Tāhuna GLENORCHY DARK SKIES SANCTUARY

Newsletter November 2026

Another year is winding down, and we know things can get really busy with everyone rushing to wrap up tasks before the summer holidays. But don't forget to take a moment to look up at the night sky and notice how the changing season also changes the stars above us!

Here's what's in this month's issue:

Archaeoastronomy: Our series continues as we explore how ancient monuments interact with the Sun and the shadows they cast.

Galaxy & Space Questions: This month, we're turning our attention to the wider galaxy—starting with a classic question: *What exactly is a light-year?*

Do you have a burning space question of your own? Drop us an email, and we'll try to answer it in an upcoming newsletter!

A new space probe is off to Mars check out the world astronomy news.

Our constellation this month is **Taurus,** back in the night sky by the end of the month.

Coming up this month:

- 5th November: Guy Fawkes
- 9th November: New Moon
- 14th November: 4 planet alignment
- 24th November: Full Moon

Dark Sky Group Updates:

Behind the scenes, our team has been working hard on a brand-new app to streamline dark sky measurements with the Queenstown Community Tech Lab. Once complete, this tool will make taking sky readings much faster, and we plan to share it with dark sky groups across New Zealand. Ultimately, it will make reporting to Dark Sky International much smoother—and bring us one step closer to making New Zealand an official Dark Sky Nation! We also received funding from LoveQT for some community bat monitors that'll be available to borrow in the new year. More news on that coming next month...



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World Astronomy News

A new journey to the Martian Moons

Led by the Japan Aerospace Exploration Agency, the MMX mission is officially on its way to Mars to take a close-up look at its two fascinating moons, Phobos and Deimos. If everything goes as planned, this ambitious mission will make history as the very first spacecraft to land on Phobos, collect precious samples, and bring them all the way back to Earth for scientists to study.

The Voyage and the Plan

Right now, the spacecraft is journeying through space under its own power. The trip to the Red Planet will take about ten months, with arrival expected in August 2027. Once it reaches Mars, MMX will slip into a special orbit around Phobos and spend about three years exploring the Martian system.

Along for the ride is the **IDEFIX rover**. This is a fantastic collaboration between the space agencies of France and Germany and is scheduled to touch down on Phobos in late 2028 or early 2029. After carefully mapping the surface to find the best landing spots, MMX will perform two separate touchdowns to scoop up samples and safely store them in its return capsule. Before heading home, the spacecraft will even swing past the smaller moon, Deimos, for a series of close-up flybys.



If all goes according to schedule, MMX will return to Earth in November 2030 and drop off the sample capsule in Australia in 2031.

Solving a Cosmic Mystery

Scientists are eagerly awaiting these samples to finally answer a decades-old question: How did the Martian moons get there in the first place? Right now, experts are divided between two main theories.

On one hand, their neat, circular orbits suggest they might have formed much like Earth's moon, born from the debris of a massive cosmic collision between Mars and a giant space rock. On the other hand, neither Phobos nor Deimos is big enough to become round—instead, they are oblong and lumpy, looking a lot like giant floating potatoes. Combined with clues from telescopic measurements, this potato-like shape hints that they might actually be ancient asteroids captured by Mars' gravity long ago.

By solving this cosmic puzzle, the MMX mission will give us incredible new insights into the geological past of Mars and the early history of our solar system.

FUN FACT: Phobos is only 26 x 22 x 18 kilometers, with a mean diameter of about 22 kilometres and Deimos is even smaller 15 x 12 x 11 kilometres in size.

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Archaeoastronomy

Some of the ancient civalisations we know about went to extremes to engineer their monuments. Others were more subtle in their approach, but all of them left behind both art and mystery that still intrigues us today.

We often think of historic architecture as static stone structures, but many of the world's most famous monuments were designed to interact with light and shadow, transforming them into living astronomical tools.

Playing with shadows

One interesting way early cultures seem to have interacted with their environment is to create interesting effects with shadows.

