Winter 2016/7 Number 14

Kielder Observatory Newsletter

KIELDER OBSERVATORY
Infinite Inspiration

NEW OBSERVATORY BUILDING FUNDED!

EDITORIAL

New Year's greetings to you all, with a bumper 32 page edition! 2017 promises to be another exciting year for the Observatory, with work for our new building expected to start in February. In the night skies, Venus has been putting on a good show in the SW in early January, and we have the prospect of a binocular comet over the next couple of months. And if you are planning on spending your Summer holidays in the USA, remember there is a total eclipse of the Sun over there on August 21st.

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
secretary@kielderobservatory.org
membership@kielderobservatory.org
admin@kielderobservatory.org

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DIRECTOR'S CUT

Firstly I would like to wish you all a very Happy New Year.

2016 was quite a year at the observatory, with record breaking numbers visiting us and the staff continuing to deliver a quality experience. We ended the year with our Christmas bash at the Holly Bush Inn, and what a night it was…anyway moving on.

It's a new year now and 2017 promises to be a very formative period in the future of the facility. John Holmes and I along with our trustees are working tirelessly to deliver our new observatory before the new observing season starts in August. It's an exciting prospect with a new instrument along with a kitchen area for serving hot drinks … so no more struggling in the little corner any longer. The new facility also gives us a tremendous opportunity to continue our "Art in Space" programme. We now have some professional input into this project and we are hopeful that it will inject identity into the new observatory as well as provide a space for creative learning. We will be teaming up with professional organisations and through partnership we will grow our remit. The facility will be used extensively around imaging, providing real time data to our guests which we can discuss and debate and of course to just revel in the beauty of it all. Dare I also mention the "R" word? Research…well yes I dare and it is also our intention this year to instigate research programmes at the facility around, to begin with, extra solar planets. Coupled with this we also will be able to increase capacity at the observatory by an extra 5 seats for all events. Which has to be good. This year sees our full first year with the admin improved new web site, its working very well and gives a more streamline visitor experience which is improving on booking numbers and ease of navigation through the site. On the topic of numbers we have had an unprecedented few months in bookings at the observatory with figures way ahead of last year we expect things to continue in this manner allowing the charity to continue its amazing work with a brilliant team leading the way. So to all staff members, trustees and volunteers, thank You, and lets make 2017 the best year ever and keep us firmly on the map.

Gary Fildes (FRAS MSc Hon.Caus.)

KOAS NEWS

TRUSTEE NOTES

The Trustees accepted the end of year accounts which showed that income had increased in the last quarter of the year due to the publicity surrounding the launch of Gary Fildes' book and the subsequent TV and Press media interest. The Treasurer also presented the budget for 2016/2017 which included an amount to be set aside for reserves to cover unexpected problems that may arise in the future. It was also decided that a reserves policy should be agreed and an annual figure for the amount should be recommend by a Trustees risk management sub-group which would be formal established in 2017. This represented good practice as recommended by the Charities Commission.

John Dowden, the Secretary of KOAS, formally stood down from the role. The Chairman thanked him for his support and contributions over the past few years. Under the KOAS Constitution two thirds of the Trustees must resign each year (they can then stand for re-election) Peter Sharpe resigned and sought re-election. At the AGM, Nigel Metcalfe (an existing Trustee) volunteered to take on the role of Secretary. The meeting unanimously agreed to Nigel's expanded Trustee role and also to the re-election of Peter Sharpe. The Chairman also informed the AGM that two new people were being interviewed to join as new Trustees to enhance the skills base of the Board. In late November two new trustees were elected by the existing Trustees to the KOAS Board. The individuals are:

* Richard Dale, who is the Executive Director of Finance with Newcastle University. He brings financial and commercial management/reporting experience and skills to the Board;

* Tom Grieveson, currently a trustee with Northern Education Trust that has 20 academies spread across the north of England. He is passionate about improving access to STEM subjects (science, technology, engineering and mathematics) particularly for disadvantaged students. He brings vast experience from the education sector having been a senior HMI (Her Majesty's Inspector) with Ofsted and a former headteacher. Tom is also a governor at Priory school in Hexham.

The 20 inch telescope that has been in operation since the Observatory opened

Our evening guests pose for a photo.

in 2008 was becoming unmaintainable and was in need of replacement. The Trustees agreed to the purchase of a new telescope that would be computer controlled and also most importantly would be installed so as to allow greater access by disabled visitors.

The increased number of visits by KOAS to local schools and other institutions has resulted in increased pressures on the existing KOAS workforce. It was agreed therefore to commence recruitment of a further member of staff to act as a science communicator.

As always the observatory depends on volunteers for its success and to that end a series of quarterly recruitment campaigns has started to attract new volunteers. The first, held in September, has resulted in several new volunteers joining the team, and we are most grateful for the contribution of all volunteers.

The next meeting of the Trustees will be held in late January.

Rob Little (Chair)

OBSERVATORY NEWS

The Observatory on the road! In October we took our planetarium to the incredible KingCon Comic, Film, TV and Gaming Conventions event at the Sunderland Stadium of Light.

The Observatory is now in its 9th year of operation and is established as one of the country's finest and most diverse visitor attractions. The facility last year attracted over 22,000 visitors and clearly contributes significantly to tourism both in the county and the region and has had a substantial effect on the region's profile, particularly in the winter months. The Observatory recently joined with partners in celebrating the third anniversary of the International Dark Sky Park and now has a significant international profile attracting many overseas visitors, in many cases visiting Northumberland and the North East for the first time.

The Observatory has had an exceptionally busy first quarter of the financial year with bookings at record levels and at full capacity for many weeks of the year. To satisfy this burgeoning demand, an additional observatory is being developed alongside the existing facilities.

Following several months of discussions,

funding is now in place by way of major grants from the Heritage Lottery Fund and the DEFRA LEADER programme, in addition to ongoing support from the Forestry Commission, Northumberland County Council and Northumbrian Water Ltd. The necessary permissions are all now in place and, subject to concluding the contractual discussions, work is expected to start on site during February 2017, with the new facilities being available from late Summer 2017. With the total investment of around £200k this will also provide increased capacity within the existing observatory and also offer opportunities for daytime use by schools, colleges and community groups in addition to increased corporate usage.

The Observatory has recently completed a successful educational pilot project and the Science Presenters have delivered introduction to astronomy events to Reception to Year 5 groups in schools in Northumberland and Durham by using the transportable planetarium. This programme will be developed further as the new Observatory is commissioned to connect to a wide range of curriculum subjects.

The new building will not only enhance and complement the existing facilities and help satisfy a burgeoning demand and interest in Astronomy but will also be part of a phased approach to developing a fully accessible Astronomy village which will include an 80 seater Planetarium, lecture theatres, visitor and associated facilities. As important as the physical developments, we are committed to developing accessible educational opportunities across the region and reaching young people of all ages and abilities.

