



December 2021 EDITION

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Editorial

Welcome to the December edition of Janus. There is no lecture this month, only the AGM - to be held as a "hybrid" meeting with the option to attend either in person or via Zoom.

For comet watchers, there is the potential to view C/2021 A1 (Leonard). First discovered in January 2021, it has become progressively brighter, and will be at its closest to earth on 12th December. The comet has a hyperbolic trajectory, which means that it will cross the Solar System only once, before moving far away from us, never to return. So, this will be the only opportunity to see it! There is a piece about this comet later in this edition.

Anyone concerned about the space environment must be dismayed at the 15th November Russian test of an anti-satellite (ASAT) weapon which destroyed one of their own defunct satellites. Cosmos 1408, launched in 1982, weighed 1,750 kg. It is now a field of at least 1,500 trackable pieces of debris in low orbit, threatening space operations and human spaceflight.

Speaking of concerns, following the sudden release of a clamp band during integration of the James Webb Space Telescope (JWST) with its Ariane 5 rocket at Kourou, French Guiana, NASA engineers were forced to carry out a detailed inspection to ensure that JWST had not been damaged. All was found to be well, and it is scheduled for launch on 22nd December, providing a long overdue replacement for Hubble which has served the astronomy community well for over 30 years.

Finally, there have been many superb images circulating on the WhatsApp Group. It would be nice to include some in Janus. I'd be very happy to receive them!

John



The Solar System December

MERCURY: recently passed behind the Sun at superior solar conjunction. It begins the month not readily observable since it is very close to the Sun, at a separation of only 1° from it. It remains difficult to observe throughout the month.

VENUS: begins the month visible as an evening object, having recently passed greatest elongation E. Becoming visible around 16:21, 11° above the S horizon, as dusk fades to darkness, it will then sink towards the horizon, setting 2 hours and 34 minutes after the Sun at 18:31. By the end of the month, it will soon pass in front of the Sun at inferior solar conjunction. It will be difficult to observe as it will reach its highest point in the sky during daytime and be no higher than 6° above the horizon at dusk.

MARS: has recently passed behind the Sun at solar conjunction. Throughout the month, it will be difficult to see, reaching its highest point in the sky during daytime. At the beginning of the month, it will be no higher than 3° above the horizon at dawn and at the end of the month will still be no higher than 6° above the horizon at dawn.

JUPITER: begins the month as an early evening object, receding into evening twilight. Visible in the evening sky, it will become accessible around 16:21, 23° above the S horizon, as dusk fades to darkness. It will then reach its highest point in the sky at 17:11, 24° above the S horizon, and will continue to be observable until around 20:59, when it sinks below 7° above the SW horizon. By the end of the month, it will soon pass behind the Sun at solar conjunction. It will become visible around 16:26, 25° above the S horizon, as dusk fades to darkness and will then sink towards the horizon, setting at 20:33.

SATURN: like Jupiter is currently an early evening object. It begins becoming visible

around 16:45, 19° above the S horizon, as dusk fades to darkness. It will then sink towards the horizon, setting at 20:27. By the end of the month, it will soon pass behind the Sun at solar conjunction, and will become visible around 16:50, 13° above the SW horizon, as dusk fades to darkness. It will then sink towards the horizon, setting 2 hours and 44 minutes after the Sun at 18:46.

URANUS: recently passed opposition and begins the month visible in the evening sky, becoming accessible around 17:25, 25° above the E horizon, as dusk fades to darkness. It will then reach its highest point in the sky at 21:54, 53° above the S horizon, and will continue to be observable until around 02:51, when it sinks below 21° above the W horizon. By the end of the month, it is an early evening object, receding into evening twilight. Visible in the evening sky, it will become accessible around 17:34, 43° above the SE horizon, as dusk fades to darkness. It will then reach its highest point in the sky at 19:52, 53° above the S horizon., and will continue to be observable until around 00:48, when it sinks below 21° above the W horizon.

