Wellington Astronomical Society February 2017 Volume 47 Issue 1
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The next WAS meeting will be held on Wednesday 1st of February 2017 at 7:30 pm at Carter Observatory, Upland Rd, Kelburn, Wellington

New Zealand's last living MOA (Microlensing Observations in Astrophysics)

Alex Thom

Hear about the ongoing search for extra-solar planets on New Zealand's largest telescope, the MOA. Alex recently spent a year working as a research assistant on the MOA project with a small team of six at Mt. John Observatory in Lake Tekapo. Using Gravitational Microlensing as a technique for discovering new worlds, the MOA team aims to find small, Earth-like planets which typically elude the prevailing Transit and Doppler Shift techniques. Alex will present a first hand account of what it's like working the dusk till dawn shift in one of the darkest and southern-most observatories in the world.

Alex has a B.S. in Astronomy from the University of Colorado at Boulder, USA. Graduating in 2012, he worked several years in Education and Public Outreach at LASP (The Laboratory for Atmospheric and Space Physics) before moving to New Zealand. Once here he was offered a position in the small village of Lake Tekapo working on the MOA project and giving supplemental Astronomy tours. After his research, he recently moved here to Wellington to join the team at Carter Observatory.

Inside this issue:

2016 — 2017 SUBSCRIPTIONS DUE

The new subscription year began in September, so WAS looks forward to receiving your subscription renewal.

Renewal forms can be found on the website, but a summary follows:

Subscription for Newsletter by Email 2016-2017

Adult/Waged: $ 50.00

Student/Unwaged: $ 30.00

Family: $ 70.00

Payment methods:

Cheque - make out to Wellington Astronomical Society Inc, and mail to PO Box 3181, Wellington 6140

Direct Deposit or Internet Banking - use Acc No: 03-0502-0508656-00, please include reference so WAS knows who is making the payment

Cash - please bring exact amount to meeting

WAS COUNCIL MEMBERS AND CONTACTS

Council Members

The following members were elected to Council at the Nov 2016 AGM

President: Antony Gomez
president@was.org.nz / 021_253_4979

Vice President: Duncan Hall
vice-president@was.org.nz

Secretary/Telescope custodian: Chris Monigatti
secretary@was.org.nz / 021_890_222

Treasurer: John Homes

Newsletter Editor: Gerard Coyle
editor@was.org.nz

Membership Secretary: Janine Bidmead
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Website : John Homes & Peter Woods
webmaster@was.org.nz

Council

Andrew Fuller

Edward Wilcock

Frank Andrews

Janine Bidmead

Murray Forbes

Peter Woods

Sarah Taylor

WAS ON FACEBOOK

Our Facebook page "Wellington Astronomical Society" is now operational. You can search for it on Facebook or click on this link www.facebook.com/WellingtonAstronomicalSociety/.

If you are a Facebook user, please use the page to receive up-to-date notifications of our Society's events and news. This is the easiest way to keep informed as to what is going on in the Society, as well as keeping up with astronomical news.

Remember you will need to interact occasionally with the page by liking or commenting on postings, or indicating whether you are coming to an event. Otherwise Facebook will, after a time, stop sending you new postings. So keep visiting the page as there are a number of Society events coming up in the next few months.

We also have Facebook group "WAS – Wellington Astronomical Society" www.facebook.com/groups/96304353012/ which is open for anyone to join by request. The public group is open for discussion or postings on astronomical news. The WAS Astrophotography Group www.facebook.com/groups/1684738758511214/ is for those interested in astrophotography. It serves as a place to notify others of astrophotography gatherings at short notice and to display images captured by members.

Wellington Astronomical Society February 2017 Events

WAS February Meeting

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Date: Wednesday, 1st February

Time: 7:30 pm

Venue: Space Place at ter Observatory)

Telescope 101

An introductory course to using your telescope, a joint event by WAS and Space Place.

