



February 2024 EDITION

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Editorial

Welcome to the February edition of Janus. Our lecture this month will be given by David Arditti, President of the BAA, who will talk about "Observing the Planets".

January was an eventful month for space exploration. First up, on 8 Jan, was the launch of the US Peregrine mission. The first US lunar mission since the end of the Apollo series over 50 years ago, it was designed to place a lander on the Moon. The plan was that, after separation, an Earth orbit period, cruise to the Moon, and a lunar orbit phase, Peregrine would land in Sinus Viscositatis (Bay of Stickiness) adjacent to the Gruithuisen Domes on the northeast border of Oceanus Procellarum (Ocean of Storms). Landing was planned for 23 Feb, with about 10 Earth days of operation to follow.

Sadly, all did not go to plan. A propellant leak shortly after launch meant Peregrine was unable to complete its lunar landing mission and re-entered the Earth's atmosphere on 18 January.

Japan's SLIM lander fared better. Launched on 6 Sep 2023, the spacecraft conducted a precision landing on the rim of Shioli crater on 19 Jan. For some reason, however, the probe landed on its nose. As a result, its solar panels were not orientated correctly to generate power. After a few hours running on battery power, the lander was turned off, in the hope of a later recovery of electricity. After an anxious wait, on 28 Jan, JAXA announced that a shift in lighting conditions had allowed SLIM's solar cells to catch sunlight, allowing it to resume its science operations. As I remarked in a previous editorial: Space missions are challenging!

Finally, as promised, the answers to the Christmas Quiz are also given – how many did you get right?

John

The Solar System February

MERCURY: begins the month soon passing behind the Sun. It will be difficult to see, reaching its highest point in the sky during daytime and being no higher than 0° above the horizon at dawn. By the end of the month, having recently passed behind the Sun at superior solar conjunction, it is extremely difficult to see, being very close to the Sun, at a separation of only 1° from it.

VENUS: remains just about visible as a morning object, now well past greatest elongation west and returning closer to the Sun. It begins the month rising shortly after 06:00 but will reach its highest point in the sky during daytime and be no higher than 7° above the horizon at dawn. Becoming more difficult to observe as the month progresses, by the end of the month it will reach its highest point in the sky during daytime and be no higher than 2° above the horizon at dawn.

MARS: recently passed behind the Sun at solar conjunction. Throughout the month it is not observable, reaching its highest point in the sky during daytime and being on or below the horizon at dawn.

JUPITER: is currently an early evening object, now receding into evening twilight. It begins the month becoming accessible around 17:11, 51° above the S horizon, as dusk fades to darkness. Reaching its highest point in the sky at 17:34, 51° above the S horizon, it will continue to be observable until around 23:47, when it sinks below 7° above the W horizon. By the end of the month, it will become visible at around 17:59, 45° above the SW horizon, as dusk fades to darkness. It will then sink towards the horizon, setting at 23:17.

SATURN: begins the month soon passing behind the Sun at solar conjunction. It will be difficult to see, reaching its highest point in the sky during daytime and being no higher than 10° above the horizon at dusk. As the

month progresses, it will become more difficult to observe until, by the end of the month, after passing behind the Sun at solar conjunction, it will not be visible, being very close to the Sun, at a separation of only 1° from it.

URANUS: is currently an early evening object, now receding into evening twilight. It begins the month becoming accessible around 18:11, 55° above the S horizon. Reaching its highest point in the sky at 18:20, 55° above the S horizon, it will continue to be observable until around 23:27, when it sinks below 21° above the W horizon. By the end of the month, it will become visible at around 18:57, 45° above the SW horizon, as dusk fades to darkness. It will then sink towards the horizon, setting at 00:07.

NEPTUNE: will soon pass behind the Sun at solar conjunction. It begins the month visible from around 18:11, 22° above the SW horizon, as dusk fades to darkness. It will then sink towards the horizon, setting at 20:49. By the end of the month, it is not readily observable since it is very close to the Sun, at a separation of only 16° from it.

