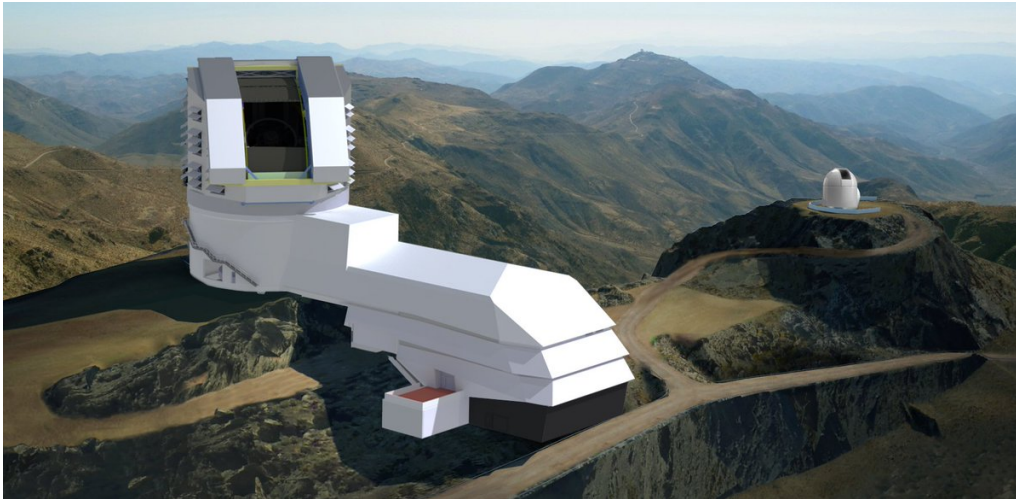


Astronomical Society of Edinburgh

Vera Rubin talk and January Sky meeting report

January 6, 2021

Categories: Meeting report, News



Prof Aaron Roodman from Stanford University and Alan Pickup gave us some great talks about the Vera Rubin Observatory and Scotland's night sky in January 2021.

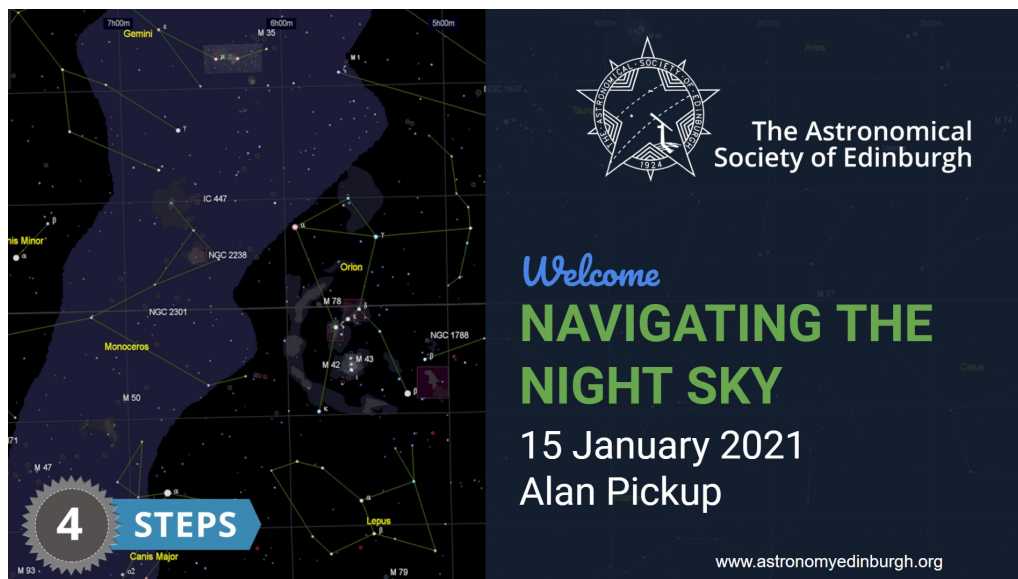
Watch the video here or on our YouTube channel.

- [0:00:00](#) The Fastest Eye on the Sky: The Vera Rubin Observatory
- [1:01:14](#) The Sky in January

Navigating the Night Sky

January 5, 2021

Categories: 4-Steps, Knowledge, Meeting report, News



Alan Pickup gave us a brilliant presentation on finding our way round the night sky. This was the most popular talk ever and we had over 700 viewers live on YouTube as well as members on Zoom. Many many positive comments with people having learned a lot from it.

Watch it again on our [YouTube channel](#).

We've had such a lot of positive comments about this talk, it clearly struck a chord. There's a real increase in interest in the astronomy and what's in the night sky.

Here's an article from the first lockdown which is just as relevant now.



Stargazing: look up during lock down

Which way does your window look? North, South, East or West? Whatever the way there's something in the sky to marvel at and perhaps now is the opportunity you needed to find out more about the wonders of your universe.



Astronomical Society of Edinburgh

The ASE Messier project

January 1, 2021

Categories: News



We've started a new project! ASE members are going to try capturing all of the objects in the Messier Catalogue and gather them on our website.

The Messier catalogue is a list of 110 objects created by French astronomer

[🔗 VISIT THE MESSIER PAGE](#)

Charles Messier in his *Catalogue des Nébuleuses et des Amas d'Étoiles* in the 18th Century. They are well known by amateur astronomers and are some of the most interesting objects in the sky. Ironically, Messier himself wasn't interested in them but in observing and discovering comets. He created the catalogue as objects to avoid in case he thought they were actually comets.

It consists of 110 star clusters, nebulae and galaxies. Not all of them are easily visible from Edinburgh, being too far south. The objects in constellations such as Puppis, Scorpius and Sagittarius will be challenging and may require members to travel further south to capture them.

We could fill in many of the objects from existing images but we plan to capture them as a collaborative project going forward. We already have a few images on the page to show how it might look. One image will be

shown for each object on the main page but clicking on an image will show all images taken by ASE members.

Access the [ASE Messier page](#) from the link under the Imaging & Observing Group menu item.

Image credits:

M33 Ian Smith

Charles Messier public domain

Ron Livesey

January 2, 2021

Categories: News



Sadly I have to inform members of the death of Ron Livesey who passed away on the 25th Jan 2021.

In recognition of Ron's contribution to amateur astronomy the ASE awarded Ron the Lorimer Medal in 2019. His contributions to the promotion and development of astronomy for amateurs made a great impression on the many people he came into contact with. To the extent that Ron had a minor planet, discovered on the 30th June 1987, named after him (7170 Livesey) by its discoverer, Robert McNaught.

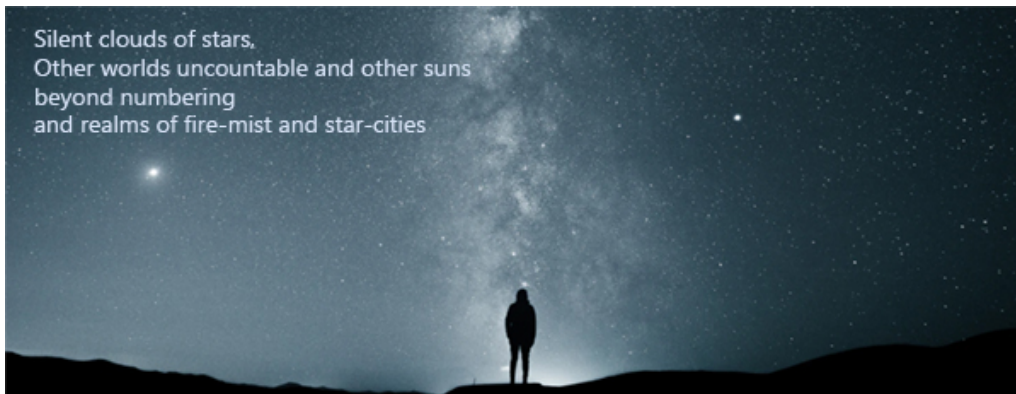
Below is the citation for the Lorimer Medal, written by Dr Dave Gavine who knew him so well and who also sadly passed away last year. I think it is as relevant for today as it was when he received the medal.

We will inform members when details of the arrangements are known. However the Covid restriction will unfortunately prevent us from paying our respects in the normal ways.

Here's a link to an article on the BAA website about Ron's famous [Jamjar Magnetometer »](#)

Andrew Farrow
President

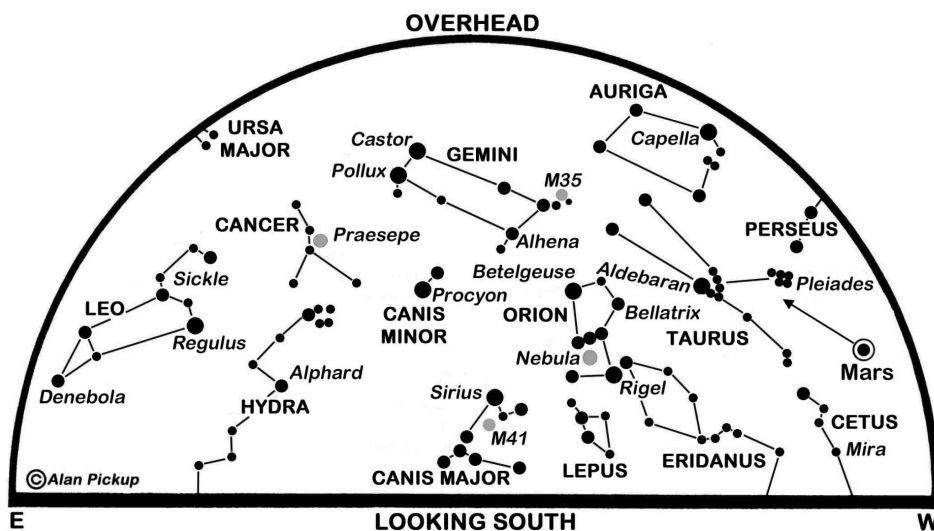
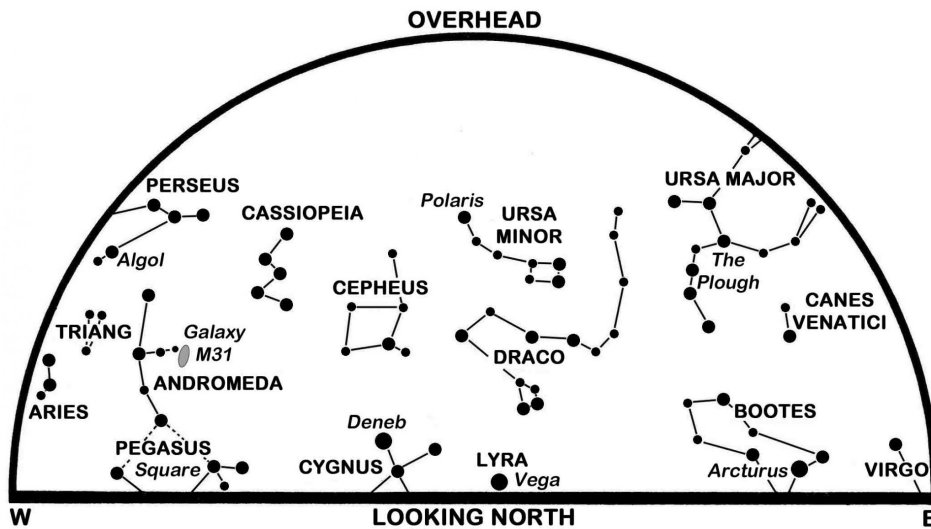
Ron Livesey has been a very active member of BAA since 1956 contributing observations of Sun, moon, planets, stars, meteors & aurora, to all the observing sections. He was Director of the Aurora Section from 1976 to 2005 and remains as Assistant Director to the present day, specialising in statistics – comparing auroral sightings with solar and magnetic activity. Ron championed the simple ‘jam jar’ magnetometer from his home in Edinburgh. Even at the age of ninety, Ron still makes sunspot observations for the Solar Section. He has contributed many papers and articles to the BAA journal and meteorological magazines and is an active promoter of astronomy throughout Scotland. As Director he issued frequent newsletters and organised Section meetings. Ron was awarded the BAA’s Lydia Brown medal and recently the Goodacre medal – its highest award. He is a past president of the Astronomical Society of Glasgow and an Honorary Member of Dundee Astronomical Society. He is revered by all amateur astronomers in Scotland who know him.



Scotland's Sky in February 2021

January 6, 2021

Categories: Sky Diary



Three international spacecraft converge on Mars



Author: [Alan Pickup](#)

The maps show the sky at 22:00 GMT on the 1st, 21:00 on the 15th and 20:00 on the 28th. An arrow depicts the motion of Mars.

February is the briefest month in the calendar, but Orion and his retinue of superb winter stars ensure that we enjoy some of our best stargazing of the year. Although there is a dearth of bright planets this month, the exception is Mars which is drawing closer to the iconic Pleiades star cluster and is about to

welcome an international trio of uncrewed spacecraft that were launched from the Earth last September.

Leading the way is the Hope orbiter, the first interplanetary mission by the United Arab Emirates. Its design and development were led by a space centre in Dubai, working in conjunction with universities in the USA. Hope is due to be captured into Mars-orbit on the 9th with the aim of plugging a gap in our knowledge concerning the daily and seasonal cycles affecting the Martian atmosphere, weather and dust storms.

China's Tianwen-1 is due to enter Mars-orbit on the 10th and, eventually, send a lander and rover down to the surface. Its first task, though, is to image and survey its first-choice landing site in Mars' Utopia Planitia, a large plain in the planet's northern hemisphere. It may not be until May before the lander touches down and its rover trundles down a ramp to begin its exploration.

Finally comes NASA's Perseverance rover which is heading directly for a landing on the 18th. Its target is in the 49-km-wide Jezero Crater which lies on the edge of Syrtis Major, a dark feature on Mars that is familiar to amateur astronomers and was the first surface marking ever to be recognised on another planet.

It is thought that Jezero once held a long-lived lake in which ancient Martian life may have developed. An array of scientific instrument will investigate this theory while, in addition, the rover carries an experimental solar-powered mini-helicopter called Ingenuity to scout its way ahead. Also attached is a plate with a staff-and-serpent symbol as an appreciation to healthcare workers during the Covid-19 pandemic.

