



March 2020 EDITION

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Editorial:

Welcome to the March edition of Janus which contains a number of items from Gary Walker, including a reflection on the life of Heather Couper who did much to popularise astronomy. She will be sadly missed.

A couple of news items caught my eye last month which, if you haven't already seen them, are worth reading. The first one announced that Scientists have detected evidence of a colossal explosion in space - five times bigger than anything observed before. The huge release of energy is thought to have emanated from a supermassive black hole some 390 million light years from Earth, and the eruption is said to have left a giant dent in the Ophiuchus galaxy cluster. For those wanting to read more, the full account is at <https://www.bbc.co.uk/news/science-environment-51669384>

The second item reported something closer to home – an object known as “2020 CD3”, Earth's newest possible “minimoon”. A minimoon, also known as a temporarily captured object, is a space rock that gets caught in Earth's orbit for several months or years before shooting off into the distant solar system again (or burning up in our planet's atmosphere). This one has an absolute magnitude around 32, indicating that it is very small in size - probably around 1.9–3.5m in diameter. The Minor Planet Centre classifies it as an Amor asteroid since it orbits beyond Earth, although the JPL Small-Body Database considers it to be part of the Earth-crossing Apollo group of asteroids. For more details, just type 2020 CD3 into Google!

John



The Solar System March

MERCURY: recently passed in front of the Sun at inferior solar conjunction and, at the beginning of the month, is not readily observable being very close to the Sun, at a separation of only 8° from it. Later in the month, it is visible as a morning object, having recently passed greatest elongation west. However, it remains not observable, reaching its highest point in the sky during daytime and being close to the horizon at dawn.

VENUS: is emerging into the evening sky as it approaches greatest elongation East. It begins the month visible from around 17:58 UT as the dusk sky fades, 34° above the SW horizon. It will then sink towards the horizon, setting at 21:56 UT. By the end of the month, it is visible as an evening object from around 19:49 UT as the dusk sky fades, 36° above your western horizon. It will then sink towards the horizon, setting at 00:09 UT.

MARS: is currently emerging from behind the Sun. Throughout the month, it is not observable. Reaching its highest point in the sky during daytime, it will be no more than 9° above the horizon at dawn.

JUPITER: recently passed behind the Sun at solar conjunction. At the beginning of the month it is visible in the dawn sky, rising at 04:44 UT – 2 hours and 1 minute before the Sun – and reaching an altitude of 10° above the SE horizon before fading from view as dawn breaks around 06:23 UT. It remains visible throughout the month, eventually rising at 04:01 UT – 2 hours and 37 minutes before the Sun – and reaching an altitude of 13° above the SE horizon and fading from view as dawn breaks around 06:16 UT.

SATURN: recently passed behind the Sun at solar conjunction and, throughout the month, is not observable. At the beginning of the

month, it will reach its highest point in the sky during daytime and be no higher than 5° above the horizon at dawn. By the end of the month, despite emerging from behind the Sun, it will again reach its highest point in the sky during daytime and be no higher than 10° above the horizon at dawn.

URANUS: will soon pass behind the Sun at solar conjunction. At the beginning of the month, it will become visible around 18:56 UT as the dusk sky fades, 32° above the SW horizon. It will then sink towards the horizon, setting at 22:34 UT. By the end of the month, it is not observable, reaching its highest point in the sky during daytime and being no higher than 7° above the horizon at dusk.

NEPTUNE: will soon pass behind the Sun at solar conjunction. At the beginning of the month it is not readily observable, being very close to the Sun, at a separation of only 7° from it. By the end of the month, it is still not readily observable, remaining close to the Sun, at a separation of only 21° from it.

Planetary viewing highlights this month

8 Mar – 20:00 UT: Almost full Moon in Leo

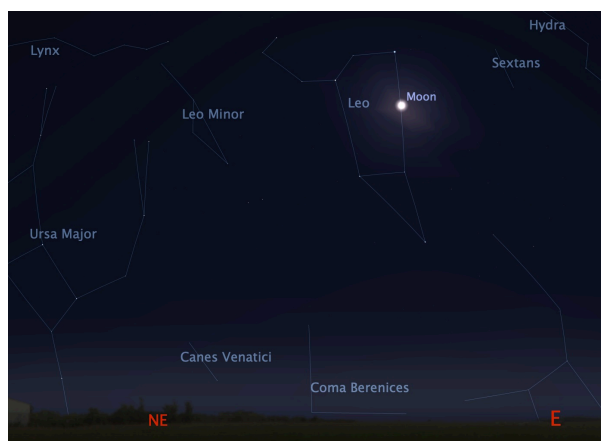


Image: Stellarium

In the late evening, the Moon, one day before full, lies below the belly of Leo, the Lion.

