**Winter Night Sky** Stardome

The cold, still nights provide brilliant stargazing and planet viewing opportunities. The zodiac constellations of winter are Libra, Scorpius, Sagittarius and Capricornus. The first three are particularly distinctive and once identified, they won’t be forgotten.

Winter, with cold, still nights provides the best planet-viewing opportunities of the year. These planets will be found on the plane of the ‘Ecliptic’. Jupiter and Saturn are very well placed for telescope viewing around 11pm.

In NZ’s northern sky over the early winter the orange star Arcturus is the main feature. It is the fourth brightest star of the night sky and the brightest in the constellation Bootes. By late winter we see the two bright stars Vega in Lyra and Altair in Aquila as the most prominent starry landmarks. In the far south of the country these Northern Hemisphere stars don’t rise very high but are very familiar in the north.

Looking south in early winter, the spectacular constellations of Crux, Centaurus and Carina are high up and the further south you are, the better the view. These regions are richly packed with stars and are well worth exploring with binoculars.

By early August the Scorpius-Sagittarius region is the one to explore during the early evening. This is the brightest and densest part of the Milky Way and it is seen best from the latitude of Aotearoa. On dark moonless nights away from towns and cities, the light from several hundred billion stars combine to make ‘star clouds’. This bright region of the Milky Way and our beautiful natural landscapes make perfect targets for astro-photographers. When looking at Sagittarius you are looking straight towards the heart of our galaxy, with the massive black hole 26,500 light years away at its centre. The central black hole has a mass equivalent to 4.1 million Suns! Wrap up warm and explore this region with binoculars.

The Southern Hemisphere winter solstice marks the time when the Sun reaches its northern-most point in our sky. In 2019 the winter solstice falls on June 22 (at 3:54am NZST) and signals the shortest day of the year. After that time the Sun begins moving south again, extending our days and shortening the nights.

The Māori named the beautiful cluster of stars in Taurus, Matariki. It is known to Europeans as ‘The Pleiades’ or the ‘Seven Sisters’ & to the Japanese it is ‘Subaru’ but many other cultures have their own names for it as well. Rather less poetically, astronomers usually just call it M45. About seven stars are usually seen with the naked eye but many more can be seen with binoculars. Astronomers estimate it contains about 1,000 stars. It is 430 light years from us and formed during Earth’s Jurassic Period (era of the Dinosaurs).

The Māori based their calendar on the cycle of the Moon. However, as the lunar calendar gets steadily out of alignment with the seasons, it is realigned each year with the sighting of Matariki in the dawn sky around mid-June. This sighting restarts the lunar calendar with the next new moon. Beyond the practical need to maintain a calendar, Matariki is also a celebratory period, lasting about a month, that is very important in Māori culture.

**Mercury:** Mercury can be spotted low in the northwest after the Sun sets in late June but it will be difficult to see. It moves back towards the Sun, passing it around 21 July. From that date it reappears in the dawn sky before sunrise but it will be very hard to spot. By the end of August Mercury again passes the Sun and cannot be seen.

**Venus:** Early in June Venus can be spotted low in the east in the dawn. However, Venus continues to move back towards the Sun, passing the Sun in mid-August at which point it is lost in the Sun’s glare

**Mars:** Mars is very difficult to see. It sets soon after the Sun in the evening twilight early in June and by July it is too close to the Sun to be seen.

**Jupiter:** On June 1 Jupiter rises about half an hour after sunset. Jupiter is at opposition on 10 June and is the ideal time to look at it with a telescope. At opposition the planet rises as the Sun sets so it is ‘opposite’ the Sun in the sky. By about midnight, Jupiter is high overhead, the perfect time for telescopic viewing. Jupiter continues to be very well placed for viewing throughout the winter months. The moon passes Jupiter on the night of June 17/18, the two are closest, 2.5° apart, at 7 am, just before they set and 13 hours before full moon.

**Saturn:** On June 1 Saturn rises some 2.5 hours after sunset and the moon will pass very close to Saturn on June 19. Saturn is at opposition on 11 July, which is the ideal time to look at it with a telescope. By about midnight, Saturn is high overhead. It continues to be ideally placed for viewing throughout the winter months.