NEWSLETTER

The next WAS meeting will be held on
Wednesday 1st August 2012 at 7:30 pm
at Carter Observatory, Upland Rd, Kelburn, Wellington
Topic:

The Starlight Conference

Presented by: Gordon Hudson

Gordon was one of the astronomy representatives at the Third International Starlight Conference took place at the Godley Hotel, Lake Tekapo, on June 10-13. It was hosted by Canterbury University, by RASNZ and by UNESCO's Starlight Initiative. It brought together 64 participants from a very diverse range of backgrounds to discuss issues of light pollution, starlight reserves, astro-tourism and stargazing, Maori astronomy and the aesthetics of a dark sky. The participants included astronomers, tourism operators, conservationists, lighting engineers, experts in Maori astronomy, lawyers, educators and those simply enthralled by the beauty of the night sky. With such a multi-disciplinary meeting, no-one was an expert in everything and we all learnt a lot about the multi-faceted and fast growing Dark Sky Reserve movement around the world.

Coinciding with the conference was the announcement from Bob Parks, Executive Director of the International Dark-Sky Association (headquarters in Tucson, Arizona), that the Aoraki Mackenzie region had been successful in gaining the status of the world's third and largest International Dark Sky Reserve, following the application by the Aoraki Mackenzie Working Part, a committee established by the Mackenzie Tourism and Development Trust under the aegis of the Mackenzie District Council.

UPCOMING EVENTS: The next observing evening at the Tawa College observatory will be on: Saturday 11 August (reserve day 18th).

Text Chris Monigatti on his mobile 021 890 222 if you want to attend.

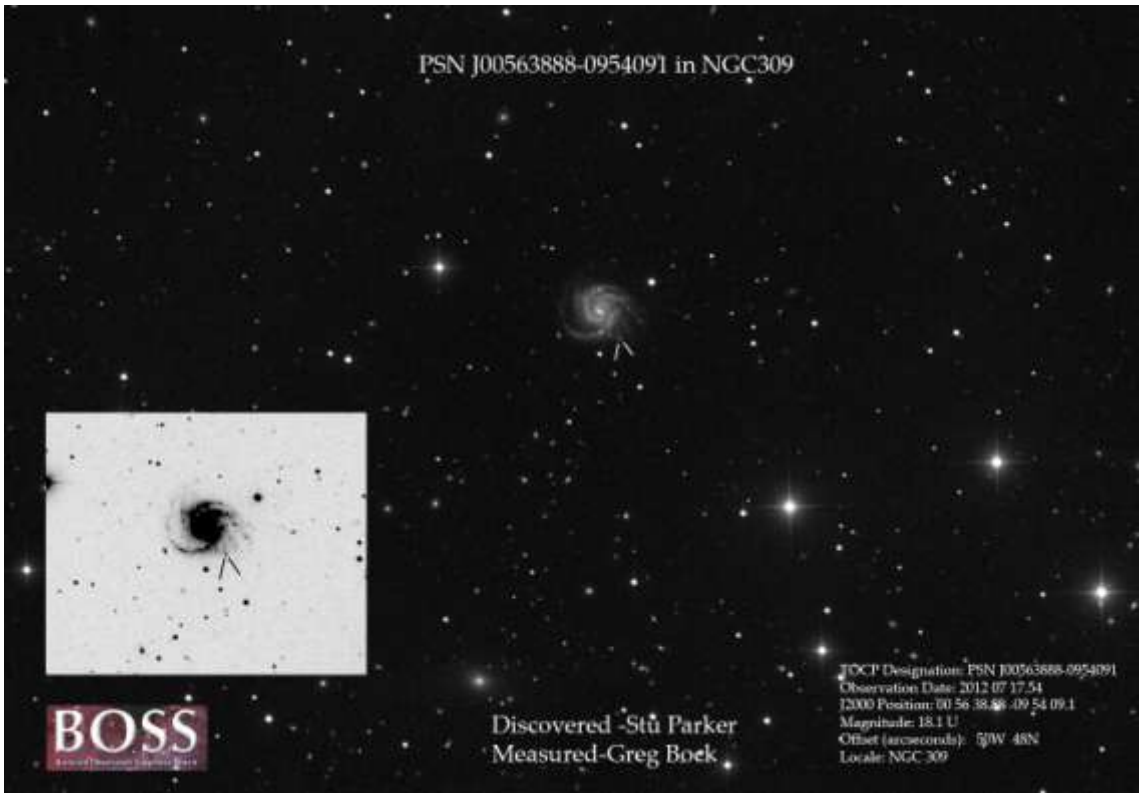
Chairman's Report for July 2012

The last meeting on July 4th was by Stuart Parker who told us about his "Supernova Factory".