18 March – 04:00 UT: Three planets and a waning crescent Moon



Image: Stellarium

If clear before dawn, looking towards the southeast, one should see a waning crescent Moon, Mars, Jupiter and Saturn in a line.

29 Mar 19:00 UT: Venus and a 5-day old crescent Moon

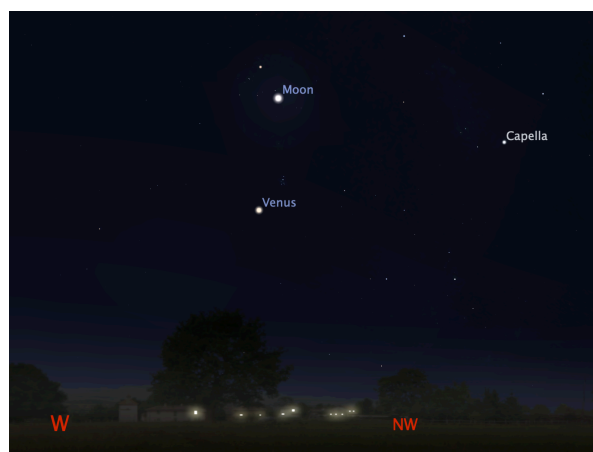


Image: Stellarium

If clear in the early evening of the 29th, Venus will be seen below a 5-day old crescent Moon

31 March 04:00 UT: Saturn, Jupiter and Mars.



Image: Stellarium

If clear before dawn on the 31st, one will see a nice grouping of, from left to right, Saturn, Mars and Jupiter.

MOON PHASES:

First Quarter	2 March
Full Moon	9 March
Last Quarter	16 March
New Moon	24 March

Heather Couper – Gary Walker

I received the sad news that Heather Couper died on 19 February. She was only 70 years old, so I was shocked at the news.

She first appeared on "The Sky at Night" in 1980, and later presented a number of TV programmes including "the Planets" and "The Stars". She lived with Nigel Hemburst, her business partner, and they co-authored many books, including the Phillips "Stargazing" annual book. Ironically, I won this book, (for 2020, of course), in the AGM raffle last year. She became another populariser of Astronomy.

She was the first ever female President of the BAA from 1984-1986. She studied Astrophysics at the University of Leicester, and later became the Senior planetarium lecturer at the Royal Observatory, Greenwich. She was subsequently awarded a CBE for popularising Astronomy.

She gave two lectures at the Ewell Astronomy Society, on 4 January 1978, and 6 January 1980, as well as being the guest speaker at the Society's 21st Anniversary on 24 October 1987.

Heather was a very attractive and glamorous woman. I saw her on a couple of occasions. One was at a lecture given by Nigel Hemburst, on Halley's Comet, at Sutton Library, on 15 November 1985. I arrived slightly late for the lecture and found a seat by the aisle. I later found out that I was sitting next to Heather and had a chat with her! The other time, I saw her, she was signing copies of her book at the February 2004 London Astrofest.

In the mid 1980's, she was very prominent with her "Big Hair", which was fashionable, at the time. Her "star" (excuse the pun!), seemed to be in the "ascendant" in the early to mid 1980's, in particular.

She will be greatly missed.

London Astrofest – Gary Walker

As usual, I went to the London Astrofest, on 31 January. I have now been going there since the second one was held in 1993 (i.e. 27 years ago!).

I recently found my Astrofest Show Guide of 1993, and it is interesting to see which stalls and exhibitions were present then, and which have long since gone.

The only ones surviving from 1993 are, of course, the "Astronomy Now" stall (they sponsor Astrofest!), "The British Astronomical Association" (BAA), and "The Society of Popular Astronomy" (which used to be called by the unfortunate name of the "Junior Astronomy Society"!).