Cost: $40.00

Date: Friday 3rd February (rain date Friday 10th February)

Time: 8.00-10:30 pm

Venue: Space Place, Carter Observatory

Details: www.museumswellington.org.nz/telescope-101/

WAS Society Observing Evening

Come along and see the many wonderful objects, star clusters, galaxies, dying stars and nebulae around and near the Southern Cross, the spectacular globular cluster 47 Tucanae and the Tarantula Nebula in the Large Magellanic Cloud (LMC).

Date: Saturday 4th February

Time: 8:30 pm

Venue: Tawa College

WAS Astrophotography Group

This is our first gathering of the WAS Astrophotography group for this year. Bring along a tripod and a DSLR with a wide angle lens if possible. This group is for beginners and the experienced where the experienced will help beginners to get started on imaging the night sky. Register you interest on the WAS Astrophotography Facebook page. For further details or cancellations contact Edward 021_08304802 or Chris 021_ 890222.

Date: Saturday 25th February

Time: 8:00pm,

Venue: Te Raekaihau Point, South coast between Lyall Bay and Houghton Bay, Queens Drive

Central Star Party 2017

During the Wellington Anniversary weekend, I had the privilege of attending my first Central Star Party (or "Stardate", as I heard it posthumously referred to many times!) at Tuki Tuki near Havelock North, Hawkes Bay. And I already can't wait to attend my second one! I can think of little better than three days of stuffing my brain full of more knowledge than I could ever hope to remember about imaging the Sun, using professional astrophotography equipment I could never afford, amateur spectroscopy, the ins and outs of telescope building and refurbishment, living on Mars, the quantisation of spacetime itself, and seeing more objects in the night sky I could ever hope to discern from suburban Wellington - and of course, discussing all of the above and more with like-minded people.

A definite highlight for me was being able to glance at glorious smudges across the FOV of the telescopes of famous galaxies themselves. Seeing the Sombrero Galaxy, NGC253, NGC4945, and Centaurus A come to life before my very eyes was a pretty incredible experience. I was also finally able to understand why poor William Herschel ever gave planetary nebulae their unfortunate misnomer - upon seeing several disc-shapes, seemingly planet-sized smudges, I think I can finally forgive his correlation!

I have never had so many people intelligently and ardently sing the praises of refracting telescopes to me (or ever, come to think of it), but after seeing various nebulae through a homemade 7" inch refracting telescope - I may be turning to the dark side and abandoning my strong preference for reflectors toward a more well-rounded viewing experience. And concerning telescopes, I sincerely enjoyed being able to ramble about radio telescopes and the joys of radio blobs to several different audiences over the course of the weekend, so thank you to anyone who would listen to me excitedly talking about galaxy cluster mergers and the glory of Centaurus A.

A big thank you to all of the organisers who put on a fantastic weekend, the speakers of fascinating topics across the board, and especially to Antony for providing transport for me and Vicky for putting up with me sleeping in every morning in the (quite lovely & well-insulated) bunkroom! Hopefully you'll be keen to do the same whenever the next star party is happening. :)

Susannah Keel

A 120 hour exposure image of Centaurus A by Rolf Olsen who gave 3 presentations on astrophotography at the Central Star Party - www.rolfolsenastrophotography.com

Vicki and Susie talking with a friend at Mt Bruce

Camping and telescope observing area

The main hall with kitchen and lecture area

The family camping area

Demonstrating a binocular telescope

A poem about moons for Valentine's Day

Jupiter was named after the Roman King of Gods,
His Greek equivalent Zeus, loved many women's bods.
Sixty-seven of Jupiter's moons there are,
And each named after a lascivious memoir.

First comes **Metis**, who caused Zeus some strife,
She was cunning, his cousin, and his first wife.
Then comes two nymphs both beautiful and the same,
Adrasteia and **Amalthea**, taught the king no shame.
They raised him and fed milk to the young king,
By becoming a goat, which Zeus found inspiring.
Next is **Thebe**, great lover of Zeus,
But was also his child, this dude is obtuse!