He use two telescopes with computer controlled pointing and CCD cameras that take approximately 30 to 50 pictures a minute of southern galaxies during clear conditions and repeat the same sequence of objects some days later. The pairs of pictures are then compared using software that "blinks" between the two pictures which makes it easier to spot a change. Any candidates then need to thoroughly checked to make sure that the changed object is not an asteroid, known variable or similar object. If that test is passed then he notifies members of his Boss Team (Backyard Observatory Supernova Search) http://www.bosssupernova.com who take independent pictures to confirm that they too can see the object.

If that is confirmed then they can report to Central Bureau for Astronomical Telegrams (CBAT) for further investigation by professional astronomers and their resources which may occasionally include Hubble telescope time.

Just 3 days after his talk to us Stu found his latest supernova PSN J00563888-0954091 (2012dt) in NGC309 which is shown in the picture below Congratulations Stu and thanks for letting us in on how it is done.



Thomas Cooke Telescope Volunteers

Thanks to the members who volunteered to help with Saturday evening viewing following the planetarium show. We need more volunteers for August and September, so please put your hand up to do a shift one Saturday evening. A list of dates will be at the next meeting so please come and sign on.

WAS Research Astronomy Group;

Occultation predictions for the Wellington area are published on our web site at http://was.org.nz/01Occs.html or look at the RASNZ Occultation Section web site at http://occsec.wellington.net.nz for both predictions and results from the Australia/New Zealand region.

Variable Stars..We have also been working through a series of tutorials by Murray Forbes on processing images with IRIS software in order to get accurate star magnitudes from CCD or Digital Camera images.

We hope to have these put into a single document that can serve as an introduction to photometry for variable star observations. Remember visual observing of variables with naked eye or binoculars can also be valuable and a good introduction to the activity.

We welcome other observers to these meetings including those who would like to introduce us to their favourite astronomical research topics.

This is also a good place to come to ask questions about your telescope or equipment. Remember there are no stupid questions just stupid answers.

Jupiter Extinction Events (JEEs) and Jupiter Mutual Events (JMEs)

Weather permitting the best times to start trying to observe will be:

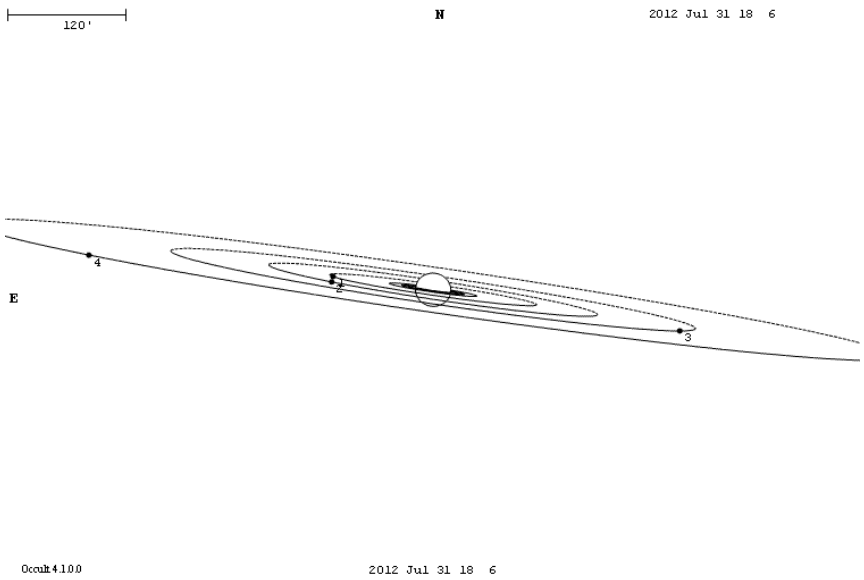
31 Jul starting at 17:00 UT , 2 Aug starting at 16:15 UT will also have 3 eclipse events in the time slot (moon in Jupiter shadow), 8 Aug starting about 16:00 UT

The Challenge is to observe for long times – maybe up to 6 hours, the longest times will be possible from about Sept to November. You need to make continuous recording with little or no saturation of moon images, and use PST rather than Aperture measurement.

See http://scottysmightymini.com for more info and predictions.

For Pictorial of orbits use Occult4 ... Ephemerides...Graphics of the planets and their moons.

Use the animation option to see what is going on. Diagram shows positions at 18:00UT on 31st July.



