JANUS
THE NEWSLETTER OF EWELL ASTRONOMICAL SOCIETY

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Editor: ewellastro.editor@gmail.com
Email: ewellastro@gmail.com
Website: https://www.ewellastronomy.org

Editorial

Welcome to the August edition of Janus. Just a reminder that there is no monthly meeting this month – our next meeting is on 8 September when Jonathan Tennyson from University College London will talk about "Water in the Universe".

A friend of mine with an interest in astronomy asked me last month whether I knew anything about "Smart Telescopes". I had to confess that I hadn't come across the term, so set about getting more information.

According to Google, Smart Telescopes are a new category of digital telescopes, controlled from a smartphone or tablet, which use integrated image sensors, software, and optics to "deliver unique and compelling experiences in a simple, all in one package". In essence, these telescopes provide an end-to-end astro-photography capability without the need to capture, stack and process large numbers of images. They can also be used by more than one person at a time.

It will come as no surprise to learn that the capability doesn't come cheap. Unistellar (*https://www.unistellar.com*) market the EVSCOPE 2 Smart Digital Reflector Telescope, which is iPhone & Android compatible, has computerized GOTO Point & Track, 114mm Aperture and Nikon 7.7Mpixel Electronic Eyepiece. Cost (from Rother Valley Optics) is £3299. Vaonis (*https://vaonis.com*) market the Vespera which has similar connectivity and tracking capability, with 50mm aperture refractor optics, at a cost of £1299 from First Light Optics.

So, are smart telescopes the future for astronomy, especially if they get cheaper?

John

The Solar System August

MERCURY: begins the end of the month, emerging into the evening sky as it approaches greatest elongation E, it is not observable, reaching its highest point in the sky during daytime and being no higher than 0° above the horizon at dusk. By the end of the month, it will soon pass in front of the Sun at inferior solar conjunction. It remains not observable since it is very close to the Sun, at a separation of only 12° from it.

VENUS: begins the month soon to pass in front of the Sun at inferior solar conjunction. It is difficult to observe, reaching its highest point in the sky during daytime and is 4° below the horizon at dusk. By the end of the month, having recently passed in front of the Sun at inferior solar conjunction, it is visible in the dawn sky, rising at 04:19 BST – 1 hour and 49 minutes before the Sun – and reaching an altitude of 12° above the E horizon before fading from view as dawn breaks around 05:47.

MARS: will soon pass behind the Sun at solar conjunction. Throughout the month, it will reach its highest point in the sky during daytime making it difficult to observe – it begins the month level with the horizon at dusk and ends the month 3° below the horizon at dusk.

JUPITER: begins the month emerging from behind the Sun and is visible in the dawn sky, rising at 23:46 BST and reaching an altitude of 44° above the SE horizon before fading from view as dawn breaks around 04:57. By the end of the month, it is visible in the morning sky, becoming accessible around 22:52, when it reaches an altitude of 7° above the E horizon. It will then reach its highest point in the sky at 05:17, 53° above the S horizon, before being lost to dawn twilight around 05:47, 53° above the S horizon.

SATURN: begins the month approaching opposition and is visible as a morning object.in the morning sky, becoming

accessible around 23:09, when it reaches an altitude of 10° above the SE horizon. It will then reach its highest point in the sky at 02:54, 27° above the S horizon, and will be lost to dawn twilight around 04:32, 23° above the SW horizon. By the end of the month, having recently passed opposition, it will become accessible around 21:08, when it rises to an altitude of 10° above the SE horizon. It will reach its highest point in the sky at 00:48, 26° above the S horizon, and become inaccessible around 04:28 when it sinks below 10° above the SW horizon.

URANUS: is currently emerging from behind the Sun. It begins the month visible in the dawn sky, rising at 00:02 BST and reaching an altitude of 31° above the E horizon before fading from view as dawn breaks around 03:35. By the end of the month, it is visible in the dawn sky, rising at 22:05 BST and reaching an altitude of 54° above the SE horizon before fading from view as dawn breaks around 04:42.