Further progress reports will be included in future Newsletters together with further news of the work which we are developing with educational and training providers.

"Booked this for a Christmas present for my husband. We both - but him especially- had a fantastic time. The observatory is an amazing place with wonderful staff and volunteers. Despite the heavy cloud with not a star in sight, Gary and his team made sure we had a brilliant evening, we learned lots and had lots of laughs We'll definitely be back!"

Sarah from Covenrty

OBSERVATORY NEWS

On the hardware front, the venerable 20" in the Sir Patrick Moore dome has now been replaced by a brand new 16" f8 Ritchey-Chretien astrograph. Unlike the more common Newtonian design of our previous 20", which has a parabolic main mirror and a flat secondary, Ritchey-Chretien telescopes have hyperbolic primary and secondary mirrors and are designed to give very wide, flat fields, ideal for astrophotography. Trustee Jurgen Schmoll describes its installation in the next item.

As anticipated in the last newsletter, the Observatory featured in an item on light pollution on the BBC's Country File Autumn Diaries. This aired on October 28th. Sky News broadcast live from the Observatory on the night of the supermoon on November 14th - unfortunately the weather didn't play ball! The BBC CBeebies Stargazing team were also filming at the Observatory on Monday 9th Jan and at the Calvert Trust with our staff on Tues 10th.

Did you get our calendar!?

Our next Volunteer Open Day is on Saturday 11th Feb. As spaces are limited, if you are interested in attending please book through our website (or ring the office). It's free - we just need to know the numbers.

* * * *

"All of the team were welcoming, enthusiastic and had a clear passion for their subject with an ability to convey this to an audience with varied capability. Due to cloud there were no stars to see but they made the most of the moon. We will be back."

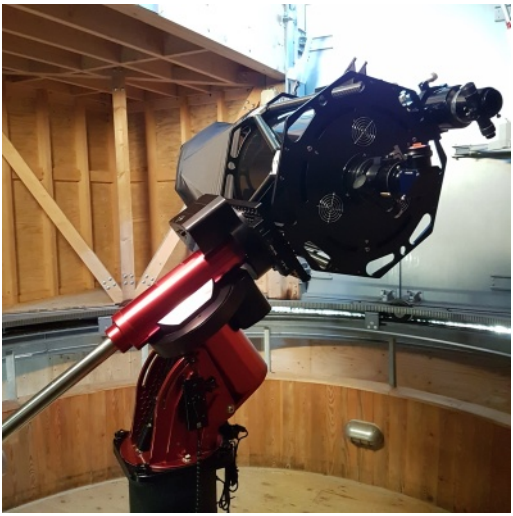
Sharon and Steve Sanders, Barnsley

A new telescope for the Observatory

Trustee Jurgen Schmoll reports on the not entirely straightforward installation of our new telescope ...

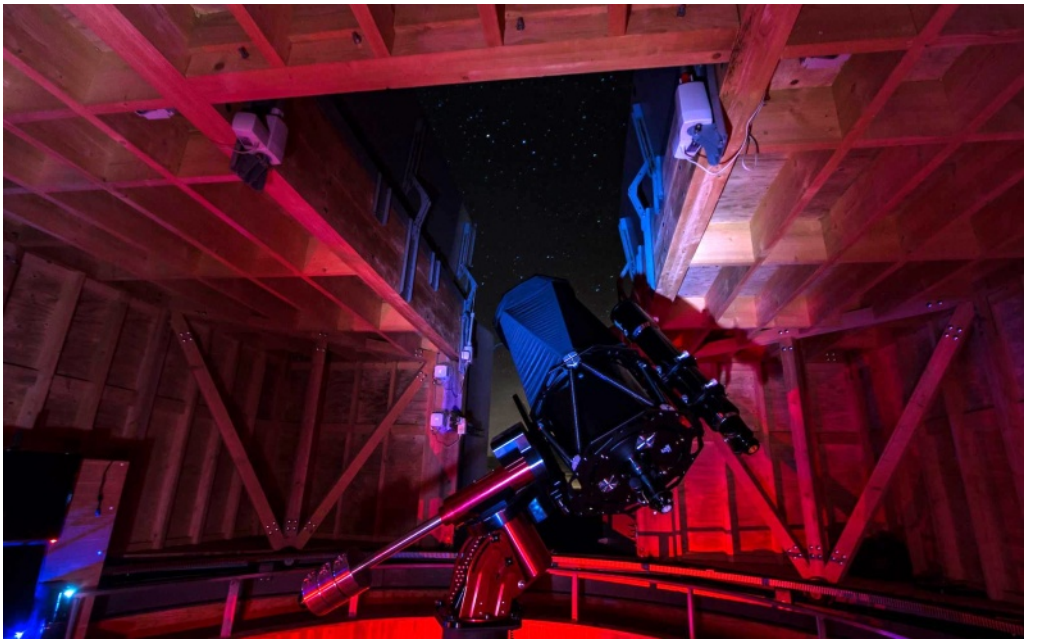
If you have visited Kielder Observatory in the last few weeks, you will have noted the dramatic change in the Sir Patrick Moore turret already. The old 20 inch Newtonian has been finally replaced for good by a 16 inch Ritchey Chretien on a Paramount ME mount. This new telescope will not only allow staff to use computer control to find objects quickly, but it creates much less of a barrier for disabled people to use. Until now, while the turret was wheelchair accessible, the telescope was not and even able bodied visitors had to climb a ladder in the dark, and to push the untracked telescope to follow the object. The new instrument is mounted on a relatively low pier so that children or wheelchair bound visitors can look through the eyepiece when the telescope points upwards.

The instrument is a 400mm Ritchey-Chretien - the same optical system used by professionals, for example in the Hubble Space Telescope. Invented in the 1920s, the strength of this system is that it creates round star images up to the edge of the field with only two mirrors involved. As the shape of these hyperbolic mirrors is difficult to make, until recently such instruments were astronomically priced as well, but thanks to modern manufacturing methods they are now much more affordable. Apart from joyful views, this telescope will also perform as an excellent imager, and some test shots have already been taken.



The new 16" Ritchey-Chretien astrograph installed in the Sir Patrick Moore dome.

HARDWARE NOTES



The 16" in action ...

The installation of the instrument in early December was a story on its own. Events were on and we had to work on an operating observatory. First a builder had to cut the former platform off that was the base for the 20 inch Newtonian. This was followed by a task force made up of Gary, Luke Tyas and myself. We drilled four holes into the concrete for some heavy anchor bolts, to hold the short pier. Installation went smoothly and quicker than expected the telescope stood in front of us in its full glory. In the mean-time Luke focused on the installation of a new computer and screen that doubles up for showing objects and controlling the mount. Everything went well and efficiently, even though we found a part of the mirror cell had come loose in the tube - thankfully the mirror was not scratched by the chunk of metal that must have become loose on its way from China via Germany into Kielder Forest! Just when we thought everything was done, the power supply of the Paramount decided to die and we had to drive up to Hexham to locate some electronics repair hardware - namely a soldering iron and a

multimeter. Despite our best efforts, we could not revive the transformer and frustratingly we were left with a non working telescope!