Variable Stars

by Aline Homes

R Hydrae and Other Mira-type Long-period Variables

Long period variables (LPVs), like Cepheids, are pulsating stars. As the name suggests, the pulsations are slow with cycles lasting typically for hundreds of days, they are also of high amplitude - 2.5 magnitudes or more in the visual part of the spectrum. Mira stars, named after the first to be discovered (Mira or omicron Ceti) are cool, low-mass red giants noted for their predictable (or semi-predictable) variations. Their light curves typically show a single more-or-less stable period that varies by only one or two percent from cycle to cycle.

R Hydrae (R Hya) was the third Mira-type variable discovered. It was seen as early as 1662 by Johannes Hevelius and included in his catalogue and in his 1690 Uranographia star atlas as a sixth-magnitude star in the eastern part of the constellation of Hydra, the (female) Water-snake. It was not, however officially recognised as variable until 1704. R Hya is well worth observing because its period is known to have shortened from 495 days in about 1700 to 380 days by 1950. Since then it has followed the standard Mira pattern. The amplitude has also changed.

Observing R Hydrae

This is one of many Mira-type stars suitable for beginning variable star observers because it is easy to find and the entire cycle can be followed with binoculars or small telescopes, even from light-polluted sites. At maximum it is visible to the naked eye. A finder chart for R Hya is given in Fig. 1.

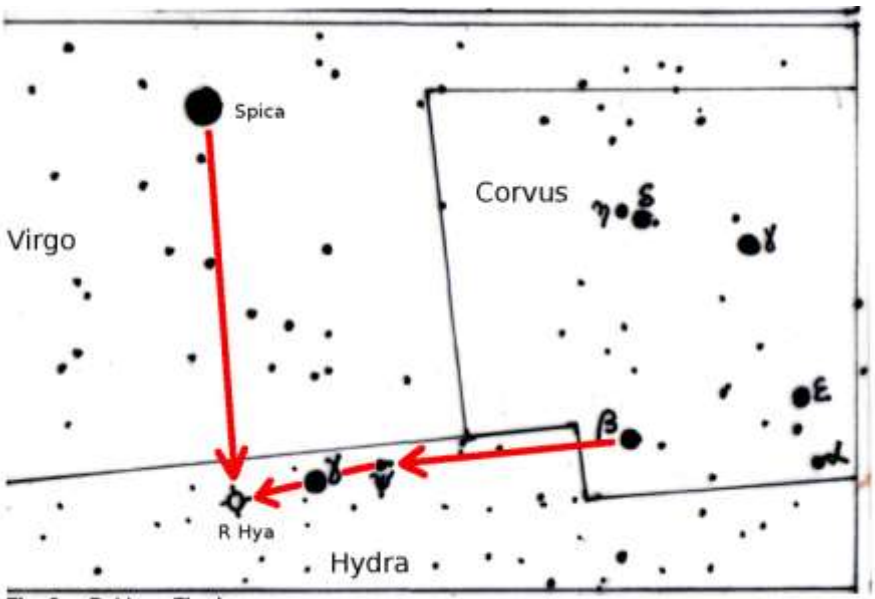
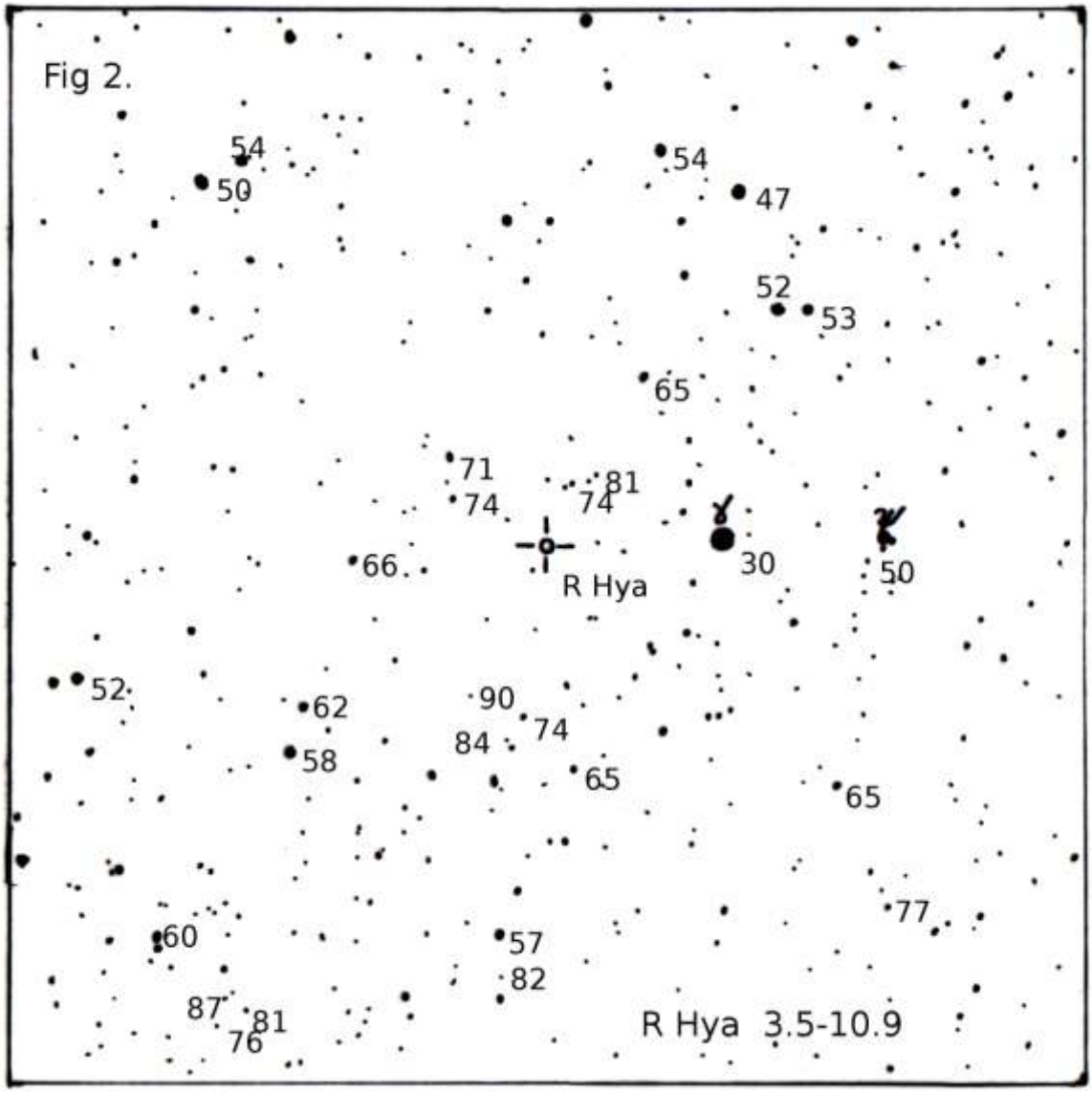