Those that are, unfortunately, long gone include the "Earth & Sky" stall - which sold a lot of books - but has not been present since around 1999, when the owners retired. Others were the "The Webb Society", "Armagh Planetarium", "Sky & Telescope", and "Starlab" - an inflatable planetarium, which was really good! There was also a space for local astronomical societies - indeed our own society exhibited there in the 1990s.

More recently, "Telescope House" last exhibited in 2016, and the "Cambridge University" bookstall has been absent since 2018. Naturally, what I miss most are the old bookstalls which have just gone – probably forever!

On a positive note, new stalls soon replace the old stalls - in recent years ones such as "MSG Meteorites" (which not surprisingly sells all varieties of meteorites!) and numerous other stalls, have appeared. Consequently, the appearance and form of Astrofest remains largely unchanged.

Totally unchanged was the Herstmonceux Observatory Science Centre exhibition which was, as usual, in the foyer. They had leaflets celebrating the fact that it is now 25 years since the Centre started. At the time (1995), Sir Patrick Moore was thrilled, as he said that it had been "Saved for Science". Of course, this observatory had officially closed in 1989 and, for some years after that, the future of the site was uncertain - it had been purchased by a businessman who soon went

bankrupt. Thankfully, the site was then purchased by the Queens University of Kingston, Ontario, Canada, under "Science Projects Ltd". It opened in April 1995, and the repair of the telescopes was completed by 2004.

CPRE Orion Star Count in Orion – Gary Walker

The Campaign to Protect Rural Environment (CPRE) has asked people to do an annual star count to see how good or, more likely, how awful their night skies are. The count is of how many stars one can see with the naked eye, within the constellation of Orion. This count does not include the 4 corner stars of Betelgeuse (yes, it's still there!), Bellatrix, Rigel, etc, but one can include the "Belt" and "Sword" stars.

The count was intended to take place over the week 21-28 February, but I did an earlier count, in case the weather was not good, in that week! Of course, it had to be done when there was no Moon in the sky

I did a count on 16 February, when I saw 16 stars (with difficulty). On 25 February, I managed to see 23 stars within the constellation.

If you can see up to 35 stars, your sky is really good; if it is 10 or less, one has severe light pollution. My first count of 16 indicates I sometimes suffer moderately severe pollution, but it is not as bad (or as good) as other areas. The second count of 23 indicates more modest pollution.

No such thing as a "Super Moon" – Gary Walker

I find it somewhat surprising, and disturbing, that some in the Society are getting excited about the recent "Super Moon". Astronomers know these moons as "Perigee Moons", as the moon is in an elliptical orbit and will, at times, be closer to the Earth than at other times.

However, the term "Super Moon" is just a media construct that first appeared in March 2011, and was originally coined by an

Astrologer (I kid you not!). If they were that important then, why didn't astronomers known about them centuries ago?

Visually, it is impossible to tell the difference between a normal Full Moon and a "Super Moon" - one cannot compare them, at the same time, without resorting to time travel; in any case, the difference is only slight. However, if one photographs both a normal Full Moon, and a "Super Moon", at the same magnification, it can then be seen that the "Super Moon" appears slightly larger.

The situation is not helped by the numerous "Dinner Plate" sized Full Moons that appear across the media at these times, but these are only giant sized because of the use of extreme telephoto lenses (similar to using a small telescope). Thus, these images, are misleading and meaningless.

When people think they are seeing a "Super Moon" rising low over the horizon they are, in fact, seeing is the "Moon Illusion". This is a psychological effect, caused between the eye and the brain, which is still not fully understood, even though it has been evident for thousands of years. This effect makes the Full Moon, or Sun, appear large, when it is low down, but smaller, when it is high up in the sky. If one uses a theodolite to measure the size of the Moon, at low and high altitudes, it would appear to be the same size.

Movies often vastly exaggerate the size of the Moon (as we saw in Dr Rachael Livermore's presentation of the film, "Joe Versus the Volcano", where a giant dinner plate sized Full Moon slowly rises up over the horizon!).