A week later we met again, this time prepared with a spare transformer and a repaired cable, as we had discovered that the old cable produced a short circuit that could not be detected with the low multimeter voltage but was a problem at the 48V needed for the Paramount. A very tricky problem and hard to diagnose! While the new transformer was attached and Luke did finishing touches on the computer link to the telescope, I re-attached the loose primary mirror bracket and started with the optical collimation of the instrument. After assuring the optimum position of the secondary mirror using a laser collimator, I took advantage of clear skies, pointing the telescope at a star. After some iterations the instrument finally showed it's full potential and it does not disappoint! The first visitors came to join in the "first light".

Some finishing touches are still required. The telescope mirror cell seems to be a bit loose, so the optical alignment state varies a bit and the optics need tightening. Also we will attach a camera to the 120mm ED refractor that rides on the large reflector, which will allow wide field shots to be taken and guiding to be enabled for the main telescope.

Jurgen Schmoll

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Not been to Kielder 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

SCIENCE SLOT

With Gary expressing an interesting in observing exo-planets from Kielder, Dr Mark Swinbank tells us what Durham University students get up to on the roof of the Physics department!

The Durham astronomy lab ("astrolab") is one of the flagship facilities in the Physics department at Durham University. On the roof of the physics department, we have four telescopes: three 14" and one 16" Meades, each which are housed in their own domes. These telescopes are used primarily by our third year Physics & Astronomy under-graduates, although we also carry out some project work for our final year year students who are carrying out research projects.

During the first two terms (September--December and then January--April), our students work in pairs to undertake a 10-week observing project. The projects that the students can choose all aim to

A view across our 16" telescope (and Durham) during operation on 21st December 2016.

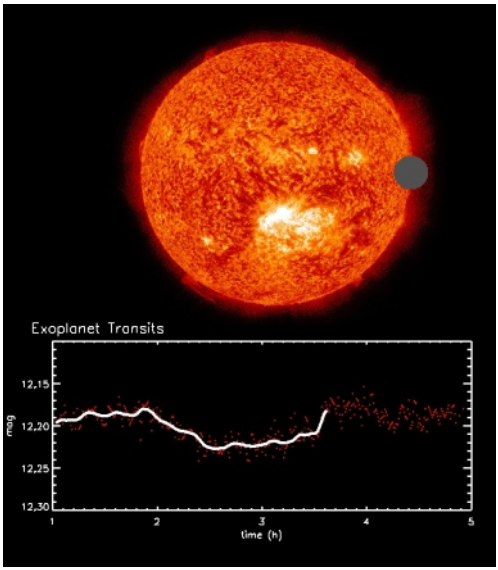
measure the dynamical nature of the solar system or Universe, with projects that range from tracking near-earth, main-belt asteroids or Trojans of planets, measuring the light curves of distant Type I supernovae, or deriving light curves for asteroids, variable stars or eclipsing variables. Recently, the most exciting "new" project is to measure the light curves caused by transiting exo-planets.

Some of these projects frequent, but relatively short sets of observations, where the telescope can be started, focused, pointed and take the data within about 1-hour. These projects are well suited to students with busy social lives! The projects that require measurements of light curves typically take several hours (and often several repeats) and are better suited to students who are able to obtain the data in a few (long) shifts. Most of the variable stars, eclipsing binaries and asteroid light curves that we target have periods of about 6--12 hours, and changes in brightness of ~0.1--1 magnitude. The exo-planet transits are much more challenging, although we now routinely detect transits with depths ~0.01 magnitudes (just a 1% variation in brightness) at a Visual magnitude of ~13 using the 16" telescope. This is a particularly exciting project: 10 years ago we did not know exo-planets existed, and now we can detect them using telescopes in Durham!

Over the last ~10-years we have also developed the telescopes and domes so that they can be robotically controlled. Although the students must startup, point and focus the telescope, the telescope can then be left running through the night, with a shut-down time set depending on the predicted weather, time the object sets or Sunrise. All of the domes are controlled from the Digital Dome Works, which continually rotates as the telescopes track the sky. Our in house software automatically shuts at the required time, homing and closing the dome and parking the telescope. In the mean time, the CCD will continue to take images until the shutdown is activated, taking (up to 1000 x 60-second exposures). The 60-second exposure time limit is set by the tracking - beyond this the images start to trail. A weather station on the roof (which tracks temperature, and measures the winds speed and rain) over-rides and shuts down the telescopes if the weather turns during the night. Now that we can run in this semi-automated way, since our first

remote/robotic facility, DRACO, was commissioned in 2002, over 570,000 CCD images have been taken.

In all cases, the emphasis for the projects are to obtain the data and then measure



Upper panel A schematic of an exo-plant transiting in front of a star from a simple model of an exo-planet transit. Lower panel: the light curve obtained from the astrolab 16" telescope of an exo-planet transit in front of WASP-33-b in January 2017. In this case, the exo-planet transit has a depth of only 0.02 magnitudes, but is easily seen between hours 2 and 4 of the observation.

and properly propagate the measurement and systematic errors throughout the analysis. For example, in our near-earth object project, the goal is to track a group of asteroids over a period of ~10-weeks and then calculate the orbital parameters, and so predict where the object will be at any point in the future. However, in this project, the measurements (and derived orbit) are fundamentally limited by the limited number of measurements made (usually ~20 over the course of 10 weeks) and the precision of the astrometric catalog used to reference the stars on the sky. Understanding how these uncertainties propagate into the orbit parameters, and what effects these errors have on future "predictions" for an objects position is key: we try and drill in to the students that anyone can make a measurement (and that a measurement is meaningless without an error-bar), but a good scientist will be able to measure the error, and also know what is the error on the error!

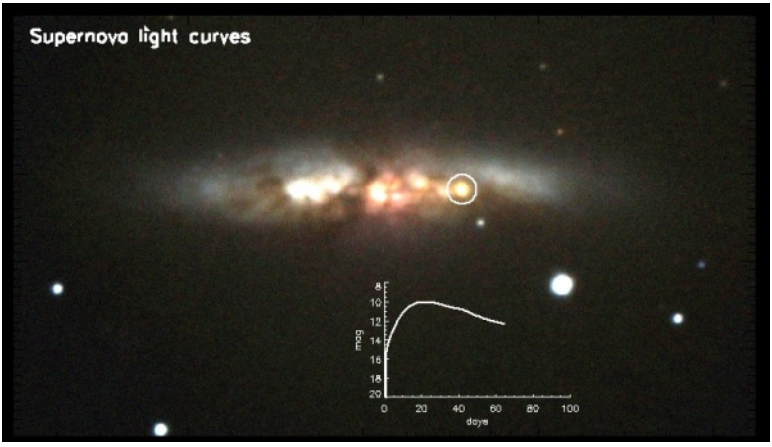
Whilst there are darker sites around the Durham area compared to the roof of the Physics Department (which looks North over the city and towards Newcastle), the access to the department and telescopes for both the staff and students means we

have a very safe and controlled environment for observing. Typically the weather is clear enough to observe one in every four nights during the term, and on the "best" nights, we can reach 19th magnitude with long exposures, and the best "seeing" we measure is ~1.5" FWHM, although it's typically 4".