Fig 1: R Hya Finder

Remember that North is at the top and West to the right. Find the prominent kite shape of Corvus, SW of Spica and star-hop eastwards from the tail of the crow (beta Corvi) to the next bright, naked-eye star, gamma Hydrae. R Hya lies roughly the same distance due east of gamma as psi Hya lies west, in the same binocular field.

Once you have located R Hya, switch to the comparison chart (Fig 2).



Before you start making any observations, orient the chart and make sure you can identify all the comparison stars. Make your estimates using the Schrader method outlined in previous articles. With Mira variables, once a week is usually often enough to make observations. Because these Miras are red stars, you have to take extra care, because red stars tend to appear brighter than blue ones of the same magnitude, so you should try to make your observations quickly. Red stars also tend to look brighter in bright moonlight.

About R Hya

R Hya is a cool red giant, a late stage in the evolution of a sun-like star. Eventually, when it has exhausted its fuel, the outer layers will be blown off into space, leaving the carbon-oxygen core as a white dwarf.
R Hya varies between 4.5 and 9.5 over a period of approximately 385 days. As already stated, the period was much longer in the past, but the decline ceased about 1950 and has since been stable. Recorded maxima have varied between 3 and 6, and minima between 9 and 11, so 4.5 to 9.5 is an average only, and if you see it brighter or fainter than this, nothing is wrong!

R Hya was due to reach minimum on 29th June, but will be beginning to rise. It was still not visible through my 9x63 binoculars when I last looked (16th July), but my eyes may have not been sufficiently dark-adapted. Maximum is not due until the 4th December, so you will not be able to follow it all the way this cycle.

What caused the period shift? Miras are close to the end of their lives. They are not massive enough for core-fusion to proceed beyond helium burning, so fusion in the core has largely shut down. Hydrogen fusion is taking place in a thin shell just outside the dense carbon/oxygen core, resulting in a thin layer of helium. Every 1,000 to 10,000 years, enough helium builds up to reach critical mass. As soon as fusion begins in the helium layer, the shell expands and hydrogen burning ceases. The star increases in brightness and the period of pulsation lengthens. Helium fusion lasts about a century. When this "shell flash" ends, the shell shrinks and hydrogen burning resumes. It is thought that R Hya underwent such a shell flash in the seventeenth Century and has now returned to normal.

