, in Cepheus, is well placed at this time of year.***

*Credit: Nigel Metcalfe*



## NIGHT SKY

**DECEMBER 2017** (times in GMT)

### Lunar phases

Full moon	03/12/2017	15:46
Last quarter	10/12/2017	07:51
New moon	18/12/2017	06:30
First quarter	26/12/2017	09:19

### PLANET SUMMARY

Mercury and Venus are too close to the Sun, this month. Mars is a morning object along with Jupiter. Saturn is not visible this month. Uranus is an evening object visible until well after midnight.

### THE STARS AT 8PM (GMT)

North – Cassiopeia will be near the zenith, with Draco nicely placed splitting up the two bears

East – Perseus, Auriga and Taurus are nicely placed.

South – Andromeda is high up with Pisces nicely placed. Pisces Austrinus [with its brightest star, Formalhaut] is near the horizon

West – Cygnus, Vulpecula and Delphinus are nicely placed, as is Lyra. Hercules is

near the horizon.

### METEOR SHOWERS

December a significant meteor shower, the Geminids along with a minor shower the Ursids

1) Geminids – are active from early December until about the 20th with a peak on the 13th or 14th December. Unusually for meteors they are sourced from an Asteroid, 3200 Phaethon. Expect about 30-50 per hour. In 2017 there is a waning last quarter Moon rising after midnight so it will be a good year to get out and see this regular shower.

2) Ursids – are active around 23rd December. In 2017 there is a thin crescent Moon so there will be a good opportunity to see this faint shower.

### COMETS

There are no bright comets visible in December.

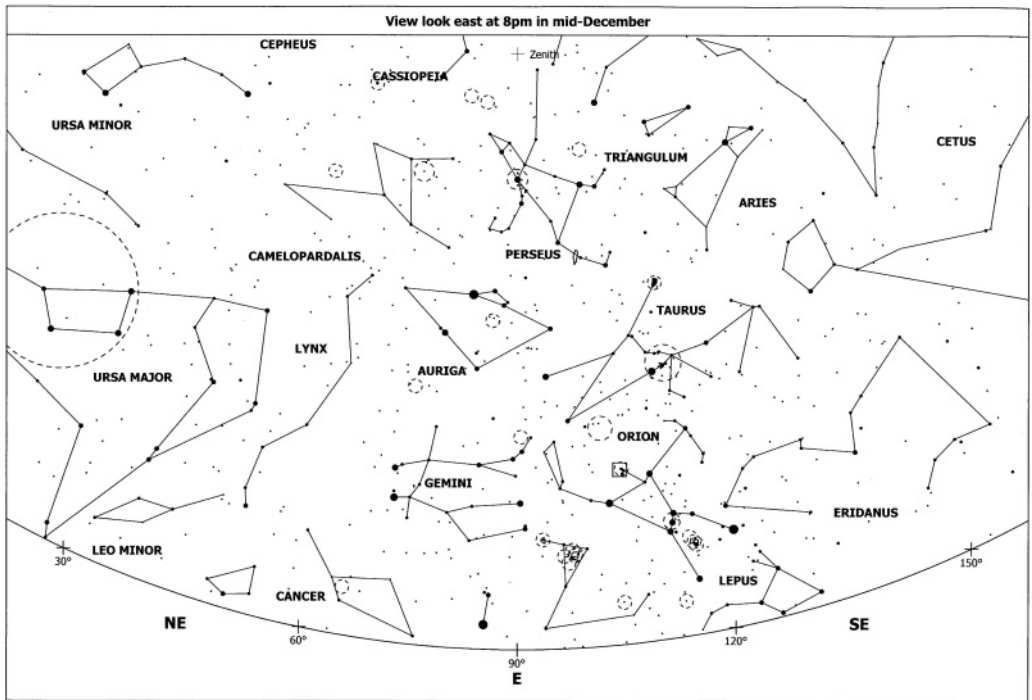
### The Planets 15/12/2017

	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	08:17	07:38	07:49	04:59	03:40	04:39	08:39	13:09
Transit	12:02	11:39	11:37	09:55	08:38	09:17	12:27	20:01
Set	15:48	15:40	15:24	14:44	13:36	13:56	16:16	02:57