NEPTUNE: is currently an early evening object, receding into evening twilight. It begins the month becoming accessible around 17:25, 31° above the SE horizon, as dusk fades to darkness, and will then reach its highest point in the sky at 18:44, 33° above the S horizon. It will continue to be observable until around 21:43, when it sinks below 22° above the SW horizon. By the end of the month, it will become visible around 17:34, 32° above the S horizon, as dusk fades to darkness. It will then sink towards the horizon, setting at 22:25.

MOON PHASES:

Last Quarter	27 Oct
New Moon	4 Dec
First Quarter	11 Dec
Full Moon	19 Dec
Last Quarter	27 Dec

Notable Events:

Observation of some of these events may require a telescope, although some will be visible with the naked eye. More information at <https://in-the-sky.org>

December

- 1 Neptune ends retrograde motion and returns to its usual eastward motion after opposition.
- 6 December ϕ -Cassiopeid meteor shower 2021
- 7 Conjunction of the Moon and Venus
Venus at greatest brightness
- 8 Conjunction of the Moon and Saturn
- 9 Monocerotid meteor shower 2021
Conjunction of the Moon and Jupiter
- 10 Asteroid 44 Nysa at opposition
- 12 σ -Hydrid meteor shower 2021
C/2021 A1 (Leonard) at perigee
- 13 Venus at highest altitude and well [placed in the evening sky
- 14 Geminid meteor shower 2021
- 16 Comae Berenicid meteor shower 2021
- 19 December Leonis Minorid meteor shower 2021
- 22 Ursid meteor shower 2021

Collected Observations (and thoughts) – Gary Walker

Comet 67P - 2 Nov

On the nights of 31st October and 1st November, I finally managed to see the Comet 67P in my scope! I had been trying without success to see it since early October. Naturally, the comet appeared as a dim fuzz ball, and was situated in the constellation of Gemini, at this time.

This comet is Churyumov-Gerasimemko, (try saying that when you're drunk, or even if you're not!), but it is (not surprisingly) known by the easier term of Comet 67P!

This, seemingly underwhelming comet has a special place in astronomy, as it was the one visited by the ROSETTA probe, which orbited it, before dispatching the lander, Philae onto the surface of its nucleus in late 2014. It is the 39th comet that I have seen.

This year's appearance of the comet is the next orbit of it since then, as it has a short orbit of only 6.45 years.

Venus - 2 Nov

Venus has been particularly difficult to see this year, as it has remained at a low altitude and has been setting soon after the Sun.

However, on 1st November, I found and observed it in the late afternoon. It was extremely low in the South, virtually "scraping" the hedge line of my view to the South.

It appeared as a half phase, but it all speeds up towards the end of the year when it becomes a large crescent, as it approaches Inferior Conjunction! In doing so, it becomes much larger and thinner.

Venus - 17 Nov

I saw Venus again in the afternoon of 17th November, and it had changed significantly since my previous observation on 1st November. It was now at crescent phase, being just under 40% phase. It was still very low down in the South, in line with the Sun, but still widely separated from it, as Venus was in the SSE, whilst the Sun was in the SW.

From now ongoing into December, the best time for viewing Venus is coming, as its angular size increases dramatically, just as it turns into a beautiful, thin crescent.

The Sun has been fairly active lately, with sunspots now present most of the time.

Astronomy in Coronation Street! - 24 Nov

On 24th November, an episode of Coronation Street showed the young boy, Sam, with his refractor telescope, looking through it and seeing a Leonid meteor streaking through the field of view. This, of course, is total nonsense, as you would never use a telescope to observe a meteor shower! This is because meteors are too fast, and the field of view of any scope is far too small to be used in this way. Even the lowest power eyepiece only gives a view of half a degree, and maybe 1-2 degrees in wide-angle eyepieces!

Even binoculars would not be very helpful, although they can have a field of about 5 degrees or so. Indeed, one's own naked eyes are the best way of seeing a meteor

shower, as one's personal field of view is very wide, and covers many degrees - as much as 180 degrees, or so, at any one time!