NEPTUNE: begins the month visible as a morning object in the dawn sky, rising at 22:22 BST and reaching an altitude of 35° above the S horizon before fading from view as dawn breaks around 03:35. By the end of the month, approaching opposition. it is visible in the morning sky, becoming accessible around 22:58, when it reaches an altitude of 21° above the SE horizon. It will then reach its highest point in the sky at 02:13, 36° above the S horizon. And will be lost to dawn twilight around 04:42, 27° above the SW horizon.

MOON PHASES:

Full Moon	1 August
Last Quarter	8 August
New Moon	16 August
First Quarter	24 August
Full Moon	31 August (Blue Moon)

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*

August

2	Moon at perigee
3	Close approach of the Moon and Saturn
8	Venus at aphelion Close approach of the Moon and Jupiter
9	Mercury at dichotomy Close approach of the Moon and M45 Mercury at greatest elongation East
10	Asteroid 10 Hygiea at opposition Mercury at aphelion
13	Perseid meteor shower 2023 Venus at inferior solar conjunction
14	Messier 15 is well placed
15	Messier 2 is well placed
16	Moon at apogee
18	Moon at perihelion Conjunction of Moon and Mercury κ-Cygnid meteor shower 2023
19	Close approach of Moon and Mars
24	Lunar occultation of Delta Scorpii
25	Lunar occultation of Antares
27	Asteroid 8 Flora at opposition Saturn at opposition
29	Uranus enters retrograde motion Moon at apherion
30	Moon at perigee Close approach of the Moon and Saturn
31	Blue Moon (2nd Full Moon of the month)

September

1	Lunar occultation of Neptune Aurigid meteor shower 2023
4	Jupiter enters retrograde motion Close approach of Moon and Jupiter
5	Close approach of Moon and M45
6	Mercury at inferior solar conjunction
7	Lunar occultation of Beta Tauri
9	September ε-Perseid meteor shower 2023
12	Moon at apogee
13	Conjunction of the Moon and Mercury
16	Conjunction of Moon and Mars
17	Moon at perihelion
18	Venus at greatest brightness

19	Neptune at opposition
21	Lunar occultation of Antares
22	Mercury at greatest elongation West
23	Mercury at highest altitude in morning sky
22	Mercury at dichotomy
23	September equinox Mercury at perihelion
25	NGC 55 is well placed
27	Close approach of Moon and Saturn Moon at aphelion 47 Tuc is well placed
28	Daytime Sextantid meteor shower 2023 Moon at perigee

Collected Observations (and thoughts) – Gary Walker

20 Years in the Ewell Astronomical Society – posted 5 July

I first joined the Ewell Astronomical Society on 11 July 2003, so I have now been coming for 20 years in all! At the time I joined, meetings were still being held at St Mary's Church Hall, Ewell, prior to us moving to our present site of Nonsuch High School in January 2005. We originally met in the Sixth Form Common Room on the ground floor but were subsequently moved to the new Library in September 2016, our current location.

Meetings, over the past 20 years have followed the same format, of having a speaker giving a presentation on some aspect of Astronomy, followed by a tea break. Then, a member would give the "Sky at Night" brief talk, informing members as to what was coming up in the sky in the next month.

The AGM has always been held at the December meeting when there is no invited speaker. An astronomical quiz is held, and prizes are given out; there is also a raffle.

The school has an 11 inch SCT telescope housed in a dome on the roof of the school, which is used for school and Society observations.

The Society itself was formed in 1966, at least 37 years before I joined, which begs the question “why didn't I join much earlier?”

Well, as it was held in Ewell, it is difficult to get there from my home in Banstead, and it’s even worse coming back, due to the lack of public transport! I would be entirely dependent on lifts, and I thought that nobody would be coming my way home! It is far better now being situated in Cheam, as public transport is considerably better! If it had been easier to get to Ewell, I could have joined sometime in the 1980's.

Over the years, the Society has sometimes organised visits to places of astronomical interest,
and I have been to the Mullard Space Science Centre in Surrey, the Mill Hill Observatory in North London, the Hampshire Observatory at Clandon, and the Herstmonceux Observatory in Sussex.

Sir Patrick Moore was the original Patron of the Society, and even gave a couple of lectures to it, in 1967. After he died, Professor Ian Morrison took over as Patron.