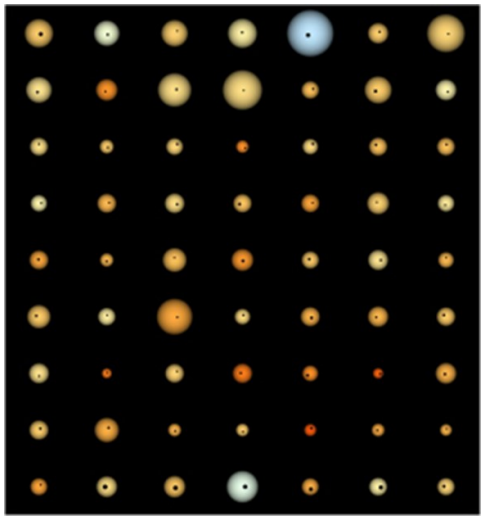
The first things to be spotted through a telescope,
Some larger moons brought Galileo great hope.
Io was Zeus' wife Hera's pretty priest,
And turns out untrustworthy at the very least!
Zeus and Io mated at their leisure,
So Hera turned her into a Heifer!
Then Zeus moved on and decided to turn into a bull
And **Europa** was next on his list of women to pull.
She rode into the sunset on the back of the beast,
To be made queen of Crete and had two kids at least.
Next Zeus took fancy of a pretty young boy,
Ganymede was his name and he hailed from Troy.
He was abducted to pour wine for the Greek gods,
So they could perve over his highly toned quads.

Callisto was a stunner and vowed to stay chaste,
So Zeus pursued her with additional haste.
Her mentor Diana was not best pleased,
So turned her into a bear and poor Zeus grieved.
We have come to the end of the Galilean moons,
And hope unlike Zeus, for them you don't swoon!

Zeus moved on to another lover **Themisto**,
And then turned into a swan to give **Leda** a go.
With **Himalia**… Zeus then proceeded,
Lysithea was who he next decided he needed.
Elara's beauty caught Zeus' eye,
But Hera soon shrieked her jealous cry.
And so Zeus hid her underground,
Never again to be found.

There was nothing this king didn't try to seduce,
Even married women were at the mercy of Zeus.
To entice Ixion's wife **Dia**, Zeus had to transform
Into a stallion and hubby left forlorn.
Carpo was a child of the king,
And for once no mention of an incestuous fling!
Maybe Zeus' appetite was finally full,
But over your eyes I shall not pull the wool.
There are still fifty-two moons left to be named,
And they must follow the theme, it is proclaimed.
So astronomers hunt through every story of Zeus,
To find a lover or daughter who may be of use.
Thankfully Zeus never ceased in the hunt,
And the ladies remained drawn to his divine front.
We are grateful to Zeus and his wandering eyes,
But not to follow his behavior, would make you wise.
Astronomers may need some moon-naming material,
But his antics shouldn't be considered light or ethereal.
For 'tis Valentine's day; a time to celebrate true love,
And leave the lewd behavior for the gods up above.

Janine Bidmead



Comet Campaign: Amateurs Wanted

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit **spaceplace.nasa.gov** to explore space and Earth science!

In a cosmic coincidence, three comets will soon be approaching Earth—and astronomers want you to help study them. This global campaign, which will begin at the end of January when the first comet is bright enough, will enlist amateur astronomers to help researchers continuously monitor how the comets change over time and, ultimately, learn what these ancient ice chunks reveal about the origins of the solar system.

Over the last few years, spacecraft like NASA's Deep Impact/EPOXI or ESA's Rosetta (of which NASA played a part) discovered that comets are more dynamic than anyone realized. The missions found that dust and gas burst from a comet's nucleus every few days or weeks—fleeting phenomena that would have gone unnoticed if it weren't for the constant and nearby observations. But space missions are expensive, so for three upcoming cometary visits, researchers are instead recruiting the combined efforts of telescopes from around the world.

"This is a way that we hope can get the same sorts of observations: by harnessing the power of the masses from various amateurs," says Matthew Knight, an astronomer at the University of Maryland.

By observing the gas and dust in the coma (the comet's atmosphere of gas and dust), and tracking outbursts, amateurs will help professional researchers measure the properties of the comet's nucleus, such as its composition, rotation speed, and how well it holds together.