MOON PHASES:

Full Moon	25 January
Last Quarter	2 February
New Moon	9 February
First Quarter	16 February
Full Moon	24 February
Last Quarter	3 March

Notable Events:

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

February

- 1 Cluster IC 2395 is well placed
- 2 Mercury at aphelion
- 5 Lunar occultation of Antares
Conjunction of Mercury and Pluto
- 7 Conjunction of the Moon and Venus
- 8 Conjunction of Moon and Mars
Moon at perihelion
α-Centaurid meteor shower 2024
Conjunction of Moon and Mercury
NGC 2808 is well placed

- 10 Moon at perigee
- 11 Conjunction of the Moon and Saturn
- 12 Lunar occultation of Neptune
- 14 Comet C/2021 S3 (PANSTARRS) passes perihelion
- 15 Conjunction of Mars and Pluto
Conjunction of the Moon and Jupiter
- 16 Close approach of the Moon and M45
- 18 Conjunction of Venus and Pluto
Lunar occultation of Beta Tauri
- 19 Messier 81 is well placed
- 21 The cluster NGC 3114 is well placed
- 22 Conjunction of Venus and Mars
- 25 Moon at apogee
- 27 Moon at aphelion
The cluster IC 2581 is well placed
- 28 Mercury at superior solar conjunction
Saturn at solar conjunction

March

- 2 The Theta Carinae cluster is well placed
- 3 Lunar occultation of Antares
Asteroid 3 Juno at opposition
- 8 Conjunction of the Moon and Mars
The Moon at perihelion
Conjunction of the Moon and Venus
The Wishing Well cluster is well placed
- 10 The Moon at perigee
- 12 Asteroid 23 Thalia at opposition
- 13 Close approach of the Moon and Jupiter
- 14 Conjunction of the Moon and Jupiter
γ-Normid meteor shower 2024
- 15 Close approach of the Moon and M45
- 16 Lunar occultation of Beta Tauri
- 17 Neptune at solar conjunction
Mercury at perihelion
- 19 Venus at aphelion
- 20 March equinox
- 21 Close approach of Venus and Saturn
- 22 Conjunction of Venus and Saturn
- 23 Mercury at dichotomy
The Moon at apogee
- 24 Mercury at greatest elongation east
- 25 Mercury at highest altitude in evening sky
Penumbral lunar eclipse
- 28 The Moon at aphelion
- 30 136472 Makemake at opposition
Lunar occultation of Antares

Collected Observations (and thoughts) – Gary Walker

The terrible December Weather – Posted 3 Jan

As the editor mentioned in the January edition of Janus, the weather has been awful throughout December!

I only managed to observe the Sun on a total of 13 days. The Sun may have been technically visible on a few other days, but often only appearing as "flashes", or else gleaming weakly through cloud, so not observable. On some days, the Sun was invisible all day! It doesn't help that the Sun is at its lowest in the sky at this time of year.

Dull weather is very common in November and December in the UK, plus we have had one storm after another, continuing into January.

Dame Maggie Aderin-Pocock – Posted 10 Jan

One of the presenters of the Sky at Night, Maggie Aderin-Pocock, has been made a Dame in the New Year Honours List.

I saw her sitting at a table on one of the BBC TV programmes showing the New Year and Hogmanay celebrations!

First American Moon landing mission since Apollo launched – Posted 10 Jan

On 8 January, the first American Moon landing mission since the end of the Apollo Moon Missions, over 50 years ago, was launched from Cape Canaveral, on a new Vulcan rocket. It's an unmanned mission, and is not a NASA mission, but a private one, as so many of the new Space missions now are! Called the Peregrine Mission One Lander, it was built by the private firm Astrobiotic.

It carries several instruments (including one built in the UK), a rock chip from Mount Everest, and the ashes of the famous British Science Fiction writer, Arthur C. Clarke. He, of course, wrote many such stories but tried to keep to the known science of astronomy and space flight physics, etc. His most famous story was "2001 - A Space Odyssey".

Typically, however, the Peregrine Mission ran into problems. The dreaded word, "anomaly", soon came up (a word that you DON'T want to hear on a new space mission!). With the propulsion system leaking, it has now been stated that it won't be able to land on the Moon! They said that they wouldn't be able to keep its solar arrays pointing correctly for more than two days, so they intend to get it as close to the Moon as possible. It may, however, still be possible to use it as a normal spacecraft.