To supplement the observing program, we also run a 0.5-meter telescope on the island of La Palma in the Canaries which is queue scheduled to provide data for student projects. Whilst the students must run this telescope remotely (we can't afford to send our students to La Palma!), this telescope provides additional images to supplement the projects, and since the 0.5-meter is bigger and on a better site, provide deeper images and so smaller measurement errors, which benefits a number of projects.

Overall, the astronomy lab is generally accepted to be one of the highlights of the under-graduate program - mostly thanks to the driving force behind the observatory: Dr. John Lucey. The vast majority of the students thoroughly enjoy the observing experience and project work. For almost every project, we try and observe targets that have not been targeted by students in previous years - after all, there's a lot of stuff up there!

Dr Mark Swinbank
Centre for Extragalactic Astronomy
Durham University



One recent project involved measuring the light curve of the supernova in the galaxy Messier 82.

NIGHT SKY

JANUARY 2017 (times in GMT)

Lunar phases

First quarter	05/01/2017	19:47
Full moon	12/01/2017	11:34
Last quarter	19/01/2017	22:14
New moon	28/01/2017	00:07

PLANET SUMMARY

Mercury is in daylight. Venus – in Aquarius - is a nice view in the evening sky after sunset. Mars – also in Aquarius - is quite close to Venus this month. Jupiter – in Virgo - is a morning object rising after midnight. Saturn is a daylight object and Uranus – in Pisces - is still putting on a good show in the evening sky.

THE STARS AT 8PM (GMT)

North – Cassiopeia shows up as a letter 'M' near the zenith. Cygnus is nicely placed ion 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 major meteor shower of this month were 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.

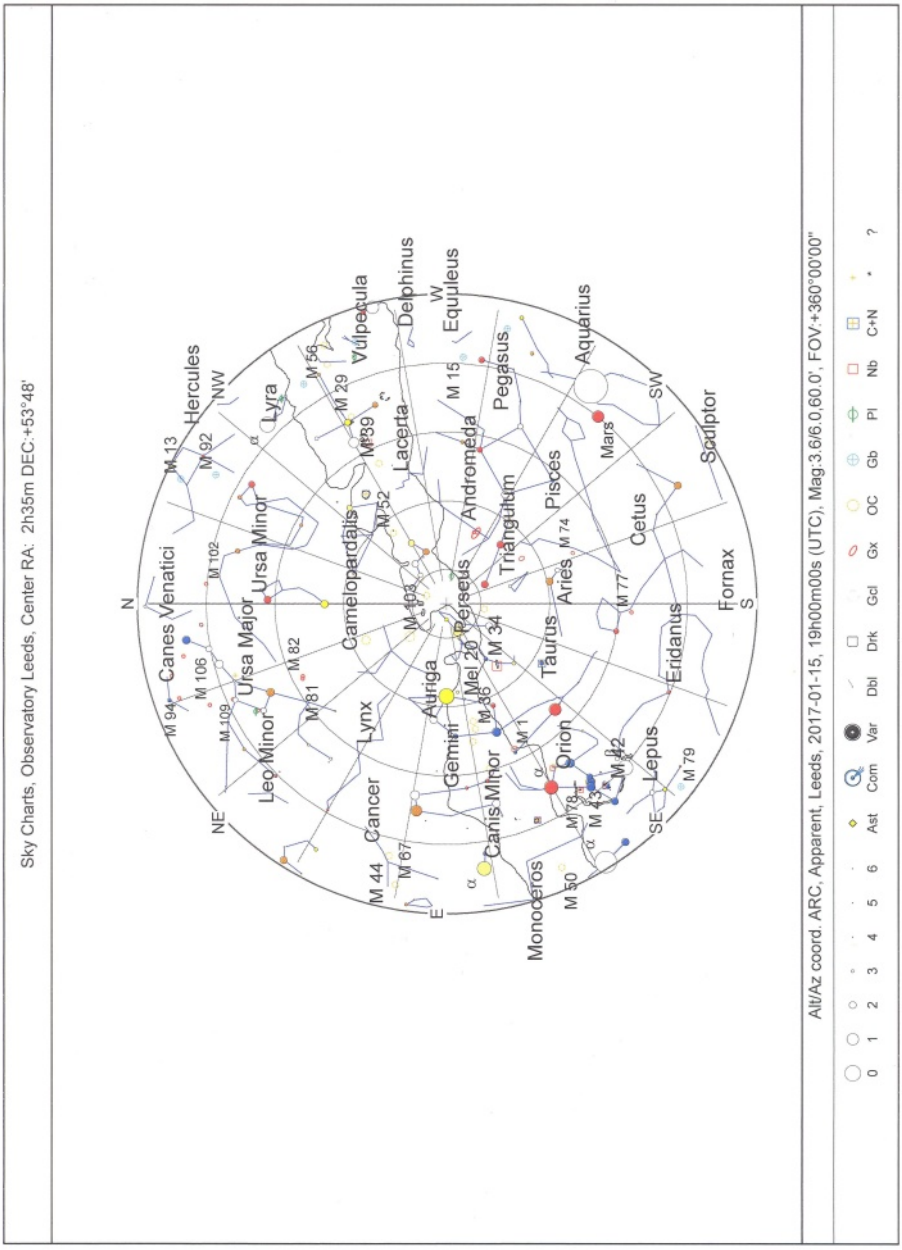
COMETS

Comet 45P/Honda makes its appearance low down in the Northern skies during twilight (see February's notes, and the Observers' Slot).

The Planets 15/01/2017

	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	08:15	06:38	09:58	20:23	10:13	00:30	06:04	10:59
Transit	12:17	10:35	15:23	02:33	15:52	05:53	09:57	17:43
Set	16:19	14:31	20:49	09:43	21:33	11:15	13:49	00:31

January night sky.



NIGHT SKY

FEBRUARY 2017 (times in GMT)

Lunar phases

First quarter	04/02/2017	04:19
Full moon	11/02/2017	00:33
Last quarter	18/02/2017	19:33
New moon	26/02/2017	14:58

PLANET SUMMARY

Mercury is still in close conjunction with the Sun. Venus is the Evening Star visible for about 3 hours after sunset. Mars is still quite close to Venus this month – both Planets are in Pisces. Jupiter – in Virgo - is heading towards opposition later in the year and is visible from about 11:30pm onwards. Saturn - in Ophiuchus - is just visible low in the eastern sky before dawn. Uranus - In Pisces - is visible for about 3 hours after sunset and is quite close to Mars and Venus.

