St Benedict's NIGHT SKY NEWS – June 2023

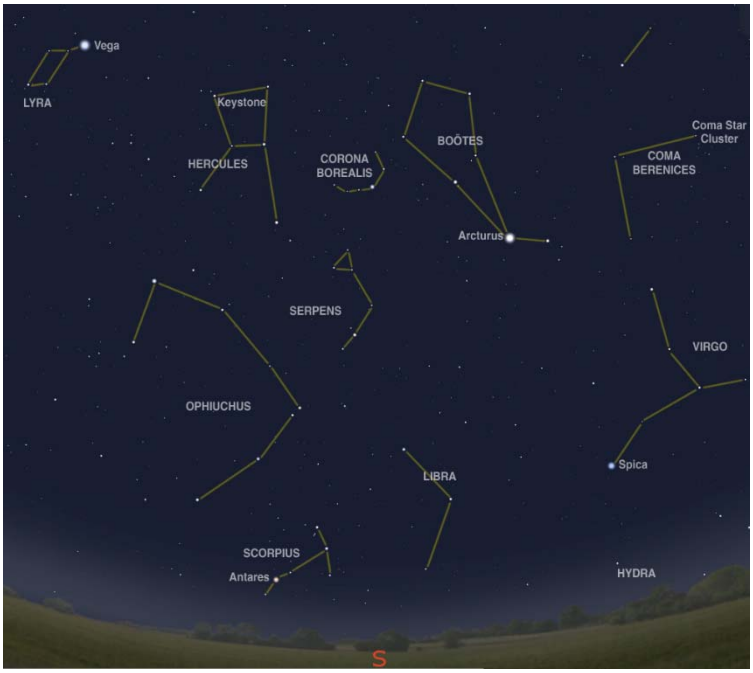
St Benedict's is a member of the **SOCIETY FOR POPULAR ASTRONOMY** and receives regular newsletters regarding astronomical events and information. If you would like to be included on the mailing list for these, please contact JGregory@st-benedicts.suffolk.sch.uk

STARS IN YOUR EYES

June is midsummer for us in the northern hemisphere, the month of the Summer Solstice. This means that it does not get dark enough for stargazing until well after 10pm. Also, because our night time side of the Earth is facing away from the centre of our Milky Way galaxy, there are no really bright constellations as there are in winter. However, this is no excuse not to have a go!

High in the sky, looking south, is one of the most distinctive constellations, owing to its clear shape of a crown: **CORONA BOREALIS** – which is Latin meaning "Northern Crown".

Of the seven stars that make up the constellation, only four are brighter than magnitude 3.0. The brightest itself being only magnitude 2.2. Best viewing conditions will be between 11pm and midnight around the time of the New Moon, 19th.



Although rather faint, the constellation can be found by first locating two of the brightest stars in the summer sky: the bright, white **Vega** (in the constellation **Lyra**) and the orange-hued red giant **Arcturus** (in the constellation **Boötes**). Use the sky map on the right. Draw an imaginary line between the two stars and the "crown" of **Corona Borealis** will be easily spotted between the constellations of **Hercules** and Boötes.

Corona Borealis was first catalogued by the Greek astronomer Ptolemy in the 2nd century. At the time, it was known simply as Corona. Corona Borealis is the 73rd constellation in size, occupying an area of 179 square degrees and, as such, will look good using small binoculars.

THE CORONA BOREALIS MYTH

In Celtic mythology, Corona Borealis is known as *Caer Arianrhod*, or the Castle of *Arianrhod*, the place where the mythical *Lady Arianrhod* lived – known as the "White Goddess", her name translates as "Silver Wheel". She is ruler of *Caer Sidi*, a magical realm in the north. She was worshiped as priestess of the moon. The benevolent silver sky-lady came down from her pale white chariot in the heavens to watch more closely over the tides she ruled. She was called the Silver Wheel because the dead were carried on her *Oar Wheel* to *Emania* (the Moon-land or land of death), which belonged to her as a deity of reincarnation and karma.

However, probably the most well-known myth is from Ancient Greece where Corona represents the crown of Ariadne, daughter of King Minos of Crete, who helped the hero Theseus defeat the Minotaur and find his way out of the creature's labyrinth in which it lived. The Minotaur was a creature with a human body and head of a bull that lived in a labyrinth designed by Daedalus. In the myth, Ariadne married the god Dionysus. The circlet of stars in the constellation Corona Borealis represents the crown made by the god Hephaestus that Ariadne wore on her wedding day.

