Evening sky in May 2012

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 (not shown) is the brilliant 'evening star' appearing low in the northwest soon after sunset. It sets 1½ hours after the sun at the beginning of May but only 25 minutes after sunset at the end. Sirius, the brightest star, is midway down the western sky. Directly below it is Orion with bright stars Rigel and Betelgeuse, and 'The Pot'. Canopus, the second brightest star, is southwest of overhead. Saturn and Spica make a pair of 'stars' of medium-brightness in the northeast. Below them is Arcturus often twinkling red and green. To their left is Mars, similar in brightness and colour to Arcturus. Crux, the Southern Cross, and The Pointers are southeast of the zenith. The Scorpion, on its back, is rising in the southeast. The Milky Way spans the sky.

The Evening Sky in May 2012

**Venus** (not shown) is the brilliant 'evening star' appearing low in the northwest soon after sunset. It sets around 7:20 pm at the beginning of the month but only 30 minutes after sunset at the end. As the sky darkens **Sirius** appears in the west with **Orion** below it. **Canopus** is southwest of the zenith. **Crux**, the Southern Cross, and the Pointers are southeast of overhead. Midway up the north sky is orange **Mars**. To its left is Regulus, the brightest star in Leo. High in the northeast sky is **Saturn** making a close pairing with **Spica**, the brightest star in **Virgo**. Below them, low in the northeast is **Arcturus**, a bright orange star often twinkling red and green.

**Venus** is catching us up and getting closer. It is slipping lower in the twilight as it moves between the Earth and the Sun. It is 53 million km from us mid-month. In a telescope it appears as a tall thin crescent as most of its sun-lit side is facing away from us. Venus crosses the face of the sun ('transits') on June 6. That event will be visible from New Zealand.

**Mars** is fading as we leave it behind. We passed it in early March. It is now around 160 million km away and small in a telescope. **Saturn** is a nice sight in a telescope. A small telescope will show the rings. Saturn's largest and brightest moon, Titan, orbits about four ring-diameters from the planet. Larger telescopes will show Saturn's smaller moons looking like faint stars close to the planet. Saturn is 1330 million km away in mid May.

Below Sirius are **Rigel** and **Betelgeuse**, the brightest stars in **Orion**. Between them is a line of three stars: Orion's belt. To southern hemisphere star watchers, the line of three makes the bottom of 'The Pot', now tipped on its side. **Sirius**, 'the Dog Star', marks the head of **Canis Major** the big dog. Sirius is the brightest star in the sky though planets Venus, Mars and Jupiter can be brighter.

**Crux**, the Southern Cross, is southeast of the zenith. Left of it are Beta and **Alpha Centauri**, often called 'The Pointers'. Alpha Centauri is the closest naked-eye star, 4.3 light years away. It is a binary star: two sun-sized stars orbiting each other in 80 years. Beta Centauri, like most of the stars in Crux, is a blue-giant star hundreds of light years away. **Canopus** is also very luminous and distant: 13 000 times brighter than the sun and 300 light years away.

Low in the east is the orange star **Antares**, marking the heart of the Scorpion. Antares means 'rival to Mars' in Greek. It is a red giant like Betelgeuse; 600 light years away and 19 000 times brighter than the sun. **Arcturus**, in the northeast, is the brightest red star in the sky but, at 37 light years, is much closer than the red-giants previously mentioned. It is about 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 the sky past the Pointers and Crux, 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. A scan along the Milky Way with binoculars shows many clusters of stars and some glowing gas clouds, particularly in the **Carina** region, to the right of Crux, and in Scorpius.

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 about 160 000 light years away and is about 5% the mass of our Milky Way galaxy. The Small Cloud is around 200 000 light years away and 3% the mass of our galaxy. That's still many billions of stars.

**Mercury** (not shown) ends a morning sky appearance in late May. At the beginning of the month it rises in the east two hours before the sun. Its rising time gets steadily later as it moves to the far side of the sun. It is around 190 million km from Earth at mid month and tiny in a telescope.

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 to reach the nearest star, Alpha Centauri.
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.

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Interesting Objects in the Winter Southern Sky

**Centaurus**, with the bright 'Pointers', and **Crux**, the Southern Cross are south of overhead, the tightest grouping of bright stars in the whole 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**, nearly overhead, 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**, near the SMC, is a similar but smaller cluster about 16 000 light years away.

**Coalsack nebula**, left of Crux, looks like a hole in the Milky Way. It is a cloud of dust and gas 300 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. These clouds eventually form new stars.

**The Jewel Box** is a compact cluster of young bright stars about 7000 light years away. The cluster formed less than 10 million 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 and lower, 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 60 times heavier than the sun. It is five 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 LMC contains many clusters of young bright stars seen as spots of light in binoculars. The LMC is 160 000 l.y away; the SMC 200 000 l.y. They are 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.

*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 to reach the nearest star, Alpha Centauri.*
Northwest Evening Sky in May

The chart shows the northwest sky at dusk. Interesting star clusters and nebulae are marked with asterisks. They are described on the back of the chart.

The Western Sky at Dusk in May

**Orion** the Hunter is prominent in the western evening sky, below **Sirius** the brightest star. Sirius marks the head of one of the two dogs following the hunter down the sky. **Procyon** marks the lesser dog. Well to the right of Orion are the pair of stars making **Gemini** the Twins. Above and right of Castor and Pollux is 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 both brighter than the sun -- 23 times brighter -- and relatively a close 8.6 light years 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 four bright stars above Sirius. Sirius, being bright, often twinkles like a diamond when low, 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. Its brightest stars are **Rigel** and **Betelgeuse**. Rigel is a blue-giant star 40 000 times brighter than the sun and much hotter. It is 800 light years away. Betelgeuse is a red-giant star, cooler than the sun but hundreds of times bigger; 9 000 times brighter than the sun and 400 light years from us. Between them is a line of three stars: 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 lying on its side. In early June Orion can be seen both in the west at dusk and in the east at dawn.

The milky way is faint in this region as we are looking toward the nearby edge of the disk. Several star clusters visible in binoculars or small telescopes are marked with asterisks. The numbers beside them are from a catalogue compiled by Charles Messier, an 18th Century French comet searcher. **M47** is visible to the naked eye as a fuzzy spot though it is 1600 l.y. away. **M41**, **M50** and **M93** are best seen in a telescope. Messier also catalogued the Orion Nebula (M42) and the Praesepe cluster (M44).

**Procyon** is a relatively close star, just 11 years away. It's about 7 times brighter than the sun.

**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.

**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 the full moon. It is also known as the Beehive and binoculars show how it got that name: dozens of stars are seen like bees around a hive. The cluster is some 500 light years from us. It formed in a gas cloud about 700 million years ago.

*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.*