

The chart is oriented for
 April 15 at 10 p.m. NZST
 May 1 at 9 p.m. "
 May 15 at 8 p.m. "
 June 1 at 7 p.m. "

Evening sky in May 2021

To use the chart, hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge. As the earth turns the sky appears to rotate clockwise around the south celestial pole (SCP on the chart). Stars rise in the east and set in the west, just like the sun. The sky makes a small extra westward shift each night as we orbit the sun.

Venus might be seen setting in the northwest 40 minutes after the Sun (so is not on the chart.) Mars is a reddish 'star' low in the northwest setting soon after 8 pm. Sirius, the brightest true star, is midway down the western sky. Directly below it are bright stars Rigel and Betelgeuse and 'The Pot'. Canopus is southwest of overhead. Crux, the Southern Cross, and the Pointers, Alpha and Beta Centauri, are southeast of the zenith. Orange Arcturus, in the north, often twinkles red and green. Saturn rises in the southeast around 11, followed by Jupiter around midnight. Jupiter is the brightest 'star' in the morning sky. A total eclipse of the Moon occurs on May 26th.

The Evening Sky in May 2021

Venus might be seen from places with a low skyline to the northwest, setting 40 minutes after the Sun. Mercury, to the right of Venus but much fainter, sets an hour after the Sun mid-month. (These planets aren't on the chart as they set before 8 pm.) The Moon will be between Venus and Mercury on the 13th.

As the sky darkens **Sirius** appears midway down the western sky. It is the brightest of all the stars. It twinkles with all colours when setting in the southwest around midnight. Sirius, 'the Dog Star', marks the head of **Canis Major** the big dog, now head down, tail up. Below Sirius are bluish **Rigel** and reddish **Betelgeuse**, the brightest stars in **Orion**. Between them is a line of three stars, Orion's belt. The line of three also makes the bottom of 'The Pot', now tipped on its side. **Canopus**, the second brightest star, is southwest of overhead.

Mars is the only planet in the evening sky. It looks like a medium-bright red star low in the northwest, setting around 8:30. It is now 320 million km away so shows only a tiny disk in a telescope. The Moon will be beside Mars on the 16th.

Crux, the Southern Cross, is southeast of the zenith, to the right of 'The Pointers'. **Alpha Centauri**, the brighter Pointer, is the closest naked-eye star, 4.3 light years* away. Beta Centauri, the other Pointer, is a blue-giant star hundreds of light years away. So are most of the stars in Crux. **Canopus** is also very luminous and distant: 13 000 times brighter than the sun and 300 light years away.

Following the Milky Way down into the southeast finds **Scorpius**. Orange **Antares** marks the Scorpion's body. Its upside-down tail curves to the right of Antares. **Antares** is a red-giant star like Betelgeuse: around 12 times the mass of the sun but wider than Earth's orbit.

Orange **Arcturus** is the brightest star in the northern sky. It often twinkles red and green when low in the sky. **Arcturus** is the brightest red star in the sky. It is 37 light years away and 120 times brighter than the sun.