The Society has a monthly magazine called "Janus" (what you are reading this on!). For a long time, some issues of Janus were given out at meetings, but later it went online. Indeed, for a time, around 2017, it seemed as if it was going to fold. Fortunately, it survived, and has appeared online at the beginning of each month ever since! The late Maurice Gavin was one of Its Editors for some years. He was also the President of the British Astronomical Association from 1995 - 1996. Other members of the Society were also in the BAA - Ron Johnson, for one.

Some of the Speakers giving presentations are famous in the astronomical world, such as Professor Monica Grady, Dr Michele Dougherty, the late Bob Mizon, Michael Maunder, Dr Lucie Green, Nik Szymanek, Owen Brazel and our Patron, Professor Ian Morison. The late Heather Couper was the Guest Speaker in October 1987, at the Society’s 21st Anniversary. She also gave a couple of lectures in 1978, and 1980.

I have seen several Speakers from the Mullard Space Science Laboratory, as well from UCL, and the Hampshire Astronomical Society from Clandon. Some of the Speakers have come back repeatedly to speak to us - indeed, one of them, Melis Irfan was a former student at Nonsuch High School. At other times, the Speaker may be

someone from our Society itself, such as David Fishwick (who is speaking this month), and others have included Maurice Gavin and Ron Johnson.

I have attended two of the key milestone events of the Society - its 40th celebration in 2006, and its 50th in 2016, both held at Horton Park County Club.

Unsurprisingly, many members have been here far longer than I have. Maurice Gavin was a member for 50 years from 1968 to 2018, when he passed, and Ron Johnson has also been a member from the early days.

The years of the Society have normally been placid, although they were severely disrupted by the Covid 19 Pandemic of 2020 – 2021. This was an unprecedented event not seen in our lifetimes! It was comparable to the Second World War, that our forefathers had to experience! Meetings were impossible due to the dreaded "Social Distancing" rules, that meant that nobody could be closer than 2 metres to anyone not in their family or "bubble". This, of course, effectively stymied any forms of meetings at all!

The last meeting before Lockdown was held only about 10 days before we were told to "stay at home" by the then Prime Minister, Boris Johnson. After that, any social gatherings were forbidden (unless of course, you were high up in the Government, such as Boris Johnson and his cronies!). Lockdown Number One lasted from 23rd March 2020 until "Freedom Day" arrived on 19th July 2021. The only way that Society meetings could work was in the dreaded "Zoom" meetings, which were started in October 2020.

Only from 10th September 2021, could physical meetings resume! Surprisingly enough, they are still termed "hybrid" meetings. Of the around 25-30 attendees, most attend physically, but 3 or 4 still prefer to attend through "Zoom", almost 2 years later!

Female Speakers are still rare, and until recent years, very few women were members of the Society. More women have now joined, so the Society is no longer just made up of retired men!

Overall, during my 20 years as a member, overall, the Society has changed very little! That said, recent years have seen a welcome influx of new members joining the Society. This may be partly due to the Society having an exhibition, at the Nonsuch Show, held at the end of each May, at the Bank Holiday. Volunteers from the Society exhibit some of the members telescopes, and this year, the weather was actually good enough for them to show Solar observations to the public!

Modern digital technology has faciliated the setting up of a "WhatsApp" Group to alert members to sudden improvements in the weather to allow ad hoc observations at Warren Farm. This also informs members of observation sessions at Ranmore Common. Members are also now informed of coming events by email.

Venus now a crescent – posted 6 July

It's now Crescent 🌙 time for Venus! After passing the half-way phase in May, by early July it had become a beautiful crescent 🌙 phase. This is always the most interesting time to observe Venus, because as its phase shrinks to a crescent 🌙, it increases in size, because it is reaching its closest point to the Earth. Indeed, it is the closest planet to Earth, with a minimum distance of 25 million miles. Thus, it is also the planet that can reach the largest angular size, even larger than Jupiter!

Throughout its cycle, Venus is only about 10' arcseconds at furthest distance, increasing to a massive 60' arcseconds at Inferior Conjunction (and, much more rarely, a Transit!).

Venus looks particularly beautiful when it is at crescent phase.

I observed it in the afternoon of 6th July, when it was at 29% phase, and its appearance resembled a 3-day old crescent Moon. The phrase was even large enough to be visible with binoculars.