## NIGHT SKY

***December night sky looking east.***



***Look out for the famous Double Cluster on the Perseus/Cassiopeia border.***

*Credit: Nigel Metcalfe*



## NIGHT SKY

### JANUARY 2018 (times in GMT)

#### Lunar phases

Full moon	02/01/2018	02:23
Last quarter	08/01/2018	22:25
New moon	17/01/2018	03:17
First quarter	24/01/2018	23:20
Full moon	31/01/2018	14:26

#### PLANET SUMMARY

Mercury will be a very difficult object to locate in the morning twilight. Venus is too close to the Sun. Mars and Jupiter are both morning objects and the much brighter Jupiter can be used as a marker to help to locate Mars. Saturn is close to Mercury and equally challenging to locate. Uranus is still visible for many hours after sunset.

#### THE STARS AT 8PM (GMT)

North – Cassiopeia shows up as a letter 'M' near the zenith. Cygnus is nicely placed in the north-west. Hercules and Lyra are low down.

East – Perseus and Auriga are high up, with Gemini, Taurus and Orion nicely

placed. Leo, Cancer and Monoceros are low down.

South – Aries and Pisces are nicely placed, with Lepus – the Hare – near the SE horizon, below Orion.

West – Andromeda is high up with Pegasus nicely placed. Cygnus and Delphinus are low down.

#### METEOR SHOWERS

The main meteor event in January is the Quadrantids on the 4th of the month. A very short but sharp shower, sometimes with brilliant blue-coloured shooting stars, this shower is highly unpredictable. Visible 'in' the constellation of Bootes – the location of its radiant point, the prospects for 2018 are fair with a waning gibbous Moon likely to overshadow all but the brightest particles of this shower.

#### COMETS

There are no bright comets visible in January 2018.

*Night Sky credits: Lunar and planetary data sourced from Cybersky 5*

#### The Planets 15/01/2018

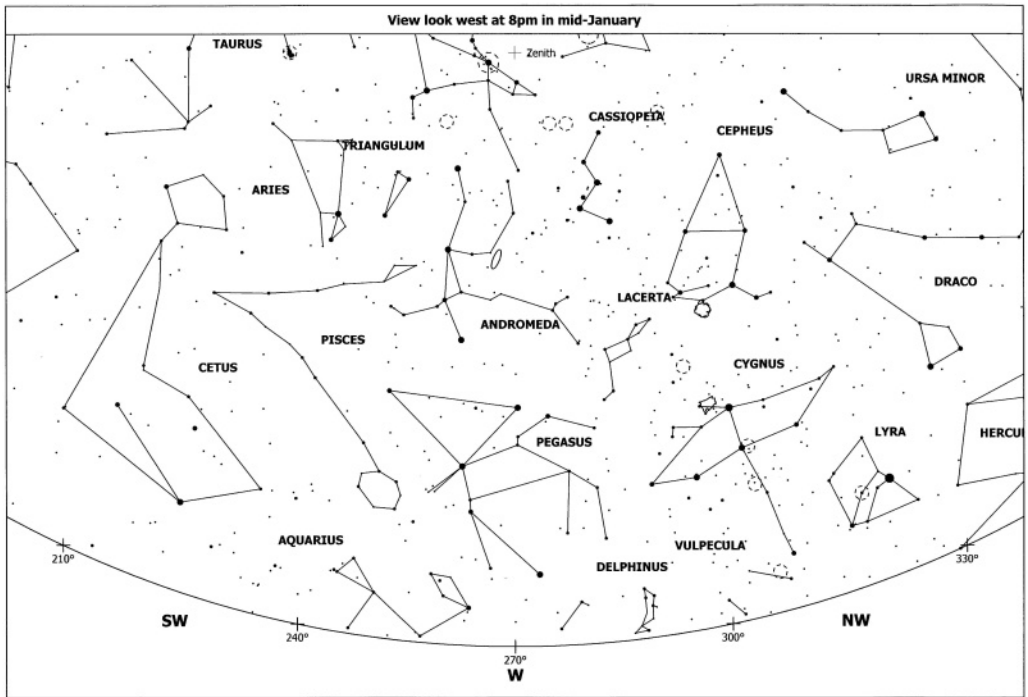
	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	08:15	07:10	08:29	06:50	03:30	03:07	06:53	11:06
Transit	12:17	10:53	12:24	11:00	07:52	07:36	10:41	17:59
Set	16:18	14:36	16:19	15:09	12:13	12:06	14:29	00:55