The image below is of the Wilmington long man. On the summer solstice the man is in full sun all day. At the winter solstice the sun doesn't reach the man at all. At the spring equinox the sun casts a shadow that touches the top of one staff the man holds and the bottom of the other one. At the autumn equinox ,the shadow goes the opposite direction.





The Serpent of Chichén Itzá

One of the most famous examples of shadow play takes place in Mexico at the Maya pyramid of El Castillo in Chichén Itzá. Twice a year, during the spring and autumn equinoxes, the late afternoon sun casts a series of triangular shadows along the side of the main staircase. As the sun sinks lower, these shadows connect with a carved stone snake head at the base, creating the striking illusion of a massive feathered serpent slithering down the pyramid toward the earth.

Both of these spectacles signaled crucial seasonal shifts for farming and spiritual rituals.



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Learn the night sky

This month...

The New Moon is on the 9th of November, and the Moon will be full on the 24th of November. Dark night begins at 10:29pm on the 1st of November and begins at 11:28 pm by the end of the month on the 31th of November.

In the Morning Sky

Venus is visible at dawn, and Jupiter is visible in Leo at midnight. On November the 14th four planets can be seen just before dawn. Jupiter and Mars high in the sky, and Venus with Mercury low on the eastern horizon.

In the Evening Sky

The bright star of Sirius is now seen in the evening sky rising at about 10:30pm at the start of the month and at sunset by the end of the month. Shortly after Sirius, Orion's belt can be seen followed by Aldebaran and the constellation of Taurus (including Matariki). These stars become increasingly visible as the Milky Way core sinks below the horizon. The Milky Way core will disappear from our skies completely by the end of November, not becoming visible again until early March.

In the Zodiac lineup of constellations, this month we are looking at Taurus. As a zodiac constellation, Taurus sits on the ecliptic, meaning the sun, moon, and planets pass through it. Taurus is one of the oldest known zodiac constellations, featuring a V-shaped face formed by the Hyades star cluster and a glaring red eye named Aldebaran.

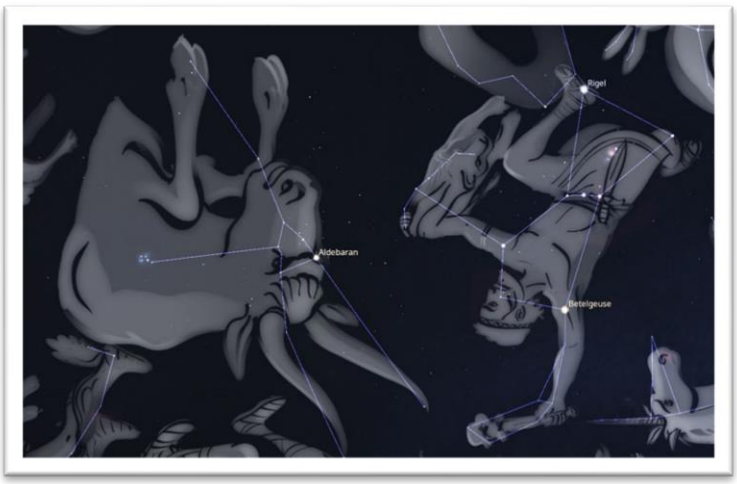
Taurus, has its origin in ancient Sumer. It depicts "The Bull of Heaven", a gigantic creature that was slaughtered by Gilgamesh, king of Uruk, to protect his people. It is depicted as half in the sky. The Bull of Heaven was considered a gate-keeper for the Sun when it goes from the southern to the northern hemisphere (the first constellation after spring equinox). Its counterpart in autumn is "The Bull of the Earth," a metaphor for the scorpion as Taurus and Scorpius are opposite each other in the zodiac.

In ancient Greek mythology, Taurus represents the bull from the story of the abduction of Europa, a beautiful Phoenician princess. According to the myth, Zeus, the king of the Greek gods, transformed himself into a magnificent white bull to seduce Europa and carry her away to the island of Crete. To honour this mythological event, the constellation Taurus was established, with its bright star cluster, the Pleiades, often associated with the Seven Sisters, representing the bull's shoulder.

