St Benedict's NIGHT SKY NEWS – Sept 2023

St Benedict's is a member of the **SOCIETY FOR POPULAR ASTRONOMY** and receives regular newsletters regarding astronomical events and information. If you would like to be included on the mailing list for these, please contact JGregory@st-benedicts.suffolk.sch.uk

EDITOR'S NOTE: After a brief break for August, the *NEWS* is back. September is aways a special month as it marks the Autumn Equinox (this year on Saturday 23rd), after which the nights will get progressively longer than the days and, with the Sun sinking lower beyond the northern horizon, the nights will become darker too.

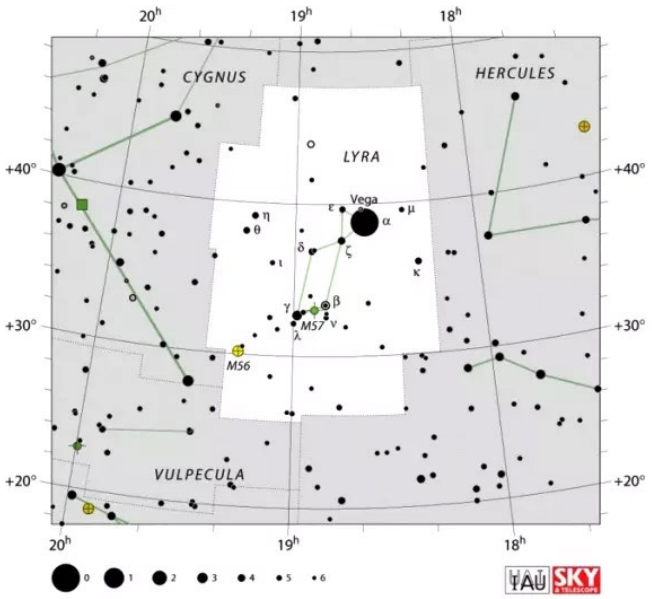
STARS IN YOUR EYES

Our featured constellation this month is actually one of the smallest in the night sky, but is easy to spot as it contains one of the brightest stars, **Vega** – it is the constellation **LYRA**.

At a magnitude of 0.03, Vega is the 5th brightest star in the night sky. Stand facing due south at around 8pm and Vega will be seen shining a bright blue-white almost directly overhead. Once your eyes become adjusted to the dark, you will then be able to make out the fainter stars of the constellation LYRA. In particular there are two stars close to Vega that make an equilateral triangle.

Vega was the first star other than the Sun to be photographed and the first one to have its spectrum recorded. It was first imaged by William Bond and John Adams Whipple at the Harvard College Observatory on July 17, 1850, and it was the American amateur astronomer Henry Draper who took the first photograph of Vega's spectrum in August 1872.

The star belongs to the spectral class A0V, which makes it a white dwarf. It was the northern pole star around the year 12,000 BC and will be again around the year 13,727.



Vega also forms part of a familiar summer asterism, the **Summer Triangle**, with the stars **Altair** in the constellation Aquila and **Deneb** in Cygnus. Vega is located at the vertex of the triangle.

The Summer Triangle lies in a rich field of the Milky Way. This time of year is idea for following the Milky Way with Vega and the Summer Triangle being an excellent guide. Once you have located the Triangle you will be able to follow the Milky Way, as a broad luminous band across the sky, all the way from the north eastern horizon down to the south west.

THE LYRA MYTH

Lyra represents the lyre of Orpheus, the musician and poet in Greek mythology who met his end at the hands of the Bacchantes. When he passed, his lyre was thrown into a river. Zeus sent an eagle to get the lyre and placed both of them in the sky.

Orpheus was the son of the Thracian King Oeagrus and the muse Calliope. When he was young, god Apollo gave him a golden lyre and taught him to play it, and his mother taught him to write verses. Orpheus was known for his ability to charm even stones with his music, for his attempts to save his wife Eurydice from the underworld, and for being the harpist and companion of Jason and the Argonauts. Without Orpheus and his music, the Argonauts would not have been able to make it past the Sirens, whose song enticed sailors to come to them, which usually resulted in sailors crashing their ships into the islands on which the Sirens lived. When the Argonauts approached the islands, Orpheus drew his lyre and played music that drowned out the Sirens' calls.