Edinburgh's days grow two hours longer in February as the sunrise/sunset times change from 08:07/16:46 on the 1st to 07:06/17:45 on the 28th. The Moon is at last quarter on the 4th, new on the 11th, at first quarter on the 19th and full on the 27th.

As darkness falls at present, the bright and non-twinkling Mars stands 51° high in the south as seen from Edinburgh. This month sees it continue to fade and recede, its magnitude falling from 0.4 to 0.9 while its distance grows from 178 million to 219 million km. It also tracks 16° east-north-eastwards against the stars, moving from Aries into Taurus where it lies 3° below the Pleiades star cluster at the month's end. Mars sinks westwards during the evening and sets in the north-west by 02:00.

The Moon lies below-Mars on the 18th and is at first quarter on the next evening when it lies further to the left of the planet and 6° below-left of the Pleiades. Compare the brightness and colour of Mars with Taurus' leading star Aldebaran which shines at about magnitude 0.9 not far to Mars' east (left). Whereas Mars owes its reddish-orange hue to its rusty surface, Aldebaran is an orange giant star with a surface at 3.600°C , some $1,900^\circ\text{C}$ cooler than our Sun.

Most of the other bright planets are lost in the Sun's glare, at least as seen from our latitudes. Saturn and Jupiter reached conjunction on the Sun's far side in the past few days while Venus rises with the Sun. Mercury concludes its spell of evening visibility as the month begins and reaches inferior conjunction on the Sun's near side on the 8th.

There is no mistaking the handsome constellation of Orion the Hunter which climbs from the south-east to pass due south one hour before our map times. The distinctive pattern made by its main stars is entirely a chance alignment – the stars concerned are at different distances with the closest, Bellatrix (see chart), at about 250 light years. All the others are at least twice as distant and the three in Orion's Belt are beyond 1,000 light years. All these are more massive and much more luminous than our Sun – place the Sun at a comparable distance and we'd probably need binoculars to spot it.

If we could examine Orion through infrared eyes, we would see the whole constellation blanketed by clouds of gas and dust which lie 1,000 to 1400 light years away. Dubbed the Orion Molecular Cloud Complex, it is peppered by glowing nebulae of which the most prominent is the famous star-factory of the Orion Nebula.

Above-left of Orion, and due south at our map times, is Gemini, the constellation of the heavenly twins of Greek mythology, Castor and Pollux. Its two leading stars have the same names, with Pollux, the brighter and lower of the pair, being the closest giant star to the Sun at 34 light years.

Castor, though, is a remarkable family of six stars at a distance of 51 light years. What the unaided eye sees as single, appears through a telescope as two white stars only 5 arcseconds apart that orbit each other every 445 years, while a third dim star circles them both every 14,000 years or so. In fact, spectroscopy tells us that the third star is made up of a pair of red dwarf stars circling each other every 20 hours, and that each of the brighter stars has its own exceedingly close red dwarf companion.

Tradition depicts the twins lying side by side with their feet towards Orion. The star Alhena, at the feet of Pollux, is slightly fainter than Castor while our chart plots the star cluster M35 hovering near Castor's feet. Easily seen through binoculars and spreading over an area as large as the Moon, M35 lies about 3,870 light years away and its stars formed some 175 million years ago.

Diary for 2021 February

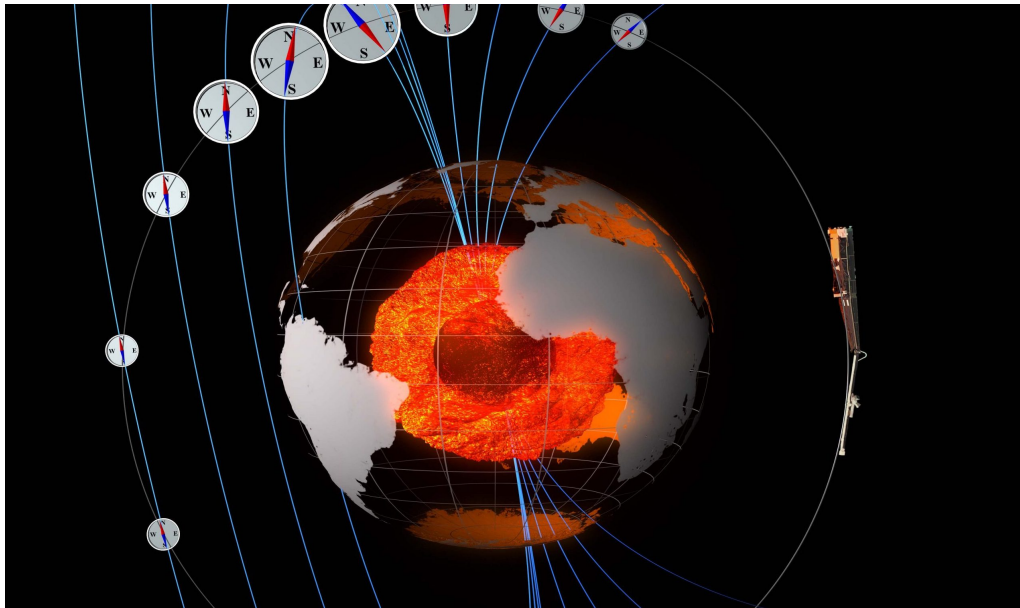
- 3rd 00h Moon 7° N of Spica
- 4th 18h Last quarter
- 6th 09h Moon 5° N of Antares
- 8th 14h Mercury in inferior conjunction on near side of Sun
- 11th 19h New moon
- 18th 23h Moon 4° S of Mars
- 19th 14h Moon 6° S of Pleiades
- 19th 19h First quarter
- 20th 14h Moon 5° N of Aldebaran
- 24th 02h Moon 4° S of Pollux
- 25th 01h Moon 2.7° N of Praesepe
- 26th 15h Moon 5° N of Regulus
- 27th 08h Full moon

This is an extended version, with added diary, of Alan's article published in The Scotsman on January 30 2021, with thanks to the newspaper for permission to republish here.

From SWARM to JUNO meeting

February 6, 2021

Categories: Meeting report, News



Dr Ciaran Beggan of the British Geological Survey gave us a fascinating talk on how magnetic fields work on Earth and Jupiter, and also how missions are expanding our understanding of them.

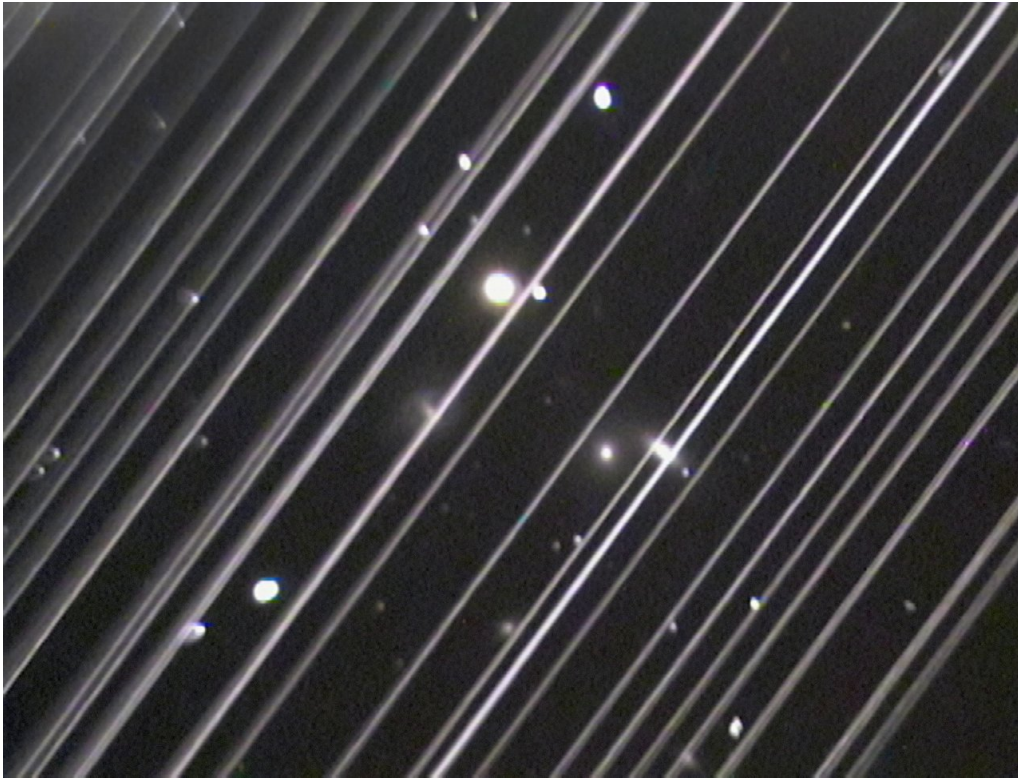
Mark Phillips also gave us a presentation on the Sky in February.

Watch the video here or on our [YouTube channel](#).

"Losing the Sky"

February 3, 2021

Categories: News



Our good friend and Honorary President, Prof. Andy Lawrence has written a new book. It is a popular-level polemic about the pollution of the night sky by satellite megaconstellations.

An important and very readable short book for anyone who cares about what's happening to our night skies.

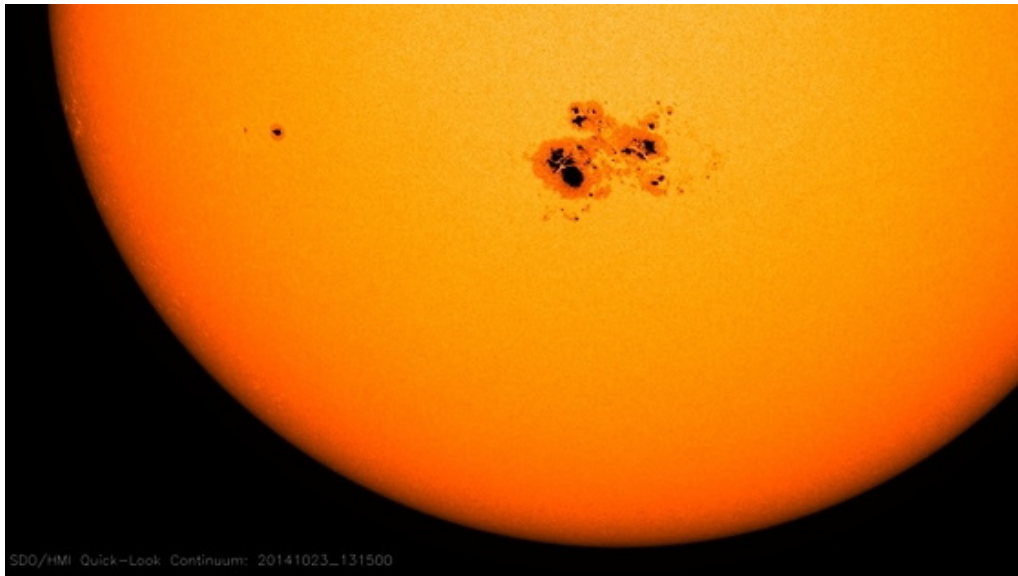
You can get the ebook from [Apple Books](#) or [Amazon](#). Only £1.99! Paperback and Google Play book versions soon.

Image Credit: Victoria Girgis/Lowell Observatory

The Solar Cycle Meeting – All About Sunspots!

February 0, 2021

Categories: Meeting report, News



Lyn Smith, the BAA Solar Section Director, told the engrossing story of our nearest star, The Sun. She described the solar cycles and sunspots. With the latest cycle (Cycle 24) just ending, Lyn reflected on the solar activity observed and shared her own personal highlights. Lyn used historic information about the solar cycle patterns to give some insight into what we can expect from Cycle 25, starting now. The Sun can easily be observed by everyone – but it is EXTREMELY important to do this safely. Watch the video to learn more!

Andrew Farrow shared an update on the recent funeral of Ron Livesey, including the revelation that the '[JamJar Magnetometer](#)' was actually a 'well known brand' Coffee Jar Magnetometer.

Watch the meeting video here or on our [YouTube channel](#).

Expanding the ASE Technical Support

February 3, 2021

Categories: News



To help Mark in the amazing job he has done creating and maintaining our website, a small team is in training to help with support.

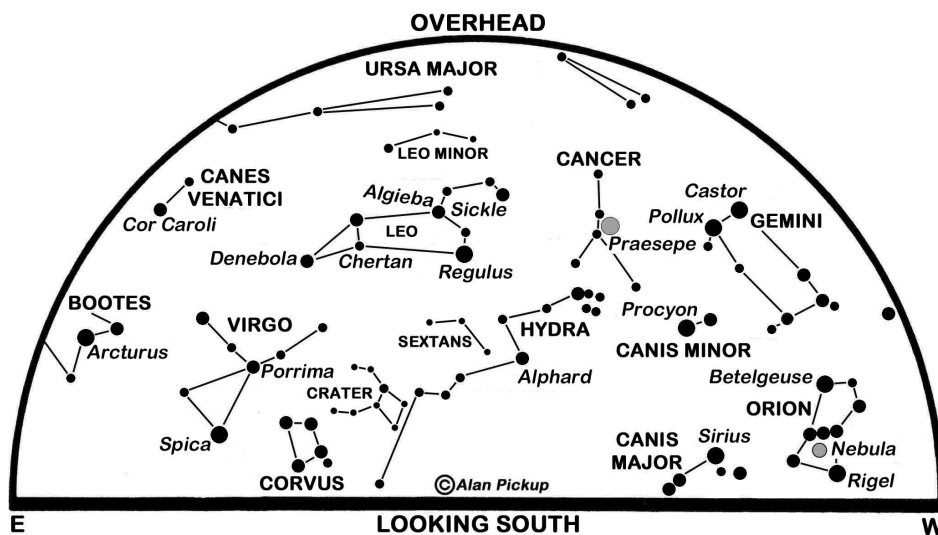
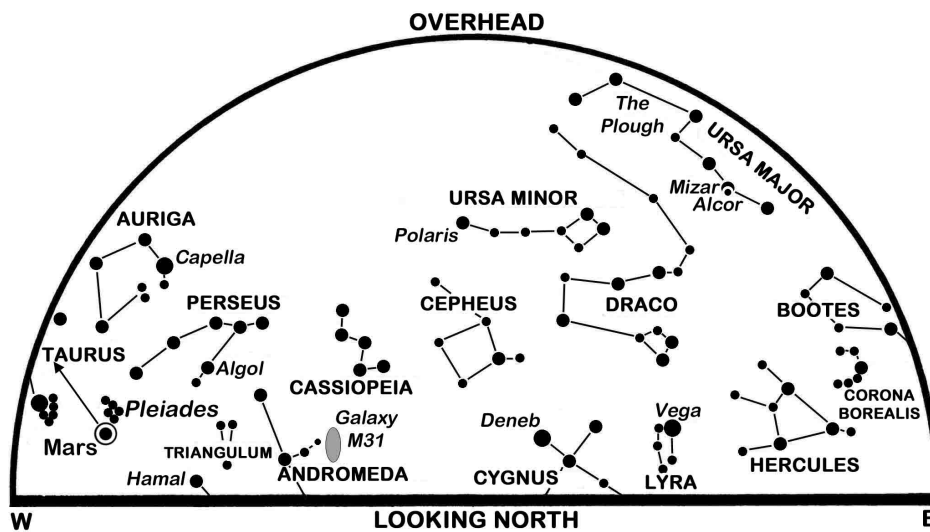
Neil Martin, Ian Smith, Sean Wixted, Will Joy and Andrew Farrow will be learning the ropes to spread the workload and ensure the website is well tended too if Mark needs a rest or even a holiday. Hopefully the result will not be noticeable to users and fatal website crashes will be avoided in the early days!