Also, observing from a balcony in the heavily light-polluted skies of Manchester would be even more problematic.

Unfortunately, I have seen other soaps imagining that one can use telescopes for meteor or UFO watching. Some years ago, another astronomer, Curly Watts, also in this soap, "bought" a star and named it after his girlfriend - lo and behold, they (and us!) could see the star shining brightly over Coronation Street!

However, some of the astronomy in this episode was accurate, in that Sam said that the Leonards were past their peak now, and George, the undertaker, said about Meteor Crater being about 50,000 years old!

So, occasionally, one can be gratified by accurate astronomical information in TV soaps, and other media, but all too often, the amateur astronomer will be wincing when seeing some totally inaccurate information being shown!

November EAS talk by John Axtell on Sputnik

On 12th November, John Axtell gave what must be one of the most unique lectures in the history of Ewell Astronomical Society.

There was a physical attendance of about 21 people at this meeting, but it was still a "hybrid" meeting with some attending in person, whilst others watched by Zoom.

The subject was "Sputnik in Context" and, indeed, he put Sputnik in the context of this whole era of the late 1950's, when the Space Race had not even got underway, and how the Russians outfoxed the Americans, at this time!

Unfortunately, computer problems stopped him showing some sound effects, but he still managed to gamely carry on with the lecture.

One of the most entertaining things about his lecture was his extensive use of "props", at times, for example flinging some Frisbees across the room! He also gave out pieces of

Bubble Wrap for people to pop. Later, in his Grand Finale, he sang "A Russian Love Song", produced by the Goons in 1957. He sang, (and played!) all the characters in this song, wearing a Russian fur hat (for the Russians), an ARP hat, a policeman's helmet, a Union Jack hat, a Union Jack, and an American flag!



Of course, in 1957, Patrick Moore had only just started his long-running TV programme "The Sky at Night", just six months prior to Sputnik's launch. Also, at this time, the Ewell Astronomical Society did not yet exist (neither, come to think of it, did I!), as it was still 9 years before it came into being.

The launch of Sputnik was one big boost for the Sky at Night series as, suddenly, space

travel was happening for real, and it was Big News! Without it, the Sky at Night might have foundered. It also benefitted others - as John Axtell pointed out, the Jodrell Bank Telescope was about the only instrument that could track Sputnik, so Sputnik was also a big boost for Jodrell Bank and Bernard Lovell, as they were suddenly very important (beforehand, it had been seen as a waste of money by many). How fickle the general public and the Media were (and still are)!

With the start of the Space Race, and especially the Apollo Missions, "The Sky at Night" really took off, and went from strength to strength, with Patrick broadcasting not only on this, but on the News, coverage of the Apollo Missions. I noted that John also included a photo of "The Race into Space" Book Bond Tea cards - I was also collecting those in the early 1970's!

Latest Observations - 26 Nov

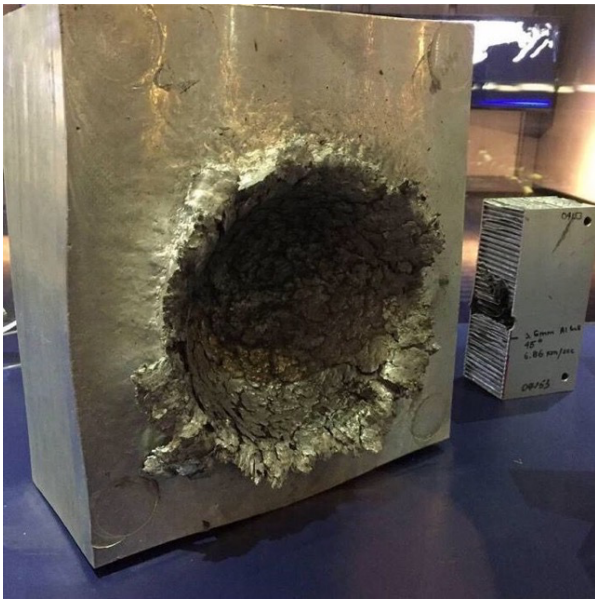
I could still see Comet 67p in mid-late November and, although still relatively dim (probably at about magnitude 9, or so), it was brighter than earlier on. It was still not far, from the star, Pollux, in Gemini.