The Minotaur was in fact Ariadne's half-brother: according to the legend, her mother Pasiphae gave birth to the creature. The King Minos had the Minotaur locked inside the labyrinth to hide the family secret. The labyrinth was designed in such a way that no one, not even the Minotaur, could find a way out. When Theseus came to Crete, he was chosen to be one of the people put into the labyrinth for the Minotaur to find and eat. Ariadne fell in love with Theseus and, following Daedalus' advice, gave him a ball of thread to take with him into the labyrinth if he promised to take her with him once he escaped. Theseus agreed. Once he defeated the Minotaur with his bare hands, the hero followed the trail of the thread and found his way out of the labyrinth.

Ariadne and Theseus sailed off together shortly thereafter, but he soon abandoned her on the island of Naxos. The god Dionysus found the princess weeping, fell in love, and the two were soon married. Ariadne wore a crown made by Hephaestus at the wedding and, once the ceremony was over, she tossed it into the sky, where the jewels turned into stars and the crown became the constellation Corona Borealis. The brightest star in the constellation, Gemma, got its name from the Latin word for "jewel."

The Arabs know the constellation as "the poor people's bowl" or *Alphecca*, which means "broken up." The name *Alphecca* was later given to the constellation's brightest star, Alpha Coronae Borealis. The Cheyenne called the constellation the Camp Circle because its shape was similar to the way they arranged their camps, in a semi-circle.

THE MOON THIS MONTH

PHASE

Full Moon	4th
3rd Quarter	10th
New Moon	19th
1st Quarter	27th

The wild strawberries that start to ripen during early summer give the name to June's Full Moon: STRAWBERRY MOON. Other names for this Full Moon are **Rose Moon**, **Hot Moon**, **Berries Ripen Moon** and **Green Corn Moon**.

This "Strawberry Moon" name has been used by Native American Algonquian tribes that live in the north-eastern United States as well as the Ojibwe, Dakota, and Lakota peoples to mark the ripening of "June-bearing" strawberries that are ready to be gathered. The Haida term Berries Ripen Moon reflects this as well. As flowers bloom and early fruit ripens, June is a time of great abundance for many.

The Celtic names are **Horse Moon**, **Dyan Moon**, and **Rose Moon**. Other English names are **Flower Moon** and **Planting Moon**. Other sources quote **Mead Moon** as the Anglo-Saxon name because this was the time for mowing the meads, or meadows. June was traditionally the month of marriage, and is even named after the Roman goddess of marriage, Juno. Following marriage comes the "honeymoon," which may be tied to this alternative Moon name!

When it has just risen above the horizon, the Moon may well appear a golden or reddish colour. This is not the true colour, though – it is because the dust in the summer atmosphere scatters the light at the violet end of the spectrum allowing the red/orange/yellow to dominate.

THE PLANETS THIS MONTH

MERCURY Best opportunities are in the morning, mid-to-late June, just before sunrise. But difficult.

VENUS Spectacular evening "star" planet. Cannot be missed at magnitude -4.7. It will be very close to a first quarter crescent Moon and a faint Mars late in the evening on the 21st, just above the western horizon.

MARS Rather faint in the western evening sky after sunset. Best seen at the beginning of the month. Close to the Moon and Venus on the 21st (see above), but getting lost in the twilight.

JUPITER: Morning planet, low in the eastern sky before sunrise. Will be seen very close to the third quarter crescent Moon on the 14th. But you'll need to be up and out just after 3am!

SATURN: Morning planet, visible low in the south. Fainter than Jupiter and soon lost in the early morning light.

METEORS THIS MONTH

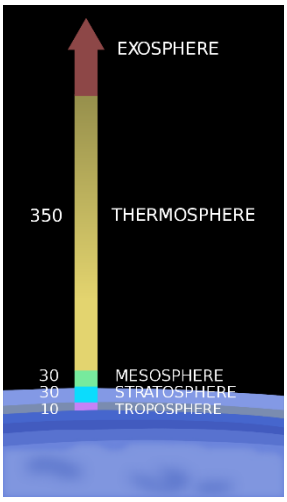
There are no major showers this month.