THE STARS AT 8PM (GMT)

North – Draco is nicely placed for viewing – splitting the two Bears
East – Gemini and Cancer are nicely placed with Leo visible later in the evening
South – Monoceros and Canis Major are low down with Orion, Gemini and Taurus all well placed for viewing.
West – Perseus is almost overhead with Andromeda nicely placed for viewing. Pegasus and Cygnus are low down.

METEOR SHOWERS

There are no major meteor showers in February.

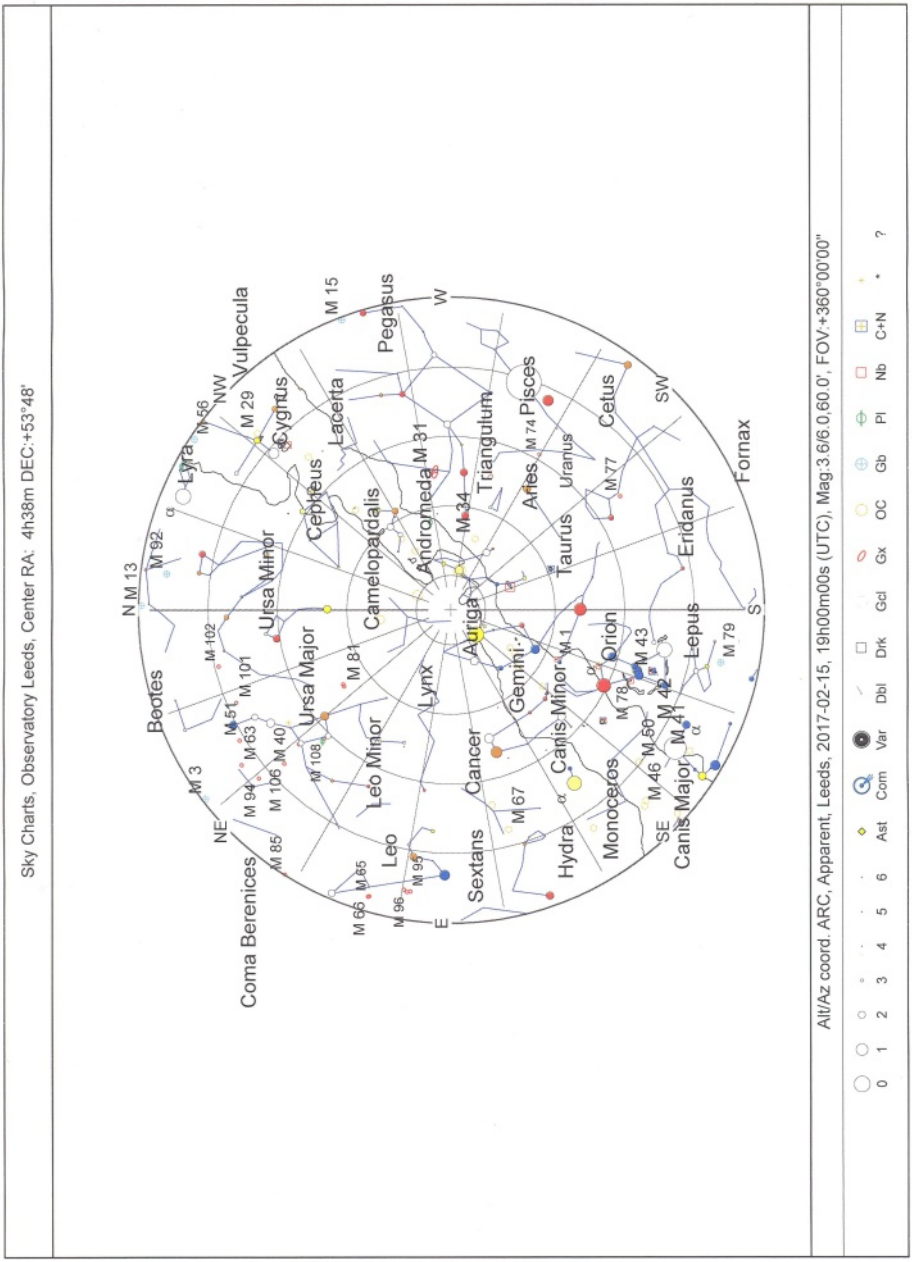
COMETS

45P/Honda-Mrkos-Pajdusakova was at perihelion at the end of 2016 and has a brief observing window in the evening twilight at the beginning of January. It emerges from solar conjunction at the beginning of February on its way to passing 0.08 au from the Earth on February 11. It could be a binocular object as it moves rapidly across the sky during February. Though it is initially a morning object, it quickly moves into the evening sky after closest approach, but by then begins to fade fast. It passes a few degrees from M3 in mid February.

The Planets 15/02/2017

	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	07:26	07:12	08:07	22:39	08:43	22:28	04:16	08:59
Transit	12:21	11:16	14:47	03:31	15:14	03:53	08:17	15:44
Set	17:18	15:42	21:29	09:19	21:47	09:15	11:58	22:30

February night sky.



NIGHT SKY

MARCH 2017 (times in GMT)

Lunar phases

First quarter	05/03/2017	11:32
Full moon	12/03/2017	14:53
Last quarter	20/03/2017	15:58
New moon	28/03/2017	02:57

PLANET SUMMARY

Mercury is in conjunction with the Sun. Venus will be a very challenging object low in the west after sunset. Mars will be visible for about 1 hour in reasonably dark skies in the west after sunset. Jupiter will be visible from around 10pm until lost in the dawn twilight. Saturn is still a morning object. Uranus is closing in on solar conjunction after its recent good evening aparition.

THE STARS AT 8PM (GMT)

North - Cepheus and Lacerta are nicely placed with the two Bears easily viewable. Hercules is rising. Pegasus has set.
East – Leo is prominent with Virgo – containing Jupiter - rising. Cancer is nicely placed.
South – Gemini, Taurus, Orion and Canis Major are all in good positions for viewing. Auriga is near the zenith.
West – Perseus and Cassiopeia are both nicely placed. Pisces is setting.

METEOR SHOWERS

There are no major meteor showers in March.