The Guidance notes are a little worrying - '**ASE Tech Manual**...or how to keep the ASE running during a pandemic, asteroid strike or zombie apocalypse'.

Scotland's Sky in March 2021

February 6, 2021

Categories: Sky Diary



Mars and the Pleiades in closest rendezvous in 32 years



Author: [Alan Pickup](#)

The maps show the sky at 23.00 GMT on the 1st, 22.00 GMT on the 16th and 21.00 GMT (22.00 BST) on the 31st. An arrow depicts the motion of Mars. Summer time begins at 01.00 GMT on the 28th when clocks go forward one hour to 02.00 BST.

As an exciting fresh era of Martian exploration begins with the arrival of three new missions, the planet still features in our evening sky. This month sees it closer to the Pleiades or Seven Sisters star cluster than during any other approach between 2006 and 2038.

The other major planets are poorly placed, with Venus rounding the Sun's far side on the 26th and Mercury, Jupiter and Saturn hugging our south-eastern horizon at dawn.

Our charts show Mars sinking in the western sky as it tracks east-north-eastwards in Taurus. As darkness falls on the 1st, though, it stands high in the south-west and 3° or six Moon-breadths below the Pleiades. Shining at magnitude 0.9, it is equal in brightness to the orange giant star Aldebaran which lies 13° to Mars' left and is seen against the V-formation Hyades cluster of fainter stars. Over the following days, Mars slips to the lower-left of the Pleiades, being nearest at 2.7° on the 4th and directly between the cluster and Aldebaran on the 8th.

On the evening of the 19th, look for the 33% illuminated crescent Moon 2.3° below-right of Mars and just one-third of the way between Mars and Aldebaran. Mars dims to magnitude 1.3 by the 31st when it sits between the horns of Taurus and above Aldebaran. As Mars recedes from 219 million to 263 million km during March, it shrinks between 6.4 and 5.3 arcseconds in diameter, making it too small for useful telescopic study.

The Sun climbs another 12° northwards in March to cross the sky's equator at 09:37 GMT on the 20th, the moment of our spring or vernal equinox when days and nights are almost of equal length around the Earth. Our days are lengthening at their fastest rate of the year so our view of the stars and constellations at nightfall is also changing quickly.

Take Orion, for example. As nautical twilight ends on the 1st, and the sky becomes effectively dark, Alnilam, the middle star of Orion's familiar Belt, stands 33° high and due south as seen from Edinburgh. By the equivalent time on the 31st, though, it has dipped to 22° in the south-west and during April it slides into our western evening twilight.

Edinburgh's sunrise/sunset times change this month from 07:04/17:47 GMT on the 1st to 06:46/19:49 BST on the 31st, after

our clocks jump one hour forwards to British Summer Time on the 28th.

The Moon is at last quarter on the 6th, new on the 13th, at first quarter on the 21st and full on the 28th.

As the twilight fades on the 14th there is a slim chance of spotting the very young Moon when it is only 2% sunlit and a mere 4° high in the west at 18:50, but probably only visible through binoculars and provided the horizon is exceptionally clear. It should be much easier on the 15th, when it is 5% illuminated and visible for more than two hours after sunset. On that evening, and for the ones that follow, look for earthshine as the Moon's darker side is lit by the almost-full Earth in the lunar sky.

Over the succeeding nights the Moon climbs against the star background but never strays far from the ecliptic, the path taken by the Sun during the course of the year. Since the planets orbit the Sun in a similar plane to that of the Earth, they, too, keep close to the ecliptic and it is no surprise that Mars is hugging the ecliptic as it passes between the Pleiades and Aldebaran.

Although it is not plotted, the ecliptic continues across our southern chart to pass through Gemini, Cancer, Leo and Virgo, a path that takes it close to the Praesepe star cluster in Cancer, and the bright stars Regulus in Leo and Spica in Virgo. Praesepe (the Latin for manger) appears as a hazy blob to the naked eye and as a swarm of stars through binoculars, leading to its alternative name of the Beehive. In all, it holds around 1,000 stars at a distance of some 577 light years.

Regulus lies 79 light years away and consists of four stars grouped as two pairs, though only one, a blue-white subgiant star, is obvious. Curling above Regulus is the Sickle of Leo, a reversed question-mark of stars that represent the lion's head and mane. Here we find Algieba, 130 light years away and one of the finest double stars in the entire sky. We need a telescope to divide its pair of striking golden-yellow stars which appear only 4.7 arcseconds apart and take 510 years to orbit each other.

Leo's body stretches to the left (east) of Regulus to Denebola, the lion's tail, and includes the third magnitude star Chertan which is useful as a signpost for locating the brightest of all the asteroids, the 525 km diameter Vesta, as it comes to opposition on the 4th. Vesta

moves from 1.6° (3 Moon-widths) left of Chertan late on the 1st to lie 1.3° due north (above) Chertan one week later. At magnitude 5.8, it is an easy binocular object as it approaches within 204 million km of the Earth.

Vesta was orbited by NASA's Dawn spacecraft in 2011 and 2012 and found to be a remarkable, and perhaps unique, asteroid in that (like the Earth) it is a differentiated world with an iron-rich core overlaid by a rocky mantle and volcanic crust. The early solar system probably had many similar bodies, dubbed protoplanets, that became the building-blocks of the planets, or were smashed to pieces in collisions.

Diary for 2021 March

- 2nd 07h Moon 7° N of Spica
- 3rd 10h Mars 2.7° S of Pleiades
- 5th 07h Mercury 0.3° N of Jupiter
- 5th 14h Moon 5° N of Antares
- 6th 01h Last quarter
- 6th 11h Mercury furthest W of Sun (27°)
- 11th 00h Neptune in conjunction with Sun
- 13th 10h New moon
- 18th 22h Moon 6° S of Pleiades
- 19th 18h Moon 1.9° S of Mars
- 19th 22h Moon 5° N of Aldebaran
- 20th 09:37 Vernal equinox
- 21st 15h First quarter
- 23rd 00h Mars 7° N of Aldebaran
- 23rd 11h Moon 3° S of Pollux
- 24th 10h Moon 2.9° N of Praesepe
- 26th 01h Moon 5° N of Regulus
- 26th 07h Venus in superior conjunction on far side of Sun
- 28th 01h GMT = 02h BST Start of British Summer Time
- 28th 19h Full moon
- 29th 16h Moon 6° N of Spica

This is an extended version, with added diary, of Alan's article published in The Scotsman on February 27 2021, with thanks to the newspaper for permission to republish here.

Meeting report 5th March 2021

March 6, 2021

Categories: Meeting report, News

Robin Hague, Head of Launch, gave a fascinating introduction to 'Skyrora', Edinburgh's local rocket company and described how it is taking a more sustainable approach to rocketry.

Alan Pickup described the highlights of the night sky in March and the opportunities for our imagers to add to the Society's catalogues.

Andrew welcomed everyone to the meeting and talked about the society's '4 Steps to the Stars' outreach programme. Prof. Andy Lawrence then gave a brief overview of his new book 'Losing the Sky', concerning the impact of satellite mega constellations.

Robin Hague talked through the different rockets constructed by Skyrora and the testing and evaluation process the company has undertaken. Great emphasis has been placed on a more sustainable approach by using fuel made from recycled plastics and building a 'Containerised' launch system. We were told the resulting environmental impact of Skyrora's launches is significantly lower than more traditional approaches. With 'Containerisation' they are providing mobility and flexibility to getting to the right launch site with the necessary weather window. Robin also talked through the testing and development process undertaken, from the first and smallest of their rockets to the current engine testing of their largest multistage rocket.

Alan talked us through the main aspects of what the night sky has to offer in March as the nights begin to shorten.

Comet Tales

March 6, 2021

Categories: Meeting report, News



We knew it would be good but it was really quite special, our talk from ASE member Prof. Randall Stevenson on Comet Tales: Thomas Hardy, Literature and Astronomy, 1850 to the Twentieth Century.

The intersection between the arts and science is always an interesting place. The quotes from the newspapers set it firmly in history and made it all come to life. There we also some cleverly chosen quotes from Hardy's novels that helped to capture the essence of the topic, even if you hadn't read them. The images he chose were really atmospheric, capturing the sense of how epic these comets actually were. Links to Charles Piazzi Smyth and Sir James Jeans were also particularly effective for us, especially as we celebrated Piazzi Smyth's bicentenary a couple of years ago, and Jeans was also the first recipient of our [Lorimer Medal](#) in 1936.

*"to set the emotional history of two infinitesimal lives
against the stupendous background of the stellar universe,
and to impart to readers the sentiment that of these
contrasting magnitudes the smaller might be greater to
them as men"*

Thomas Hardy, Two on a Tower

We had a large, international and very engaged audience on our YouTube channel with lots of interesting chat. Mr Comet himself, David H. Levy also turned up and commented: *"This is a priceless hour for me. It touched on the subject of literature, comets, and the night sky which is by far my favourite subject!"* and *"Wonderful, inspiring lecture. Comet at Yell Ham especially moving."*

Other comments:

"I knew this lecture was going to be good, but I didn't expect it to be so good. Thank you prof. Randall"

"My first time. Won't be my last. Thanks so much."

And a little mention of "Comet in Moominland"!

All in all a fantastic talk and evening.

*It bends far over Yell'ham Plain,
And we, from Yell'ham Height,
Stand and regard its fiery train,
So soon to swim from sight.*

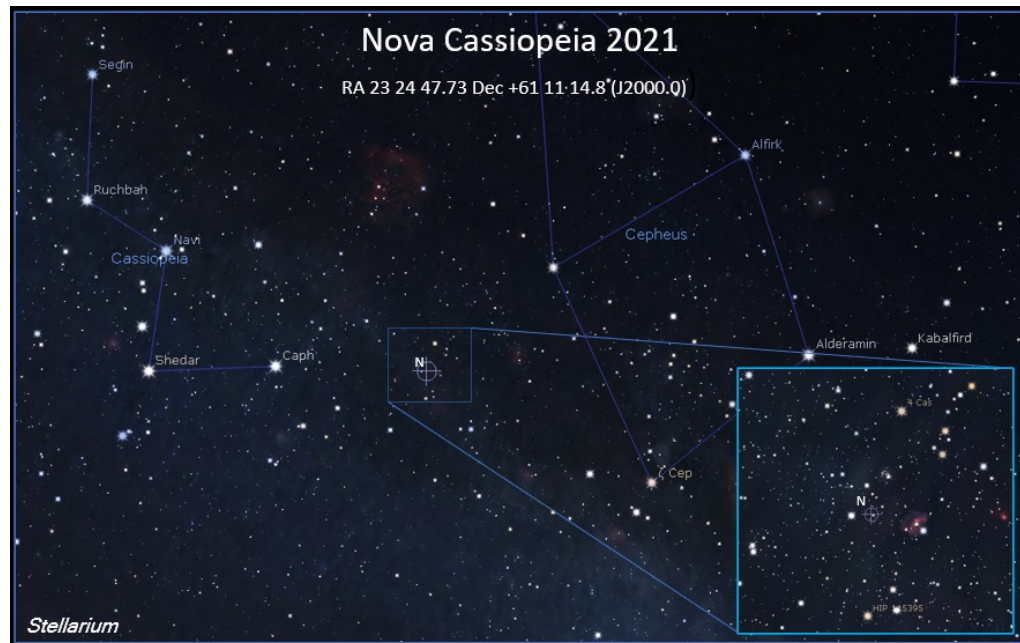
*It will return long years hence, when
As now its strange swift shine
Will fall on Yell'ham; but not then
On that sweet form of thine.*

*The Comet at Valbury or Yell'ham
By Thomas Hardy*

Nova in Cassiopeia

March 0, 2021

Categories: News



Yuji Nakamura (Kameyama, Mie, Japan) has reported the discovery of a possible nova, PNV J23244760+6111140, on March 18.4236. It is relatively bright at mag. 8 and may brighten more so worth a look. Here's a finder chart prepared by Alan Pickup.