The observations may also help NASA scout out future destinations. The three targets are so-called Jupiter family comets, with relatively short periods just over five years—and orbits that are accessible to spacecraft. "The better understood a comet is," Knight says, "the better NASA can plan for a mission and figure out what the environment is going to be like, and what specifications the spacecraft will need to ensure that it will be successful."

The first comet to arrive is 41P/Tuttle-Giacobini-Kresak, whose prime window runs from the end of January to the end of July. Comet 45P/Honda-Mrkos-Pajdusakova will be most visible between mid-February and mid-March.

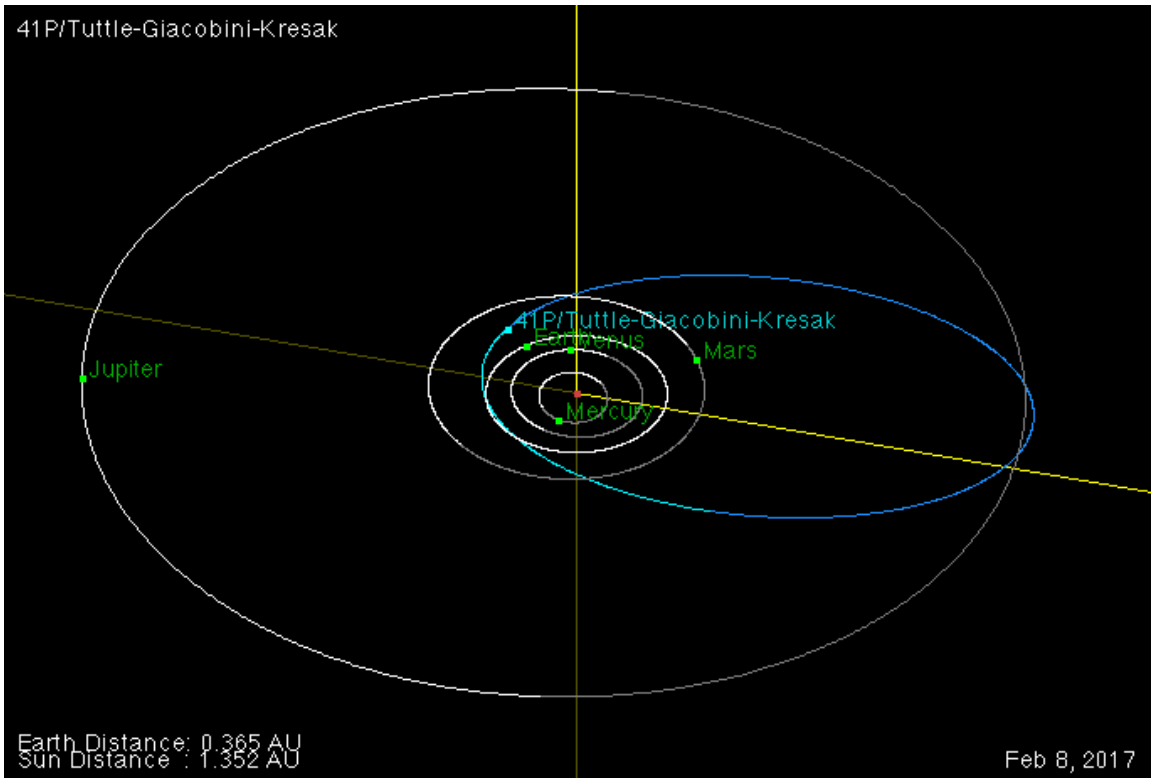
The third target, comet 46P/Wirtanen won't arrive until 2018.

Still, the opportunity to observe three relatively bright comets within roughly 18 months is rare. "We're talking 20 or more years since we've had anything remotely resembling this," Knight says. "Telescope technology and our knowledge of comets are just totally different now than the last time any of these were good for observing."

Marcus Woo

For more information about how to participate in the campaign, visit www.psi.edu/41P45P46P.