NOCTILUCENT CLOUDS

Although June is a disappointing month for stargazing, there is a good chance of seeing a truly wonderful night sky phenomenon: **noctilucent clouds**. They only ever appear at the height of summer.

Noctilucent clouds are extremely rare very high clouds seen in the night sky, usually on clear summer nights. Their name is derived from the Latin meaning "light shining". They become visible about the same time as the brightest stars, sometime after 10.30pm, and are usually bluish or silvery in appearance, although may also appear orange or red. They often closely resemble thin streaky cirrus, though other shapes are often seen.

Noctilucent clouds are extremely rare collections of ice crystals. They become visible about the same time as the brightest stars appear and often stay visible after dark because they are still reflecting sunlight due to their great height. Unlike normal clouds that extend up to about 60,000 feet, noctilucent clouds are at altitudes around 200,000 feet. They occupy the layer of atmosphere known as the **Mesosphere** and are only seen at latitudes between 45°N and 80°N in the Northern Hemisphere, and equivalent latitudes in the southern hemisphere. They are seen less often in the southern hemisphere as there is very little land and very few people there. Only the southern tip of Argentina and Chile, and the Antarctic are at the correct latitude.



Like many clouds, noctilucent clouds need water vapour, dust, and very low temperatures to form. Low temperatures are easily attainable in the Mesosphere, but water vapour and dust are in short supply. The dust may well come from tiny meteors from space, although dust from volcanoes or man-made pollutants may add to these. Scientists believe that the moisture comes through gaps in the **tropopause**, or perhaps forms from the chemical reaction of methane and other chemicals.

The Mesosphere is one of the five main layers of the Earth's atmosphere. The tropopause is the boundary between the **Troposphere**, the lowest layer, and the next layer, the **Stratosphere**.

ISS SIGHTING TIMETABLE

To check the latest sighting times, use the following link:

Newmarket, England, United Kingdom | Sighting Opportunity | Spot The Station | NASA

JAMES WEBB SPACE TELESCOPE - LATEST NEWS

Since becoming fully operational almost exactly 1 year ago, the JWST has revealed the cosmos in a way that we have never seen before and its revelations continue. Here are just a few of the more recent news items:

- May 15, 2023 - Using Webb's NIRSpec (Near-Infrared Spectrograph) instrument, astronomers have confirmed gas – specifically water vapor – around a comet in the main asteroid belt for the first time, indicating that water ice from the primordial solar system can be preserved in that region.
- May 10, 2023 - A science team gains new insight into the atmosphere of a "mini-Neptune," a class of planet common in the galaxy but about which little is known.
- May 8, 2023 - Astronomers used NASA's James Webb Space Telescope to image the warm dust around a nearby young star, Fomalhaut, in order to study the first asteroid belt ever seen outside of our solar system in infrared light.
- May 1, 2023 - Astronomers used NASA's James Webb Space Telescope to study a rocky exoplanet known as GJ 486 b, and their observations using Webb's Near-Infrared Spectrograph (NIRSpec) show hints of water vapor.
- Apr 24, 2023 - NASAs James Webb Space Telescope has confirmed, for the first time, a protocluster of seven galaxies at a distance that astronomers refer to as redshift 7.9, or a mere 650 million years after the big bang.

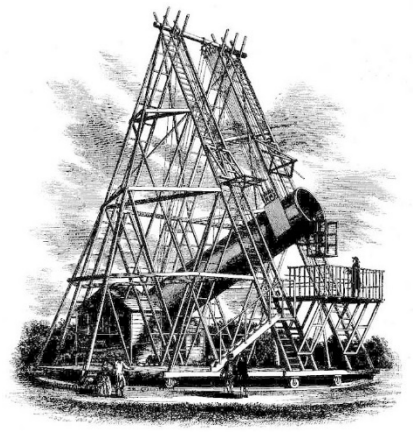
Keep up to date with all the latest news from the JWST at:

https://www.nasa.gov/content/james-webb-space-telescope-latest-news

THE HISTORY OF ASTRONOMY – Part 3

INTO THE LIGHT…and beyond!

Part 2 ended with the sentence *"It was early in the nineteenth century before we began to comprehend the true immensity of the cosmos."* It was around this time in Europe, especially the UK, that astronomers began to build larger and larger telescopes with which to discover and observe the planetary bodies in our Solar System, as well as more distant stars, nebulae and galaxies.