For some reason, the media has latched onto the "Super Moon" term and, more worryingly, it has been highlighted in some astronomical magazines (which should really know better!). Perhaps they are working on the basis of, "if you can't beat them, join them"?

However, in reality, the "Super Moon" is a meaningless "phenomenon", of no astronomical significance, and use of the term should, in my view, be discouraged.

An unusual English Meteorite – John Murrell

Only about 20 meteorites have been identified that fell in the UK. The latest fell near Glatton, Cambridgeshire on 5 May 1991, and was preceded by the Bovedy meteorite that landed in Northern Ireland on 25 April 1969. I remember this passing across the skies of what is now South London. It was certainly spectacular - I was outside with a friend, and the first we noticed was that we had shadows in the green light!

The Wikipedia page at https://en.wikipedia.org/wiki/Meteorite_fall lists 19 events, but one interesting event is missing - probably as no meteorites were recovered and, as a result, it has not been confirmed, although the evidence seems to suggest it was a real meteorite landing. Unfortunately, any evidence has been long destroyed and recovering any meteorites will be very difficult for reasons that will become obvious.

The meteorite fall happened at 2am on 13 November 1892. What is unusual is that the meteorite struck a ship (or more exactly) the Seven Stones lightship that marks the Seven Stones reef between Cornwall and the Isles of Scilly. In those days the lightship was manned by a crew of around 10 men. The crew reported the event, presumably at the next crew changeover, to the superintendent who passed the report onto the Elder Brethren of Trinity House who were responsible for operating the lightship. In turn they sent the report to the Royal Society. The report is reproduced below.

IV. “Account of a Meteor that fell on the ‘Seven Stones’ Lightship,” in a Letter from the Secretary to the Corporation of the Trinity House, addressed to the PRESIDENT. Received January 9, 1873.

Trinity House, London, E.C., 9th January, 1873.

SIR,—I am directed to acquaint you that on the 13th of November last, at 2 A.M., a meteor burst against the ‘Seven Stones’ light-vessel belonging to this Corporation, and moored about $9\frac{1}{2}$ miles E. by N. of the Scilly Islands; and that it has been reported that the watch were struck senseless for a short period, seeing nothing before the shock, but that, on recovery, balls of fire like large stars were falling in the water like splendid fireworks, and that the decks were covered with cinders, which crushed under the sailors’ feet as they walked. It appeared, the men said, as if something was passing swiftly and met with the obstruction of the vessel and burst.

The superintendent reports that the men say there was a very decided smell of brimstone, but add that they did not mention that until he asked them. There is reason to fear that the cinders were all washed off the decks by the rain and sea before daylight; and it happened also unfortunately that the men did not think to observe the compasses.

The Elder Brethren have great doubts whether any more accurate account of the phenomenon than the foregoing is obtainable; at the same time they direct me to report the matter to you, conjoined with the assurance that if any important or interesting scientific question is likely to be elucidated by further inquiry, they will have great pleasure in causing special questions to be put to the men, or in affording any member of the Royal Society facilities for investigation.

I am, Sir,

Your most humble Servant,

Sir G. B. Airy, K.C.B., &c. &c.

ROBIN ALLEN, *Secretary.*

The description is interesting in that the meteorite was soft enough to break up under the crew’s feet. While it describes as unfortunate that the men did not observe the compasses, it is also unfortunate that no one collected any samples before they were washed off the deck. The

description would seem to indicate that the meteor had broken into a large number of parts - enough that they were still falling after the watch had recovered from being “knocked senseless”. It is difficult to know what knocked them senseless – was it the blast wave as the meteor broke up? The argument against this is that the blast wave arrives at the speed of sound and the meteor should have arrived first, as we saw & heard from the Chelyabinsk meteor.

