**SKY GUIDE WINTER Jun – Aug 2020 – Stardome Observatory**

It’s getting colder but these long winter nights should be cherished, as they 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 won’t be forgotten once identified.

During winter the Sun is low in our day time sky. This means that planets opposite the Sun in our night sky will be high above the horizon by the middle of the night. Therefore, the winter months provide the best opportunities to view the planets through a telescope. The solid yellow line marked on star charts is called the ‘ecliptic’, and is the plane of our Solar System along which the Sun and the planets are found.

You will also notice that the ecliptic crosses the plane of the Milky Way near the constellations of Scorpius and Sagittarius. During mid-winter the Ecliptic passes nearly overhead around midnight so any planets near these constellations are ideally placed for viewing through a telescope. This year the bright planets, Saturn and Jupiter, will be together in Sagittarius, significantly changing the look of that constellation.

In our northern sky during early winter, the orange star, Arcturus, is the main feature. It is the 4th brightest star in the night sky and the brightest in the constellation Bootes. By late winter Arcturus is setting earlier and has been replaced by the 2 bright stars Vega in Lyra and Altair in Aquila as the most prominent northern starry landmarks. In the far south of NZ these northern stars don’t rise very high but they are familiar to those 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 many star clusters that 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. When not competing with the light pollution of towns and cities (or the Moon), the light from billions and billions of stars combine to make ‘star clouds’ that can be seen with the naked eye. When looking at Sagittarius you are looking straight towards the heart of our galaxy with its central super-massive black hole.

The Southern Hemisphere winter solstice marks the time when the Sun reaches its northern most point in our sky — and therefore it is lowest in the sky at noon. In 2020 the solstice falls on 21 June (at 10:44am) and signals the shortest day of the year. After that date the Sun begins moving south again, extending our daylight and shortening the nights.

Māori named the beautiful cluster of stars in Taurus, Matariki. It is known to Europeans as the Pleiades or the Seven Sisters but many other cultures have their own names for it as well. Rather less poetically astronomers usually call it M45. About seven stars can be seen with the naked eye but many more can be seen with binoculars.

The Māori calendar is regulated by the cycle of the Moon. However, because the lunar calendar gets steadily out of alignment with the seasons, it is realigned each year with the sighting of either Matariki or Puanga (Rigel) in the dawn sky in late 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 that is very important in Māori culture. Traditionally, it was believed the brighter the stars were, the warmer the coming season would be for growing crops.

**Mercury**
Mercury is very low in the west after sunset in mid-June. It can next be seen in the dawn sky very low in the east around 24 July. Mercury will be lost in the Sun’s glare during August.

**Venus**
Venus emerges from the Sun’s glare from mid-June and is very bright low in the north-eastern sky before dawn. It passes the bright star Aldebaran in Taurus on 12 July and continues to be seen in the pre-dawn north-eastern sky through August.

**Mars**
Mars rises after midnight and is best seen high overhead before dawn throughout the months of June to September. It will be close to the Moon on 13 June.

**Jupiter**
Jupiter rises around 8pm together with Saturn and near mid-June both are seen overhead by about 2am. The Moon joins this pair of bright planets on 9 June. By mid-August they will be overhead at 10pm, so well placed for telescope viewing.

**Saturn**
In June Saturn rises around 8pm, shortly after Jupiter, and these two bright planets can be seen overhead by about 2am. The Moon passes this pair of bright planets on 6 and 7 July. By mid-August they will be overhead at 10pm and very well placed for telescope viewing.