Wellington Astronomical Society July 2015 Volume 45 Issue 6
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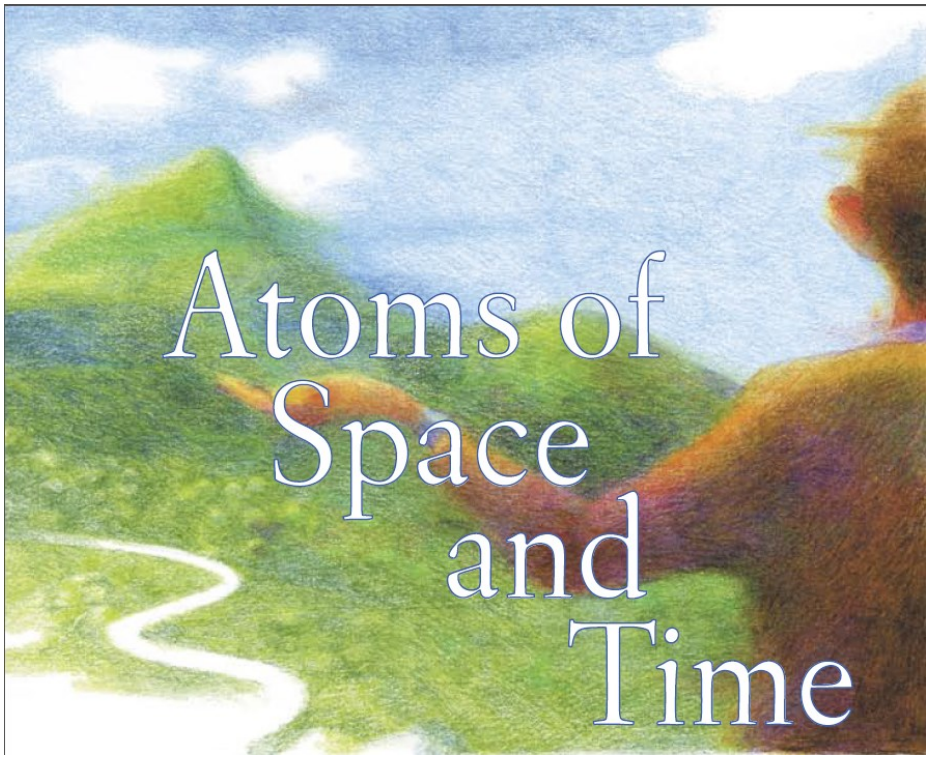
The next WAS meeting will be held on Wednesday 1st July 2015 at 7:30 pm at Carter Observatory, Upland Rd, Kelburn, Wellington



Atoms of Space and Time by Antony Gomez

Image ©Scientific American

Two corner stones of modern physics are the theories of quantum mechanics and general relativity. Both are extremely good at predicting results in their own realms, quantum mechanics on the microscopic scale; and general relativity on the cosmic scale. However both theories are incompatible with each other leaving theorists searching for a new theory of quantum gravity. One possibility involves string theory whereas a lesser known theory called loop quantum gravity (LQG) is also making headway. A prediction of LQG is that space is made up of discrete portions which have a minimum sized volume. Consequently time is also made up of tiny discrete intervals. This changes our view of the Big Bang and black holes. Instead of the Big Bang we have the Big Bounce, and black holes end up becoming white holes.

Inside this issue:

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PRESIDENTS REPORT JULY 2015 GORDON HUDSON

This month of June has been a quiet time and now that the RASNZ conference has passed we can move on. The Wellington Astronomical Society was very well represented at the RASNZ conference with 20 of our members attending. This was the largest attendance of all the societies throughout the country.

With Matariki events happening in June several of our members are attending schools and giving presentations and I would like to thank those who are involved in the school events. Unfortunately I will be away from June 20th until July 5th and will not be able to take part in any of these events.

The June talk by John Talbot was about the Jupiter Moon events - these were of Transits, Eclipses, Mutual Occultation, Extinction events. We also saw images of Tekapo from student Edward Wilcock, and Aurora & Night Sky images taken by Frank Andrews.