Nova Cas 2021 is at RA 23 24 47.73 Dec +61 11 14.8 (J2000.0)

ASE projects

March 1, 2021

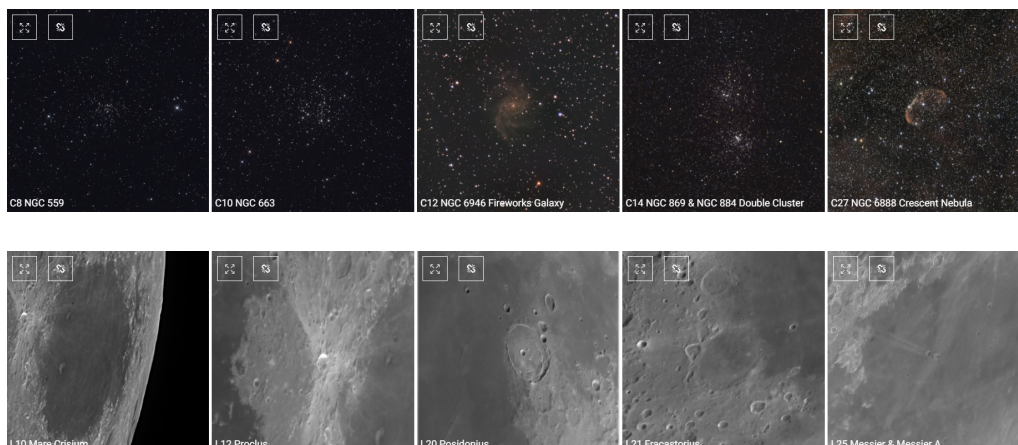
Categories: News



A few months ago, our Imaging & Observing Group started a project – the [ASE Messier Project](#). Our plan is to image or observe (draw) as many of the [Messier catalogue](#) objects as we can.

This has been going well, with 36 out of 110 objects already imaged. We have now added two other projects: The [ASE Caldwell Project](#) – objects from the [Caldwell catalogue](#), and the [ASE Lunar 100 Project](#) – lunar features in the [Lunar 100 catalogue](#).

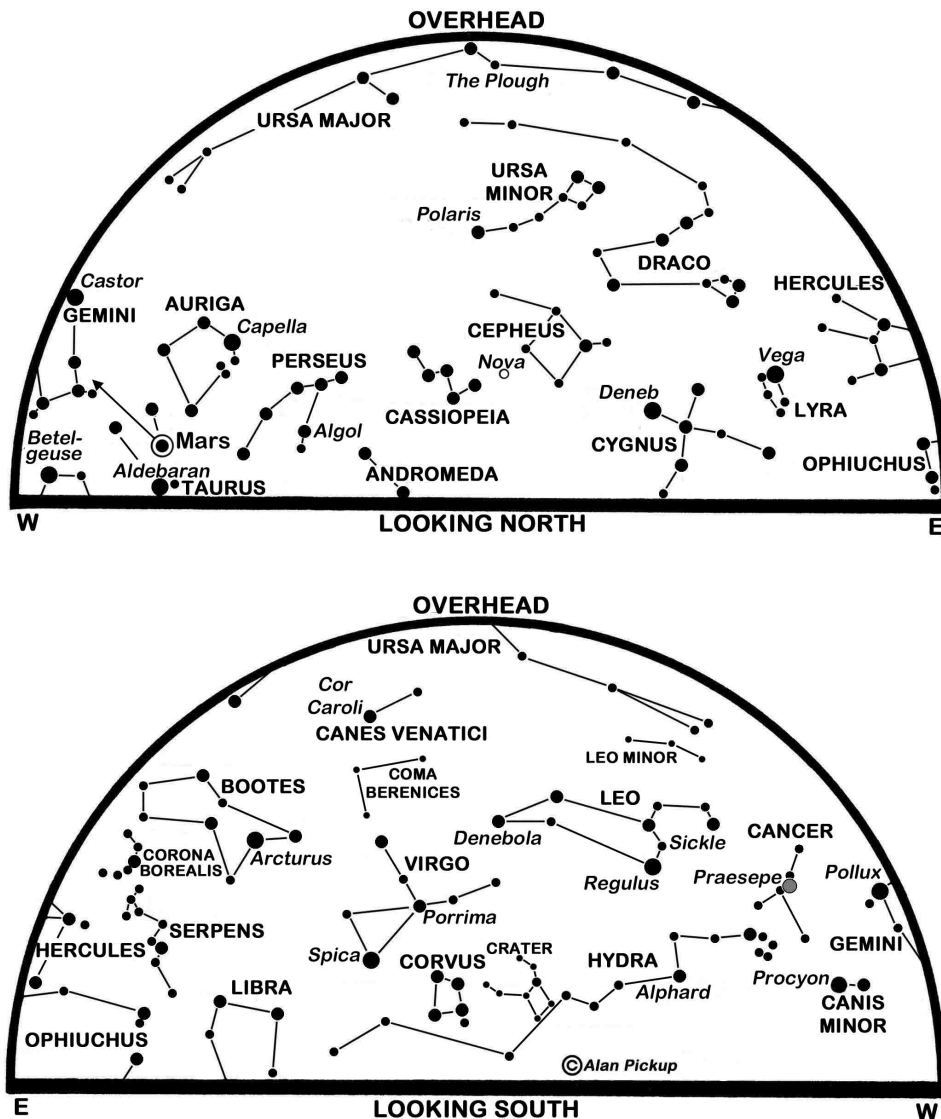
There is a wide range of experience in the Society but everyone is welcome to contribute – all will be used – and hopefully we will all learn together.



Scotland's Sky in April 2021

March 3, 2021

Categories: Sky Diary



Ingenuity helicopter readied for pioneering flight on Mars



Author: [Alan Pickup](#)

The maps show the sky at midnight BST on the 1st, 23:00 on the 16th and 22:00 on 30th. An arrow shows the motion of Mars.

With most of the planets poorly placed for viewing, and with Orion sinking into the western evening twilight, our April night sky might appear disappointing to many. Mars is still there, but it no longer demands attention at nightfall since it is four

times further away and more than thirty times fainter than it was as recently as October.

Our monthly chart represents something of a lull between the spectacular evening constellations of winter and the rich Milky Way patterns of the summer and autumn, typified by the Summer Triangle formed by the bright stars Altair in Aquila, Vega in Lyra and Deneb in Cygnus. The latter two lie in the north-east at our map times and if we watch Vega as it climbs high into the east in the early hours of the 22nd, we should be alert for medium-swift meteors of the Lyrids shower as they diverge from a radiant point close by.

Step outside at nightfall at present, though, and Orion still dominates our lower south-western sky, the three stars of his Belt pointing to the left to Sirius and to the right to Aldebaran in Taurus. Mars, now noticeably dimmer than Aldebaran, lies 10° above it on the 1st before tracking east-north-eastwards between the Bull's horns and onwards to the feet of Gemini by the month's end.

Meanwhile, the planet dims from magnitude 1.3 to 1.6 as its distance grows from 263 million to 302 million km and its tiny disk shrinks below 5 arcseconds in diameter.

On the evening of the 26th, Mars passes only 0.6° (about a Moon's breadth) above-right of M35, a cluster of hundreds of stars at a distance of almost 4,000 light years. M35 is usually easy to see through binoculars, but may be more of a challenge on this occasion since the meeting with Mars occurs in the light of the full Moon.

NASA's engineers have continued checks of their Perseverance rover following its spectacular landing in Mars' Jezero crater on 18 February. It has made its first drives, while its two onboard microphones (the first to reach the planet) relayed the sounds of the Martian wind and the rover's metal wheels crunching across the surface. The rover also carries Ingenuity, a 1.8 kg helicopter which could make the first ever powered, controlled flight on another planet in the coming days, but probably no earlier than the 8th, under the watchful eyes of Perseverance's cameras.

Edinburgh's sunrise/set times change from 06:43/19:51 BST on the 1st to 05:31/20:50 on the 30th. The Moon is at last quarter on the 4th, new on the 12th, at first quarter on the 20th and full on the 27th.

The thin sliver of the young Moon may be glimpsed just above our western horizon in the evening twilight on the 13th while a day later it is impressively earthlit below the Pleiades. It lies between the Pleiades and Aldebaran on the 15th and 3° above-left of Mars on the 17th, having occulted the planet earlier that day as seen from south-eastern Asia.

The Plough looms overhead at our map times, though it is squashed and stretched on our charts. At the same time, the familiar “W” of Cassiopeia is turning counterclockwise below Polaris in the north. A rare binocular-brightness nova or “new star” – actually a temporary and non-destructive outburst of a faint star – was discovered from Japan on 18 March (see chart), peaked at about magnitude 7.6 a day or two later and is fading only very slowly as I write this.

Leo, chasing Cancer into the south-west at the map times, is followed by Virgo and its bright star Spica, the 15th brightest in Earth’s night sky and six ahead of Leo’s leader Regulus. Higher in the south-east, and in third place in the stellar league, is Arcturus in Bootes. We can connect Arcturus to Spica and the fainter Denebola at Leo’s tail to form an asterism that many call the Spring Triangle. Include the still fainter star Cor Caroli in Canes Venatici, the Hunting Dogs, further to the north to construct yet another asterism, the Diamond of Virgo which is known more grandly as the Great Diamond.

The western half of the diamond contains a region sometimes called the Realm of the Galaxies. Here, about 54 million light years away and 10° east of Denebola, is the heart of the Virgo cluster of more than 1,300 galaxies, several of which are visible through small telescopes. One of these, M87, is home to the supermassive black hole whose image was released two years ago this month. The Virgo cluster dominates the much larger Virgo supercluster of galaxies to which the Andromeda Galaxy and our own Milky Way belong. Another supercluster of galaxies has its centre some 300 million light years away in the neighbouring dim constellation of Coma Berenices.

The giant planets Saturn and Jupiter are becoming visible in our predawn sky, but are much better seen from southern latitudes. Forty minutes before sunrise on the 1st, Saturn is magnitude 0.7 and only 4° high in Edinburgh’s south-east while Jupiter is much brighter at magnitude -2.1 but 2° lower still and 12° to Saturn’s left. By the equivalent time on the 30th, they stand 4° higher and, given an unobstructed horizon, should be easy to spot in the brightening twilight.

Venus swept around the Sun's far side on 26 March and is followed by Mercury on the 19th. As they begin to emerge in our evening twilight, Mercury passes 1.3° above-right of Venus on 25th. Thirty minutes after sunset on the 30th, Venus is brilliant at magnitude -3.9 but only 2° high in the west-north-west, while Mercury is 2° higher and magnitude -1.2.

Diary for 2021 April

- 1st 22h Moon 5° N of Antares
- 4th 11h Last quarter
- 12th 04h New moon
- 15th 06h Moon 5° S of Pleiades
- 16th 06h Moon 5° N of Aldebaran
- 17th 13h Moon 0.1° S of Mars
- 19th 03h Mercury in superior conjunction on far side of Sun
- 19th 20h Moon 3° S of Pollux
- 20th 08h First quarter
- 20th 20h Moon 3° N of Praesepe
- 22nd 19h Moon 5° N of Regulus
- 26th 04h Moon 6° N of Spica
- 26th 10h Mercury 1.3° N of Venus
- 27th 05h Full moon
- 29th 08h Moon 5° N of Antares
- 30th 21h Uranus in conjunction with Sun

This is an extended version, with added diary, of Alan's article published in The Scotsman on March 31 2021, with thanks to the newspaper for permission to republish here.

Missions to Near Earth Asteroids & April Sky Report

April 1, 2021

Categories: Meeting report, News



We had another successful meeting with a fantastic talk by Dr John Davies, entitled: Missions to Near Earth Asteroids. This was followed by a very enjoyable talk detailing the Sky in April by ASE member, Ian Smith.

Dr John Davies is an accomplished Astronomer from here in Edinburgh working at the UK Astronomy Technology Centre (UKATC), which was formerly known as the Royal Observatory, Edinburgh. John's talk was a real gem with an in-depth detailed technical description of two current ongoing missions: The Japanese Hayabusa-2, and the American OSIRIS-REx missions, which are both sample return missions to understand the properties and characteristics of some of our Near Earth Asteroids (NEO's).

John introduced us to NEO's, their different classes and how they are formed. They have surprisingly relative short average lifetimes, are being constantly replenished, are not randomly distributed and that they form families separated by such things called Kirkwood Gaps!

We then heard in great detail all about the two sample return missions:

- Hayabusa-2:
Launched in December 2014 and arrived at its target Asteroid 162173, Ryugu which is carbon rich having a diameter of +/-900m.
We learned about the challenges involved, the deployment of all the 'hopping' landers and incredible mechanics and workings which lead to the successful sampling and the subsequent dramatic return of the sample to the Australian desert in 2020.
We heard about the future prospects of this mission, which include flybys of further NEO's and a possible finale of landing on a large building sized asteroid in around 10 years time.
- OSIRIS-REx:
An American NASA mission which stands for: Origins, Spectral Interpretation and Security – Regolith Explorer.
Launched in 2016 and arrived at its target NEO: Asteroid 101955 Bennu, carbon rich with diameter of +/-500m in 2018.
We heard a detailed analysis of the mission and the sampling method is shown with excellent mission photos and video, preparing us to look out for the sample return which is planned to arrive home in September, 2023.

We saw visual proof of Asteroid Ejecta and the probable origin of the Geminid Meteor shower, which John co-discovered after data analysis!

The meeting was rounded off by Ian Smith's Sky in April talk about interesting astronomical observation prospects for April. As well as discussing April's sky maps together with planet and moon observation prospects, a comet pass and an explanation for the origin of the Zodiacal light, both of which may be possible to observe during April. Ian also described 'Galaxy Season', the 'Pink Moon' and World-Wide Astrofest.

This fascinating and enlightening meeting with two terrific talks was viewed from all over the World by our YouTube audience as well as our society members via Zoom. Like all our recorded talks, this is one not to be missed!

Will Joy

Venus Tablets of Ammisaduqa and Scope Talks.

April 0, 2021

Categories: Meeting report, News



We had another excellent talk by ASE member, Dr Bruce Vickery, entitled: Venus Tablets of Ammisaduqa. This was followed by two descriptive ‘scope talks’ detailing equipment and tips by ASE members, Pat Devine and Hugh Somerville.

Bruce’s lecture was a fascinating in-depth analysis of the origin and importance of a famous cuneiform tablet describing astronomical observations of Venus and his attempts to try and help date Babylonian history by its interpretation. Bruce essentially acts like a modern-day astronomical detective and comes up with some surprising conclusions which undoubtedly will be useful and intriguing for archaeologists and historians to engage and develop further.