For us down here in the Southern Hemisphere, everything is seen upside down. In Maori Matauranga, the v shape by Aldebaran is the sail on the waka of Taramainuku , Pleiades is the front of the waka, and Orion's belt and sword is the stern.

There are some cool deep space objects to be found in the Taurus constellation.

The Pleiades (M45 / Seven Sisters, Matariki): A bright, loose open star cluster featuring hot blue giant stars and surrounding reflection nebulosity (such as the Merope Nebula).



The Hyades: The closest open star cluster to Earth, forming the prominent V-shaped face of the bull.

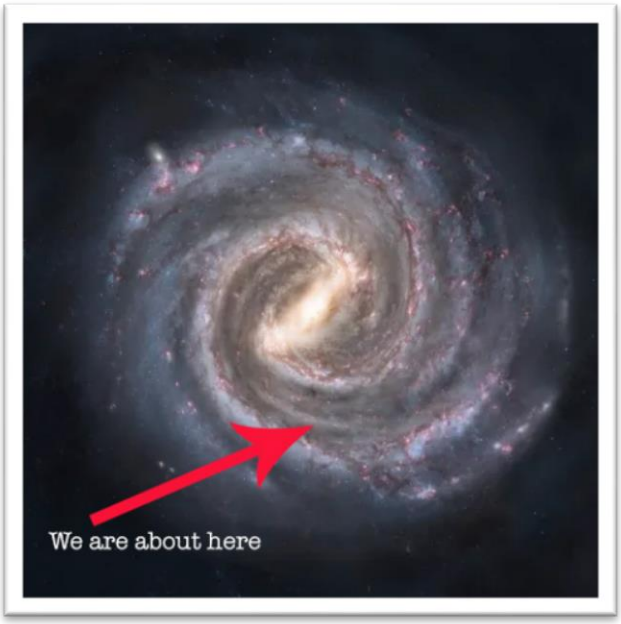
Messier 1 (Crab Nebula / NGC 1952): A historic supernova remnant created by a stellar explosion recorded in AD 1054, powered by a central pulsar.

It also has several open clusters that are great to look at through binoculars.

NGC 1409 & NGC 1410: An interesting pair of physically interacting / merging galaxies.

Let's talk about Galaxies

How big is the universe?



Galaxies are the biggest single object in the universe, and usually consist of billions of stars all orbiting around a dense centre. In fact almost all objects we can see in space...star clusters, nebulae, black holes, exist inside a galaxy.

These days we know that the universe has *trillions* of galaxies.

But only 100 years ago we thought that the Milky Way was the whole universe!

This thinking changed virtually overnight when Edwin Hubble was able to measure the distance to the stars in the Andromeda nebula and proved it was far beyond our own galaxy ...and was in fact another galaxy in its own right.

But the distance between the galaxies is vast...many times the size of the galaxies themselves, and galaxies are mind bogglingly huge!

So how big is a galaxy?



Our own Milky Way galaxy is estimated to be **100 thousand light years across!** And holds over **200 BILLION** stars.

FUN FACT: It is estimated that about 117 billion people have ever been alive on earth throughout history, so there is a star in our galaxy for every single one of us.

Above is an artist's impression of how our galaxy might look. And to the left is a view of the Sombrero Galaxy, which is how our galaxy might look like from the side.

Our galaxy is known as a bar galaxy. It has a bar in the centre and spiral arms coiling away at each end.

Our Sun is located towards the edge and between the two main spiral arms.

The arms of a spiral galaxy contain most of the interstellar medium – dust and other material between stars – within a galaxy. It is in the spiral arms that new stars are forming, hence their usually bright, blueish or white colour.. It is the dust that obscures background light to create the dark lanes you can see in our Milky Way.