The membership cards were distributed to those attending members at the June meeting and these should be worn at all WAS meetings. For those of you who have not picked up your card, would you do so at the next meeting.

Unfortunately I will not be here for next month's meeting as I will still be in Whangarei with the American Pluto Occultation team so I will miss Antony's talk on Atoms of Space & Time.

Later in the year in October we will have Professor Chris Lintott visiting us and this should be quite a memorable occasion. However details for this lecture are still being sorted so watch this space.

The WAS dome which has been stored at my place for the last 2 years is still there. Work has begun on ground preparation for the piles and pier.

We have now heard from the lawyers about the Syd Cretney Bequest letter. The full amount of the bequest has been approved and will soon be deposited in an interest earning Trust account held by WCM. The Steering Group will need to meet again to discuss the details and how to proceed with the even harder task of making the dream become a reality

The volunteering at Carter is going well but it is mainly through the efforts of a couple of our members. We need more volunteers. We assist on Tuesdays and Saturday evenings so put your hand up at the next meeting.

The WAS observing evening once a month at Tawa College is struggling with lack of observers. Where are you all? The next observing evening at Tawa College is on Saturday 18th July starting at 7pm.

Finally I would like to pay a tribute to a passing of one of New Zealand's great and prolific Mirror and Telescopes makers Graham Loftus. Graham had made dozens of mirrors and telescopes that are now spread through NZ. Graham made the mirrors for my first three telescopes. The telescope I had much to do with was the 24" Cassegrain at Cape Egmont Observatory under a large dome that Graham also built. This telescope was central to the first Stardate that I created in 1988. Sadly it no longer exists. Graham passed away on Saturday May 16th at age 93.

WAS COUNCIL MEMBERS AND CONTACTS

Council Members

The following members were elected to Council at the Nov 2014 AGM

President: Gordon Hudson

gordon@kpo.org.nz ph 04 - 2365125

Vice President: John Talbot john.talbot@xtra.co.nz ph 04 293 4620

Secretary: Chris Monigatti

chrismon@xtra.co.nz mob 021 890 222

Treasurer: Lesley Hughes

Councilors:

Aline Homes

John Homes + Webmaster

Roger Butland

Frank Andrews

Murray Forbes

Antony Gomez

Duncan Hall

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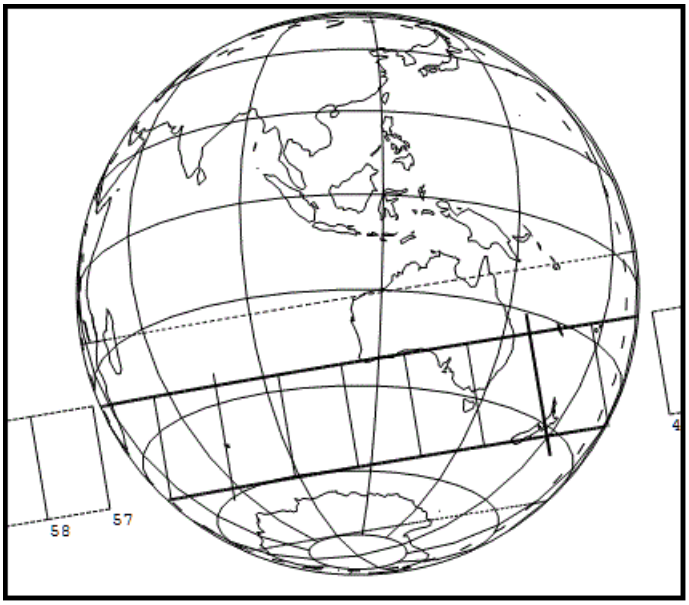
PLUTO OCCULTATION 29 JUNE 16:50 (4:50 AM TUES 30 JUNE NZT)

Star is UCAC4 347-165728 – Mag 12

RA (h) 19h 01m 46.1s

DE (deg) -20° 40' 07.1"

This high profile and important event may be observable anywhere in Australia and NZ (see image below).