COMETS

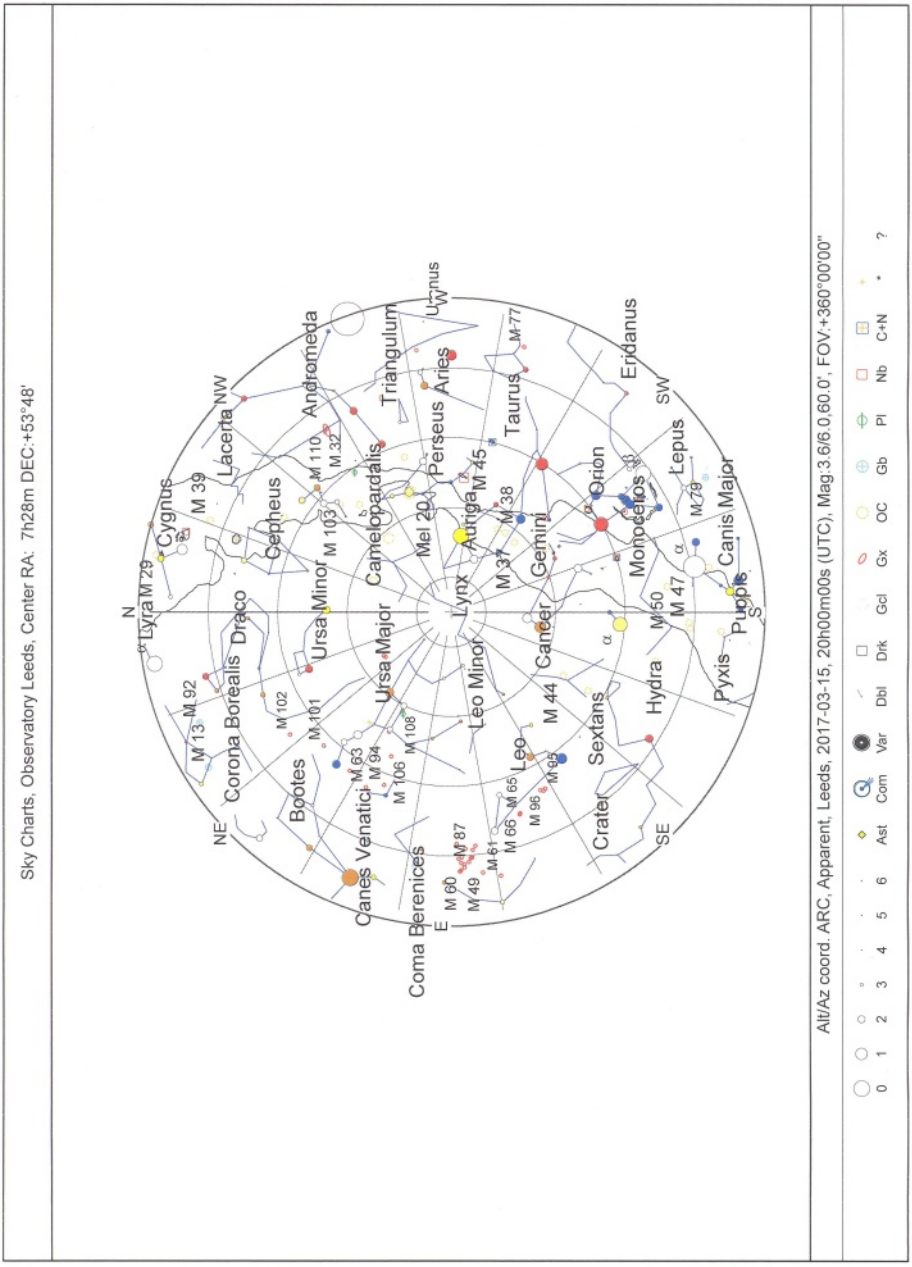
Comet 2P/Enke may be visible.

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

The Planets 15/03/2017

	Sun	Mercury	Venus	Moon	Mars	Jupiter	Saturn	Uranus
Rise	06:22	06:40	05:51	21:29	07:24	20:26	02:33	07:10
Transit	12:16	12:47	13:00	02:08	14:10	01:56	06:24	13:59
Set	18:12	18:57	20:07	07:44	21:58	07:22	10:15	20:48

March night sky.



ASTRONOMERS' TALES

Kielder couldn't exist without its volunteers, so we asked recent convert Dave Wright to describe his experience of becoming a volunteer ...

Having been a keen amateur astronomer for a few years. I had always wanted to visit the Kielder Observatory but never seemed to get around to doing it. Also being keen campers, my wife and I were staying at Kielder campsite in one of their camping pods. We got talking to the couple in the next pod, who told us they were here to do volunteering at the observatory. Until then I had not realized that they had volunteers there. Immediately I thought “what a great idea”. On returning home I went to the observatory website and sent an email stating my interest in becoming a volunteer. The next day I received a reply with a downloadable application form. I returned this and after about a week I received another email inviting me to an informal meeting at the observatory on the next Saturday afternoon. I emailed back immediately to say that I would be attending.

I was excited on the Saturday as I travelled to Kielder, a journey of about an hour for me. There was a group of about 20 of us there for the day and we were met by Gary Fildes the founder and director of the observatory. We had coffee and tea whilst he told us what volunteering entailed. Afterwards he showed us around the observatory and of course the telescopes. He also explained that you could volunteer as much or as little as you wanted to fit in with your lifestyle.

A couple of days later I received another email asking if I was still interested in volunteering and if so could I attend a training day again on the next Saturday. I replied immediately that I was very interested and would definitely be there. The next visit was still informal but a lot more involved and was more concerned with where things were kept and how they worked with a lot of questions and answers.

Next was an email welcoming me to the observatory staff and enclosing that month and the next months rota with highlights where volunteers were needed. I volunteered for 4 nights during the next month. As my first night approached I was excited and also a bit apprehensive not knowing what to expect. I need not have worried, when I arrived an hour before the event began I was met by three members of staff who were very friendly and welcoming. On that first night I helped set everything up and get ready for the public to arrive.

Are you interested in volunteering? Then why not sign up for one of our open days? The next one is on February 11th.

I was there to meet the public as they arrived. During the course of the night I listened to the talks the staff gave and watched what they did, trying to take as much in as I could. I talked to the public as much as I could and was able to answer quite a few questions I was asked. The night went very well and I thoroughly enjoyed it and couldn't wait to do it again.
The next time was very much the same, again learning as much as possible, this was a private event and was different as they were all children. I still learned a lot from the staff.
On my third event I was getting much more confidant and was sort of thrown in at the deep end as one of the staff had to go and sort something out and asked me to take over the telescope talk from him. I did so with success and felt proud of myself.

By the time I got to my fourth and fifth events I was starting to join in with the telescope talks and talking to the public much more and was feeling a lot more confident and remembering how the full time staff do their talks. As time goes on I am getting more comfortable speaking in front of the public and also to them on a one-to-one basis.
This is definitely one of the best things I have done and I do not regret it one little bit, for me it is a dream come true. If you are reading this then you obviously get the observatory newsletter and as such have an interest in astronomy. Then why not give volunteering a go? You do not have to know much about the sky or astronomy as you will learn as you go along, but admittedly it is an advantage.