Two more Miras in Carina.

Here are two more Mira-type stars for you to try, both in Carina, that will be observable for another couple of months or so, before they get too far to the south. They are both in the same area as l-Carinae. Fig 3 is a finder chart, and Fig 4 gives some comparison stars.

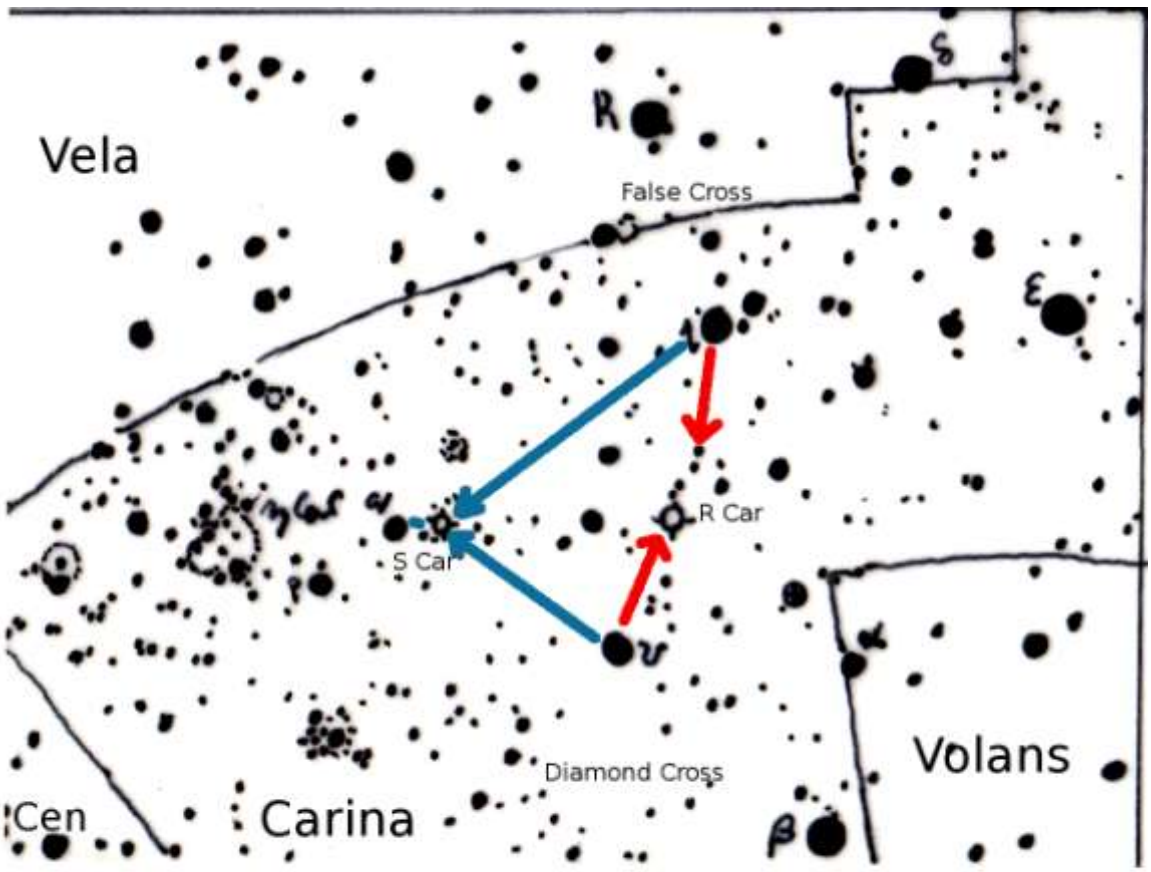
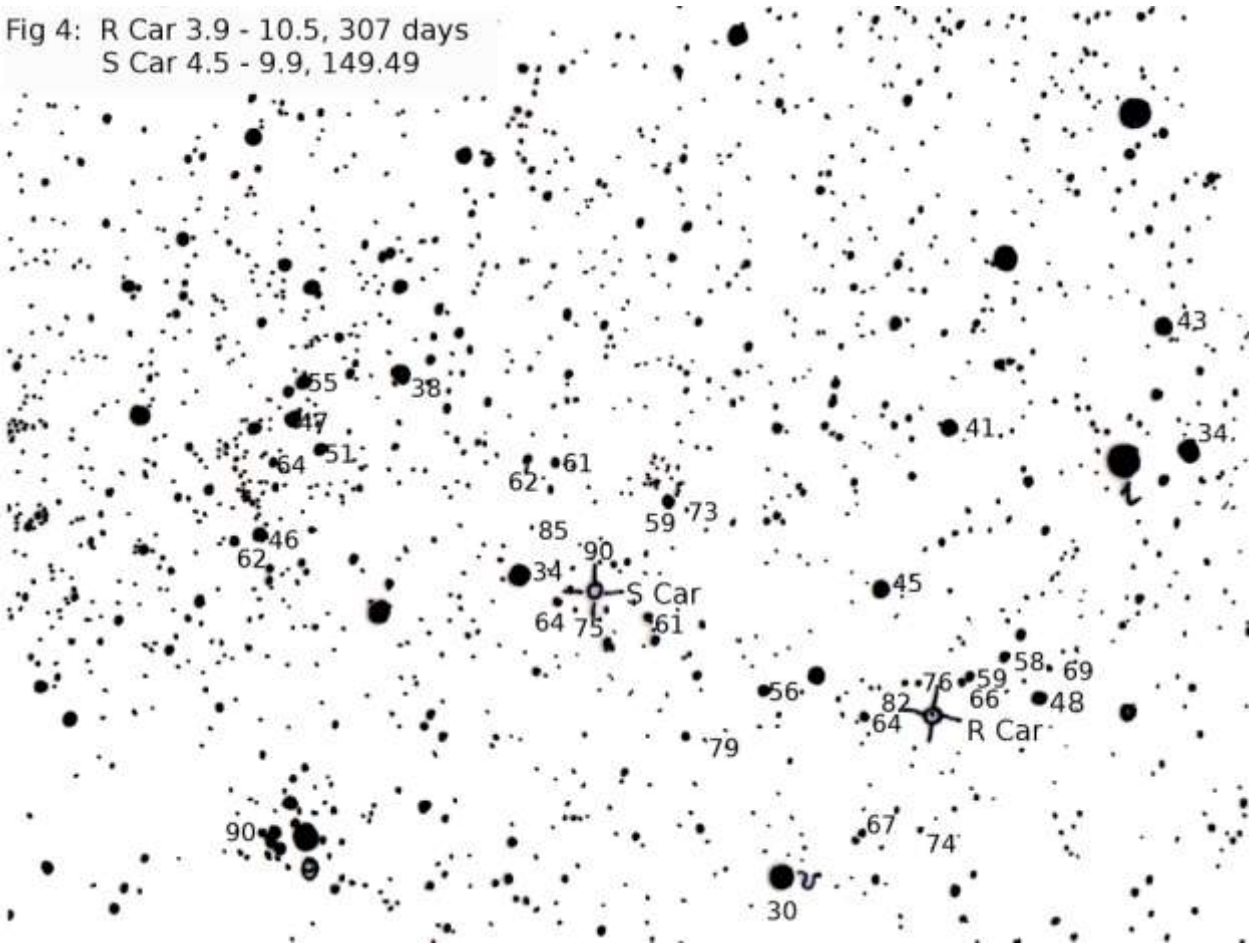