NASA is flying SOPHIA, the 747 carrying a 2 metre telescope, from Christchurch.

Three or four Professional teams are coming to NZ or Australia with special camera equipment.

Just about 10 days later the New Horizons space craft will fly by Pluto so this gives the opportunity to get both ground based and space based observations within a few days of each other.

OccSec intends to share results with all teams. Observers will be co-authors of any papers.

The predictions still vary. There is now an Occult Watcher event in the TT14 Feed and the RIO feed for this event which shows the shadow mainly over Australia. There are already more than more than twenty stations registered so please add yours.

I would encourage all observers in AUS and NZ with a 8 inch or bigger telescope and preferably video recording and GPS timing ability to have a go despite the early hour of the morning. Some NZ observers may have a problem with early dawn light but the star is fairly bright (m 12) compared to many Pluto events.

The prediction for Pluto's moons all show low probability so I suggest you concentrate on the main event which should occur somewhere between 16:40 and 16:55 UTC.

The part of greatest interest will be the two edges where Pluto's atmosphere will produce slower than normal transitions, and if you have set your gain about right (star about 10% to 20% below saturation) you may see step(s) due to dust or inversion layers.

Please report any observations to John Talbot mail to: john.talbot@xtra.co.nz

If you want to try to catch an unknown moon then continuous observing for about 35 mins each side of centre would be needed to be able to assert hit or miss. That means you need to have a lot of space for recording as you need high fastest sampling rate to catch a small moon. Given Pluto's moons size you should probably not integrate if possible, or keep it short.

If you want to do a practice run before the event try using C2A to locate Pluto and see if you can see M12 stars in the field. And practice getting your gain right.

All we need is a clear night with no cloud to pick up the almost full moon 37 degrees away.

Best pre point starting star is Antares at about 7:30pm check C2A.

I will have to get up early that morning.

Philae phones home By Kelley Beatty of Sky & Telescope Magazine

Philae, the comet lander which hopped across comet 67P/ Churyumov-Gerasimenko before settling in a dark corner, shut down when its solar panels could not power its systems. Now Philae has woken up and contacted home.

Scientists are very excited; the original plan had Philae reporting the comet's status before it became very active as it approached the Sun. It will now show what happens as the comet's orbit takes it near the Sun. Closest approach is expected during August.

Philae appears to be in good shape despite seven months of inactivity, reporting that its internal temperature is -35°C and that it has 24 watts of electricity available. Apparently the lander revived sometime before yesterday as some historical data was also received.

ESA engineers are awaiting further transmissions from the lander, which can only occur when Rosetta is within view. So far 300 packets of data have been received, but more than 8,000 data packets are stored in Philae´s mass memory. Those data should reveal details about the comet's activity.

Ever since it fell silent, efforts to figure out exactly where Philae landed on the comet's very irregularly shaped nucleus. Using visual and radio tracking after the landing last year, combined with a radio beacon from the CONSERT radar experiment aboard Philae, searchers had recently narrowed the possible landing sites to a few areas. Close-ups taken after the landing in mid-December even revealed a tantalizing bright spot that, perhaps, revealed Philae amid a rubble field. Presumably, now that it's transmitting again, a firm location can be quickly established.

DID THE K-T IMPACT RE-IGNITE MASSIVE VOLCANISM?

It has long been known that some mass extinction in the geological record are associated with episodes of prolonged volcanic activity. These happen when plumes of hot rock rise through Earth´s mantle and generate huge lava flows, called flood basalts, like the Deccan Traps in India (image below courtesy of Mark Richards).

Since the 1980s it has been established that the asteroid impact that made the Chicxulub crater off the Yucatán coast of Mexico also wiped out the dinosaurs and around 90% of other species. This is known as the Cretaceous-Tertiary (K-T) mass extinction. Muddying this hypothesis, though, has been the improbable coincidence of the impact with the vast and prolonged volcanic activity that made the Deccan Traps in India.