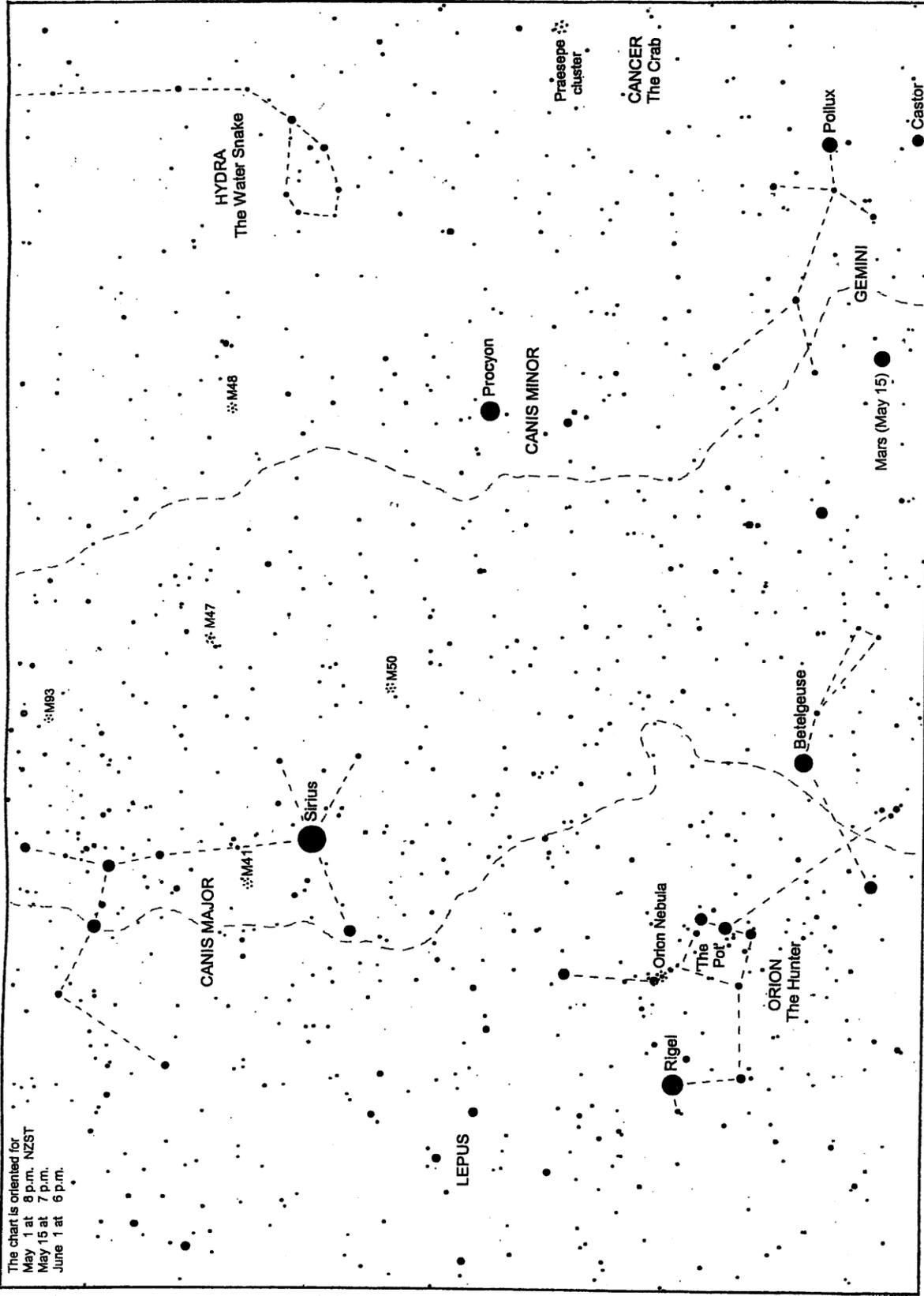
The **Milky Way** is brightest in the southeast toward **Scorpius** and **Sagittarius**. In a dark sky it can be traced up past the Pointers and Crux and fading toward Sirius. The Milky Way is our edgewise view of the galaxy, the pancake of billions of stars of which the sun is just one. The thick hub of the galaxy, 30 000 light years away, is in Sagittarius. The nearby outer edge is by Orion where the Milky Way is faintest.

The Clouds of Magellan, **LMC** and **SMC**, are midway down the southern sky, easily seen by eye on a dark moonless night. They are small galaxies. The Large Magellanic Cloud is 160 000 light years away. The Small Cloud is around 200 000 light years away. There are many billions of stars in each of them.

Saturn and Jupiter are in the late night sky, so are not shown on the chart. Saturn rises a little south (right) of due east before 11 pm mid-month. It looks like a bright star shining with a steady cream-coloured light. Golden Jupiter appears in the same direction after midnight. It is the brightest 'star' in the morning sky. The Moon will be near Saturn on the night of May 3-4. It will be between Saturn and Jupiter on May 4-5 and again, later in the month, on May 31st-June 1st.

There is a brief **total eclipse of the Moon on May 26**. The Moon begins to enter the outer part of Earth's shadow, the penumbra, at 8:47 pm. It won't darken much till it meets the inner shadow, the umbra, at 9:45. By 11:11 the Moon will be fully in Earth's shadow. Its bottom edge is closer to the penumbra so may be a little brighter than the top edge. The Moon begins to leave the umbra at 11:27 and is fully clear of it by 12:53. It leaves the penumbra at 1:50 a.m. It has become fashionable to call a lunar eclipse a 'blood moon' as the eclipsed Moon is often deep red. However the colour can be anything from orange-brown, like a dried apricot, to dark bronze. It all depends on how much light is being refracted around the Earth by the air and how much cloud there is around Earth's edge, as seen from the Moon.