Weather conditions for Astronomy, lately! – Posted 17 Jan

It is obvious to astronomers, and others alike, how poor the weather has been in the last few months. If any proof were needed, Ron Johnson's presentation of his annual round-up of last year's clear and cloudy nights, showed just how poor it was!

I have just counted how many days in the months from June to December 2022, I was able to astronomically observe the Sun:

- June 2022 - 29 days (including a full set of observations from 1-27 June)
- July 2022 - 26 days.
- August 2022 - 29 days.
- September 2022- 26 days.
- October 2022 - 26 days.
- November 2022 -16 days.
- December 2022 - 13 days.

It is clear from this that, in the summer months of June – October that year, I managed to observe the Sun on most days each month, but in November and December, this declined drastically to only seeing it on about half the days in these two months!

In the Summer months, of course, the days are far longer, so there is obviously much more time to see the Sun, anyway, but during the shorter winter days, there is less time to see it. In addition, November and December are characterised by long spells of overcast, dull weather and, even when high pressure is over us, it does not always mean that it will be clear, as anticyclones have a nasty habit of filling in with clouds in the Winter months!

The longest spell that I have ever had of continuous consecutive observations of the Sun, was in 2011, from 17 April – 4 June,

which meant at least 48 days of Solar observations (i.e. a period of one-and-a-half months). Usually, I am lucky to get about two weeks of continuous observations, although, as shown above, I did get 27 consecutive days in June!

Of course, the Sun was visible more than this, but either only showing as brief flashes of sun in tiny breaks in the cloud cover, or else, only gleaming faintly through alto-stratus cloud cover. In either case, the Sun was not visible long enough for me to make any observations, or the Sun was too weak to observe through a telescope.

Japan lands on the Moon! – Posted 26 Jan

On 19 January, Japan became the 5th nation to successfully put a lunar lander on the Moon. Unfortunately, as per usual, of late, a problem occurred with using its solar panels to generate power! A small rover ejected from the SLIM lander prior to its arrival on the lunar surface, took a photo of the lander, showing that, for some reason, it had landed on its nose!

To avoid draining the remaining power in the batteries, they shut down the power, and are waiting for the Sun to be in a more favourable position, so that the batteries can be recharged.

Lunar Halos – Posted 27 Jan

I have noticed in the media, and on social media, articles and images of lunar Halos. On 26 January, an article appeared online on the BBC News website entitled "Halo sighted around Moon". This was seen in the West Midlands.

Halos around the Moon (or Sun) form when they are shining through a thin layer of

cirrostratus cloud, with ice crystals forming this effect. Unfortunately, they often indicate that rain is approaching! They are not actually uncommon, and they can appear quite beautiful. As a result, people have started to post images of them on social media.

I wonder if they will be the new version of the "SuperMoon", that was only "discovered" by the media in 2011! The media have recently "discovered" this Lunar Halo phenomenon, even though they have always been around. As a result, they are given more importance than they merit!

I also saw this Lunar Halo, which occurred about 2am on the night of 25 January - it appears that the rare clear conditions were widespread over the UK, as was the case with the Lunar Halo that I saw on the late evening of 25 November, last year. That one seems to be where the media started showing interest in this phenomenon!

Update on Japanese Moon Lander – Posted 29 Jan

The BBC News announced today that the Japanese Moon Lander had woken up again!

As stated before, a mini-probe released from the lander showed that the lander was in an embarrassing position - upside down! So, the scientists turned off the batteries to save power and wait for the Sun to be at a different angle, just right for the probe to receive sunlight and power up again!

It has now imaged rocks in the foreground, which have all been given dog themed names. This is in keeping with the common tradition for rocks, imaged by landers, to be given names!

Humans are going back to the Moon to stay, but when that will be is becoming less clear

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A 2019 Time magazine cover portrayed four astronauts running towards the Moon. Pictured alongside the headline “The Next Space Race”, one of the astronauts carried an American flag, one carried a Chinese flag and the other two belonged to space companies owned by billionaires: Elon Musk’s SpaceX and Jeff Bezos’ Blue Origin.