Want to teach kids about the anatomy of a comet? Go to the NASA Space Place and use Comet on a Stick activity! spaceplace.nasa.gov/comet-stick/



An orbit diagram of comet 41P/Tuttle-Giacobini-Kresak on February 8, 2017—a day that falls during the comet's prime visibility window. The planets orbits are white curves and the comet's orbit is a blue curve. The brighter lines indicate the portion of the orbit that is above the ecliptic plane defined by Earth's orbital plane and the darker portions are below the ecliptic plane. This image was created with the Orbit Viewer applet, provided by the Osamu Ajiki (AstroArts) and modified by Ron Baalke (Solar System Dynamics group, JPL). ssd.jpl.nasa.gov/

2017 North American Eclipse Tour

WAS has received the following email:

"Dear Astronomical Society,

Last year we contacted you regarding an eclipse tour departing Sydney, Australia for the 2017 total solar eclipse in North America that your members might be interested in.
We have now finalised details and flights and are currently taking bookings for the tour.

Details and the finalised itinerary can be downloaded from our website
www.spacetimetravellers.com.au

We will be based in Portland, Oregon for the eclipse and plan to view from either Madras or Salem but it will depend on the weather conditions on the day as to where we watch the eclipse.

Highlights Include:

- *Mt Wilson tour and night viewing on the 60-inch and 100-inch telescopes*
- *Meteor Crater including rim tour*
- *Lowell Observatory tour*
- *Kennedy Space Centre*
- *Smithsonian Museum*

Kind Regards
Mel
SpaceTime Travellers"

Occultations for February 2017

Total Lunar Occultations

Unfortunately there are only three worthwhile lunar occultations during February:

- ZC0454 is occulted by the moon on Saturday 4th February at approximately 09:30 NZDST. This is during twilight (with the Sun only 10° below the horizon). Fortunately ZC0454 is a K3 spectral type which means it is a very red star, and so you may be able to improve the contrast between the star and the (bright twilight) sky by using a red filter.

- ZC0764 is occulted by the moon on Monday 6th February (Waitangi Day) at approximately 11:42 NZDST. This is a double star event but the 0.1" separation means the components are too close together to be individually resolved. Both components are listed as having the same magnitude (5.8), which means we don't actually know the brightness of the individual components. As the components are predicted to disappear 0.23 seconds apart, we should be able to see a double-step in the video measurements lasting 5-6 frames.

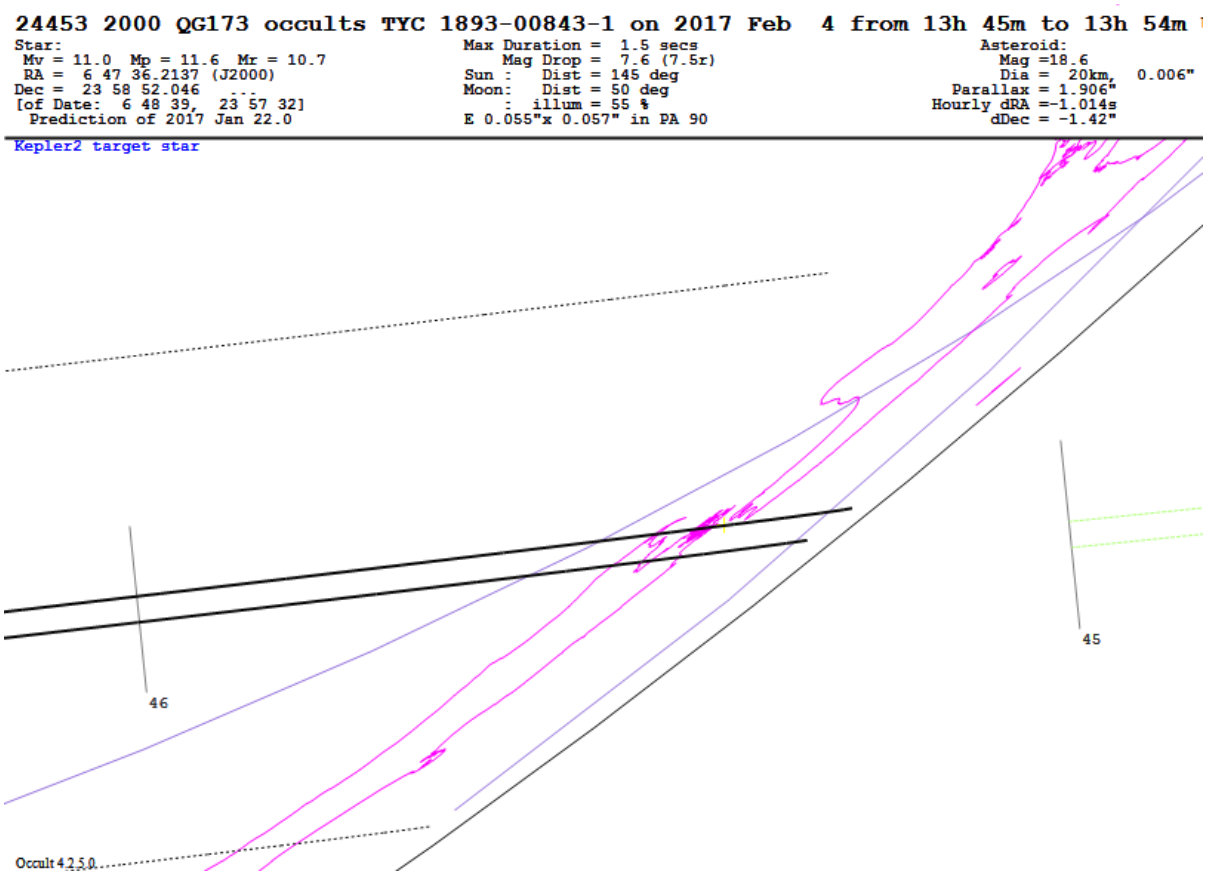
- ZC0913 is occulted by the moon the following night (Tuesday 7th February). This is another twilight event (with the Sun only 5° below the horizon). Unfortunately we can't use a red filter this time as the star is too blue (being a B8 spectral type). The star is also a close (unresolvable) double star, with the fainter component (mag 6.1) disappearing behind the lunar limb 0.15 seconds after the brighter component (mag 5.1). This should give us a double-step event in the video measurements over 3-4 frames.