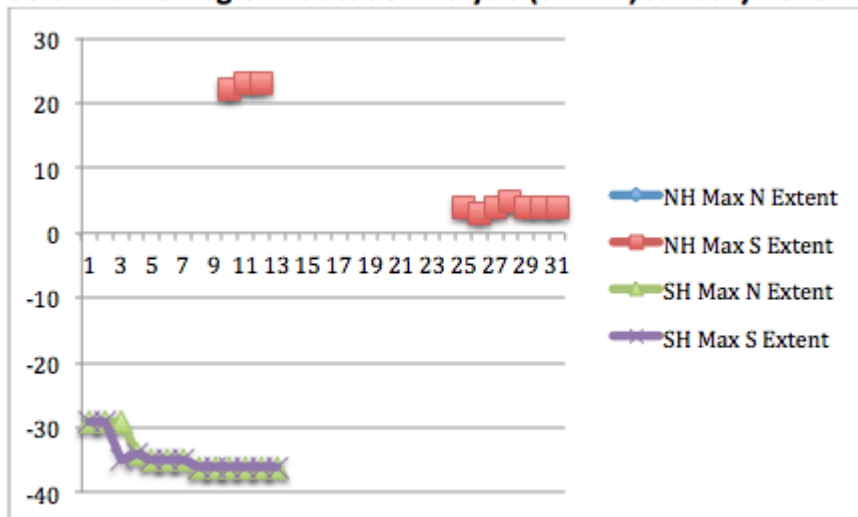
There is no mention of any damage, although minor damage to paintwork may have been difficult to detect amongst damage from the sea in such an exposed position.

The prospect of recovering any meteorites is small as, whilst the position is known, they may have been carried some distance by the tide before getting to the seabed and they may have been destroyed by sea water over the intervening years.

This remains an intriguing report, but we are unlikely to get any further information to confirm the event.

Solar Active Region Latitude Analysis (SARLA) Report January 2020 - Stephen

Solar Active Region Latitude Analysis (SARLA) January 2020



No data outages were recorded this month

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2020 SARLA Methodology:

Data were collected on a daily basis using www.solarmonitor.org who publish daily latitude and longitude coordinates for solar active regions. These were entered onto a spreadsheet. At the end of the month, the data were converted into a chart to produce a graphical representation of the distribution of active regions by latitude for both hemispheres of the Sun.

Limitations of Data:

There were no data outages during the month, so gaps in the chart represent periods when solar active regions were absent from the disk.

Findings:

In the northern hemisphere there was a brief outbreak of activity at a high latitude toward the end of week 2. There was then activity recorded at a low latitude (close to the solar equator) for just over a week at the end of the month. Analysis of the magnetic arrangements of these active regions demonstrates a North polarised leading section for the high latitude active region at the end of week 2, which is in keeping with a Solar Cycle 25 feature, whilst the lower latitude active regions toward the end of the month demonstrate a South polarised leader, which is consistent with a Solar Cycle 24 feature.

In the southern hemisphere the picture is less clear, with a weak active region at a higher latitude seen for a couple of days, with a South polarised leading section, consistent with a Solar Cycle 25 feature. This was then followed by a much stronger active region at a higher latitude, also demonstrating a South polarised leader, and therefore a Solar Cycle 25 feature.

Impression:

A mixture of remnants from Solar Cycle 24, and the new Solar Cycle 25 active regions is seen. As might be expected, the Solar Cycle 25 active regions are seen at much higher latitudes than those of Solar Cycle 24. The southern hemisphere appears to be organising into a Cycle 25 arrangement ahead of the northern hemisphere, which still appears to be in a state of flux. This is likely in keeping with the fact that for a majority of 2019, the solar southern hemisphere was quiet in terms of activity, whilst the northern hemisphere continued to be relatively active. A clear asymmetry of the hemispheres is apparent. This was also noted in the SARLA research paper published in 2017, which can be found at:

https://ryebrookspace.weebly.com/uploads/5/0/0/0/50005359/using_solar_active_region_latitude_analysis_to_monitor_solar_cycle_progress.pdf

Plan:

Surveillance will continue during February 2020, at the end of which a further analysis will be published. An important indicator to look for will be the extinction of Solar Cycle 24 active regions in the northern hemisphere.

Solar Activity - Large Prominance and more – Gary Walker

Since the end of January, the Sun seems to have woken up, with a few sunspots, including the “largest” that I’ve seen for some time - a small-to-medium sized spot. Some spots, including this one, are from the old cycle 24, but one has been seen from the new cycle 25.

Beginning on 6 February, I observed a long filament crossing the Sun, near the bottom of the disk.