One proposal was that seismic energy from the Chicxulub impact was focused on the opposite side of the Earth and caused the volcanism. This theory was abandoned after continental drift calculations showed that the Deccan Traps were 5000 km from the antipodal point of the impact.

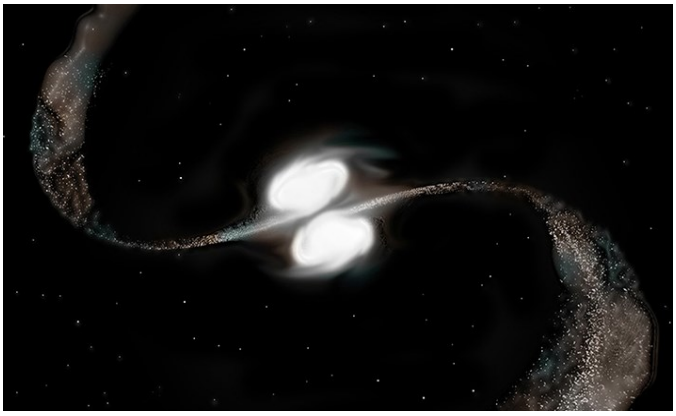
Recent work by a group at the University of California Berkeley suggests a solution. They confirm that the Deccan volcanism was occurring well before the impact. However, their field work has determined that the volcanism had stopped some time before the impact. It was re-ignited about 100,000 years after the impact when it produced most of the magma.

The coincidence of the new volcanism with the impact is highly improbable. To explain the connection the team suggest that the earthquake made by the impact -- around magnitude 9 globally! -- restarted the magma plume toward the surface. The Deccan lava flows erupted for several hundred thousand years after the re-ignition probably spewing immense amounts of carbon dioxide and other noxious, climate-modifying gases into the atmosphere. How much these worsened the mass-extinction is a matter of debate.

-- A summary of a pressrelease from the University of California Berkeley, forwarded by Karen Pollard.

See the original and much more at http://newscenter.berkeley.edu/2015/04/30/did dinosaur-killing-asteroid-trigger-largest-lava-flows-on-earth/

Galaxy Mergers Fuel Quasars



Using the Hubble Space Telescope´s infrared vision, astronomers have unveiled some of the previously hidden origins of quasars, the brightest objects in the universe. A new study finds that quasars are born when galaxies crash into each other and fuel supermassive, central black holes.

"The Hubble images confirm that the most luminous quasars in the universe result from violent mergers between galaxies, which fuels black hole growth and transforms the host galaxies," said C. Megan Urry, the Israel Munson Professor of Astronomy and Astrophysics at Yale University, and co-author of the study published online June 18 in The Astrophysical Journal.

Quasars emit a light as bright as that of one trillion stars. Over the past two decades, researchers have concluded that the energy for quasars comes from supermassive black holes inside the cores of distant galaxies.

But where do the supermassive black holes get their fuel? It had been theorized previously that such energy could come from the merger of two galaxies. The new study confirms it by using Hubble´s sensitivity at near-infrared wavelengths of light to see past the intense glow of the quasar, to the host galaxies themselves.

The Hubble observations show that the peak of quasar activity in the early universe was driven by galaxies colliding and then merging together. Those studied were "dust reddened quasars" found in several ground-based infrared and radio sky surveys. These quasars are enveloped in dust, dimming their visible light.

Eilat Glikman of Middlebury College in Vermont, lead author of the study, used Hubble´s Wide Field Camera 3 to look at 11 such quasars from the peak of the universe´s star-formation era, 12 billion years ago. "The new images capture the dust-clearing transitional phase of the merger-driven black hole scenario," Glikman said. "The Hubble images are both beautiful and descriptive."