The most famous story involving Orpheus is that of the passing of his wife Eurydice. Eurydice was trying to escape a satyr at her wedding, and fell into a nest of vipers. She was bitten on the heel. Orpheus found the body and, deeply shaken, he played songs that made the gods and the nymphs cry. The gods felt pity for him and advised him to travel to the underworld and try to retrieve Eurydice. Orpheus took their advice. Once there, his song deeply moved Hades and his wife Persephone and they agreed to return Eurydice to the world of the living on one condition: Orpheus should walk in front of her and not look back until they both had reached the upper world. Orpheus and Eurydice started walking and, as much as he wanted to, he did not look back. However, he forgot that they both had to arrive to the upper world before he could turn. As soon as he reached it, he turned around, but Eurydice was not quite there yet and she disappeared from his sight, for good this time.

This story inspired the opera, **Orpheus in the Underworld**. Written by the Frenchmen Hector Crémieux and Ludovic Halévy, it was first performed in full in 1874. It featured music by the German-born French composer Jacques Offenbach, and it is probably his most famous work. The opera did not take the story seriously and is very much a lampoon and what people describe as a "comic opera".

THE MOON THIS MONTH

PHASE

3rd Quarter	6th
New Moon	15th
1st Quarter	22nd
Full Moon	29th

The Full Moon closest to the September equinox is called the **Harvest Moon**. It is unique because the Moon rises close to the same time several days in a row.

Usually, Full Moon names reflect the time of year they happen. And, true enough, the Harvest Moon graces the skies in the harvest season in the Northern Hemisphere. There is also an astronomical reason why the Full Moon closest to the autumnal equinox is called the Harvest Moon.

On average, the Moon rises about 50 minutes later each day. At Full Moon, it rises as the Sun sets. In the Northern Hemisphere around the Harvest Moon, however, the difference in the time of moonrise from one day to the next is less than 50 minutes. At the latitude of Edinburgh in the UK, the Moon rises about 10 minutes later each day. At the lower latitude of New York in the USA, the difference is around 25 minutes per day.

With successive moonrises coming around the same time of day, it may feel like there are several Full Moons in a row. Historically, the extra moonlight meant that farmers could work and harvest their crops for a longer time in the evenings. Hence, the Harvest Moon.

The Harvest Moon may look red when it rises. This is because the Full Moon rises at sunset, and refraction causes more of the red sunlight to come through at that time, giving the Moon a red tint.

THE PLANETS THIS MONTH

MERCURY: Generally lost in the morning twilight.

VENUS: Visible as a bright "morning star" at magnitude -4.7.

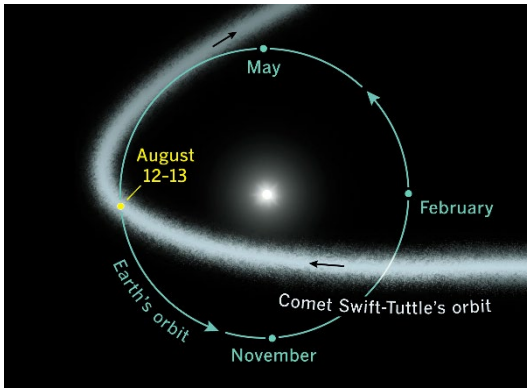
MARS: Now lost in the evening twilight.

JUPITER: Rising bright in the east at late evening time and remains visible throughout most of the night.

SATURN: Low in the south late evening, not as bright as Jupiter but easily visible.

METEORS THIS MONTH

No showers this month, but one of the year's most important showers, the **Perseids**, happened during August and peaked around the 12th. Unlike last year when there was a Full Moon lighting up the sky at the peak time, this year the was only 10% illuminated and the Perseids were easily visible and put on quite a show, with many observers worldwide reporting up to 100 per hour!



The Perseids are caused by Earth passing through debris — bits of ice and rock — left behind by **Comet Swift-Tuttle** which last passed close to Earth in 1992. The Perseids peak when Earth passes through the densest and dustiest area. Years without moonlight see higher rates of meteors per hour, and in outburst years (such as in 2016) the rate can be between 150-200 meteors an hour!