Dave Wright

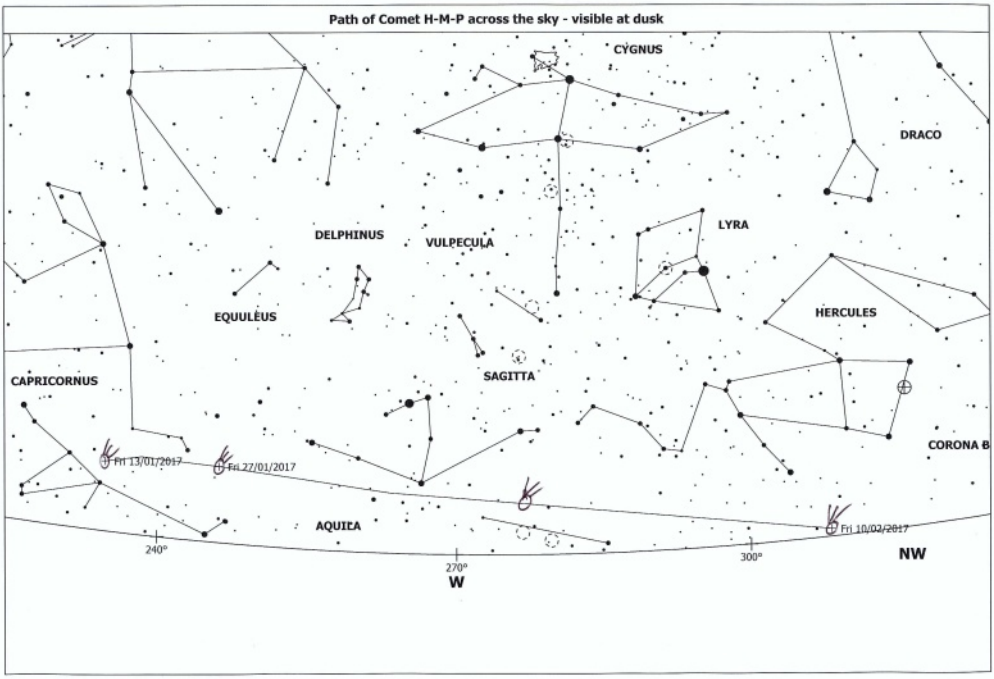
OBSERVERS' SLOT

Comet 45P/Honda-Mrkos-Pajdusakova

For most of early part of 2017 there will be a moderately bright Comet in the sky. The comet is Comet 45P/Honda-Mrkos-Pajdusakova. It will be visible in evening twilight low in the constellation of Capricornus, the Sea Goat, during January reaching a brightness of +6 around mid-month, before re-appearing in the morning sky in early February. Here is a star chart of its position over the next 3 months and you can find out more about the Comet here.....

https://theskylive.com/45p-info

It is nowhere near as spectacular as some of the comets of recent years but it is likely to be the brightest of all of the comets in the sky for the foreseeable future. Currently pulling away from the Sun, after perihelion on 31st December 2016, the comet should be visible in binoculars or a telescope until the end of January and through February. It was featured in a recent Astronomy Picture of the Day:
https://apod.nasa.gov/apod/ap170102.html



The Planets in 2017

During 2017, a number of the planets will appear during quite a few months of this year. Some will be easily spotted in the sky such as Venus and Jupiter, others such as Saturn will take a little tracking down. A third group including Mars will take a bit more effort to locate. So, taking each planet in turn, here are some notes to get you started:

a) Venus - the Morning [and sometimes Evening] Star.
Between now and March 16th Venus will appear as a brilliant object in the after-dusk sky - visible for many hours after sunset. Between March 17th and April 2nd it will disappear behind the Sun. Then from April 3rd until November 16th it will be present in the pre-dawn morning sky. Up until May it will appear as a slender crescent - in binoculars - as its apparent diameter reaches its largest. Thereafter the phase will increase but its apparent size will decrease as it heads towards its maximum elongation from the Sun. During this time it makes a few close encounters - in the sky - with some other familiar objects:
* September 20th - it is near the bright star Regulus in the constellation of Leo low in the ENE just before dawn.
* Early morning on October 5th it skims past the red planet Mars.
* On November 13th it passes very close to Jupiter and will be visible in the morning twilight, low in the south-east.

Some people suggest that a conjunction of Venus and Jupiter may have been one of the astronomical events around the time of the birth of Christ.

b) Mars - the Red Planet.
Mars will be visible from now until early June in the evening sky and then in the morning sky from September 11th until

"My wife and I absolutely loved our evening with you. A great team of knowledgeable professionals who put all at ease, imparting knowledge in a friendly and fun environment. We were unfortunate that cloud, fog and rain tried to spoil the viewing but it was a brilliant evening. We attended the late night Aurora Borealis event. 2330 hrs Saturday through to 0230ish Sunday morning. A 5 star recommendation. We will be back again."

Peter from Ripon

OBSERVERS' SLOT

New Year's Eve 2017. Not really the best time to view Mars as it will be near aphelion - furthest distance from the Sun, but it is a taster for what is to come in late July 2018 when Earth and Mars have another close approach similar to its last really good sighting in Summer 2003. Mars skims Venus on October 5th and can be seen close to Mercury on the morning of September 16th.

c) Jupiter - Jupiter is a morning object until April 6th. From April 7th until October 6th it moves into the evening sky and returns to the morning sky from November 13th until December 31st. For most of 2017 Jupiter slowly traverses through Virgo reaching Libra in mid-November. On November 13th it has a close encounter in the sky with Venus.