The V1405 Nova Cass was still visible in late November and was about magnitude 9 (roughly the same magnitude that it was when it was originally discovered on 18th March this year - over 8 months ago!).

Is it now finally fading back into obscurity after all its multiple flare-ups? I suppose that this is a classic case of "Watch This Space"!

Also, in late November, a total of three bright planets were visible in the early evening sky - Venus at furthest West, but still the brightest, with Saturn, some degrees to the East, followed up by Jupiter, even further Eastward.

How damaging can a piece of plastic be in space? - John Davey



Credit: Dharmik Baraiya, Maharaja Sayajirao University

This image shows in spectacular fashion what happens to aluminium when impacted by a 14gm piece of plastic travelling at 24,000 km/hr (6.7 km/sec) in the near vacuum of space.

The velocity of a satellite in low earth orbit is about 7 km/sec. Depending on the direction of travel of a piece of space debris, its closing speed with a satellite could be up to twice this figure.

So how foolhardy was the recent Russian ASAT test which generated a field of at least 1,500 trackable pieces of debris in low orbit (and many more, smaller, untrackable pieces) threatening space operations and human spaceflight??

Comet Leonard: Meet the “Christmas Comet”! - John Davey



Comet Leonard, discovered at the beginning of 2021, will get closest to the Earth this December – hence the nickname “Christmas comet”.

What is Comet Leonard?

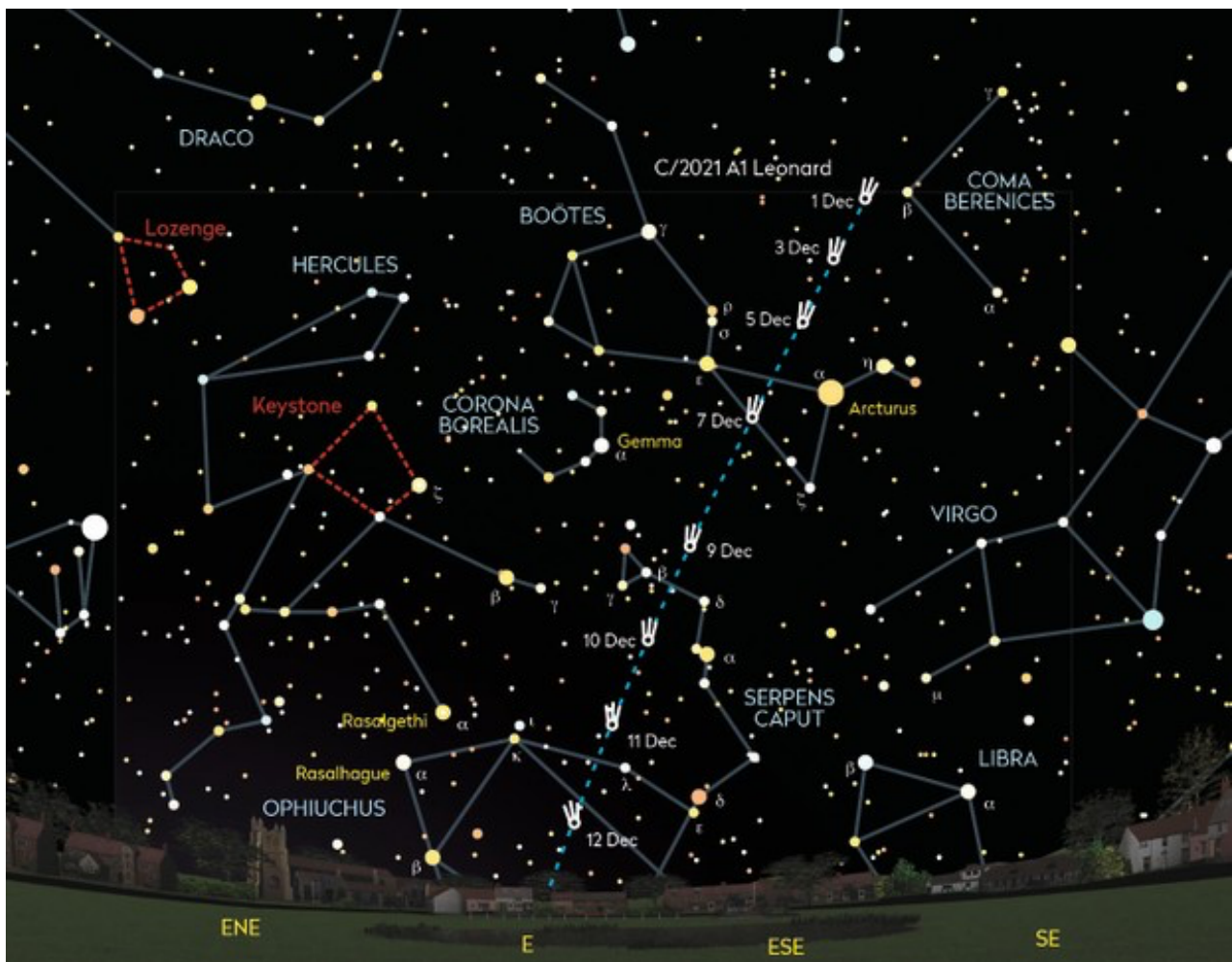
On 3rd January 2021, American astronomer Gregory J. Leonard discovered a new comet at the Mount Lemmon Observatory in Arizona, USA. It was named C/2021 A1 (Leonard) – the letter “C” means “non-periodic comet”, and “2021 A1” indicates that it was the first comet discovered in the first half of January 2021.