Until recently, it seemed as if the US and SpaceX were set to win this race to return to the Moon with Nasa’s Artemis programme. But a number of setbacks have called that into question. And Blue Origin, China and other countries and companies are continuing their own lunar efforts. On January 9 2024, NASA announced that it was delaying the Artemis 2 mission, the first crewed flight of the Space Launch System (SLS) and the Orion capsule – the vehicles built to send astronauts back to deep space. The flight would slip from late 2024 to no earlier than September 2025. This was due to some safety issues that need to be fixed on Orion.

Consequently, Artemis 3, which is supposed to involve the first crewed lunar landing since 1972, will take place no earlier than September 2026. Artemis 3 is to use SpaceX’s Starship orbiter as the lander for two crew members. This mission is set to put the first woman and the first person of colour on the lunar surface.

A non-American crew member could also walk on the Moon by 2030, highlighting the fact that Nasa has involved international partners in the Artemis venture. Up until now, just 12 humans have set foot on the Moon. All of them have been male and all have been American.

However, the Starship orbiter, crucial to these aims, has experienced problems. A second test launch for the rocketship-like orbiter atop its huge booster rocket back in November 2023, was spectacularly destroyed eight minutes and six seconds after lift-off.

It will have to be ready to go by 2026. But, before then, SpaceX will have to demonstrate that it can refuel in orbit and then land Starship on the Moon without crew.

At the same time, however, Blue Origin is also working on a lander, called Blue Moon. Blue Moon is due to be used as the Moon landing craft for the Artemis 5 and 6 missions in 2029 and 2030.

Time will tell which lander can actually be ready for use first. But competition is always a good stimulator, and it could accelerate achievements.

Commercial companies supporting Nasa in the Artemis program will have to put a lot of attention into what to do and when. The lives of crew members are at stake here, so missions have to proceed in a safe and sustainable manner.

As with Apollo, NASA is also trying to use the program to inspire the next generation of scientists, engineers and mathematicians. Baby boomers like myself are very proud to be “Apollo kids” who

were inspired to study scientific subjects by those momentous achievements – particularly the first steps on another world, viewed through black and white TVs in July 1969.

International competition

China is also preparing itself, together with several other countries including Russia, to develop a lunar base for humans, called the International Lunar Research Station (ILRS). Beijing and its partners will include also private sectors players and governmental and non-governmental organisations, with an organisational scheme which is a first.

The Chinese program's first human missions to the lunar surface are expected by 2030. Among the sites where they want to land is the Moon's south pole. Nasa also wants to land here, but few of Beijing's choices are in overlap with the locations selected for Artemis.

The south pole is a target for both the US and China because countries want to extract the water ice that's hidden in craters there. This water could be used for life support at lunar bases and to make rocket fuel, helping bring down the cost of space exploration.

Space programs are never on time, and postponements are normal. Space agencies are more cautious nowadays, even more than before, because few tragedies we experienced in the past are obliging them to think very carefully before launching humans in space.

Safety of the crew is mandatory, and it must be always the first priority. So, if this is the reason why we have to wait a bit more before few human beings, after decades, will walk again on the Moon, I'm happy to wait for it.

Going to space has never been easy, as demonstrated by several uncrewed missions to the Moon over the last 12 months – both governmental and commercial – which didn't make it. But perhaps it's better we fail now while we are preparing for the new phase of humanity's history.

The Moon will soon experience human beings on its surface again, working and living on a regular basis. But when humans go back there, this time it will be to stay.

Object of the month – The Crab Nebula - Martin Howe

In 1054, Chinese astronomers recorded the appearance of what they referred to as a “guest star”, or supernova as we know them, in the constellation of Taurus. This supernova generated a large expanding cloud of dust and gas which we now see as the crab nebula. This nebula was discovered by John Bevis in 1731, but has more well-known associations with two other notable astronomers – Charles Messier and Lord Rosse.