Venus only changes slowly from full phase to gibbous to half phase over several months so, at this stage it is not so interesting. However, once passing the half-phase of 50% mark, then things change between this and the crescent phase. At this part of the

Venus apparition, things happen very quickly, with its crescent shrinking down to nothing within a few weeks, and then reappearing in the morning sky, and it does the whole cycle in reverse!

A warm Summer's night – posted 8 July

The night of 7th–8th July was very warm and humid, with a gentle breeze blowing. The sky was totally clear. I was writing this at about 2.40am!

I could see some occasional flashes to the South, which were probably distant lightning flashes! I saw Saturn rising, and I saw that the rings had noticeably closed up, since last year. The Western part of the rings could still be seen to be partly open, but the Eastern side appeared more closed up, and gave the general appearance of a thick bar.

Soon afterwards, I could see Jupiter rising too. Also, a waning gibbous Moon, but it did not badly affect the darkness of the sky.

I also looked at a few planetary nebulae, such as M57, M27, and NGC 6905.

The Andromeda Galaxy of M31 was already up in the East, too.

During the day on 7th July, it was virtually clear and cloudless, so I looked at Venus again. The crescent phase was now visible in my 11 X 80 binoculars.

On observing the planetary nebula of NGC 6905, in Delphinium, I saw that it was one of those planetary nebulae that show up much better with the Oxygen 111 filter, than without it. With the filter, it appeared as a fuzzy disk, but without it, the nebula was only just visible! Other planetary nebulae that are much better seen with this filter are M97 in Ursa Major, and NGC 2438 in Puppis!

However, some planetary nebula, such as M57, although enhanced by this filter, can be clearly seen without it.

NGC 6905 is known as the "Blue Flash" Nebula as it appears blue in images, but it only appears grey in my telescope, so clearly it is not bright enough to activate the colour rods in my eye!

Satellites – posted 10 July

Any time that I am out under a clear night sky, I cannot fail to see at least one satellite crossing the sky, every few minutes! Many are quite bright, not much fainter than the International Space Station. They come from all directions, not just West to East like the ISS! Some move from South to North, or vice - versa! They all appear yellow in colour, and often will fade into the Earth's shadow.

The Sun – posted 11 July

The Sun continues to be very active in all wavelengths, as the Solar Maximum approaches. In white light, on 8th – 10th July, for example, there were at least 5 - 6 separate spot groups visible! One was a big spot, which had a large umbra, joined to another smaller umbra, by a "tail" or "bridge", making it appear like a tadpole! It was, of course, surrounded by a large penumbra. Obviously, in Ha light, there were plenty of prominences, filaments, and places, visible, along with the occasional flare!

So far, I have not seen the Notilucent Clouds!

WHEN will Betelgeuse Blow? – posted 13 July

There has been some recent renewed speculation about when Betelgeuse will turn supernova. This is because it has been reported to be 50% brighter than normal. Unfortunately, I cannot check for myself, as Orion is not visible in the summer sky at night!

Astronomers will remember when Betelgeuse faded more than usual in late 2019 to early 2020. This event has become known as the "Great Dimming" by astronomers. I saw it myself, and I saw that Betelgeuse had faded to the same magnitude as Bellatrix, or even a bit fainter! It actually faded from its usual magnitude of +0.5 down to 1.6.

This was eventually proved to be due to an outburst on the star, of material being ejected way beyond it. This then cooled and became a cloud of soot, which blocked some of the light from Betelgeuse, causing it to "fade".

A paper has been produced by Hideyuki Saio from Tohoka University in Japan speculating that Betelgeuse could blow as soon as a few decades from now, whilst others disagree, saying it still has about 100,000 years to go!

IF Betelgeuse does explode in this century, it would, of course, mean that Betelgeuse has already exploded, and the star no longer exists! This is because Betelgeuse is about 600 light years away, so we are not actually seeing it as it is now, but as it was about 600 years ago. Even, at the colossal speed of light, we cannot see these types of events in real time!

Looking up into the night sky is about the only way that it is possible for us to time travel – only, however, into the past, not the future!

In the words of the 1951 science fiction film, "The Thing from another world" one can only say, "Keep watching the skies"!