For text and images see http://news.yale.edu/2015/06/18/galactic-crashes-fuel-quasars-study-finds

JULY NIGHT SKY 2015

Brilliant silver Venus and golden Jupiter are close together in the west at the beginning of July and remain an eye-catching pair through the month. Northeast of the zenith is Saturn, cream-coloured. Well left of Saturn, at the same elevation but fainter, is Spica. Midway down the north sky is orange Arcturus, similar in brightness to Saturn. Sirius, the brightest true star, sets in the southwest as twilight ends, twinkling like a diamond. Canopus, the second brightest star, is also in the southwest at dusk. It swings south later. South of the zenith are 'The Pointers', Beta and Alpha Centauri. They point to Crux the Southern Cross on their right. To the right of Saturn is orange Antares, the brightest star in Scorpius. Vega rises in the northeast around 9 pm.

Venus and Jupiter are less than a full-moon's width apart on July 1. This is a rare close pairing of bright planets. They set in the west around 8:30 pm. Through July Jupiter sinks lower in the twilight as we move to the far side of the sun from it. Venus also falls lower, but remains above Jupiter. Venus is catching up on the Earth. It passes between us and the sun in mid-August. The two planets appear similar in size in a telescope. Venus is a tall thin crescent. Jupiter is a disk with its four 'Galilean' moons in a line on either side. The planets' apparent pairing is strictly a line-of-sight effect. On July 15 Venus is 62 million km from us and Jupiter is 930 million km. In mid-July Venus is just left of Regulus, the brightest star in Leo. The moon is near the two planets on the 18th and 19th.

Saturn is always worth a look in any telescope. A small telescope shows the ring system and biggest moon Titan looking like a star about four ring-diameters from the planet. Big telescopes show fainter moons closer in. Saturn is around 1400 million km away in July. It sets in the southeast around 3 a.m.

Alpha Centauri is the third brightest star. It is also 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. Canopus swings down to the southern skyline before midnight then moves into the southeast sky in the morning hours. It is a 'circumpolar star': it never sets. Crux and the Pointers are also circumpolar. Canopus is a truly bright star: 13 000 times the sun's brightness and 300 light years away.

Arcturus, in the north, is the fourth brightest star and the brightest in the northern hemisphere sky. It is 120 times the sun's brightness and 37 light years away. It twinkles red and green when setting in the northwest around midnight. It is an orange colour because it is cooler than the sun; around 4000°C.

East of the zenith, and right of Saturn, is the orange star Antares, marking the heart of the Scorpion. The Scorpion's tail, upside down, is stretched out to the right of Antares making 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 Scorpius is 'the teapot' made by the brightest stars of Sagittarius. It is also upside down in our southern hemisphere view.

The Milky Way is brightest and broadest in the east toward Scorpius and Sagittarius. In a dark sky it can be traced up 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 actual centre is hidden by dust clouds in space. A scan along the Milky Way with binoculars shows many clusters of stars and some glowing gas clouds.

The Large and Small Clouds of Magellan, LMC and SMC, look like two misty patches of light low in the southern sky. They are easily seen by eye on a dark moonless night. They are galaxies like our Milky Way, but much smaller. The Large Cloud is 160 000 light years away and 5% of the mass of the Milky Way. The Small Cloud is 200 000 light years and 3% of the Milky Way's mass.

Mercury ends a morning sky appearance. At the beginning of July it is below orange Aldebaran in the northeast as twilight begins. It sinks lower in the dawn and disappears mid-month.

*A light year (l.y.) is the distance that light travels in one year: nearly 10 million million 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.