Charles Messier chose what was later to be known informally as the crab nebula as the very first entry in his catalogue of objects that he compiled, largely for his own purposes of avoiding mistaking these objects for comets in his future observing sessions (comet hunting was his main passion). Although he discovered 13 comets, ironically it is the list of objects *not* to be mistaken for comets that he is better known for. There does not seem to be any indication of the significance of the sequential order in which he catalogued these objects. Many of the objects are much brighter than the first entry in the catalogue (M1, the crab nebula) and known about long before Messier himself was even born – for example M31 (the Andromeda galaxy), M42 (the Orion

nebula) and M45 (the Pleiades). The first version of his catalogue was published in 1774, and in this version, the objects were not even actually numbered.

William Parsons, also known as the 3rd Earl of Rosse was renowned for building the largest reflecting telescope of its day (1845) – the Leviathan as it became known as. This had a 72-inch diameter mirror, and was 54 feet in length. It was a drawing of M1 through this instrument from which the crab nebula's name was derived, due to its perceived likeness with a crab. Earlier drawings of M1 through smaller telescopes more resembled a pineapple, but for some reason it was the later "crab" version that stuck. I personally struggle to see any resemblance with a crab (or pineapple) in the modern-day high-resolution images!

The supernova remnant is thought to be currently expanding at a rate of about 1,500 kilometres per second, and is currently about 11 light years in diameter. It appears to us as a rather small 7 arcminute diameter fuzzy blob in Taurus, near the border with Orion (recall, for scale, the Moon appears to us as having a 30-arcminute diameter). It is also a rather faint object at magnitude 8.4, and so well below naked eye visibility, but should be visible in binoculars from a dark site.

The image below was taken with a 127mm refractor and an ATIK 314L CCD camera and is made up of a combination of exposures using H α and OIII narrow band filters, making for a total exposure time of 2 ½ hours.



Night Sky Conditions 2023 - Ron Johnson

The following is a summary of the night sky condition during 2023.

The three classifications used are as follows:

Clear Night: No cloud in the sky throughout the period.
(Notionally dusk – 23.00UT)

Clear/Cloudy Night: Cloud passing from time to time with clear periods long enough to permit observations to be made.

Cloudy Night: Sky completely covered in cloud throughout the period.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Clear	1	5	0	6	7	10	1	3	3	0	5	0
Cle/Clo.	12	6	3	4	9	1	5	4	6	6	7	7
Cloudy	8	17	28	20	15	19	25	24	21	25	18	24
Totals:		Clear 41		Clear/Cloudy 70		Cloudy 254						

Longest run of consecutive clear nights: 4 nights
24 - 27 May

Longest period between clear nights: 48 days
16 September – 2 November

Longest run of consecutive cloudy nights: 16 nights
3 - 17 March

Best Month: May (7 + 9) Worst Months: July (1 + 5) & October (0 + 6)

Comparison of 2023 with previous years (since 1969)

Clear: 41 7 years with less clear nights
78 (31); 79 (39); 87 (36); 94 (39); 15 (37); 16 (40) & 21 (39).

Clear/Cloudy: 70 4 years with less clear / cloudy nights
87 (56); 91 (68); 97 (67); & 98 (67).

Cloudy: 254 1 year with more cloudy nights
87 (275).

Useable: 111 1 year with less useable nights 87 (90).

Important Note:

To allow sufficient time to compile Janus and place it on the EAS Website by the 1st of the month any submissions for publication are required at least 3 days before the end of the month. Any items received after this date will be held over until the following month.

Up Next:

NEXT MEETING: 8pm Friday 9 February – Nonsuch High School

David Arditti President of the BAA, will give a talk about “Observing the Planets”.

Ron Canham will also give a presentation on the sky at night for the coming month.

NEXT USER GROUP:

Suspended until further notice.

NEXT DENBIES OBSERVING SESSION:

The next session, allowing for moon rise & set times and cloud conditions, should be sometime around the new moon which is on 9 February.

The precise date and timings of any session will be advised by email and WhatsApp a few days in advance but should be within the period 5-16 February.