*A **light year (l.y.)** is the distance that light travels in one year: nearly 10 million million km or 10^{13} km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes four years for sunlight to reach the nearest star, Alpha Centauri.



Northwest Evening Sky in May 2021

The chart shows the northwest sky in the evening. The chart may need to be tilted to the left or right to match the sky, depending on the time of night. Interesting objects are described on the other side of this page.

Chart produced by Guide 8 software; www.projectpluto.com. Labels and text added by Alan Gilmore, Mt John Observatory of the University of Canterbury, P.O. Box 56, Lake Tekapo 7945, New Zealand. www.canterbury.ac.nz

Interesting Objects in the Northwest Evening Sky in May 2021

High in the NW sky is **Sirius**, the brightest true star. Below Sirius is **Orion** the Hunter. Sirius marks the head of one of the two dogs following the hunter down the sky. **Procyon** marks the lesser dog. The pair of stars making **Gemini** the Twins are low in the north. Above and right of them is a glowing spot, the **Praesepe** star cluster marking the shell of **Cancer** the Crab.

Sirius is the brightest star, though star-like Venus and Jupiter, and sometimes Mars, are brighter. Sirius appears bright because it is 23 times brighter than the sun in true brightness and because it is relatively close at 8.6 light years (l.y)* away. Sirius was often called 'the dog star' being the brightest star in Canis Major, one of the two dogs that follow Orion across the sky. Canis Major is heading down the western sky. The dog's hindquarters are marked by the four bright stars above Sirius. Sirius often twinkles like a diamond when it is low in the sky, as the air breaks its light into separate colours.

Orion the Hunter, or warrior, is now upside down in the west in our southern hemisphere view. The line of three stars makes Orion's Belt. The line of faint stars above and left of the belt form Orion's Sword in the northern view, hanging from his belt. To most southern hemisphere sky watchers the belt and sword form **The Pot** or The Saucepan, now tilted on its side.



The **Orion Nebula** is visible in binoculars as a misty glow around the middle stars of Orion's Sword or the handle of The Pot. It is a vast cloud of dust and gas about 1300 l.y. away and more than 20 l.y. across. Ultra-violet light from a massive, extremely hot star in the cloud causes it to glow. Some stars in this region are less than a million years old and a few of the brightest may be much younger still. The sun, by contrast, is 4.6 billion years old. There are many bright and dark nebulae in this part of the sky. The Horsehead nebula, a favourite of astronomy books, is beside the top star of Orion's Belt, but too faint to be seen in small telescopes.

Rigel is a blue 'supergiant' star 40 000 times brighter than the sun and 800 l.y. away. Its surface temperature is 12 000°C, giving it a bluish colour. **Betelgeuse** is a red giant star around a 1000 times bigger than the sun -- five times wider than Earth's orbit -- but only around 20 times heavier. It is mostly very thin gas around a dense hot core. It is 9 000 times brighter than the sun, about 600 l.y. away, and has a surface temperature of 3000°C. The sun is 5500°C. **Procyon** is a relatively close star, just 11 years away. It is about 7 times brighter than the sun. Below Orion is Aldebaran, an orange star making one eye of Taurus the bull. The Hyades star cluster makes the bull's face.