Fig 3: R and S Car Finder

R Carinae is very close to l-Car. It varies between 4.6 and 9.6 over a period of 308.71 days, and was due to reach maximum on 19th July. It may have peaked a few days sooner, and this maximum seems to be a bit brighter than normal. Several people have seen it at 4.4, even as bright as 4.3 and when I looked on 17th July, it was about 4.38. From a dark site you should be able to observe it as a naked eye star, and you will be able to follow it as it fades.



S Carinae is quite close by, near the bright reddish stars p- and q-Car. S has a much shorter period, of only 149.49 days and varies between 5.7 and 8.5, hence within the range of binoculars throughout its cycle. It was due to be at minimum on 11th July and reach maximum on 26th September, so you can follow it rising. Because the period is relatively short, it goes through several cycles during the course of a year.

Star	RA	Dec	Period	Range
R Hya	13:29:42.77	-23:16:52.7	385	4.5-9.5
R Car	09:32:14.59	-62:47:20	308.71	4.6-9.6
S Car	10:09:21.89	-61:32:56.3	149.49	5.7-8.5

The charts provided are suitable for the stars at the brighter phase of their cycle and many possible comparison stars have been omitted to make them clearer. If you prefer you can download charts from the AAVSO website, including ones suitable for use when the stars are close to minimum.

Telescopes for Sale.

Two Schmidt Cassegrain Telescopes and one Maksutov

Contact: Gordon Hudson on (04)236 5125 or email gordon@kpo.org.nz if you are interested.