Stars – posted 16 July

Our own David Fishwick gave a very good lecture in July, on the spectroscopy of solar objects, in particular, stars.

In addition, he was showing us spectra of artificial light in the library, and of a Mercury Vapour Lamp that he had brought in. We looked through his spectroscope and used Diffraction Gratings. Last summer, he brought in his spectroscope so we could look at the Sun's spectrum through it, which was a rare example of being able to do astronomical observations at a meeting! We could see the Fraunhofer Lines.

In his presentation, he reminded us that Red Dwarf stars are the most common stars in the Universe, and that 75% of stars are of this type. They are, however, all very feeble, and even though some of them are only a few light years away, none of them are visible with the naked eye. At a distance of 4.4 light years, Proxima Centauri, in the Southern Hemisphere is the closest star to us, after the Sun, , but still only manages to reach a dismal magnitude 11. This means that a telescope is required to even see it, and even in an 8" SCT like mine, it would still be faint, and rather underwhelming to view (apart from knowing that it is our nearest stellar neighbour!). It would be better to look at Alpha Centauri, which is only slightly further away, and a bright naked eye star!

Most of the stars in the solar neighbourhood are feeble stars and require a telescope to see them.

In the Northern Hemisphere, we have Barnard's Star, which is 6 light years away, and is of magnitude 9.5.

The stars that we can see in the sky are all far more powerful than them and, mostly, far more powerful than our Sun is. One example is Deneb, in Cygnus, which is of the 1st magnitude, yet is a staggering 1,600 light years away - possibly even further! It is clearly a very luminous and powerful star.

Altair is 16 light years out, whilst Vega is 26 light years distant which is still close for stars!

In the Winter sky, Sirius, which is the brightest star in the entire sky at - 1.43, is only 8 light years from us. Its companion star, known as the "Pup" or Sirius B, is of about magnitude 8, which ought to make it easily visible in any telescope, or even binoculars, but because it appears so close to the blazing Sirius, it is a classic case of being lost in the glare! This results in it being a notoriously difficult object to see, even in big telescopes!

I have attempted it, by putting Sirius itself just out of the telescopic field of view, but I wasn't sure if I managed to glimpse it or not. At present, Sirius A and the Pup are at their furthest separation from each other, which would make it easier to find!

The nearest solar type star is Epsilon Eridani, at a distance of 10.7 light years, and of magnitude 3.8. Another close solar type star, is Tau Ceti at a distance of 11.9 light years, with a magnitude of 3.6.

A winter star is Proceyn, at 11.4 light years, and a magnitude of 0.5.

One cannot tell, just by looking up at the stars in the sky, how close, or how distant they are. One would think that the brighter a star is, the closer it is, and conversely, the fainter they are, the more distant they must be, but this is not necessarily the case, as we have seen above!

As David pointed out, the Red/Orange stars are the coolest in temperature, whilst the Blue/ White stars are the hottest!

Red/Orange stars include Betelgeuse, Antares, Arcturus and Aldebaran, whilst the Blue/White ones include Sirius, Vegas, Rigel, etc.

The principal is the same as a blacksmith heating up metal in a forge, when the metal first turns red/orange, and finally to blue/white when at its hottest.

Only the bright stars will show colour to the naked eye, whilst fainter ones just appear white. This is because at night, only the brighter celestial objects will show colour, because our eyes are not designed to show colour in dim lighting, as the colour receptors in our eyes do a poor job in these conditions. Of course, in using binoculars, or especially a telescope, fainter stars can show colour, as the telescope gathers far more light.

The poor performance of our eyes in terms of seeing colour at night, explains why many objects such as galaxies and nebulae don't show colour to the human eye. Cameras. however, can carry out exposures over a period of time, and can build up images. This is why you see all those beautiful, coloured images of them, in books, etc. However, brighter deep sky objects such as M42 (the Orion Nebula) show a green colour in my telescope, rather than the pinks and reds seen in images!

Some planetary nebulae show colour in beautiful blue or green, if they have a small angular size, rather than being spread out.

Planets, of course, are bright enough to show colour, even the distant ones like Uranus and Neptune, through my telescope.

