

The chart is oriented for
 Jan. 1 at 1 a.m. NZDT
 Jan. 15 at midnight "
 Feb. 1 at 11 p.m. "
 Feb. 15 at 10 p.m. "

Evening sky in February 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 and Jupiter, low in the west, are the first 'stars' to appear after sunset. They are later joined by Mars rising on the opposite horizon. Sirius, the brightest star, appears north of overhead at dusk. Canopus, the second brightest star, is south of the zenith. Orion, containing 'The Pot', is midway up the north sky with Taurus and the Pleiades/Matariki toward the northwest. The Southern Cross and Pointers are midway up the southeast sky. The Clouds of Magellan, LMC and SMC, are high in the south sky. Saturn rises due east in the late evening.

The Evening Sky in February 2012

Three planets are bright 'stars' in a rich evening sky. **Venus** and **Jupiter** appear in the west soon after sunset as **Mars** rises in the east. North of the zenith is **Sirius**, the brightest true star. South of overhead is **Canopus**, the second brightest star.

Brilliant silver **Venus** appears low in the west soon after sunset. Though bright it is of little interest in a telescope being covered in white cloud. It looks like a tiny gibbous moon. It is slowly catching us up but is still around 150 million km away. It sets around 10 pm.

Jupiter, also in the west, shines with a steady golden light. A telescope will easily show the four bright moons first seen by Galileo in 1610. Binoculars, steadily held, often show one or two. Jupiter is 780 million km from us now. The planet is 11 times Earth's diameter and 320 times Earth's mass.

Orange-red **Mars** rises around 10:30 at the beginning of February. By the end of the month it is up at dusk. We pass it by at the beginning of March at a distance of 100 million km. That's nearly twice as far away as it was at the close 'opposition' of 2003. (It's called an opposition because the planet is opposite the sun when closest to Earth.) So Mars appears small in a telescope: one-third the size of Jupiter. Mars is half the diameter of Earth and one-tenth Earth's mass. (Mass = weight, sort of.)

Saturn (not shown) rises in the east around midnight at the beginning of the month. It is up at 10 pm by the end of February. It is below and left of Spica, a star a little fainter than Saturn.

Sirius, 'the Dog Star', marks the head of **Canis Major** the big dog. A group of stars above and right of it make the dog's hindquarters and tail. **Procyon**, in the northeast below Sirius, marks the smaller of the two dogs that follow Orion the hunter across the sky. Sirius is eight light years* away.

Below Sirius, and a bit to the left, 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'. The handle of "The Pot" is Orion's sword. It has the Orion Nebula at its centre; a glowing gas cloud many light-years across and around 1300 light years away.

Orion's belt points down and left to a V-shaped pattern of stars making the face of **Taurus** the Bull. The V-shaped group is called the Hyades cluster. It is 130 light years away. Orange **Aldebaran**, Arabic for 'the eye of the bull', is not a member of the cluster but merely on the line of sight, half the cluster's distance from us.