Perhaps the most notable feature of Comet Leonard is its incredible speed – at about 70 km/s, this is 6 km/s faster than last year's comet NEOWISE. Due to its speed, the comet's position in the sky will be changing every day when observed from the Earth.

Comet Leonard has a hyperbolic trajectory, which means that it will cross the Solar System only once, before moving far away from us, never to return. So, this will be the only chance to see it.

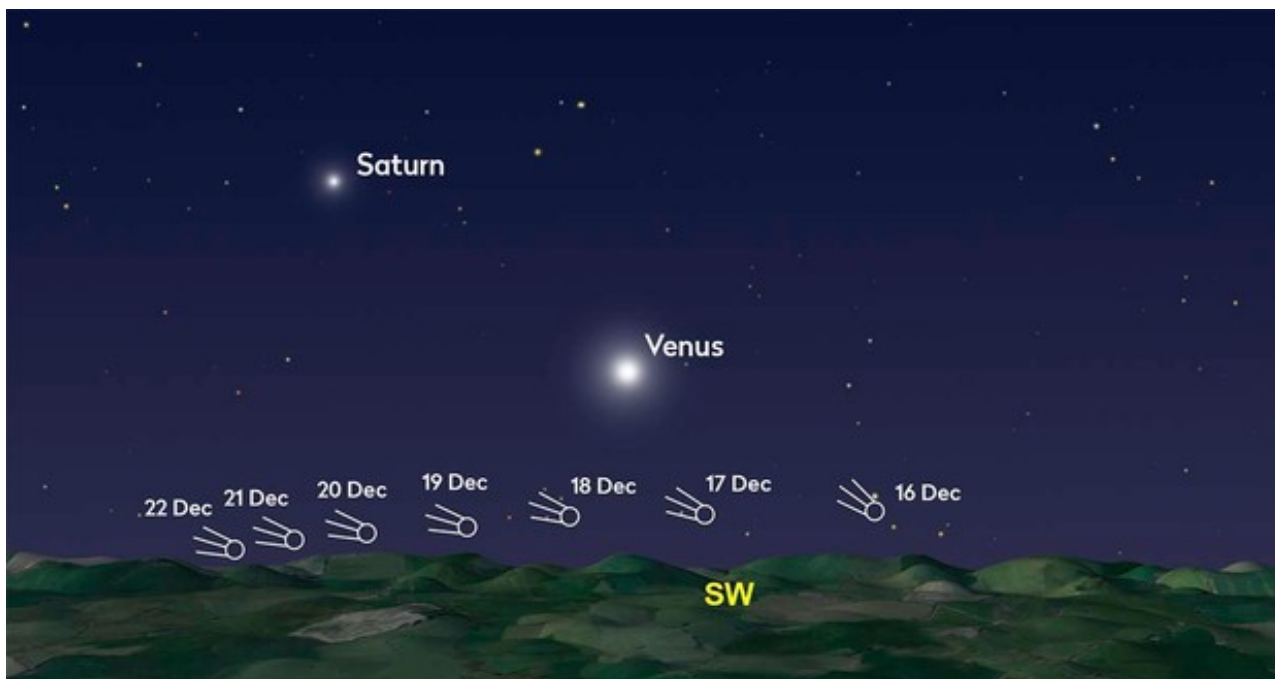
When will Comet Leonard be best visible?