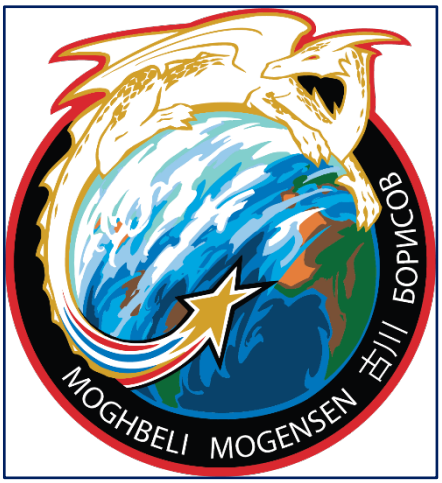
Sadly September is a "dry month" for meteors and there is no shower. However, small pieces of ice and rock are constantly entering the earth's atmosphere as we orbit the Sun, so you have the chance of spotting a meteor on any night. The next shower is the **Draconids** in October.

ISS SIGHTING TIMETABLE

Date	Visible	Max Height*	Appears	Disappears
Fri Sep 1, 3:04 AM	1 min	18°	18° above E	10° above E
Fri Sep 1, 4:37 AM	5 min	79°	28° above WSW	10° above E
Sat Sep 2, 3:50 AM	3 min	67°	67° above SE	10° above E
Sat Sep 2, 5:23 AM	7 min	75°	10° above W	10° above ESE
Sun Sep 3, 3:04 AM	1 min	21°	21° above E	10° above E
Sun Sep 3, 4:36 AM	5 min	81°	24° above W	10° above E
Mon Sep 4, 3:50 AM	3 min	74°	74° above ESE	10° above E
Mon Sep 4, 5:23 AM	7 min	53°	10° above W	10° above ESE
Tue Sep 5, 3:04 AM	1 min	19°	19° above E	10° above E
Tue Sep 5, 4:37 AM	5 min	65°	28° above W	10° above ESE

To keep up to date with future sighting opportunities, go to....
Newmarket, England, United Kingdom | Sighting Opportunity | Spot The Station | NASA

WHAT'S HAPPENING AT THE ISS?



On Saturday 26th August a SpaceX Falcon 9 rocket launched the Dragon spacecraft into orbit carrying NASA astronaut Jasmin Moghbeli, ESA (European Space Agency) astronaut Andreas Mogensen, JAXA (Japan Aerospace Exploration Agency) astronaut Satoshi Furukawa, and Roscosmos cosmonaut Konstantin Borisov, for a science expedition aboard the orbital laboratory.
Known as "Crew-7" this mission is historic as, for the first time, the 4 crew members are from different nationalities and represent 4 different space agencies. Crew-7 will join the space station's Expedition 69 crew of NASA astronauts Stephen Bowen, Woody Hoburg, and Frank Rubio, as well as UAE (United Arab Emirates) astronaut Sultan Alneyadi, and Roscosmos cosmonauts Sergey Prokopyev, Dmitri Petelin, and Andrey Fedyaev. For a short time, the number of crew aboard the space station will increase to 11 until Crew-6 members Bowen, Hoburg, Alneyadi, and Fedyaev return to Earth a few days later.

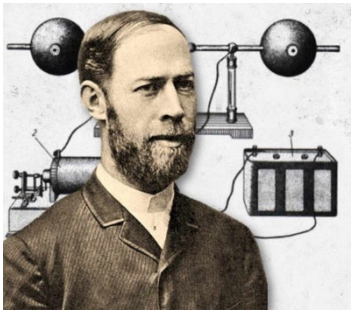
Crew-7 will conduct new scientific research to benefit humanity on Earth and prepare for human exploration beyond low Earth orbit. Experiments include the collection of microbial samples from the exterior of the space station, the first study of human response to different spaceflight durations, and an investigation of the physiological aspects of astronauts' sleep. These are just some of the science experiments and technology demonstrations that will take place during their mission.

PRINCIPAL SOURCES OF INFORMATION

https://www.constellation-guide.com/constellation-list/lyra-constellation/
https://www.timeanddate.com/astronomy/moon/harvest.html
https://www.space.com/perseid-meteor-shower-2023-amazing-photos
https://blogs.nasa.gov/crew-7/

THE HISTORY OF ASTRONOMY – Part 4

RADIO



In the late 1880s the German physicist, Heinrich Hertz, discovered the existence of long-wavelength electromagnetic radiations – **RADIO WAVES**. Although these had been predicted by the great Scottish scientist James Clerk Maxwell some years before, he was unable to produce an apparatus to prove his theory.