The ancient clay cuneiform tablet dates to a few thousand years old and was found by archaeologists at the site of the destroyed great ancient library of Ashurbanipal in Ninevah in the middle of the nineteenth century. The importance of the astronomical inscription on the tablet was realised when it was deciphered in 1912 as it could be used to accurately date the Babylonian history of king Ammisduqa, so helping to piece together Babylonian history.

Bruce described the theory and observational constraints of observing Venus, before introducing the Babylonian calendar system, which is based on the Lunar cycle. (This was quite topical, especially as Ramadan had just begun with day one of the Ramadan crescent moon observed a few days before here in Edinburgh!)

We were then drawn into exploring Bruce's modern day sleuthing detective work as he explained how he recreated the ancient Babylonian calendar and combined the ancient Venus tablet observational data. Bruce used data methods derived from Jean Meeus's book: "Astronomical Algorithms" and we were shown how possible success with his dating methods would allow parts of Babylonian history to be correctly dated, showing how astronomy can greatly help archaeologists!

Bruce's renowned expert historical knowledge, combined with this ancient astronomy detective work leads us to hear some very interesting and surprising conclusions. This was a fascinating and intriguing talk and a great one to view.

Two excellent and enjoyable 'Scope talks' then followed:

The first was by ASE member, Pat Devine. Pat introduced us to his 'astrophotography journey', describing how he started and what he decided to buy when looking at software and hardware controllers for his telescope and camera set-up.

Pat described and praised a single hardware package controller which he uses called a 'ZWO ASI AIR'. This is based on Raspberry Pi technology and is a single Wi-Fi multi controller for aligning his telescope and taking photographs. Pat uses his smartphone to control the ASI AIR and so basically all of his telescope set up and has produced many fantastic images, some of which he showed during his talk.

Pat's presentation also had several clear technical presentation slides which are also available to [download as a PDF](#).

The meeting finished with ASE member Hugh Somerville giving the second scope talk. Hugh introduced us to his 'astronomy journey' and described in detail all his equipment. Hugh illustrated his talk with great images which he had taken and importantly showed all his modifications and attachments which he has meticulously made to his telescopes! (I doubt that there are many others who have made as many modifications to their equipment as Hugh!).

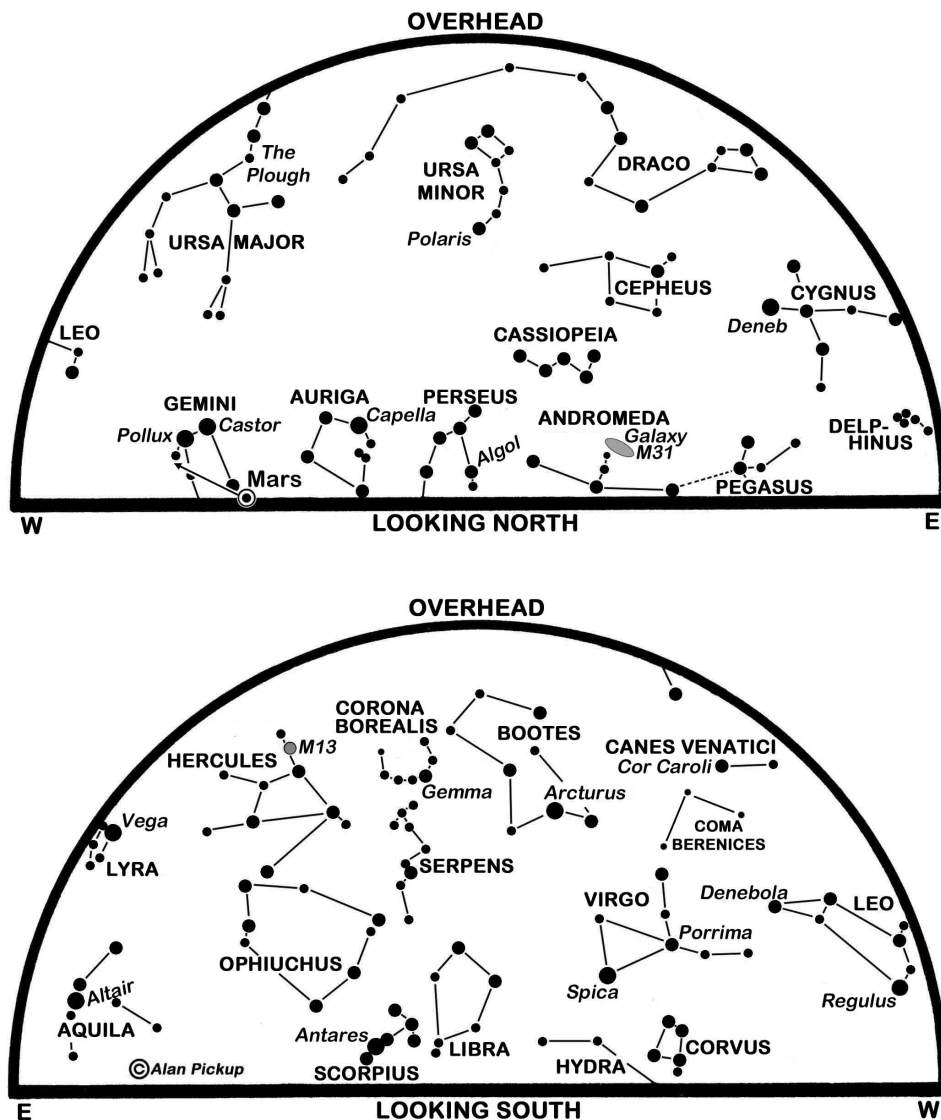
These scope talks were excellent and are the next additions to a number of previous scope talks which have been given by members in the past. These previous talks are available to be viewed from the past meeting section of our website and [YouTube channel](#) and I highly recommend them to gain some great tips, tricks and equipment ideas.

Will Joy

Scotland's Sky in May 2021

April 5, 2021

Categories: Sky Diary



Night skies threatened by growing satellite interference



Author: [Alan Pickup](#)

The maps show the sky at 01:00 BST on the 1st, midnight on the 16th and 23:00 on the 31st. An arrow shows the motion of Mars.

Edinburgh enjoys five hours of effective darkness in the middle of the night as May begins, but this dwindles to nothing by the month's end as the Sun climbs 7° northwards and persistent twilight begins to swamp all bar

the brighter stars. On the plus side, all five naked-eye planets are in view, with four of them emerging from the Sun's glare at present, including the normally-elusive Mercury as it puts on its best evening show of the year.

Spend any time under the stars at this time of year, though, and you are likely to spot one or more earth satellites. Taking just a few minutes to cross the sky, they appear like moving points of light against the stars as they shine by reflecting sunlight. Many are steady in brightness but some, perhaps because they are tumbling or spinning, appear to pulsate or flash. They may also disappear or reappear as they enter or exit the Earth's shadow. That shadow stretches high overhead during most of our winter nights when, except for a few hours around dusk and dawn, few satellites are visible.

For the next few months, though, the shadow is shallow and most satellites passing overhead can still see the Sun even during our midnight hours. The problem for astronomers is that their light and radio emissions can interfere with observations, such as attempts to study the distant universe or scan for potentially hazardous asteroids.

The issue is becoming critical with the launch of multiple satellites such as those forming the Starlink megaconstellation, intended to provide global internet access from an altitude of 550 km. Elon Musk's SpaceX company has approval to launch 12,000 Starlink satellites of which 1,354 were in orbit as of a few days ago.

While the Starlink design has changed to try to limit their brightness, all of them can be visible to the unaided eye. Indeed, a dozen or more Starlinks are likely to be making visible passes across our sky at any one time tonight, outnumbering the other non-Starlink craft. Other satellite megaconstellations are also under construction or planned by nations and companies such as China, Amazon and OneWeb, the latter now part-owned by the UK Government.

Andy Lawrence, the Regius Professor of Astronomy at the University of Edinburgh and Honorary President of our Society, has written a superb non-technical book, "[Losing The Sky](#)", about the burgeoning threat from satellite megaconstellations, why it matters, and what we can do about it.

Mercury, the smallest and innermost planet, stands low in the west-north-west at nightfall, but we need the clear horizon to catch it as it climbs above the more brilliant evening star, Venus. Thirty minutes after sunset on the 1st, Venus shines at magnitude -3.9 but is less than 3° high and best seen through binoculars. Mercury is 5° above-left of Venus and, though it is fainter at magnitude -1.1, is visible for a further hour and is easier in binoculars as the twilight fades.

Mercury should be better still over the following evenings, becoming a naked-eye object as it stands higher and approaches its greatest angular distance of 22° from the Sun on the 17th. By then, Venus is 5° high thirty minutes after sunset, and Mercury is 8° above and to its left but has dimmed to magnitude 0.5. As Venus continues to climb higher, Mercury then falls back towards it, fading sharply to magnitude 2.2 by the time it lies 0.5° (one Moon-breadth) left of Venus on the 28th.

Sunrise/sunset times for Edinburgh change from 05:29/20:52 BST on the 1st to 04:36/21:46 on the 31st. The Moon is at last quarter on the 3rd, new on the 11th, first quarter on the 19th and full on the 26th when it slides through the northernmost part of the Earth's shadow in a total lunar eclipse to be seen around the Pacific Ocean but not at all from Europe.

The slender young Moon is spectacularly earthlit as it reappears low in the west following new moon. It is barely 4% sunlit when it stands 2.7° below Mercury on the 13th and is 14% lit when it lies 4° below-right of Mars two days later.

Mars is the sole planet visible at our map times though we need to look increasingly low to find it in the constellation Gemini whose main stars, Castor and Pollux, stand side by side and almost due west as the evening twilight fades. Mars tracks to the left below them during May, falling between them in brightness as it dims slightly from magnitude 1.6 to 1.7.

As it encounters Mars on the evening of the 15th, watch for the Moon occulting the third magnitude star Mebsuta, or Epsilon Geminorum. Viewed through a telescope from Edinburgh, the star disappears for 21 minutes after it dips behind the Moon's northern edge at 23:36 BST.

Our star charts show the Plough tumbling westwards from the zenith as Leo with its leading star Regulus sink in west. Look for the first

quarter Moon 4° above Regulus on the 19th and midway between Regulus and the famous double star Algieba. The Moon moves on to lie 6° above-left of Spica in Virgo on the 23rd and 5° above-left of Antares in Scorpius on the 26th/26th.

For the final two bright planets we must look to the south-eastern horizon before dawn. This is where Saturn rises at 03:25 on the 1st and two hours earlier by the 31st. Shining at magnitude 0.6, it leads the impressively brighter Jupiter, magnitude -2.3, by some 30 minutes. The Moon lies 7° below-left of Saturn on the 4th and is 5° below the planet before dawn on the 31st.

Around 10° north-east of Jupiter is the radiant point of the Eta-Aquarids meteor shower whose peak is expected on the morning of the 6th. Its swift meteors, actually debris from Halley's Comet, are much better seen from the southern hemisphere.

Diary for 2021 May

Times are BST

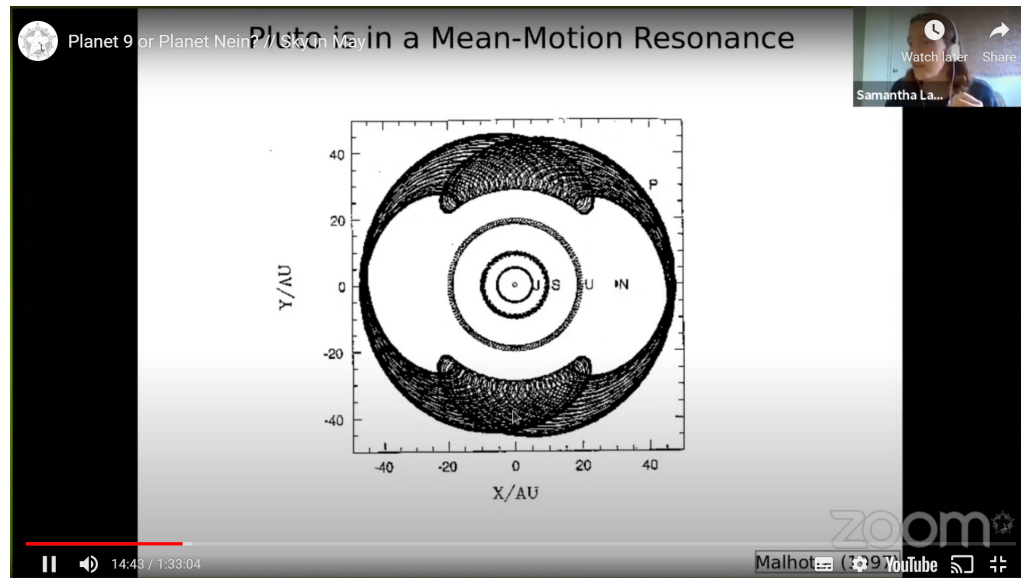
- 3rd 18h Moon 4° S of Saturn
- 3rd 21h Last quarter
- 4th 00h Mercury 2.3° S of Pleiades
- 4th 22h Moon 5° S of Jupiter
- 6th 04h Peak of Eta-Aquarids meteor shower
- 8th 12h Venus 4° S of Pleiades
- 11th 20h New moon
- 12th 23h Moon 0.7° S of Venus
- 13th 13h Moon 2.1° S of Mercury
- 16th 06h Moon 1,5° N of Mars
- 17th 02h Moon 3° S of Pollux
- 17th 07h Mercury furthest E of Sun (22°)
- 18th 00h Venus 6° N of Aldebaran
- 18th 03h Moon 3° N of Praesepe
- 19th 19h Moon 5° N of Regulus
- 19th 20h First quarter
- 23rd 15h Moon 7° N of Spica
- 23rd 21h Saturn stationary (motion reverses from E to W)
- 26th 12h Full moon and total lunar eclipse
- 26th 18h Moon 5° N of Antares
- 29th 07h Mercury 0.4° S of Venus
- 31st 02h Moon 4° S of Saturn

This is an extended version, with added diary, of Alan's article published in The Scotsman on April 30 2021, with thanks to the newspaper for permission to republish here.