Celestron C5 is a 5" Schmidt Cassegrain telescope on a solid tripod with an equatorial wedge.

Driven with a synchronous 230v motor and has a separate drive corrector. No Dec drive.

There is only one 25mm eyepiece with it. Comes in its own case.

Price is $700.00.

The **Meade ETX 90mm** is a Maksutov mirror lens telescope similar to a Schmidt Cassegrain.

Ideal for photography either Celestial or Terrestrial. Comes with one eyepiece and is battery driven in RA and DEC. Ideal for Solar Observing. Very compact and made in the USA.

Excellent condition. Price is $500.00.

This **Celestron C8** is a Schmidt Cassegrain telescope is Optical Tube assembly only.

With an 8 x 50mm finder. This telescope is set up to fit onto a German equatorial mount.

Comes with only one eyepiece.

Price $600.00.

Contact: Gordon Hudson on 236 5125 or email gordon@kpo.org.nz

The Evening Sky in August 2012

Just north of overhead the orange star Antares marks the heart of the Scorpion. The Scorpion's tail hooks around the zenith like a back-to-front question mark. Antares and the tail make the 'fish-hook of Maui' in Maori star lore. Antares is a red giant star: 600 light years* away and 19 000 times brighter than the sun. Below or right of the Scorpion's tail is 'the teapot' made by the brightest stars of Sagittarius. It is upside down in our southern hemisphere view.

Midway down the southwest sky are 'The Pointers ', Beta and Alpha Centauri. They point down and rightward to Crux the Southern Cross. Alpha Centauri is the third brightest star and the closest of the naked eye stars, 4.3 light years away. Beta Centauri, like most of the stars in Crux, is a blue-giant star hundreds of light years away and thousands of times brighter than the sun.

In the western sky are Saturn, Mars and Spica making an eye-catching trio. Saturn is brightest and on the right. Orange Mars is below Saturn and Spica at the beginning of August. It passes between the other two mid month and continues to move up the sky. Strictly it is Saturn and Spica that are falling lower in the sky as the earth moves to the far side of the sun from them. Mars is tagging along behind us.

Spica is the brightest star in Virgo. It is 260 light years away and 2500 times brighter than the sun. To the right of Saturn, Mars and Spica is orange Arcturus, brightest of the northern stars, often twinkling red and green as it sets in the northwest. It is 120 times the sun's brightness and 37 light years away.

Saturn is always worth a look in a telescope. A small telescope shows Saturn's biggest moon Titan about four ring diameters out from the planet. Larger telescopes show fainter moons, mostly inside Titan's orbit. Saturn is 1530 million km away. Mars is 260 million km away and tiny in a telescope.

Canopus, the second brightest star, is near the south skyline at dusk, twinkling colourfully. It swings upward into the southeast sky through the morning hours. On the opposite horizon is Vega, one of the brightest northern stars. It is due north in mid-evening and sets around midnight. Canopus is truly bright: 13,000 times brighter than the sun and 310 light years away. Vega is 52 times brighter than the sun and 25 light years away.