The best chance of seeing Comet Leonard will be during the mornings of 1st - 13th December. Recent estimates, based on earlier observations, have Comet Leonard positioned near magnitude +4.3 Beta (β) Comae Berenices on 1st December, shining at mag. +9.3. The comet is then expected to brighten to about seventh magnitude in mid-month, making it an easy object to observe through binoculars. As the comet will be positioned between the Sun and the Earth, an effect known as forward-scattering enhancement may boost its brightness sufficiently for it to become visible even with the naked eye between 10th and 16th December. The comet will get closest to the Earth (and be best visible) on 12th December. At this point in time, it will be million km away, shining with a magnitude of about +4. The image below shows the morning track of the comet during the first half of December.



Credit: Pete Lawrence, Sky-at-Night

Although the best prospects for seeing the comet will be during the morning, should it brighten more than expected, it might be visible in the evening. The image below shows how the comet moves relative to Venus in the evening sky.



Credit: Pete Lawrence, Sky-at-Night

What will Comet Leonard look like?

When the comet reaches maximum brightness, it will have a dust tail and a gas tail. The dust tail will be shaped like a spike: this will happen because, on 8th December, the Earth will cross the orbital plane of the comet, and observers will view the dust tail edge-on. The viewing angle will cause the tail to narrow and brighten a little.

Comet Leonard has already grown a long gas (ion) tail - it is now twice the angular size of a Full Moon! The direction of the dust and gas tails will be the same for most of the time the comet will be observable. Only in the period from 10th - 13th December, will the two tails form a visible angle that will not exceed 30°.

The comet might also have an "antitail" that will seem to point in the opposite direction to the other tails - i.e. towards the Sun. In fact, an antitail is an optical illusion that is created when we view larger dust particles deposited along a comet's orbit edge-on

Up Next:

NEXT MEETING: 8pm Friday 10 December 2021 - Nonsuch High School

Annual General Meeting. Attendance via Zoom will also be possible for those members preferring not to attend in person.

Ron Canham will also deliver his Sky at Night presentation for the month to come.

NEXT USER GROUP:

Suspended until further notice.

NEXT DENBIES OBSERVING SESSION:

3-4 December at Ranmore Common. Meet at "Stepping Stones" Pub at West Humble at 7:30 pm before going on up to Steers field at about 8pm if the sky clears.

AD HOC OBSERVING AT WARREN FARM:

These will be at short notice when the weather is favourable. Please watch our WhatsApp feed for alerts.