## NIGHT SKY

*January night sky looking west.*



*January is a good time to look at the wonders in Orion. Here we see the Great Nebula, Messier 42, (left) and the Flame Nebula (right).*

*Credit: Nigel Metcalfe*



## ASTRONOMERS' TALES

### The 2017 US Total Solar Eclipse

*Robert Williams bring us another in his occasion series of travelogues ...*

Before detailing my trip to see the total solar eclipse in the USA, on the 21st August 2017, let me start with a bit of background/back story. I have been for quite some time – actually almost 20 years – something of an astronomical event junkie. If I know that some special sky event is going to happen somewhere on the Earth at some time in the future then I can find a way to get there and - hopefully – see it. It's one of the reasons that I first came to Kielder in 2004 to see the – so called – amazing night skies – and I've seen them quite a few times. Going abroad for an astronomical event is – now – relatively easy. You can do it yourself – organising flights, accommodation and transportation – or you can let someone else do some, most or all of those aspects of a typical vacation.

The 2017 Solar Eclipse crossed a significant portion of the continental USA. As such there was about 200 million people who were within a 5 hour car or a 2 hour plane ride from the centre line. Contrast that with many other eclipse

tracks that cross places accurately described as 'the middle of nowhere with no roads and no one living there as well'. Why choose Oregon? - well again the [www](http://www) has details of weather patterns and forecasts and inland Oregon was going to be the place with best chance of clear skies. Also the NASA website has details of eclipse tracks, timings, local circumstances, altitude and azimuth of eclipses phases and much more. After some research I found the trip that looked good for me.

Once the trip was booked – with a company who had been doing eclipse trips for more than 30 years, the next challenge was getting there – and back. The trip I opted for was a short tour of Portland, then on to the Oregon coast down Highway 101, visiting places such as Astoria, Seaside, Newport, Florence, Roseberg; then turning east towards Crater Lake and Bend, before finally pitching up at our eclipse observing site in the capital of Oregon, Salem – again not in Massachusetts.

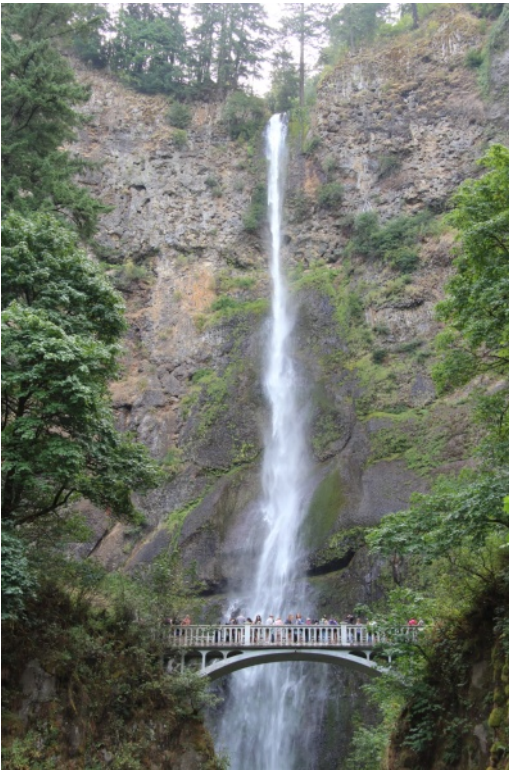
So, lets put a bit more details in place. After settling into my Hotel following 16 hours of international travelling, the group set out on a tour of Portland City. Portland is a very historic place deeply rooted in the early pioneer settlers who moved west