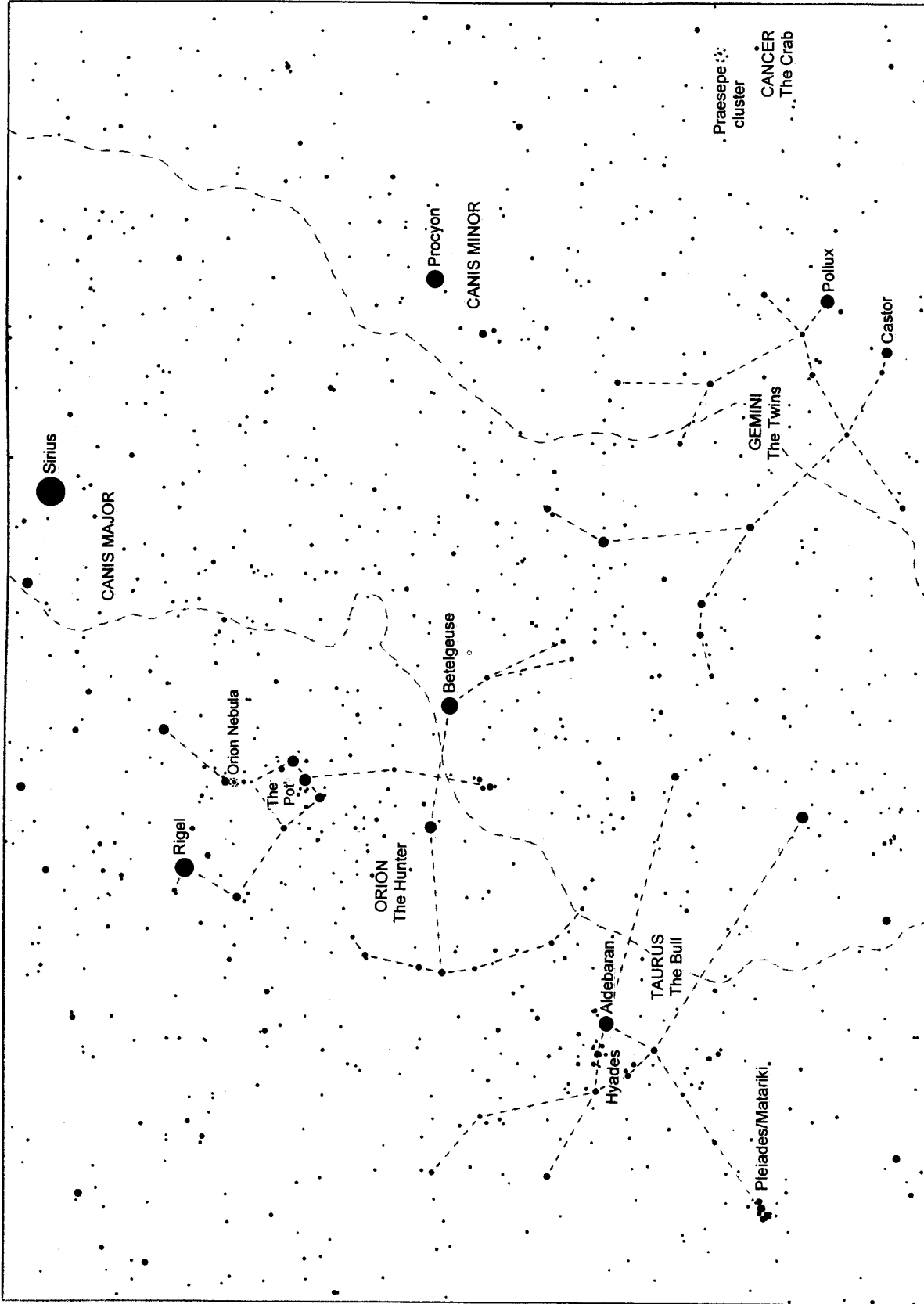
Left again, toward the northwest and lower, is the **Pleiades** or **Matariki** star cluster, also known as the Seven Sisters and Subaru. Six stars are seen by most eyes. Dozens are visible in binoculars. The cluster is 400 light years from us. Its stars formed around 100 million years ago. From northern New Zealand the bright star **Capella** is on the north skyline. It is the sixth brightest star in the sky.

Crux, the Southern Cross, is in the southeast. Below it are Beta and **Alpha Centauri**, often called 'The Pointers'. Alpha Centauri is the closest naked-eye star, 4.3 light years away. Beta Centauri, like most of the stars in Crux, is a blue-giant star hundreds of light years away. **Canopus** is also a very luminous distant star; 13 000 times brighter than the sun and 300 light years away.

The **Milky Way** is brightest in the southeast toward Crux. It can be traced up the sky, fading where it is nearly overhead. It becomes very faint east or right of Orion. The Milky Way is our edgewise view of the galaxy, the pancake of billions of stars of which the sun is just one.

The Clouds of Magellan, **LMC** and **SMC** are high in the south sky, easily seen by eye on a dark moonless night. They are two small galaxies about 160 000 and 200 000 light years away.

*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.



Northern Evening Sky in Summer

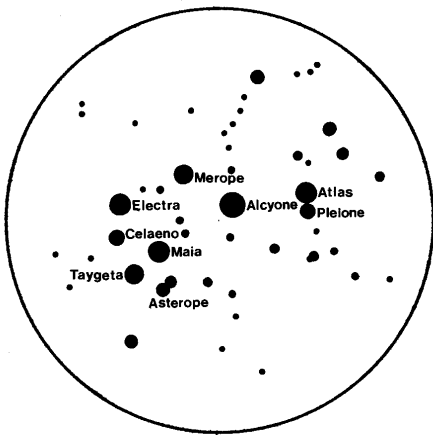
The chart shows our northern sky on summer evenings. It may need to be tilted to the left or right to match the sky, depending on the time of night. Interesting objects are described on the other side of this page.

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 8770, New Zealand. www.canterbury.ac.nz

Interesting Objects in Orion and Taurus

Taurus the Bull and **Orion** the Hunter are constellations recognised by most northern hemisphere cultures. To see the northern hemisphere pictures turn the chart upside down. The face of Taurus is outlined by the V-shaped **Hyades** cluster. The brightest star in this group is orange **Aldebaran**, the name meaning 'the eye of the bull' in Arabic. Taurus's long horns extend down our sky. The **Pleiades** cluster rides on the Bull's back.