AD HOC OBSERVING AT WARREN FARM:

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

**EWELL ASTRONOMICAL SOCIETY – QUIZ – CHRISTMAS 2023
HIGHLIGHTED ANSWERS – HOW MANY DID YOU GET RIGHT?**

- 1. What is the largest optical telescope in the world, including those currently under construction?**
 - a) The TMT, Mauna Kea, Hawaii
 - b) The GMT, Atacama Desert, Chile
 - c) The ELT Atacama Desert, Chile**
- 2. Which optical system is the fastest?**
 - a) f10**
 - b) f20
 - c) f30
- 3. Which layer of the Sun is observed in white light?**
 - a) Chromosphere
 - b) Corona
 - c) Photosphere**
- 4. Which of these solar system bodies is the largest?**
 - a) The Moon
 - b) Io**
 - c) Pluto
- 5. Who was the first Astronomer Royal?**
 - a) Christopher Wren
 - b) John Flamsteed**
 - c) Edmond Halley
- 6. In which year did the Lovell telescope become operational?**
 - a) 1955
 - b) 1957**
 - c) 1961
- 7. Which of these stars is the hottest?**
 - a) Type O**
 - b) Type F
 - c) Type K
- 8. In which year was the Society (EAS) formed?**
 - a) 1964
 - b) 1966**
 - c) 1968
- 9. The distance to the edge of the hypothesised Oort cloud surrounding our solar system is thought to be as much as 100,000 AU (AU = orbital distance of the Earth from the Sun). If this distance was shrunk such that it was the same as from central London to Gatwick airport, approximately how far away would the nearest star, Proxima Centauri, be on this scale?**
 - a) Dover**
 - b) Rome
 - c) Cape Town
- 10. Each of the following had a significant contribution to 20th century astronomical research, but can you put them in chronological order of their birth?**
 - a) Edwin Hubble; Fred Hoyle; Albert Einstein
 - b) Albert Einstein; Edwin Hubble; Fred Hoyle**
 - c) Edwin Hubble; Albert Einstein; Fred Hoyle
- 11. How many official constellations are there, north and south combined?**
 - a) 66
 - b) 77
 - c) 88**
- 12. What is the temperature of the surface of the Sun in Kelvin?**
 - a) 5778**
 - b) 5887
 - c) 5998
- 13. How many moons does Mars have?**
 - a) 2**
 - b) 4
 - c) 6
- 14. As of 9 November 2023, how many confirmed Exoplanets have been discovered?**
 - a) 4850
 - b) 5023
 - c) 5539**
- 15. Which Lagrange point provides an uninterrupted view of the Sun?**
 - a) L1**
 - b) L3
 - c) L4

16. Which planet has the most moons?

- a) Saturn b) Jupiter c) Uranus

17. What is the name of the fifth asteroid to be discovered?

- a) Flora b) Hebe c) Astraea

18. What is the penultimate letter of the Greek alphabet?

- a) Phi b) Psi c) Chi

19. What is the constellation Aquila represent?

- a) Eel b) Eagle c) Water waves

20. How far away is Voyager 1?

- a) 5 billion km b) 100 billion km c) 23.381 billion km

21. Which of these planets has the fewest moons?

- a) Uranus b) Jupiter c) Neptune

22. Charles Messier came up with his famous catalogue. Why?

- a) He just loved numbering things.
b) He wanted to observe 150 things before he died.
c) It was a list of damn nuisances that looked like comets.

23. If the moon was 100 meters away how far away is Neptune?

- a) 12,200,000 km b) 40,000,000 km c) 5,000,000 km

24. How long does a day last on Saturn?

- a) 9hr 56m b) 10hr 34m c) 16hr 6m

25. What is Space Adaptation Syndrome?

- a) 2-3 Days of Horrible Sickness
b) Filters, Fans and Engines Constantly Whirr
c) Astronauts that fail to use the Restroom Correctly

26. During which years did the Apollo Missions take Place?

- a) 1963-1972 b) 1960-1969 c) 1960-1973

27. What is the name of Pluto's closest moon?

- a) Nix b) Kerberos c) Charon

28. How much of the Milky Way is visible?

- a) 20% b) 0.000003% c) 0.02%

29. How long is the Venusian day?

- a) 5,823 hrs b) 1,408 hrs c) 24hrs 37 mins.

30. What is the total number of Astronauts to have set foot on the Moon?

- a) 12 b) 16 c) 8