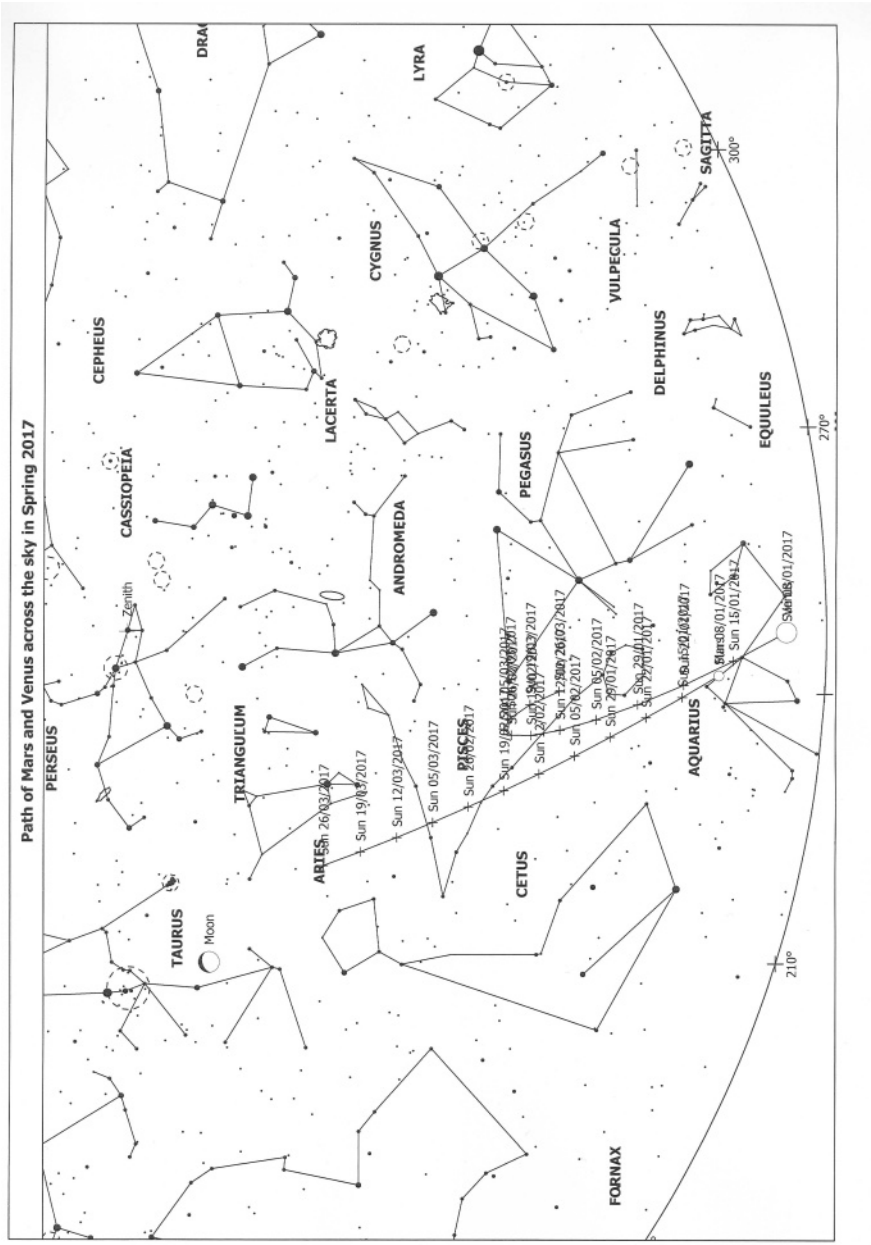
d) Saturn - the Ringed Planet - starts 2017 in the '13th Zodiac' constellation of Ophiuchus - the Serpent Bearer. On February 23rd it crosses into the 'Teapot' constellation of Sagittarius the Archer. By May 18th it has traversed back into Ophiuchus, where it will remain until November 18th when it is back in Sagittarius. It is a morning object until June 14th and then an evening object from June 15th to December 4th.

e) Uranus - the Blue-Green planet - has been in the evening skies during 2016 and continues to be there during 2017. In the constellation of Pisces it is visible in the evening skies until March 29th, the morning skies from April 30th until October 18th and then back to the evening skies from October 19th until December 31st.

You can find more details here.....
http://www.space.com/35194-planet-skywatching-guide-2017.html

Robert Williams

Venus, Mars and the Moon put on a good show in early December.



The paths of Venus and Mars in Spring 2017.

GALLERY

Back to our usual image gallery for this edition. Remember that we would love to display your images here - please send them to

newsletter@kielderobservatory.org

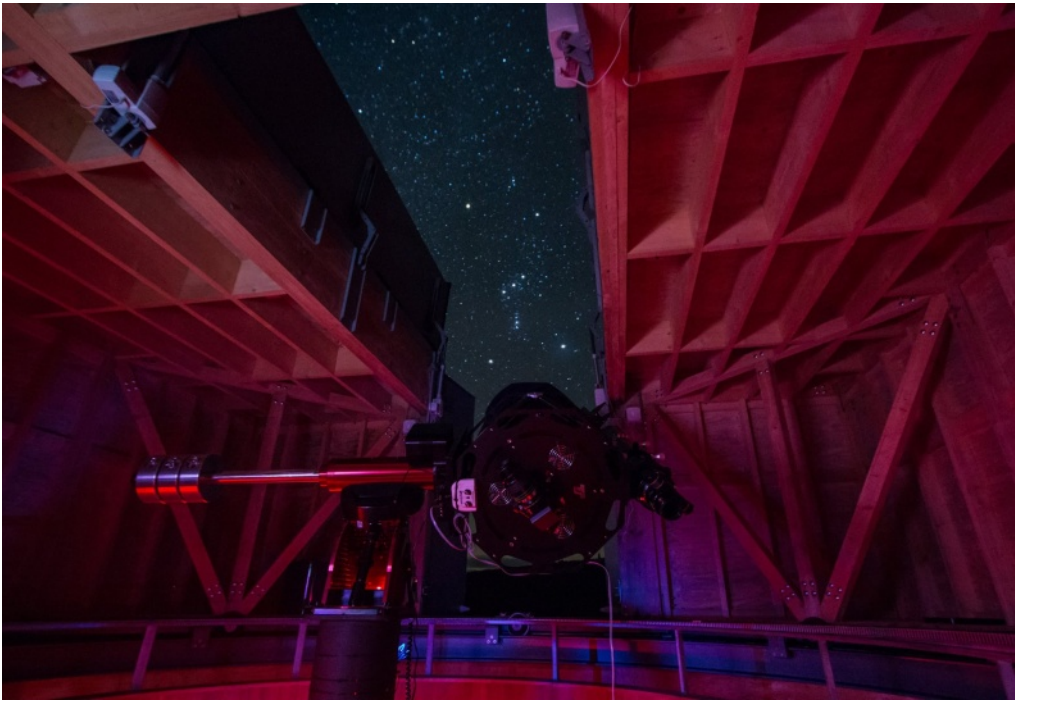
along with a brief description of how and when they were taken.

To start the winter season we have a view of Messier 42 and the Running Man, taken by editor Robert Williams through the small refractor attached to the 16" 'scope at Kielder.

Contrasting colours in Orion: left, the red supergiant Betelguese; right, the blue-white supergiant Rigel. Taken with the new 16" RC telescope at Kielder.

At the start of January, Mars and Venus formed a nice pair in the sky. This shot comes with the added bonus of a 22deg ice halo around the moon.

GALLERY



Orion viewed through the Sir Patrick Moore turret.

Well placed in the sky at the moment is the Crab Nebula, Messier 1, the remnant of a supernova seen in 1054AD. This shot was taken with a Canon 1000D camera and a 10" RC f8 astrograph by editor Nigel Metcalfe.

Another shot of M42, the Orion Nebula. Taken at the Observatory on January 2nd.

"First time visiting Kielder Observatory and I can't recommend it enough. The weather was too cloudy to see anything but the experience was still fantastic. The staff we're friendly, fun, enthusiastic and informative and I think their love of the subject really rubs off. So much so I just feel excited to go back - hopefully I'll get some clearer skies then."

Kimberley from Leeds

KOAS: Your Window to the Universe

http://www.kielderobservatory.org

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