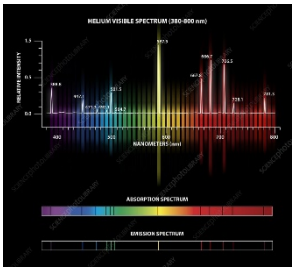


In **1781**, the English astronomer **William Herschel** discovers the planet Uranus using a homemade 6.2-inch reflecting telescope, although he at first mistakes it for a comet. Uranus is the first planet to be discovered beyond Saturn, which was thought to be the most distant planet in ancient times. Herschel built his ultimate telescope between 1785 and 1789, known as the **40-foot telescope**, or the **Great Forty-Foot Telescope**.

It used a 48-inch (120 cm) diameter primary mirror with a 40-foot-long (12 m) focal length (hence its name "Forty-Foot"). It was the largest telescope in the world for 50 years and may have been used to discover Enceladus and Mimas, the 6th and 7th moons of Saturn.

All astronomy during these times used visible light, observed through optical scopes. Herschel conducted an experiment in **1800** that would pave the way to a whole new branch of astronomy.

Repeating Isaac Newton's famous experiment on 'Light and Colours' some 35 years earlier, Herschel used a glass prism to split sunlight into its component, rainbow colours. Fascinated to know if the different colours had different temperatures, he used a thermometer to show that, indeed, they did have different temperatures. As a 'control' measurement, expecting to measure just the normal temperature of the room, he happened to place his thermometer just beyond the red end of the spectrum where no light was visible. Astonishingly he noticed a sudden increase in temperature, the highest of all, which marked the discovery of an invisible region of the spectrum: the **infrared**. This would eventually lead to the use of **spectroscopy** in astronomy. This has culminated in the most powerful infrared telescope ever produced, the **James Webb Space Telescope**.



Not long after Herschel's discovery, in **1814** the German physicist and lens manufacturer **Joseph von Fraunhofer** built the first accurate **spectrometer** and used it to study the spectrum of the Sun's light. He discovers and maps hundreds of fine dark lines crossing the solar spectrum. In 1859 these lines are linked to chemical elements in the Sun's atmosphere. Spectroscopy becomes a method for studying what stars are made of and is still a standard method today. In **1868** astronomers noticed a new bright emission line in the spectrum of the Sun's atmosphere during an eclipse. The emission line is caused by an element's giving out of light, and British astronomer Norman Lockyer concluded that it is was element unknown on Earth. He called it **helium**, from the Greek word (*helios*) for the Sun. Nearly 30 years later, helium was found on Earth.

In **1872** an American astronomer Henry Draper took the first photograph of the spectrum of a star (Vega), showing absorption (Fraunhofer) lines that revealed its chemical makeup. Astronomers began to see that spectroscopy is the key to understanding how stars evolve. William Huggins used absorption lines to measure the redshifts of stars, which give the first indication of how fast stars are moving.

In **1929**, the American astronomer Edwin Hubble used the measurement of the redshift of distant galaxies to announce the discovery that the Universe is actually expanding. Furthermore, that the farther away a galaxy is, the faster it is moving away from us.

Two years later, in **1931**, a Belgian catholic priest and astronomer, Georges Lemaître, suggested that the observed expansion of the Universe can be traced to an initial "Big Bang".

In **1983**, the first infrared astronomy satellite, IRAS, is launched. It had to be cooled to extremely low temperatures with liquid helium, and it operated for only 300 days before the supply of helium was exhausted. During this time it completed an infrared survey of 98% of the sky.

In **2021** (December), the James Webb Space Telescope was launched. It became operational in June 2022. Using the latest infrared technology, it will study every phase in the history of our Universe, ranging from the first luminous glows after the Big Bang, to the formation of solar systems capable of supporting life on planets like Earth, to the evolution of our own Solar System.

PRINCIPAL SOURCES OF INFORMATION

https://www.constellation-guide.com/constellation-list/corona-borealis-constellation/
https://www.timeanddate.com/astronomy/moon/strawberry.html
https://www.almanac.com/content/full-moon-june
https://www.metoffice.gov.uk/weather/learn-about/weather/types-of-weather/clouds/other-clouds/noctilucent