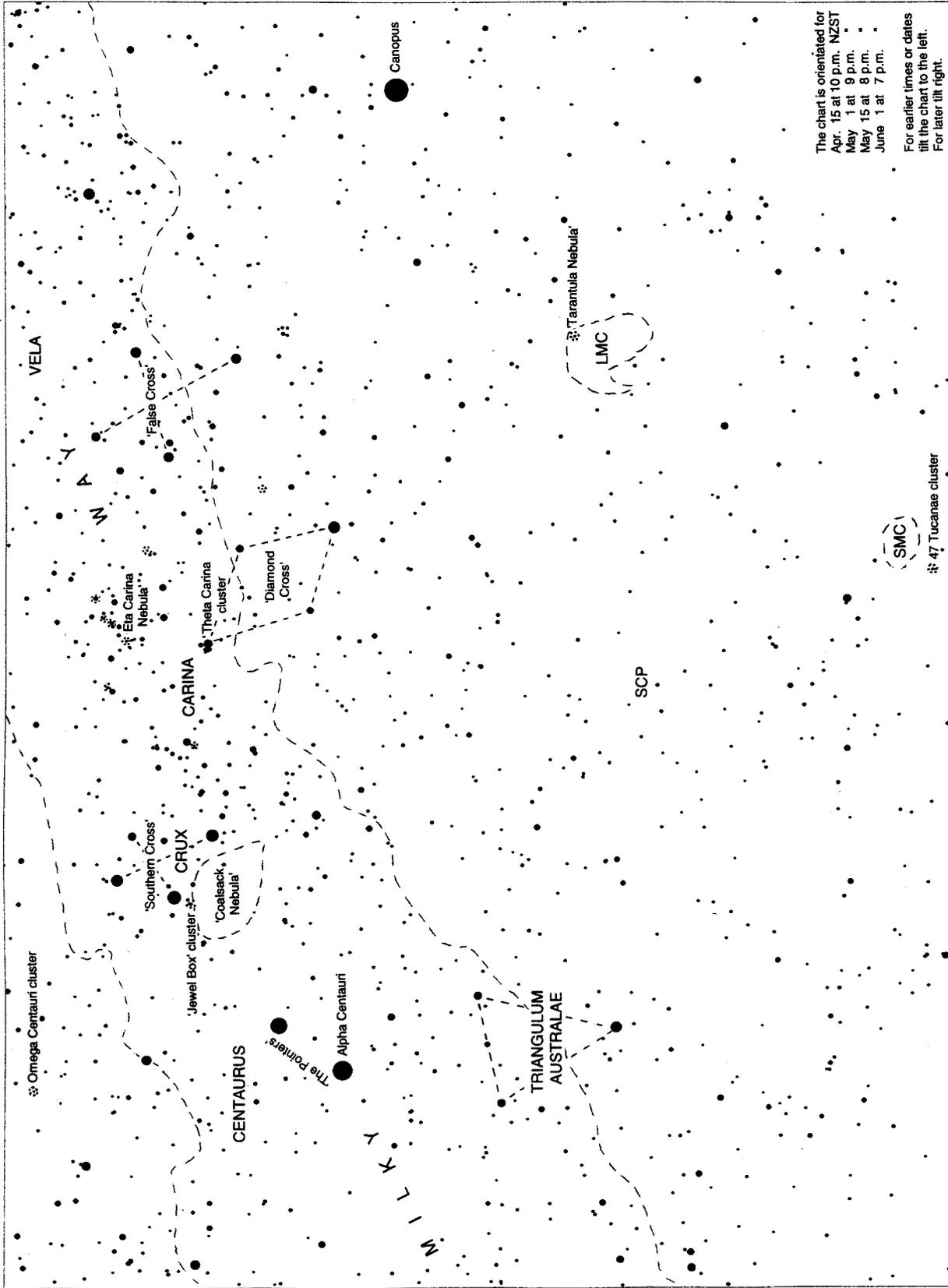
Pollux and **Castor** mark the heads of the Gemini, the twins. Though paired in myths, the two stars are not related at all. Castor is a hot white star like Sirius but 52 light years away. Golden Pollux is bigger and brighter but cooler than Sirius and 34 light years away.

Mars looks like a medium-brightness star similar to Pollux and Castor. At the beginning of the month it is a well to the left of the Twins and a little lower than them. At the end of May it will be much closer to them, above and left. It is 320 million km away, on the far side of the Sun, so tiny in a telescope.

The **Praesepe cluster** marks the shell of **Cancer** the crab. To the eye, in a dark sky, it is a spot of light bigger than a full moon. The cluster is also called the Beehive and binoculars show why. It is some 580 light years from us. It formed in a gas cloud about 625 million years ago. Because it is old, its brightest stars long ago burned out. So its stars appear more similar in brightness than is the case with the Pleiades/Matariki cluster (~100 million years old) or the Jewel Box (~16 million years old.)

The Milky Way is faint in this region as we are looking toward the nearby edge of the Galaxy's disk. Several star clusters visible in binoculars or small telescopes are marked with asterisks.

*A **light year (l.y.)** is the distance light travels in one year: about 10 million million km (10^{13} km) or 6 million million miles. Light from the sun reaches us in 8 minutes. Light from the moon gets here in 1 second. Sunlight takes 4 hours to reach Neptune, the outermost significant planet, and 4 years to reach Alpha Centauri, the nearest star.