As well as **Spiral Galaxies** there are also **Elliptical Galaxies** and **Irregular Galaxies**. and of course there are also **Dwarf Galaxies.** In fact there are more dwarf galaxies than any other kind. Gimli would be pleased!

Two Dwarf galaxies can be seen in the Southern Hemisphere. They are the Large and Small Magellanic clouds. You can see them by looking south on a clear dark night. They look like small patches of cloud.

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SPACE QUESTIONS

What is a light year?

It sounds like a measure of time, but is actually **a measure of distance.**

A light year is the distance that a photon of light can travel in one year.

Light moves at an incredible speed of about 300,000 kilometers per second. That's the fastest speed in the universe.

So how far is that?

In one full year of traveling at that speed, light covers about **9.5 trillion kilometers**!

Why do we use light years?

Regular measurements like kilometers or miles are too small and clumsy when talking about deep space.
Saying a star is *40 trillion kilometers* away is hard to imagine or work with.
Saying it is **4.2 light-years** away (like Proxima Centauri, the closest star to our sun) is much simpler and easier to understand.

FUN FACTS:

Our Sun is **8 light minutes** away from Earth. It takes light 8 minutes to reach us once it has left the Sun's surface.

Reflected light from the moon takes **1.3 light seconds** to reach us.

Our furthest space probes –voyagers one and two, have been travelling for 50 years and are just now reaching **one light day** away from the Earth.

Looking into the past

Because light takes time to travel across space, seeing a star that is 100 light-years away means you are looking at light that left that star 100 years ago. In effect, looking deep into space is like looking backward in time.



This is an image of the Large and small Magellanic clouds.
The Large Magellanic Cloud (LMC): About **163,000 light-years** away.
The Small Magellanic Cloud (SMC): About **200,000 light-years** away.

So when we look up at the Large Magellanic Cloud, the light hitting our eyes actually left that galaxy 163,000 years ago—long before modern human civilization even began on Earth.

Reclaiming the Night: Why Shielding Outdoor Light Matters

Every night, billions of unshielded outdoor fixtures spill light upward into the atmosphere and sideways into neighbouring windows. This waste—known as light pollution—obscures the stars, disrupts natural ecosystems, and impacts human health. Shielding outdoor lighting is one of the simplest, most effective steps property owners can take to restore the balance of night and day.

Preserving the Natural View of the Night Sky

Unshielded light shines directly into the sky, reflecting off atmospheric particles to create a wash of artificial brightness called "skyglow." Skyglow masks the natural cosmos, hiding constellations, planets, and the Milky Way from view. Fully shielded fixtures direct light downward toward the ground, drastically reducing upward spill and allowing the brilliance of the night sky to emerge.

The Vital Health and Ecological Benefits of Darkness

Natural darkness plays an essential role in biological systems across the planet:

- **Human Health:** Constant exposure to artificial light at night suppresses melatonin production, disrupting circadian rhythms and negatively affecting sleep quality, immunity, and overall metabolic health.
- **Wildlife Preservation:** Nocturnal animals rely on darkness to forage, mate, and avoid predators. Artificial light disorients migratory birds, causes hatchling sea turtles to head inland away from the ocean, and severely disrupts insect populations.
- **Improved Safety and Energy Efficiency:** Glare from unshielded bulbs blinds pedestrians and drivers by casting harsh shadows. Shielded lights focus illumination precisely where it is needed on walkways and entryways, providing safer lighting while reducing energy waste.

Simple Steps for Better Outdoor Lighting

1. **Install Fully Shielded Fixtures:** Choose dark-sky compliant fixtures that direct 100% of the light downward.
2. **Use Warm-Color LEDs:** Opt for bulbs rated at 3000K or lower to minimize harsh, high-energy blue light emissions.
3. **Add Timers or Motion Sensors:** Ensure lights operate only when needed rather than burning continuously through the night.

Darkness is as essential to our biological well-being and ecological balance as light is to our waking hours.

Keep it Starry!
The Tāhuna Glenorchy Dark Skies Team