Meeting report: “Planet 9 or Planet Nein?” and “Sky in May”

May 0, 2021

Categories: Meeting report, News



We had an excellent talk by Dr Samantha Lawler, entitled: Planet 9 or Planet Nein? Discoveries in the outer Solar System. This was followed by an in depth ‘Sky in May’ presentation by Alan Pickup and then for members only, our president, Andrew Farrow gave a talk on a beautiful old telescope from the society (information available for Members).

Dr Samantha Lawler is from Campion College and the department of physics at the University of Regina in Saskatchewan, Canada. Her research has been analysing outer Solar System bodies found using image data from the large telescopes from the Observatories on the summit of Mauna Kea in Hawaii.

Samantha’s lecture was a detailed and fascinating technical explanation of what astronomers understand about the bodies in our outer Solar System, discussing theories for their formation and their connection to help us understand further about the theory for the formation and position of our major Planets and so called ‘Dwarf planets’ within the Solar System. There was detailed discussion about the ‘elusive’ Planet 9

and how herself and other astronomers have gone about finding these outer solar system objects with associated challenges and difficulties.

We are introduced to Kuiper Belt Objects (KPO's) and Trans Neptunian Objects (TNO's), and given an overview of the original object found and classified as one of these – Pluto. Pluto is described in detail and we are taken on a journey of our understanding of Pluto from its discovery in 1930 to the beautiful World like images showing water ice and Nitrogen ice glaciers from the amazing fly past by the New Horizons probe in 2015.

After explaining why Pluto had its status downgraded to being a 'Dwarf Planet' (due to the finding and analysis of a further KBO – Eris), Samantha introduced us to the vast scale of our Solar and Outer Solar System. We are given an extremely clear understanding of the incredible distances, orbits, and relative positions of our inner Solar System to the far away Kuiper Belt and extremely distant Oort Cloud (which is around half the distance to our next star!).

We were then shown and explained how Planets and planetary bodies exhibit connections such as mean motion resonance. (Interestingly we were reminded of the famous Dr Gladys West who has only recently been accredited for performing the mathematical computations for the determination of the special orbit of Pluto and its mean motion orbit resonance connection with Neptune, which she worked on and calculated back in 1964.)

Samantha then described her own research as part of the Canada – France – Hawaiian team to discover many further TNO's from 'The Outer Solar System Origins Survey' (OSSOS). The survey made 840 TNO discoveries and the vast difficulties and challenges of finding TNO's were discussed with detailed descriptions of her modelling and bias assumptions. Subsequent theories are then shown for the orbits of these outer Solar System Objects, and this includes a number of possible theories for the elusive Planet 9!

The lecture is rounded up by discussing future planned surveys for finding and mapping more TNO's and KBO's, one of which is using the soon to be completed Vera C. Rubin Observatory. This included some very topical discussion on the difficulty for finding these very distant KBO's which have a brightness magnitude of 25 and are therefore 15 million times fainter than a typical SpaceX Starlink Satellite!

(Samantha expressed her passion about preserving our dark skies and we heard that there are currently +/- 1500 SpaceX Starlink satellites in orbit and by the end of 2021, SpaceX will have placed 50 % of all active satellites. We are told that SpaceX has permission for 12,000 satellites and plans to expand to a whopping 42,000! SpaceX is just one commercial company launching satellites and many more companies are soon to come online. Samantha discussed the need for urgent new modern legislation for commercial satellite ventures in space and she warned us about the loss of our beautiful night sky by these ever-increasing bright satellites and their detrimental effect on future astronomy).

All in all, the talk was superb, and, as with many astronomy theories (when looked at in detail), we are left with a feeling of yet again... 'that there is so much out there that we need to still understand!'

Alan Pickup then gave us a very informative and knowledgeable talk on the Night Sky in May which as Alan does, included some real gems of knowledge as he navigated us through the Heavens!

In addition to describing the changing constellations and general ephemeral data for the Sun, moon and planets, Alan described the Eta-Aquarids meteor shower and its origins before describing in detail about the new Nova discovered between Cassiopeia and Cepheus. This is Nova Cassiopeia 2021 and a beautiful image of it was shown as Ian Smith had captured it when imaging the Bubble Nebula.

Alan then wonderfully explained with excellent illustrations how a Nova forms with explanations of Nova light curves. There was again some talk about light polluting satellites and secret military satellites, before an update on Comet ATLAS (C/220 R4) and its possibility to view.

Alan rounded off his talk by focusing on the constellation, Corona Borealis (the northern crown), in which he described two interesting variable stars which it contains: R. Corona Borealis and T. Corona Borealis. It was another excellent talk by Alan, which should not be missed!

Will Joy

Losing the Sky event

May 1, 2021

Categories: News



We've just put out the publicity for a [very special event](#) that we'll be hosting with our Honorary President, Prof. Andy Lawrence about the problems caused by the rapid increase in satellite numbers to astronomers.

"Losing the Sky" is an online live public discussion with Andy Lawrence, Brian Eno, Catherine Heymans, Mark McCaughrean from ESA, Amy Mehlman from Viasat, and many others.

We're very privileged to be hosting this event we expect it to be very important in the fight for recovering our skies from the pollution of the mega-constellations such as Starlink.

For this one, only the invited delegates will join via Zoom and everyone else can watch live on our YouTube channel. We want this event to be seen by as many people as possible so please share it far and wide using whatever channels you can.



YouTube video player 1

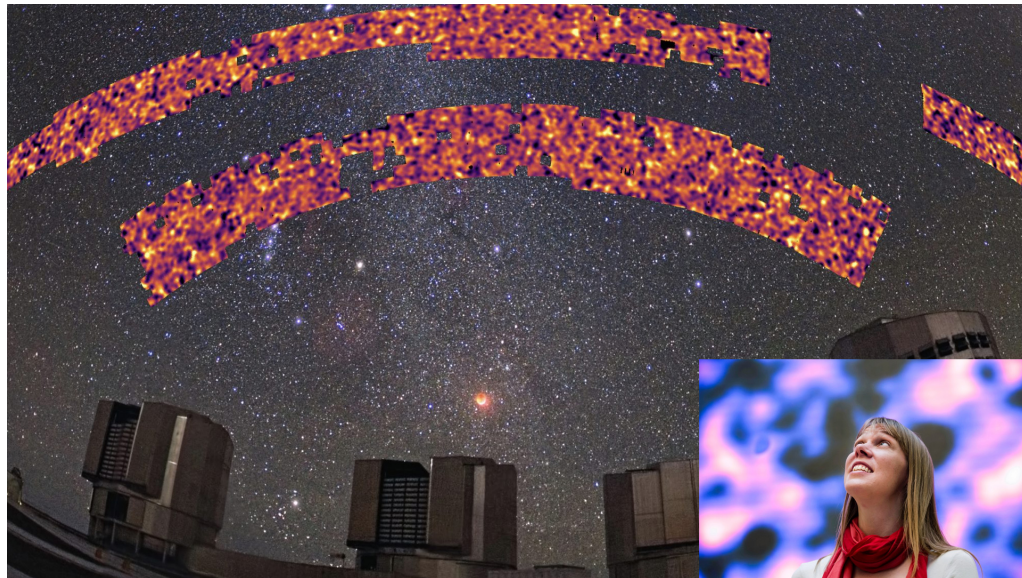
<https://youtube.com/watch?v=ESoM3Noz5zk>



Seeing the Invisible: The Dark Side of the Universe.

May 6, 2021

Categories: Meeting report, News



A major highlight of the year so far, we had an incredible and mind-expanding talk given by Prof. Catherine Heymans: “Seeing the invisible – The Dark Side of the Universe”.

President Andrew Farrow introduced the meeting, welcomed 3 new members and gave a further update on the history of our society’s recently rediscovered Charles Tulley telescope.

He then made a very important announcement, being the first to introduce **Catherine Heymans as the 11th Astronomer Royal for Scotland**.

Catherine’s lecture started with a very brief introduction to the history of the Astronomer Royal for Scotland, before introducing us to the dark side of the Universe! And, wow, what an incredible dynamic and fabulous lecture this was! We were introduced to the two Dark Entities:

- Dark Matter, which is believed to dictate where and when galaxies form.
- Dark Energy, which is believed to cause the expansion of the Universe.

We then learn how difficult it is to see and understand these two dark entities, which are invisible, but incredibly, make up 95 percent of our Universe. Catherine introduced us to 'lensing' and takes us on an incredible interactive fly-through tour of the structure of our Universe made from the Sloan Digital Sky Survey. We hear how her research as part of the Kilo-Degree Survey (KiDS) team (using the European Southern Observatory telescopes at Paranal in Chile) is managing to map the 'invisible' and perhaps explain why our universe has developed in a web like network of galaxies.

Catherine's associated complex simulations derived from her research are breath-taking to hear about and see in virtual animation. We were told about the 'James bond style' detectors which are hoping to detect these elusive dark matter particles and the future plans for better observation. We also are told the most recent 'hot off the press' news on the subject, and that there is a World-Wide scientific race for understanding, which will undoubtedly lead to incredible new discoveries. (Perhaps Einstein's famous theories may be re-written, or completely new physics will be discovered, taking our understanding to a new level).

The lecture was brilliantly articulated, full of fantastic cutting-edge graphics and news, and delivered with gripping enthusiasm! Do not miss this one. Have a wine glass ready and enjoy... Prof. Catherine Heymans' talk is awesome!

- Prof. Catherine Heymans' free online book: [The Dark Universe](#).
- Coursera free online six-week course by Prof. Catherine Heymans and Prof. Andy Lawrence: [AstroTech: The Science and Technology Behind Astronomical Discovery](#).

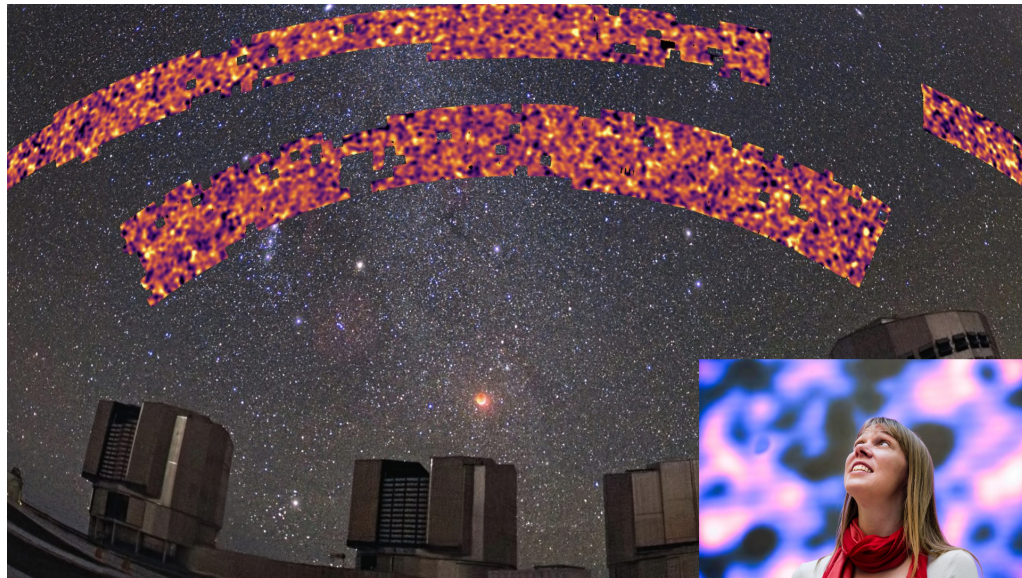
Prof. Catherine Heymans is one of the most important Astronomers in Scotland and her research is based here at the Institute for Astronomy, University of Edinburgh and at the German Centre for Cosmological Lensing, Ruhr-University Bochum.

Will Joy

Catherine Heymans – New Astronomer Royal for Scotland

May 4, 2021

Categories: News



Congratulations to Prof. Catherine Heymans who was today officially announced as the new Astronomer Royal for Scotland and the first woman to hold the post. Catherine is also our new Honorary President.

Catherine kindly allowed us to leak the news at our meeting last Thursday when she gave an amazing talk on [The Dark Side of the Universe](#). She studies the dark matter and dark energy that make up 95% of our universe. We had a very large, international audience following the talk on [YouTube](#) and the chat was really buzzing with interest and questions. A real highlight for us and she really is an enthusiastic and infectious communicator of astronomy.

The news was covered on the [BBC News](#) site and Catherine also gave a great interview on BBC's Woman's Hour. Listen on [BBC Sounds from 30m 50s](#).