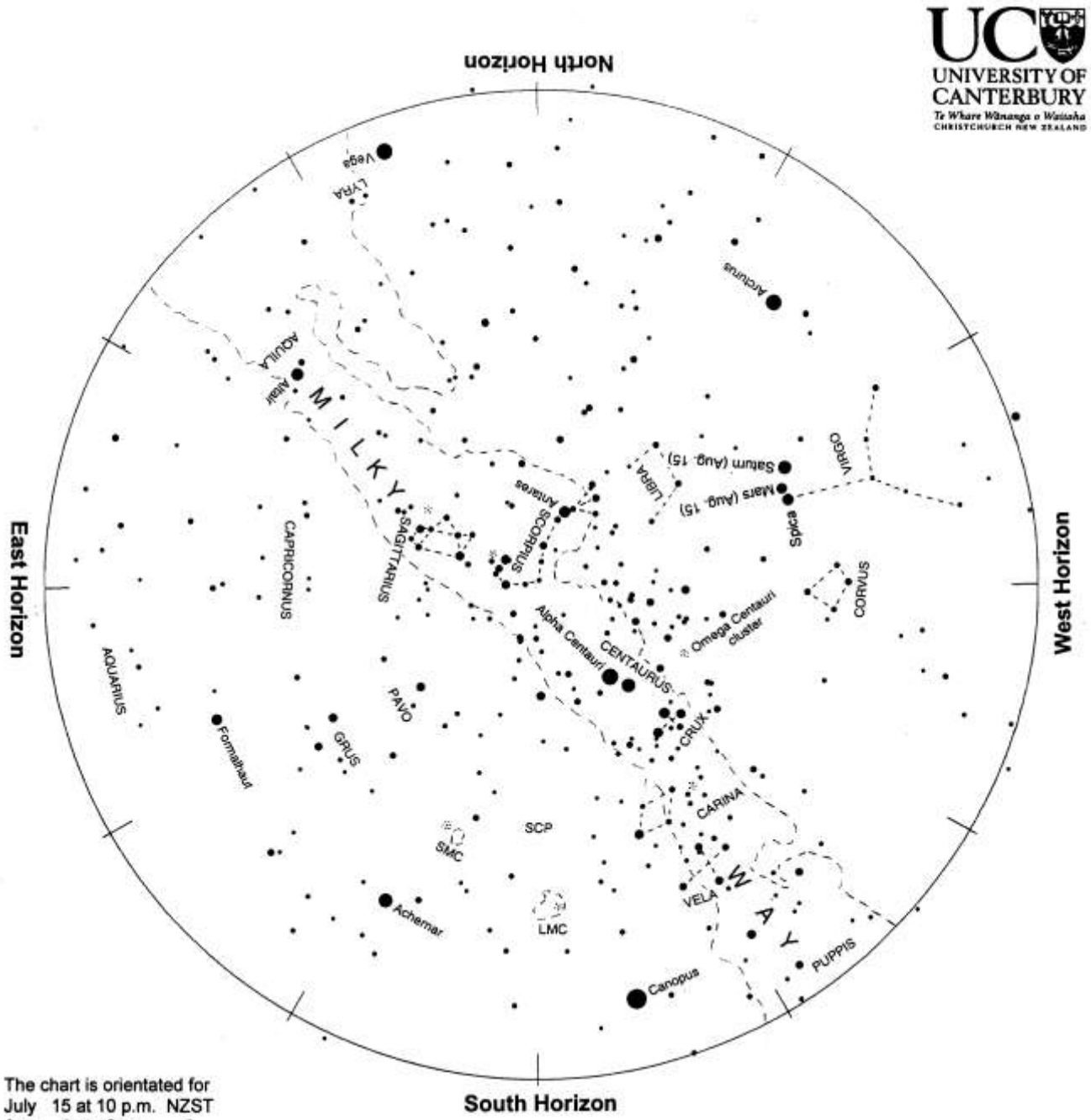
The Milky Way is brightest and broadest overhead in Scorpius and Sagittarius. In a dark sky it can be traced down past the Pointers and Crux into the southwest. To the northeast it passes Altair, meeting the skyline right of Vega. The Milky Way is our edgewise view of the galaxy, the pancake of billions of stars of which the sun is just one. The thick hub of the galaxy, 30 000 light years away, is in Sagittarius. The actual centre is hidden by dust clouds in space. At the very centre is a black hole four million times the sun's mass. Dust clouds near us appear as gaps and slots in the Milky Way. The Coalsack Nebula, by the Southern Cross, is about 600 light years away. Binoculars show many clusters of stars and some glowing gas clouds in the Milky Way.

The Large and Small Clouds of Magellan LMC and SMC look like two misty patches of light low in the south, easily seen by eye on a dark moonless night. They are galaxies like our Milky Way but much smaller. The LMC is about 160 000 light years away; the SMC about 200 000 light years away.

Jupiter rises in the northeast about 3 a.m. It shines with a steady golden light. Binoculars show the disk of Jupiter and perhaps one or two of its bright moons, looking like faint stars very close to the planet. It is 790 million km away. Brilliant Venus rises around 5 a.m. Venus is bright enough to cast shadows in dark locations. On the morning of August 14 Venus will be very near the crescent moon, easily seen by naked eye in daylight. Venus is 100 million km away. It looks like a last-quarter moon in a telescope.

Mercury might be seen mid-month rising an hour before the sun in the northeast.

*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.*



The chart is orientated for
July 15 at 10 p.m. NZST
Aug. 1 at 9 p.m. "
Aug. 15 at 8 p.m. "
Sep. 1 at 7 p.m. "

Evening sky in August 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 clockwise rotation each night as we orbit the sun.

The Scorpion's tail curls around the zenith. Saturn, Mars and Spica make an eye-catching group in the northwest. To their right is orange Arcturus, often twinkling red and green. The Pointers and Crux, the Southern Cross, are midway down the southwest sky. Canopus, low in the south, twinkles all colours. Low in the northeast is Vega. The Milky Way spans the sky from northeast to southwest with its broad centre overhead. Bright planets appear in the morning sky.

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