## ASTRONOMERS' TALES

to colonise the expanding USA. Today it is known as 'Rose City' with parks dedicated to the beautiful blooms. It is also the 'city of bridges' and is a tech-hub. There is a very large forest and timber based industry – sound familiar? - and it is much larger than in Kielder Forest.

In the past 20 years the grape-growing-for-wine, micro-and mini-brewing of craft



***The impressive 611 foot Multnomah Falls, near Portland, Oregon.***

*Credit: Robert Williams*

beers and the production of craft vodkas, whiskeys and 'Moonshine' has diversified farmers production, similar but on a much larger scale than is currently taking place in the UK. The Columbia River is one of America's great waterways. It has 11 hydro-electric schemes along its length. It also has a number of the USA's highest waterfalls, such as Multnomah and Latourelle Falls. Our trip then headed towards the coast road - Highway 101. Our first stop was [Fort] Astoria. This is a recreation of the settlement on the site of a historic fort put in place by the early settlers, financed by the Astor family – one of the richest in the USA – as part of the 'Fur Trade'. From Astoria we travelled westwards to the coast to Seaside. If we were not using US dollar currency you would be convinced that this place looked very much like Scarborough or Whitely Bay, with the traditional seaside fare of fish and chips and as I found out – superb ice-cream! Here was a historic light house with a superb view of Haystack Rock and the cliffs and coastline along with seeing some migrating whales off-migration-season. Also on the coast, in Roseburg we had a ride in a 20-seater sooped up dune buggy across the massive dune fields.

Moving on the following day we visited



## ASTRONOMERS' TALES

Crater Lake. As it was – because of very serious and widespread forest fires – we were lucky to get a – somewhat smokey – view of Crater Lake.

Having said that Crater Lake resort – about the size of Kielder Forest – was packed with about ½ million people on the day we were there. It is an all-year round resort with skiing in the winter. Crater Lake was formed about 7,000 years ago

huge numbers of campsites with RVs everywhere. We discovered that for many places in and around Salem, Hotels had quadrupled their room rates during 'Eclipse week', as compared to other times of the year. Our eclipse observing base in Salem was Willamette University. In the grounds of the University a large area had been set up for about 20,000 general visitors and we had a separate



***Eclipse as seen from Willamette University campus, Salem; showing the magnificent solar corona. Credit: Robert Williams***

and is recorded in native Indian history. It was created by the eruption of Mount Mazama. From Bend, we travelled onto Salem. On the outskirts of Salem we saw

and secure courtyard facing south for our group – which by now had swelled to 300 people with travellers from other trips by the same company.





## ASTRONOMERS' TALES

Once we were settled into Salem, we had some free time to enjoy the place – some of us went 'wine-tasting' and I have to say that Keeler Estate Pinot Noir 2014 is excellent – so we bought a bottle to share after the eclipse. [BTW it was \$32 per bottle so it was very special!].

This was – is – my 5th eclipse trip as I do plan to go on others. In the previous 4 trips I had got more experience of what to expect and how to get an image of the various phases of the eclipse including totality. So, I had taken quite a bit of kit with me – basically two of everything – tripods, DSLR cameras [One for still images, one for videoing the eclipse], lenses and – most importantly – solar filters – as these are essential during the partial phases. As back-up I had my smartphone and I took a GoPro Hero camera to do a '20-minute time-lapse' of before, during and after the eclipse, which was something new for me this time around.