On 7 February, I saw a large, and beautiful prominence on the Sun at the 11 O’clock position. It was a U shaped, looping prominence, and is about the largest, and best, that I’ve seen for a long time. This was in the late morning. In the afternoon some of it had disappeared, but there was still one prominence visible then, and on the following day too.

A few sunspots, and faculae, have also been visible, occasionally.

On 11 February, the filament had disappeared, but as I had guessed there was now a Prominence extending off the Sun’s limb. It was a long Prominence, breaking up into at least 6 “globules”. Filaments are, of

course, Prominances that appear as black lines, when silhouetted against the Sun’s disk.

Latest Observations – Gary Walker

On the evening of 11 February, I saw Neptune only a few arcminutes from the 4th magnitude star, Phi Aquari. This was the same star that it passed in September. It was not such a good view this time, as it had to be observed in a twilight sky, and Neptune was only just visible in my scope.

The following day, I observed the asteroid Vesta. This was because, over a narrow tract in Scotland, Vesta actually occulted a 5th magnitude star, which goes by the non-memorable tag of HIP 144393, or Sao 93276! This occultation occurred at approximately 21:57 UT. Vesta was at 8th magnitude, so it naturally appeared dimmer than the star. Obviously, here, there was no occultation, but it was still an excellent chance to see an asteroid make a close pass of a star.

I observed the event from around 20:20 UT until 22:59 UT. At the earlier times, I could see Vesta gradually closing in on the star. By 21:52 UT, Vesta was extremely close to the star, and the star and asteroid strongly resembled a close double star. After 21:52 UT, I could no longer see Vesta, so it was

obviously, by then, too close to the star to be split, even at high powers. I did not manage to "split" the pair until 22:12 UT, by which time Vesta was on the opposite side of the star, extremely close to it. I saw them separate further until 22:59 UT.

I could not see the 2 objects moving in real time, unlike the 4 close earth passages of other asteroids that I have seen. However, the shift in position of Vesta, over a period of time, was easy to see.

The weather was good, but very cold, with a nasty wind blowing, and with only a few pesky cirrus cloud bands at times.

The difference between UTC and GMT: The Answers – John Murrell

In my article 'The difference between UTC & GMT' in the February 2020 edition of Janus I posed 4 questions to test your understanding.

Here are the answers with a brief explanation:

1. *which year(s) since UTC was introduced in 1971 had the most (UTC) seconds?* - 1972 has been the only year with 2 leap seconds so far. 2020 will not have 2 leap seconds as it has already been announced that there will be no leap second on 30 June 2020.
2. *how many (UTC) seconds were there in that year?* As stated in the article, a normal year has 31,536,000 plus 86,400 seconds. As it was a leap year in 1972 there were 2 leap seconds so there were 31,622,402 UTC seconds in 1972.
3. *Which year(s) had the most GMT seconds?* All Leap Years have the same number of GMT seconds.
4. *How many (GMT) seconds were there in this/these year(s)?* 31,622,400 (GMT) Seconds.

In the article, I used the term GMT (Greenwich Mean Time). In fact, no one measures or publishes GMT at present even though it is apparently the basis for time in UK Law.

The measurement and publication of GMT appears to have ceased when the Royal Observatory at Herstmonceux closed, but may, possibly, have been earlier when the Royal Observatory at Greenwich closed. In practice a published time called UT1 is very close to the definition of GMT. The difference is to do with how the effects of wobbles in the rotation of the Earth known as Polar Wandering are treated. It is not clear if The Royal Observatory were aware of Polar Wandering and if they made any corrections for it.

Up Next:

**NEXT MEETING: Friday 13 March 2020
Nonsuch, High School for Girls Library
8pm.**

David Fishwick will be talking about Mercury.

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

**NEXT USER GROUP: Tuesday 3 March
2020, Nonsuch High School for Girls 8pm.**

This is an informal session for members to meet and discuss anything related to their telescopes and sky events and, if weather permits, to go up on the roof for observing. Enter via the Main Entrance opposite the Car Park

NEXT DENBIES OBSERVING SESSION:

The next observing session will be on the first clear night between Friday 20 March at 7:30pm and Wednesday 25 March at 7:30pm.

Please check back closer to the time as weather and clear skies will affect the date.

AD HOC OBSERVING AT WARREN FARM:

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