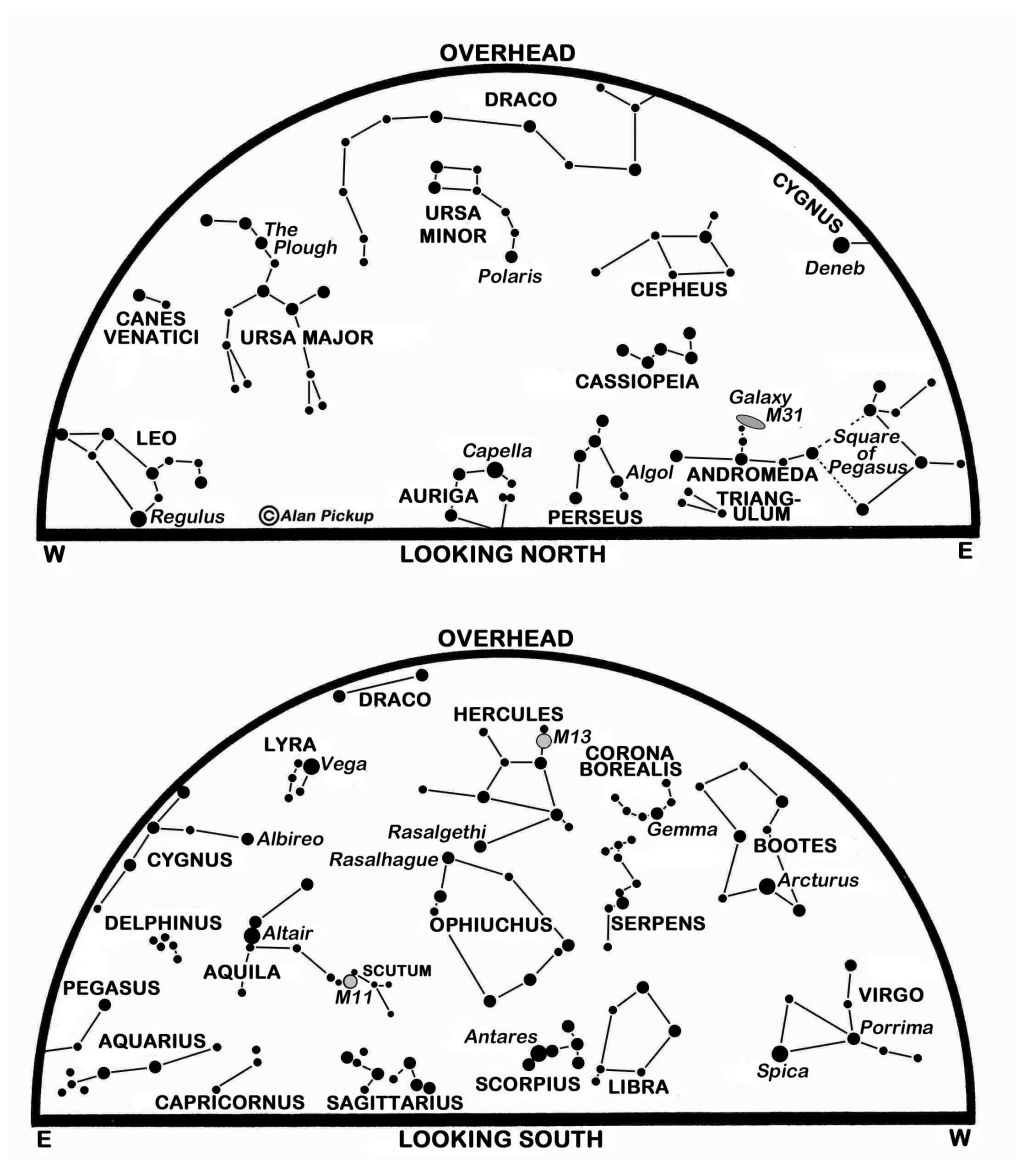
In her role as 11th Astronomer Royal for Scotland, Catherine hopes to be able to put a telescope in every outdoor centre in Scotland so that the young people who visit them will be able to learn about the wonders of our night sky.

She will also be taking part in the [Losing the Sky](#) event that we are hosting on 15 June.

Scotland's Sky in June 2021

May 1, 2021

Categories: Sky Diary



Scotland to enjoy a partial eclipse of the Sun on the 10th



Author: [Alan Pickup](#)

The maps show the sky at 01:00 BST on the 1st, midnight on the 16th and 23:00 on the 30th.

An eclipse of the Sun on the morning of Thursday, the 10th, is Scotland's celestial highlight for June, but the brighter planets are keeping a low profile and our twilit summer nights are far from ideal for stargazing.

Indeed, the night of May 30/31st was the last one until 12 July during which the Sun dipped more than 12° below Edinburgh's northern horizon in the middle of the night and we enjoyed any official nautical darkness. For the next few weeks, then, the twilight is relentless, becoming brighter and more obtrusive the further north we travel.

The Sun itself reaches its most northerly point at 04:32 BST on the 21st, the moment of our summer solstice when the Sun is overhead at the Tropic of Cancer, 23.4° north of the equator. Sunrise/sunset times for Edinburgh, meanwhile, change from 04:35/21:47 BST on the 1st, to 04:26/22:04 on the 21st and 04:31/22:02 on the 30th.

The Moon is at last quarter on the 2nd, new as the eclipse occurs on the 10th, at first quarter on the 18th and full on the 24th. During the eclipse, the centre of the Moon's shadow in space paints a path more than 525 km wide which crosses parts of northern Canada and Greenland and grazes the North Pole on its way to north-eastern Russia. The Moon, though, is too far away in its orbit and appears too small to hide the Sun completely at mid-eclipse. The result is that observers along the path witness an annular eclipse in which a dazzling ring of sunlight, a so-called Ring of Fire, encloses the inky black lunar disk for up to four minutes.

In a zone that stretches as far south as the Mediterranean, observers see a partial eclipse of the Sun as the Moon takes a bite out of the northern part of the Sun's disk. Viewed from Edinburgh, the eclipse begins at 10:08 BST as the Moon touches the upper-right edge of the Sun's disk. Mid-eclipse occurs at 11:18 when the Moon extends across the northern 43% of the Sun's diameter. The event is over when the Moon exits the top-left edge of the Sun at 12:32.

The eclipse is deeper the further north we travel, so from Lerwick in Shetland it lasts from 10:15 until 12:43, with fully 50% of the Sun's diameter hidden at 11:27. From London, though, only 32% is obscured at 11:13.

Remember that observing the Sun directly through any telescope or binoculars, or even with the naked eye, can lead to permanent eye damage. I could fill this note with recommended alternatives, but please check out "safe solar observing" online for yourself.

Of course, solar observing brings us into the realm of observing sunspots. These magnetic solar storms have been rare in recent years as the Sun experienced a lull in its approximately 11-years cycle of

activity. Now, though, there are signs that sunspots are increasing in numbers as they build towards the next solar maximum in, perhaps, 2025.

The brightest star visible at our star map times is Arcturus in Bootes in the middle of our south-western sky though it is only marginally brighter than Vega in Lyra, high in the south-east, and Capella in Auriga low in the north.

Looking in the lower northern sky we should also be alert for noctilucent (or “night-shining”) clouds which can appear anywhere between the north-west and north-east and between, say, one hour after sunset and one hour before sunrise. Caused by ice crystals at altitudes around 82 km, these reflect sunlight to shine with a bluish light long after our all-too-frequent lower-level clouds are in darkness. Noctilucent clouds often occur with a straited or rippled appearance, not dissimilar to cirrus clouds.

In the opposite direction, low in the south, is the pronounced reddish hue of the supergiant star Antares in Scorpius. Ophiuchus the Serpent Bearer and Hercules, the Roman equivalent of the Greek hero Heracles, sprawl above Antares and include several notable star clusters though our twilit June nights are not the best for seeking them out in binoculars. Foremost is the Great Globular Cluster M13 in Hercules. Discovered by Edmond Halley of comet fame, this ball of hundreds of thousands of stars, each more than twice as old as our Sun, lies some 25,000 light years away, a gulf similar to that between us and the centre of our Milky Way galaxy.

Of the planets this month, Venus is brilliant at magnitude -3.9 and stands 10° high in the west-north-west at sunset, setting itself some 90 minutes later. Mars, also low in our western evening twilight but much fainter at magnitude 1.7, tracks from 5° below and left of Pollux in Gemini to stand near the heart of the Praesepe or Beehive star cluster in Cancer on the night of the 23rd.

Look for the slender earthlit Moon almost 7° above-left of Venus at nightfall on the 12th and just 2° above Mars a day later. The Moon lies above-right of Regulus in Leo on the 15th, above Spica in Virgo on the 19th and above Antares on the 22nd.

Saturn and Jupiter rise less than one hour after our map times and stand more than 10° high in the south-east before dawn. Jupiter, in Aquarius and conspicuous at magnitude -2.4, is 7° above-left of the

Moon tomorrow morning while Saturn, fainter at magnitude 0.6 in Capricornus, lies 18° to Jupiter's right and is slightly higher. They have another conjunction with the Moon later in the period, with Saturn above-left of the Moon on the morning of the 27th and Jupiter above the Moon on the 29th.

Diary for 2021 June

Times are BST

- 1st 10h Moon 5° S of Jupiter
- 2nd 08h Last quarter
- 10th 12h New moon and annular solar eclipse
- 11th 02h Mercury in inferior conjunction on near side of Sun
- 12th 08h Moon 1.5° N of Venus
- 13th 08h Moon 3° S of Pollux
- 13th 21h Moon 2.8° N of Mars
- 14th 08h Moon 3° N of Praesepe
- 16th 01h Moon 5° N of Regulus
- 18th 05h First quarter
- 19th 23h Moon 6° N of Spica
- 21st 04:32 Summer solstice
- 21st 06h Jupiter stationary (motion reverses from E to W)
- 23rd 05h Moon 5° N of Antares
- 23rd 20h Mars 0.02° S of Praesepe
- 24th 20h Full moon
- 27th 10h Moon 4° S of Saturn
- 28th 20h Moon 4° S of Jupiter

This is an extended version, with added diary, of Alan's article published in The Scotsman on May 31 2021, with thanks to the newspaper for permission to republish here.

4 June Meeting Report

June 6, 2021

Categories: Meeting report, News



Prof. Petri Vaisanen, Director of the South African Astronomical Observatory gave us a very interesting presentation on the “South African Large Telescope (SALT) and SAAO – responding to astronomy in the 2020s”. This was followed by the Sky in June from ASE member Nigel Goodman and then our AGM for members only.

Petri told us about their current projects and technologies but also their ambitious plans for the future.

You can see the video of the talks on our YouTube channel and on the video in this post.

AGM

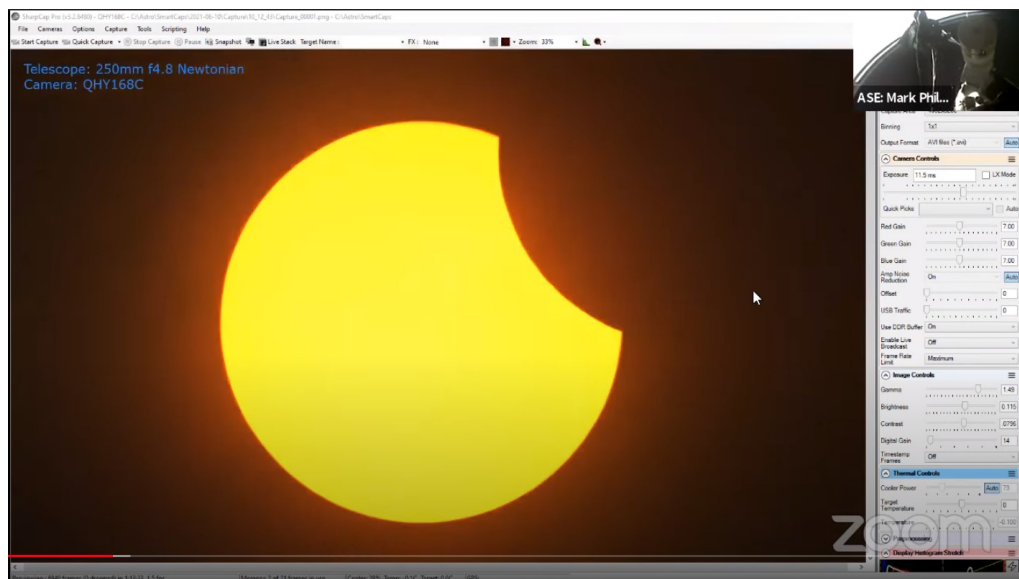
At our Annual General Meeting, Andrew Farrow gave an excellent address, looking back at his 3 years as President. The minutes of the previous AGM were adopted and the Annual Report for 2020 was accepted with a couple of minor typos. The [Annual Report](#) will shortly be posted on our website.

The council for the next session was also elected unopposed and the appointments can be seen on our [About Us page](#). Mark Phillips takes on the role of President and we welcome two new Council members in Sarah Bulman (who will be co-opted from July) and Nigel Goodman.

Partial eclipse live stream

June 5, 2021

Categories: News



The weather wasn't perfect but we saw the partial eclipse of the Sun through the clouds as did almost a 1000 others on our YouTube live stream.

Mark Phillips streamed the eclipse from his observatory on the western edge of Edinburgh and David Small also provided video from Kelso when Edinburgh was clouded out. Lots of activity on Twitter about the event as well as a large audience on YouTube.

ASE members also took some amazing images from Edinburgh and surrounding areas. You can see more of them on our [Flickr group](#) but here are a few of them:

From top, left to right:

Viv Cotton, Alan Pickup, Mike McGovern
Pat Devine, Horst Meyerderks, Peter Black
Nigel Goodman, Jonathan Smith, Will Joy



YouTube video player 1

https://youtube.com/watch?v=45K_4WLnJOY



Losing the Sky meeting report

June 3, 2021

Categories: Featured, Meeting report, News



What a fantastic set of panellists we had for the Losing the Sky event last night. The talk was very wide-ranging and covered just about all the issues associated with the problem of mega-constellations and the pollution of the night sky. Watch the video if you missed it. You won't find a better overview of the topic.

[Read the Zoom chat between participants from the event »](#)

Panellists and areas covered included:

Part I: Astronomical Science: Why are Astronomers worried?

Chair: Mark McCaughrean (European Space Agency)

Panelist-1: Meredith Rawls (Univ. Washington, Seattle)

Panelist-2: Sam Lawler (Univ. Regina, Saskatchewan, Canada)

Panelist-3: Michael Kramer (Max Planck Inst. for Radio Astronomy, Bonn)

Part II: Connecting the world: why are space companies building huge constellations?

Chair: Catherine Heymans (Univ. Edinburgh)

Panelist-1: Ruth Pritchard-Kelly (Oneweb)

Panelist-2: Amy Mehlman (Viasat)

Part III: Environment and Culture: What is our right to the sky? Should we care?

Chair: Jarita Holbrook (Univ. Edinburgh)

Panelist-1: Timiebi Aganaba (Arizona State University)

Panelist-2: Brian Eno (Musician and environmental campaigner)

Panelist-3: Aparna Venkatesan (University of San Francisco)

Part IV: Space Junk: Does the growth of space debris really threaten everybody's use of space?

Chair: Jonathan McDowell (Harvard-Smithsonian Center for Astrophysics)

Panelist-1: Moriba Jah (Univ. Texas at Austin)

Panelist-2: Alan Thompson (Skyrora)

Panelist-3: Hugh Lewis (Univ. Southampton)

Part V: Space Law: who has the say on who is allowed to do what, and should it change?