You may have heard of the Kielder

Ospreys? - well in Oregon there are dozens [hundreds?] of them and Golden Eagles and other raptors and wildlife too. I even saw a number of wild Sparrowhawks perched atop fence-posts along some of the quieter roads of Oregon.

So, you can see some of my images of the trip with this article. For more images – and the time-lapse video head to....

<https://www.flickr.com/photos/56553919@N04/albums/72157685472192594>

Where to next? - well 2018 takes me back to Tivoli Astro Farm, Namibia and I am still contemplating 2019 – it could be an eclipse trip to Chile: 2020 – eclipse trip to Argentina?. Thereafter I am looking at eclipse trips as far ahead as 2035 – when I'll be 70. Hopefully I'll be able to keep travelling by then.

For more details about planning your future eclipse trips I recommend a visit to [www.mreclipse.com](http://www.mreclipse.com)

*Robert Williams*

### **Not been to Kielder Observatory yet?**

#### **Then why not book one of our events for you or your family?**

Advanced booking is essential. Weekend events can fill up several weeks in advance. Please book online at <http://www.kielderobservatory.org/events/> or call us on 0191 265 5510. We can also be contacted at [admin@kielderobservatory.org](mailto:admin@kielderobservatory.org)



## OBSERVERS' SLOT

### Buying a telescope ...

Although we do not sell telescopes at the observatory, and nor do we endorse any manufacturer's products, with Christmas coming we thought we would give brief guide to buying a telescope.

**How much does it cost?** Telescope prices are actually quite similar to that of normal photographic equipment. So you can spend as little as £100 pounds or so for basic models, maybe a few hundred for something fairly decent, up to several thousand for high end kit.

**Where do I buy it?** If you want to examine before you buy your options are rather limited. Although there are some specialist retail telescope shops in the UK, they are few and far between. As far as I am aware the nearest to Kielder (and all places North) is in Northallerton. Most people these day buy on-line (I would choose one of the specialist astronomy shops - you won't save any money going elsewhere). You might find some camera shops are able to order in telescopes (although it is becoming increasingly difficult to find camera shops!).

### What choices do I have to make?

Several!

(1) Computerised or not. The cheapest telescopes are manual i.e. you have to push them around the sky and find objects yourself. Traditionalists will say this is the best way to begin! You can get telescopes with simple motorised axes, but once you get over £300-£400 you get the choice of computerised telescopes, which will track the stars and find objects for you automatically (although they do need careful setting up before you start). Those who lead busy lives might think this is the best way ...

(2) Mount. Usually the mount comes packaged with the telescope (you can buy both telescope tube and mount separately, but this tends to be for more specialised equipment). There are basically two kinds of telescope mounts - alt-az, which just move left and right and up and down, and equatorial mounts, where one axis rotates around the pole and the other moves at right angles to that. Alt-az tend to be cheaper and easier for a beginner to use, but require moving in both axes to track a star, whereas equatorial mounts only need moving in one (but can be confusing for beginners to grasp). If you ever want to do astrophotography then an equatorial



## OBSERVERS' SLOT

mount is desirable. Both kinds of mount can come computerised.

(3) Telescopes. Telescopes either have lenses (refractors - eyepiece at the bottom) or mirrors (Newtonians - eyepiece at the side near the top) or a combination of both (they usually have names like e.g. Schmidt, Maksutov and also have eyepieces at the bottom). You usually get more aperture for your money with a Newtonian (the Dobsonian, really a Newtonian on a special kind of alt-az mount, is the most cost effective in this respect), and more aperture (the size of the lens or mirror) is always good. However, remember that with more aperture comes more weight! Don't take any notice of magnification - this is set by the eyepiece anyway, and eyepieces come in a standard fitting and can be bought separately.

**So what do others do?** The smallest telescopes amateurs tend to use are 3"-4" (80-100mm) refractors. You find 6"-8" is a common starting size for Dobsonians or Newtonians. Once you get to 10" telescopes or above you are starting to get serious. Telescopes seem to get bigger each year, and you can buy 'off the shelf' products going up towards 20"s. But these are heavy and very expensive bits of kit and are not common.