Physicist who found spherical meteor fragments claims they may come from an alien spaceship – here's what to make of it

Acknowledgement: This article was written by Monica Grady, Professor of Planetary and Space Sciences, The Open University and was published in THE CONVERSATION on 7th July 2023. It is republished in full under a Creative Commons Licence. The original article, with additional links and images can be found here *https://theconversation.com/physicist-who-found-spherical-meteor-fragments-claims-they-may-come-from-an-alien-spaceship-heres-what-to-make-of-it-209101*

Avi Loeb, a physicist from Harvard University in the US, has recovered 50 tiny spherical iron fragments from the bottom of the Pacific Ocean that he claims may be material from an interstellar alien spaceship.

Loeb is linking his finding with the passage of a fireball in January 2014. The meteor was observed by sensors of the US Department of Defense that track all objects entering the Earth's atmosphere. It was recorded as travelling faster than most meteors and eventually broke up over the South Pacific Ocean near Papua New Guinea.

Data on the object is held by Nasa's Centre for Near Earth Object Studies(CNEOS). The meteor's official name is CNEOS 20140108, and is also referred to as IM1 (for interstellar meteor).

There is a very large scientific leap from observing a fireball to claiming it is an alien spaceship. What is the evidence on which Loeb bases the claim? And how likely is it to be true?

'Oumuamua, an interstellar comet

We have already had at least one visitor from interstellar space - the comet 'Oumuamua. The appearance of 1I/2017U1, the official name for 'Oumuamua, was certainly an unusual event. The

object was observed in 2017 as it was leaving the Solar System. Its trajectory is different from the near-circular orbits of the planets and elliptical orbits of comets.

The comet's path was traced back, with scientists discovering that it had come from well beyond the outermost fringes of the Solar System. Scientists were excited but also intrigued - although its shape was not captured on camera, the way that light reflected from it as it rotated suggested that it had an odd shape like a cigar when viewed side-on or a plate when viewed from the top.

In a thoughtful article written in 2018, Loeb speculated that 'Oumuamua might be artificial, rather than natural in origin – the product of an alien civilisation. He suggested that we should keep searching for interstellar debris in the Solar System.

In pursuit of such debris, Loeb's team interrogated the CNEOS database, looking for objects with unusual orbital characteristics. That's when they found CNEOS 20140108 and, based on its high velocity, suggested it was an interstellar meteor – giving it the more manageable name of IM1.

Modelling the path of the fireball, Loeb identified a specific area of the South Pacific where he believed debris from IM1 would be deposited. Following a dredging operation in the area with a powerful magnet, he now claims to have found material from IM1.

But what are the chances that he has found genuine interstellar debris at all, never mind a spaceship?

Cosmic spherules?

The metallic spherules that have been recovered are each about half a millimetre in diameter. It isn't impossible for them to be of extraterrestrial origin: several previous expeditions have recovered spherules from space from the seabed.

The first expedition to find such samples was HMS Challenger in 1872-76. Material dredged from the ocean floor contained many metallic droplets, described at the time, quite accurately, as "cosmic spherules". Droplets from space are spherical because they solidify from molten material torn from the surface of meteorites as they traverse the atmosphere.

Subsequent expeditions throughout the 20th century have also found cosmic spherules at the bottom of the ocean, but it has become harder to identify them. This is because, in the 150 years since the Challenger expedition, the amount of pollution has increased on Earth.

In 1872, the industrial revolution was in its infancy in Europe and practically non-existent in the southern hemisphere. Hence pollution such as "fly ash" (waste from burning coal) and particles from vehicles was minimal. Many of these pollutants are also spherical in appearance and metallic in composition.

Today, products from industrial processes and vehicles are everywhere. So, without an actual analysis of the composition of the spherules and a comparison with analyses of meteorites (and common terrestrial pollutants), it is not possible to identify any as extraterrestrial.

Interstellar?

But Loeb doesn't just think the material is from space, he thinks it is from interstellar space – arguing "this could be the first time humans put their hands on interstellar material".

This is simply not true. We have an abundance of interstellar material on Earth. Some of it is almost certainly on the ocean floor, but not in the form collected by Loeb.

The interstellar material to which I am referring comes in several different varieties. It is well known by astronomers that the interstellar medium - the space between stars - is not empty, but contains several different molecules, many of which are organic (made up of chains or rings of carbon). A portion of these molecules got mixed into the region of space where the Solar System was starting to form.