Orion, in the northern hemisphere view, has a shield raised toward Taurus and a club ready for action. 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, dangling from his belt. To most southern hemisphere sky watchers the belt and sword form **The Pot, The Iron Pot, or The Saucepan**.



The **Pleiades / Seven Sisters / Matariki / Subaru**, and many other names, is a cluster of stars well known in both hemispheres. Though often called the Seven Sisters, most modern eyes see only six stars. Dozens are visible in binoculars. The cluster is about 400 light years away. Its brightest stars are around 200 times brighter than the sun.

One **light year (l.y.)** is the distance light travels in one year: about 10 million million km or 6 million million miles. Light from the sun reaches us in 8 minutes; from the moon 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 **Hyades** cluster is 160 light years away. Its brightest stars (not Aldebaran!) are about 70 times brighter than the sun. **Aldebaran** is not a member of the cluster but simply on the line of sight. It is 65 l.y. away and 150 times brighter than the sun. Aldebaran is a giant star about 25 times bigger than the sun though only five times heavier. Its orange colour is due to its temperature, around 3500°C. The sun is 5500°C.

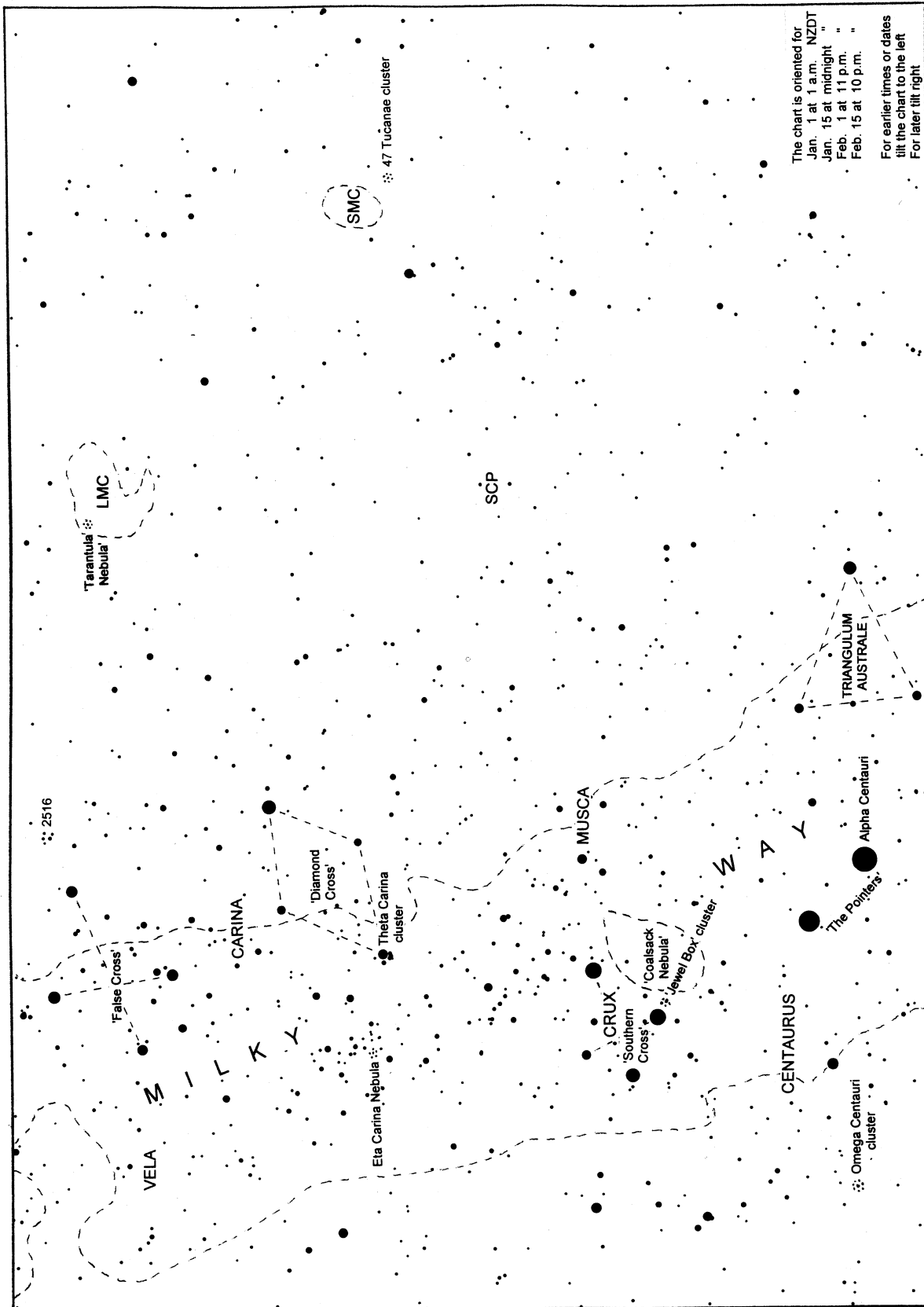


The **Orion Nebula** is visible in binoculars as a misty glow around the middle stars of Orion's Sword or the handle of The Pot. It is a vast cloud of dust and gas about 1300 l.y. away and more than 20 l.y. across. Ultra-violet light from a massive, extremely hot star in the cloud causes it to glow.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