Chair: Katherine Courtney (KCourtney Business Innovation and Strategy)

Panelist-1: Chris Newman (Univ. Northumbria)

Panelist-2: Stefano Gallozzi (Italian National Institute of Astrophysics)

Panelist-3: Brian Weeden (Secure World Foundation)

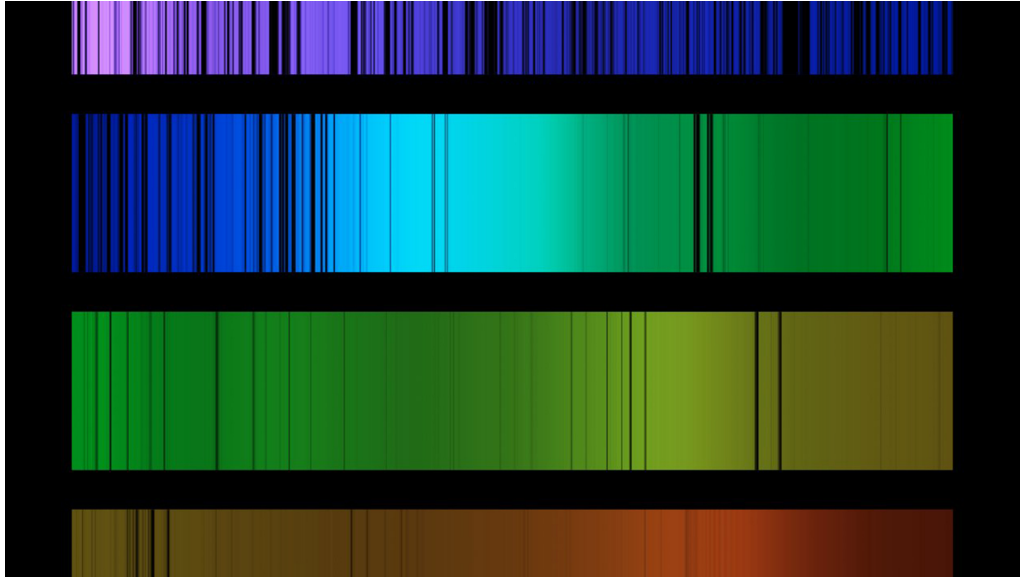
Panelist-4: Niklas Hedman (United Nations Office of Outer Space Affairs)

For more information see [Andy Lawrence's website](#).

Spectroscopy – a practical approach for amateurs meeting report

June 0, 2021

Categories: News



Our new president, Mark Phillips introduced the evening's event, in which we had a truly tremendous talk, given by Tom Field, with his lecture entitled: Spectroscopy – a practical approach for amateurs.

Tom introduced us to the principles, history and importance of Spectroscopy before discussing his journey from his very first image taken of Vega from a light polluted city to what essentially one can do as a back yard astronomer with basic equipment, to image and produce essentially the 'elemental bar codes of stars and space bodies!'

- We were introduced from basics to the theory and history of Spectroscopy, explaining absorption line and emission line spectra and focusing on the true greats of Bunsen and Kirchoff. (Tom also highlighted some of the lesser-known heroines and heroes of the science!)
- We were shown the 'periodic table of Spectra' and learned about how basic the equipment can be, with associated cost and what incredible results can be obtained by amateurs!
- Tom focused on the 'Star Analyser 100' spectroscopy grating and associated software which allows the image spectrums produced to be able to be converted into 'Bar Code style' graphical format

with elemental properties being identified, by software referencing to Bunsen's updated spectral catalogue.

In addition to being able to produce the elemental fingerprints of stars and other astronomical bodies, Tom showed us how amateur 'back yard' astronomers have been able to image and identify everything from the existence of methane on Uranus and Neptune to incredibly being able to calculate the speed of the expanding shell of a Supernova... And, Wow, all of these and more have been done by amateur back yard astronomers, using basic and relatively inexpensive equipment! (A very interesting fact is that light pollution has little effect on image spectroscopy, meaning that image spectroscopy can be undertaken from the centres of cities, etc.)

Tom delivered this lecture with huge enthusiasm which is second to none! If you want to know about spectroscopy and if you want to know how you can be able to do Astronomical Spectroscopy Imaging, then this lecture is an absolute must to view!

Finally, from Tom's own words: "The more we understand about what we are observing, the more interesting that visual observation is!"

Tom Field is a Contributing Editor at Sky & Telescope Magazine, is a software designer with a passion for spectroscopy and its associated imaging. He is the author of the RSpec software which received the S&T "Hot Product" award in 2011. Tom has spoken to hundreds of clubs via the web and in-person at many conferences in the USA and he joined us LIVE from Seattle.

Tom's website link is: rspec-astro.com and is highly recommended.

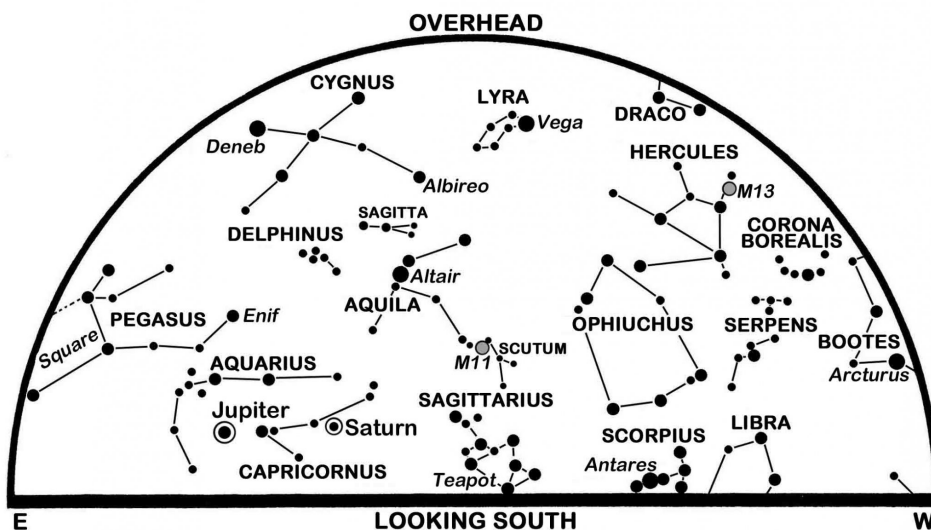
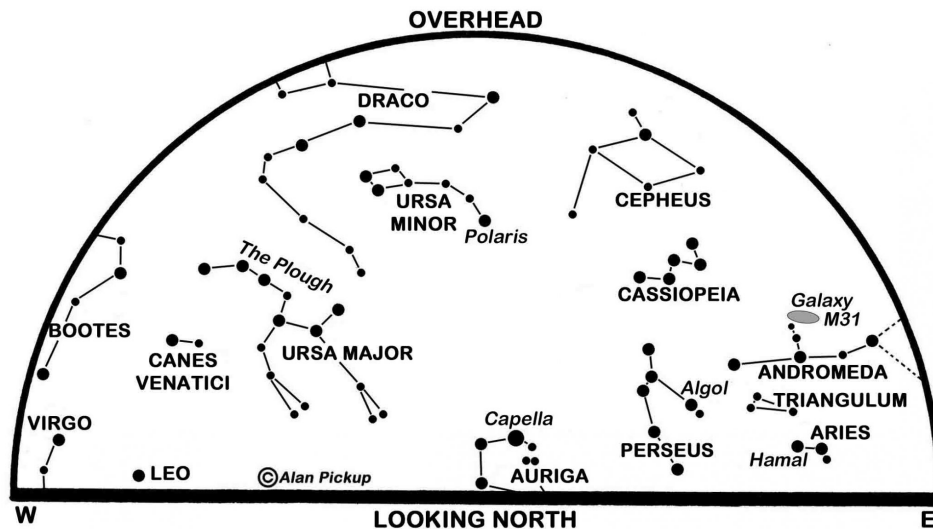
Recommended book: Spectral Analysis for Amateur Astronomers by Richard Walker.

Will Joy

Scotland's Sky in July 2021

June 3, 2021

Categories: Sky Diary



Giant planets return to evenings as summer twilight subsides



Author: [Alan Pickup](#)

The maps show the sky at 01:00 BST on the 1st, midnight on the 16th and 23:00 on the 31st.

The Sun is furthest away for the year when the Earth stands 152.1 million km from it at aphelion on the 5th, some 5 million km further than we were at perihelion in January. The Sun has already turned southwards, so we can look forward to the return of darker nights over Scotland. At

present, though, twilight persists even during Edinburgh's two darkest hours which tonight commence at 00:17 BST.

Gleaming through the gloaming, though, we can still expect to see those high-altitude noctilucent or night-shining clouds that I mentioned here last time. Usually appearing as tenuous, cirrus-like bluish wisps, they are high enough to catch and reflect the Sun's light when normal lower-level clouds are in darkness during the night. Normally we sight them low down in the northern part of our sky, but there have been outbreaks over recent weeks that have extended over the whole of the UK and southwards into France.

They form after ice crystals condense around dusty particles in the upper atmosphere, but the origin of those particles is far from clear – are they the dust from meteors, or volcanoes, or man-made pollution? One surprising fact is that there seem to be no confirmed records of them prior to 1885.

The sunrise/sunset times this month change from 04:32/22:01 BST on the 1st to 05:15/21:22 on the 31st. By the month's end, the Sun is sweeping more than 12° below our northern horizon in the middle of the night so we can anticipate almost four hours of effective darkness. Meanwhile, the Moon reaches last quarter tomorrow, is new on the 10th, at first quarter on the 17th, full on the 24th and back at last quarter on the 31st.

Our charts show Auriga's bright star Capella low in the north, roughly in the favoured direction for noctilucent clouds. It rivals Vega in Lyra, a little south of overhead, while both are surpassed only marginally by Arcturus in Bootes which is declining in the west. Vega completes the celebrated Summer Triangle with Deneb in Cygnus, very high in the east, and Altair in Aquila in the heart of our south-south-eastern sky.

The largest planets, Saturn and Jupiter, now rise before midnight BST to be prominent in our lower south-eastern sky at our map times where the bright Moon lies below-left of Saturn on the 24th and below-right of Jupiter on the 25th.

Jupiter outshines every star in the sky and brightens a little this month from magnitude -2.6 to -2.8 as it creeps more than 2° (four Moon-widths) westwards against the stars of Aquarius.

Also edging westwards, and due at opposition in Capricornus on 2 August, is Saturn which is fainter at magnitude 0.4 to 0.2. It lies some

20° west (right) of Jupiter and can also be found by extending a line from Vega through Altair.

Both Jupiter and Saturn are excellent telescopic targets. Jupiter's disk is 47 arcseconds wide at midmonth, its light and dark cloud bands running parallel to its equator and bearing spots and streaks that betray the planet's rapid rotation in under ten hours. Stable binoculars are all we need to spy its four main moons as they change their configuration on either side of the disk from night to night.

Several moons of Saturn may be glimpsed telescopically, but here the main attraction is the superb ring system. In mid-July, this spans 42 arcseconds around the 18 arcsecond disk and has its north face tipped at 18° towards the Earth.

The other bright planets may be a struggle for observers in Scotland. The most brilliant, Venus at magnitude -3.9, hovers low in our bright evening twilight where its position at sunset changes from almost 10° high in the west-north-west on the 1st to 8° in the west on the 31st. Setting little more than one hour later, it may be elusive unless our horizon is clear. Mars lies 7° left of Venus on the 1st and only 0.5° below Venus on the 13th, but at magnitude 1.8 is too dim for naked-eye visibility in the twilight. The young earthlit Moon stands 5° above-left of the pair on the 12th.

Mercury rises in the north-east more than 75 minutes before the Sun from the 8th to the 20th and might just be glimpsed through binoculars between these dates as it brightens from magnitude 0.1 to -1.1. The incredibly thin crescent of the waning Moon stands just 3° above-left of Mercury on the 8th.

The binocular-brightness nova that erupted in Cassiopeia in March continues to surprise observers by remaining visible near its discovery brightness instead of fading rapidly. Indeed, during May it rose to better than magnitude 5.5 so that it was briefly a naked-eye object. A different nova flared in the south-eastern corner of the constellation Hercules on 12 June and quickly attained a peak magnitude of 6.4, visible easily through binoculars. As most novae do, though, this one has dimmed sharply and is probably a telescopic object around the 12th magnitude as you read this.

Finally, astronomers have spotted what may be the largest comet ever seen. The nucleus of Comet C/2014 UN271 (Bernardinelli-Bernstein) may be 100 km wide, making it perhaps a thousand times larger than

Comet Halley's icy core. Approaching from a distance of more than half a light year, it apparently originated within the Oort Cloud of icy bodies at the far edge of our solar system. Currently 3 billion km away, as distant as Uranus, it already appears comet-like with a surrounding hazy cloud or coma. Perihelion, its closest point to the Sun, is not due until January 2031 when it lies at 1.6 billion km, just outside Saturn's orbit, but may still be a dim telescopic object.

Diary for 2021 July

Times are BST

- 1st 22h Last quarter
- 3rd 09h Venus 0.4° N of Praesepe
- 4th 21h Mercury furthest W of Sun (22°)
- 5th 23h Earth furthest from Sun (152,100,527 km)
- 8th 06h Moon 4° N of Mercury
- 10th 02h New moon
- 12th 10h Moon 3° N of Venus
- 13th 01h Mars furthest from Sun (249m km)
- 13th 07h Moon 5° N of Regulus
- 13th 08h Venus 0.5° N of Mars
- 17th 06h Moon 6° N of Spica
- 17th 11h First quarter
- 20th 14h Moon 5° N of Antares
- 21st 20h Venus 1.2° N of Regulus
- 24th 04h Full moon
- 24th 18h Moon 4° S of Saturn
- 26th 02h Moon 4° S of Jupiter
- 29th 17h Mars 0.7° N of Regulus
- 31st 14h Last quarter

This is an extended version, with added diary, of Alan's article published in The Scotsman on June 30 2021, with thanks to the newspaper for permission to republish here.