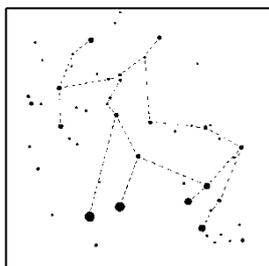
The chart is orientated for
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For earlier times or dates
 tilt the chart to the left.
 For later tilt right.

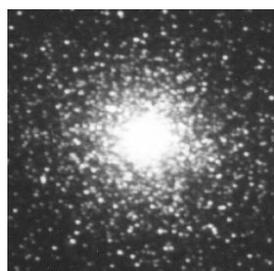
Southern Evening Sky in May
 The chart shows the area of sky from just south of overhead to midway down the southern sky.
 Interesting star clusters and nebulae are indicated with asterisks. They are described on the other side of this page.

Chart produced by Guide 8 software; www.projectpluto.com. Labels added by Alan Gilmore, University of Canterbury's Mt John Observatory
 P.O. Box 56, Lake Tekapo 7945, New Zealand. www.canterbury.ac.nz

Interesting Objects in the Southern Sky



Centaurus, with the bright 'Pointers', and **Crux**, the Southern Cross are south-east of overhead, the tightest grouping of bright stars in the sky. Originally Crux was the hind legs of the Centaur, the horse-man of Greek mythology. The complete Centaur, with bow, is outlined at left. It was only in the 17th Century that Crux was split off as a separate constellation. The slow wobble of Earth's axis allowed this part of the sky to be seen from more northerly places in ancient times. The fainter Pointer and the three bluish-white stars of the Crux are all super-bright stars hundreds of light years away. Alpha Centauri is just 4.3 light years* away and the reddish top star of Crux is 90 light years from us.

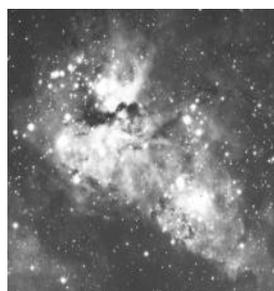


Omega Centauri, also southeast of the zenith, is a globular cluster, a ball-shaped cluster of millions of stars. Its total mass is six million times the sun's. It is 17 000 light years away and 200 light years across. Globular clusters are very ancient, around 10 billion years old, twice the age of the sun. Omega Centauri is the biggest of the hundred-odd globulars randomly orbiting our galaxy. It may originally have been the core of a small galaxy that collided with the Milky Way and was stripped of its outer stars.

47 Tucanae, by the SMC, is a similar sort of cluster 16 000 l.y. away.

Coalsack nebula, left of Crux, looks like a hole in the Milky Way. It is a cloud of dust and gas 600 light years away, dimming the distant stars in the Milky Way. Many 'dark nebulae' can be seen along the Milky Way, appearing as slots and holes.

The Jewel Box is a compact cluster of young bright stars about 7000 light years away. The cluster formed around 16 million years ago. To the eye it looks like a faint star close by the second-brightest star in Crux. A telescope is needed to see it well.



Eta Carinae nebula, a luminous spot in the Milky Way to the right of Crux, is a glowing gas cloud about 8000 light years from us. The thin gas glows in the ultra-violet light of nearby hot young stars.

The golden star in the cloud, visible in binoculars, is Eta [Greek 'e'] Carinae. It is estimated to be to be 80 times heavier than the sun. It is four million times brighter than the sun but is dimmed by dust clouds around it. It is expected to explode as a supernova in the next few thousand years. Many star clusters are found in this part of the sky.

Large & Small Clouds of Magellan (LMC & SMC) appear as two luminous clouds, easily seen by eye in a dark sky. They are galaxies like the Milky Way but much smaller. Each is made of billions of stars. The Large Cloud contains many clusters of young bright stars seen as patches of light in binoculars. The Large Cloud is 160 000 light years away, the Small Cloud 200 000 light years; very close by for galaxies.



Tarantula nebula is a glowing gas cloud in the LMC. The gas glows in the ultra-violet light from a cluster of very hot stars at the centre of the nebula. The cloud is about 800 light years across. It is easily seen in binoculars and can be seen by eye on moonless nights. This nebula is one of the brightest known. If it was as close as the Orion nebula then it would be as bright as the full moon.

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