Rigel is a blue 'supergiant' star around 40 000 times brighter than the sun and 800 l.y. away. Its surface temperature is around 20 000°C, giving it a bluish colour.

Betelgeuse is a red giant star 250 times bigger than the sun -- wider than earth's orbit! -- but only around 20 times heavier, so it is mostly very thin gas. It is around 10 000 times brighter than the sun, about 400 l.y. away, and has a surface temperature around 3000°C.

Sirius is the brightest star, though the planets Venus and Jupiter, and sometimes Mars, are brighter. Sirius appears bright because it is both brighter than the sun and relatively a close 8.6 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.



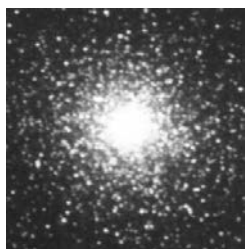
The chart is oriented for
 Jan. 1 at 1 a.m. NZDT
 Jan. 15 at midnight "
 Feb. 1 at 11 p.m. "
 Feb. 15 at 10 p.m. "
 For earlier times or dates
 tilt the chart to the left
 For later tilt right

Southern Evening Sky in February
 The chart shows the lower southern. 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

Large & Small Clouds of Magellan (LMC & SMC) appear as two luminous patches, easily seen by eye in a dark sky. They are two galaxies like the Milky Way but much smaller. Each is made of billions of stars. The Large Cloud contains many clusters of young luminous stars seen as patches of light in binoculars and telescopes. The Large Cloud is about 160 000 light years away, the Small Cloud 200 000 l.y.; away very close by for galaxies. (1 light year is about 10 000 billion km, or 10^{13} km.)



47 Tucanae, looks like a faint fuzzy star on the edge of the SMC. It is a globular cluster, a ball of millions of stars. A telescope is needed to see a peppering of stars around the edge of the cluster. Though it appears near the SMC it has no connection, being 15 000 light years away. Globular clusters are mostly very old, 10 billion years or more; at least twice the age of the sun. **Omega Centauri**, in the southeast, is a bigger 'glob'; possibly the core of a small galaxy that had its outer stars stripped off as it merged with the Milky Way.



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 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 (in The Pot's handle) then it would be as bright as the full moon and look bigger than the whole constellation of Orion.

Canopus is the second brightest star. It is 13 000 times brighter than the sun and 300 light years away. Sirius, north of Canopus on autumn evenings, is the brightest star in the sky.

Alpha Centauri, the brighter Pointer, is the closest naked-eye star, 4.3 light-years away. Alpha Centauri is a binary star: two stars about the same size as the sun orbiting around each other in 80 years. A telescope that magnifies 50x splits the pair. (A very faint and slightly closer star, Proxima Centauri, orbits a quarter of a light-year, or 15 000 Sun-earth distances, from the Alpha pair.)

Coalsack nebula is a cloud of dust and gas about 600 light years away, dimming the more distant stars in the Milky Way. Many similar 'dark nebulae' can be seen, appearing as slots and holes in the Milky Way. These clouds of dust and gas eventually coalesce into clusters of stars.

The Jewel Box is a compact cluster of young luminous stars about 7000 light years away. The cluster formed less than 10 million years ago. To the eye it looks like a faint star.



Eta Carinae nebula is a glowing gas cloud about 8000 light years away. The golden star in the cloud, visible in binoculars, is Eta Carinae. (Eta is the Greek 'e'.) It is estimated to be to be 60 times heavier than the sun and more than a million times brighter but is dimmed by dust clouds around it. It is expected to explode as a supernova any time in the next few thousand years.

Many star clusters are found in this part of the sky.

The Southern Pleiades is a newish name for a cluster of stars at one point of the 'Diamond Cross'. It is formally the **Theta Carinae cluster**, after its brightest star but is also known as the 'Five of Diamonds' cluster, the reason obvious when it is seen in a telescope. It is much fainter and smaller than the real Pleiades in Taurus but a nice sight in binoculars. The cluster is about 500 light years away and is around 10 million years old.