So there is no right an wrong answer as to what to buy - think about size and weight, and remember the old adage that the best telescope is the one you use the most! You might also find it helpful to ask questions on one of the on-line astronomy forums e.g. <https://stargazerslounge.com/>

"The team were brilliant! They engaged with the audience well and were fantastic at explaining complicated physics in layman terms. On the night we visited we were unable to use the telescopes due to weather conditions. The activities and additional talks put on instead were enlightening and just as full filling (I touched the moon!) I didn't feel we missed out. I regularly attend astrophysics events at my local university and I sometimes feel like I'm being "lectured". The team at Kielder made us feel involved, were very responsive to questions, added a touch of humour to science and got down to the audiences level. No question was ever made to feel like stupid question. Great team and great volunteers."

Angela, West Midlands



## GALLERY

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



[newsletter@kielderobservatory.org](mailto:newsletter@kielderobservatory.org)

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



***This is Messier 33, the Triangulum Galaxy, taken from the observatory. It is the third largest galaxy in our Local Group (after the Andromeda galaxy and our own Milky Way). The light took around 3 million years to reach these photographs! From a really dark site it can be glimpsed with the naked eye, but you will do better with binoculars. Curiously, due to its low surface brightness, it is often difficult to see through a telescope.***





## GALLERY

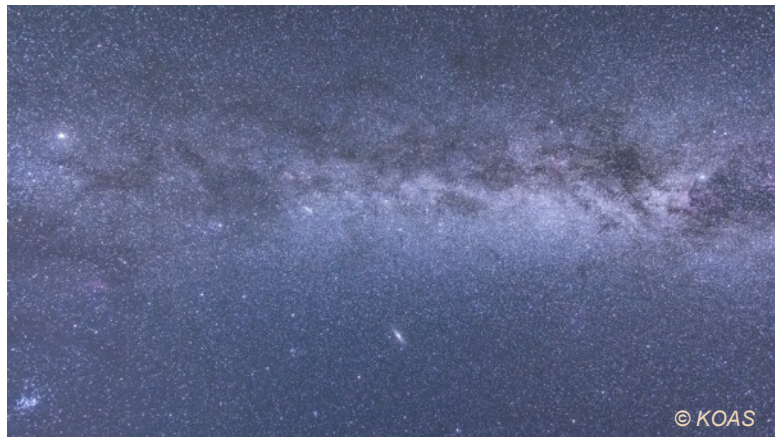
***A crescent moon and the planet Venus rising early on an August morning.***



***There seems to be a marital theme running through this newsletter! Guest Bob Richardson sends this delightful photo of his daughter's engagement in Norway. Sadly Bob and his wife did not get quite as good a view of the aurora from Kielder - next time maybe!?***



## GALLERY



*The Milky Way spans the Kielder sky. Below centre is Messier 31, the famous Andromeda Galaxy.*



*The Pleiades star cluster, otherwise known as the Seven Sisters. Easily visible by eye in the winter sky, long exposure photographs such as this reveal the cluster is embedded in nebulosity.*



## GALLERY

*The nearly full moon taken from the observatory. The prominent crater near the bottom with the rays shooting out is Tycho.*



© KOAS



© KOAS

*Star trails from the observatory roof, looking towards the South East.*





official kielder observatory calendar

2018

"All three staff were brilliant and full of knowledge. Their hot chocolate making skills are also second to none. Although the clouds were out and we didn't see a single star, we had a great time and enjoyed every minute. It's always a pleasure to hear people talk who are genuinely enthusiastic and knowledgeable about their subject matter"

Peter - Derbyshire

"Having listened to the likes of Brian Cox try to explain the Big Bang, barely understanding them, hats off to Hayden who delivered a talk that finally helped me understand (most) of it! Outstanding presentation"

David - Shrewsbury

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