Stars themselves have also contributed material to the interstellar medium, as they evolved or exploded as supernovas. Some of this material comes as tiny diamonds or sapphires - rare mementoes of stars that lived and died before the Sun was born. These grains became part of the dust cloud that collapsed to form the Solar System, and were eventually carried to Earth in meteorites.

Alien spacecraft?

Loeb's evidence for an extraterrestrial source for the material – never mind an interstellar origin – is rather shaky. He has found metallic spherules. For me (and many others) to accept that these spherules are extraterrestrial, I'd need firm analytical evidence. What is their composition? What is their age? Can we rule out terrestrial pollutants? Can we rule out debris from extraterrestrial material from within the Solar System?

The first question, about composition, has been answered: analysis of the spherules shows them to be mainly iron with a few trace metals.

We know meteors from our Solar System contain iron and nickel, echoing the relative abundances of these metals in the Sun. But the spherules apparently contain "negligible" amounts of nickel - thus indicating that they are almost certainly not from meteors within the Solar System. This does not, however, prove they are interstellar - it merely makes it more likely that they're terrestrial pollutants.

The most convincing evidence would be to measure an age for the spherules greater than that of the Sun - which would identify them as interstellar.

And that would be amazing, but it would not necessarily identify them as having an artificial, rather than natural origin. I am not sure what evidence would be sufficiently convincing for this - maybe the autograph of the alien engineer who built the spacecraft?

Object of the month – the North American Nebula (NGC 7000) – Martin Howe

August sees the welcome return of (relatively) darker skies, with the Sun setting mid-month about 8:20pm (BST). There is also the prospect of warm evenings!

Prominent in the summer sky is the summer triangle – the asterism made up of Vega (in Lyra), Deneb (in Cygnus) and Altair (in Aquila). It is a good asterism to look out for and quite easy to spot in the late twilight before it gets truly dark, as these are among the three brightest stars in the sky at this time. They make good pointers to regions of interest, especially Lyra and Cygnus, which contain many interesting objects, including this month's spotlight – the North American nebula.

Astronomers like to give objects in the sky names that resemble what they see. This practice has been going on for millennia – we just need to see the constellation names and wonder, nine times of ten, what sort of imagination (or drugs) the ancients had. The relatively recent discoveries of nebulae have only increased the number of weird and wonderful names, notwithstanding the fact they these objects will also have more formal (but boring?) monikers like NGC 1234, M27, or Caldwell 8. We have moved beyond simple names like the "Andromeda galaxy" or the "great nebula in Orion" to the "sunflower galaxy" or the "elephant's trunk nebula". I must admit, I rather prefer these names to the boring catalogue number!

It is fair to say that the names for the nebulae do resemble much more closely the underlying object than the constellations ever did (I guess since there is more of a pattern to their shape rather than just a collections of stars), and one of the better resemblances must be the North American nebula, otherwise known by the rather more boring catalogue number of NGC 7000. This is one of many great imaging targets in Cygnus, and it's riding very high in the sky at about 65^{o}, about 2^{o} from Deneb, in mid-August.

Although it is listed as having a magnitude of +4, this is spread over a large area of about 2^{o} by 1.7^{o} (remember that the diameter of the full Moon is only about ½^{o}!) and so this object would be difficult to see visually – you would need something like a 150mm telescope, wide angle lens and, of course, a nice dark sky.

However, being an emission nebula, it responds very well to imaging, especially with a hydrogen alpha filter on a mono astro-camera. The image below is made up of 6 x 15 minute exposures through a hydrogen alpha filter using an ATIK 314L mono CCD camera. You can see from this image why it was given its informal nickname, resembling as it does, the shape of the North American continent, complete with the Gulf of Mexico. There is also another nebula in the bottom right of the image, which is known as the pelican nebula, but I must admit, I have struggled to ever see a pelican in this one!

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 8 September – Nonsuch High School

Jonathan Tennyson from University College London will talk about 'Water in the Universe'.

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 on 16 August.

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 9-17 August, with 17-20 August as an additional possibility.

AD HOC OBSERVING AT WARREN FARM:

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