Notes by Alan Gilmore, University of Canterbury's Mt John Observatory,

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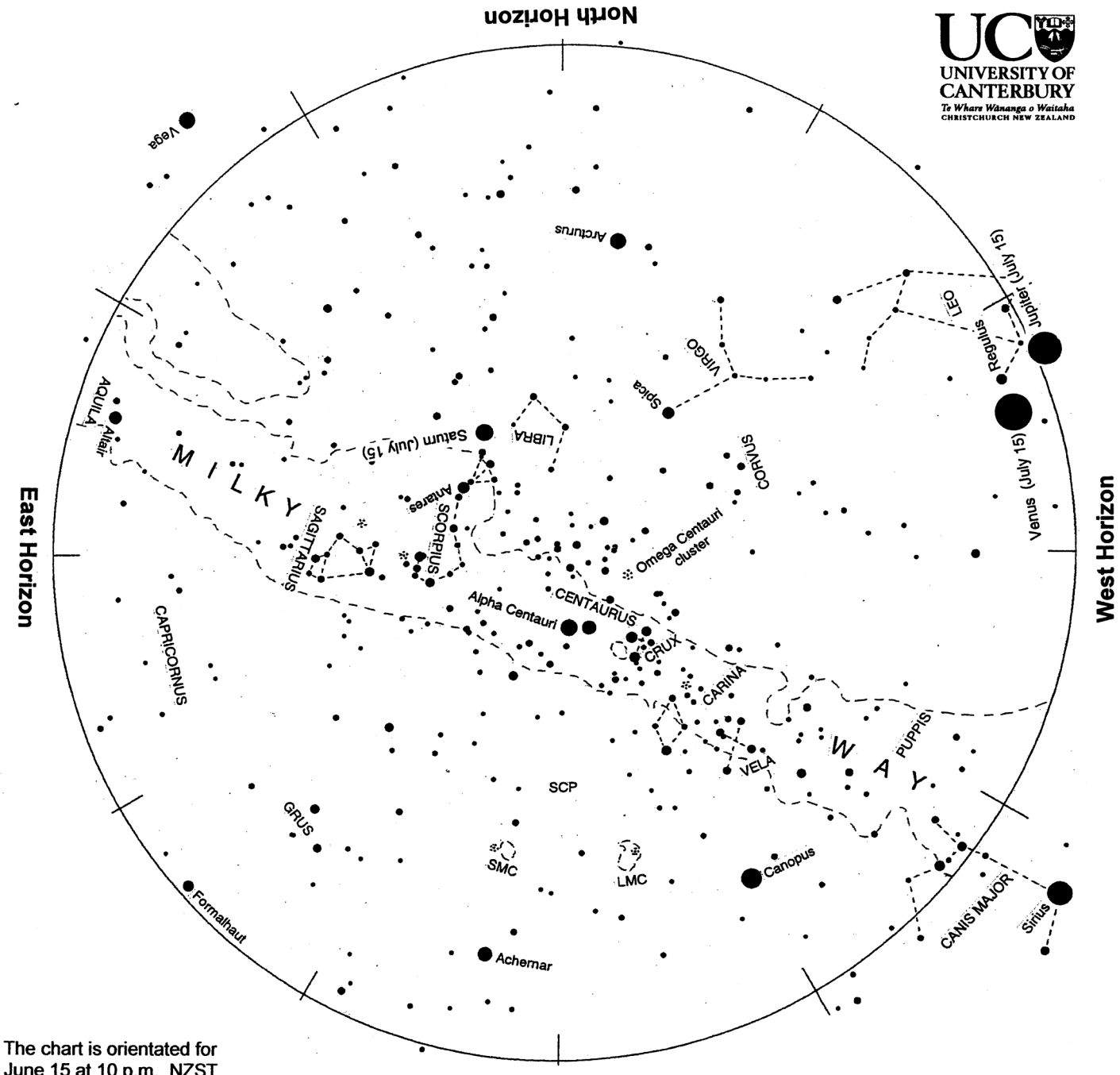

The chart is orientated for
June 15 at 10 p.m. NZST
July 1 at 9 p.m. "
July 15 at 8 p.m. "
Aug. 1 at 7 p.m. "

Evening sky in July 2015

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.

Brilliant silver Venus and golden Jupiter make a rare close pairing low in the western sky. Sirius, the brightest true star, sets in the southwestern twilight, sparkling colourfully. Saturn is northeast of the zenith with orange Antares, the heart of Scorpio, above it. Low in the north is orange Arcturus, the same brightness as Saturn. The Pointers and Crux, the Southern Cross, are south of the zenith. Canopus, the second brightest star, is low in the southwest. It swings down to the southern horizon later. The Scorpion is on its back high up the eastern sky with Sagittarius below it. Vega rises in the northeast around 9 p.m.

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