Hertz used a spark gap attached to an induction coil and a separate spark gap on a receiving antenna. When waves created by the sparks of the coil transmitter were picked up by the receiving antenna, sparks would jump its gap as well. Hertz showed in his experiments that these signals possessed all the properties of electromagnetic waves predicted by Maxwell. At first these newly discovered waves were called *"Hertzian Waves"* until, in 1910, they were officially named *"Radio Waves"*.

It is interesting historically to note that Hertz did not realise the practical importance of his radio wave experiments. He is reported to have stated that *"It's of no use whatsoever … this is just an experiment that proves Maestro Maxwell was right—we just have these mysterious electromagnetic waves that we cannot see with the naked eye. But they are there."* Asked about the possible applications of his discoveries, Hertz replied *"Nothing, I guess."*

At the onset of World War I, radio was still in its infancy. Army equipment was primitive, had a very short range, and often negotiated atmospheric interference. The majority of communications were by written messages or wire telegraphs/telephones. However, it was quickly realised that the future of communications technology lay in the use of radio and this led to a rapid expansion of research and development throughout the 1920s and beyond. It was a particular discovery in 1932 that would revolutionise Astronomy.

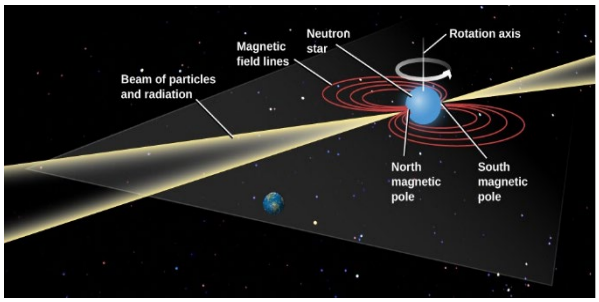
In 1932, a young engineer for Bell Laboratories (US) named Karl G. Jansky tackled a puzzling problem: noisy static was interfering with short-wave radio transatlantic voice communications. After months of tracking the source, he noticed that it shifted slowly across the sky. What could this be? Stumped, he consulted with an astronomer and came to a startling conclusion: *"I have taken more data which indicated definitely that the stuff, whatever it is, comes from something not only extraterrestrial, but from outside the solar system. It comes from a direction that is fixed in space and the surprising thing is that …[it] is in the direction towards which the solar system is moving in space. According to Skellett…there are clouds of "cosmic dust" in that direction…"*

Jansky had discovered something at the heart of the Milky Way Galaxy. His work led to one of the most important papers in the history of astronomy in the 20th century, called *"Radio Waves from Outside the Solar System"*, published in 1933. His work laid the foundation for the science of **RADIO ASTRONOMY**!

One of the most significant discoveries from Radio Astronomy came in 1967 and was made by a young, 24-year-old postgraduate student at Cambridge University's radio astronomy observatory – **Jocelyn Bell Burnell**.

Using equipment that was "hand-built" she examined, with laborious diligence, radio signals coming from space and plotted on an ink-pen chart recorder. After spending 3 months tracking the data, in November of 1967 she went to her supervisor, Antony Hewish, and showed him her evidence of a radio source that pulsed at precisely one every one and a third seconds.

There was much excitement at the time over the possibility that the signal might be coming from an alien civilisation and, initially, the source was dubbed "LGM-1" – "Little Green Men". However, it was quickly realised that this was not the case and the source was renamed a "pulsating radio source". Later, in a newspaper article, a journalist shortened it to **"pulsar"**. After several more years of investigation the source was identified as a rapidly rotating neutron star. Bell Burnell herself discovered a 2nd pulsar a few weeks after her first and, since then, different types of pulsar have been observed.



Although astronomers believe that there may be as many as a billion neutron stars in our galaxy, only about 2000 pulsars have been identified. This is because their radiation is emitted from their poles meaning that we can only detect them if they happen to be correctly aligned with their axis of rotation perpendicular to the direction to Earth, with their poles then facing us. As the star rotates it acts as a stellar lighthouse.