day			Time			P	Star		Sp	Mag	Mag		%	Elo n	Sun	Moon	
y	m	d	h	m	s		No	D		v	r	V	ill		Alt	Alt	Az
17	Feb	04	08	30	07.9	D	054		K3	5.6	5.1		52+	92	-10	29	326
17	Feb	06	10	42	19.9	D	0764	c	G4	4.9	4.6		75+	120		22	324
Double: AB 5.8 5.8 0.10" 84.4, dT = +0.23sec																	
17	Feb	07	07	59	53.9	D	0913	c	B8	5.1	5.2	S	83+	132	-5	27	020
Double: AB 5.1 6.1 0.061" 65.1, dT = +0.15sec																	

Minor Planet Occultations

There's only the one minor planet occultation during February, which takes place on Saturday 4th February at UT 13:45:24 (Sunday morning at 2:45:24 am NZDST). The shadow path is predicted to travel south of Wellington but there's quite a large uncertainty in this prediction and so we may still get to see an occultation. Unfortunately the star is only 8° above the horizon so if you live in a valley (like I do), it will be below the surrounding hills. However I'd encourage everyone who can see this event to attempt it, as the star (TYC 1893-00843-1) is part of the Kepler 2 program and so a successful observation could tell us if the star is a double star or not. The star is also quite faint (mag 11.0), so I suggest you use one of the pre-point stars listed below to align your telescope to the right place in the sky before the event.

Point Time			Star	J2000 RA		Dec		Offset	SAO
h	m	s	mag	h	m	o	'	ArcMin	
13	14	12	6.1	6	16.3	23	58	-0.1	78168
12	33	27	5.4	5	35.5	24	02	-5.3	77285
10	47	25	3.6	3	49.2	24	03	-8.6	76228
10	45	45	2.9	3	47.5	24	06	-11.7	76199
10	44	36	4.1	3	46.3	23	57	-2.4	76172
10	44	06	3.9	3	45.8	24	22	-27.5	76155
10	43	09	3.7	3	44.9	24	07	-12.3	76131
09	05	39	2.0	2	07.2	23	28	25.1	



Murray Forbes

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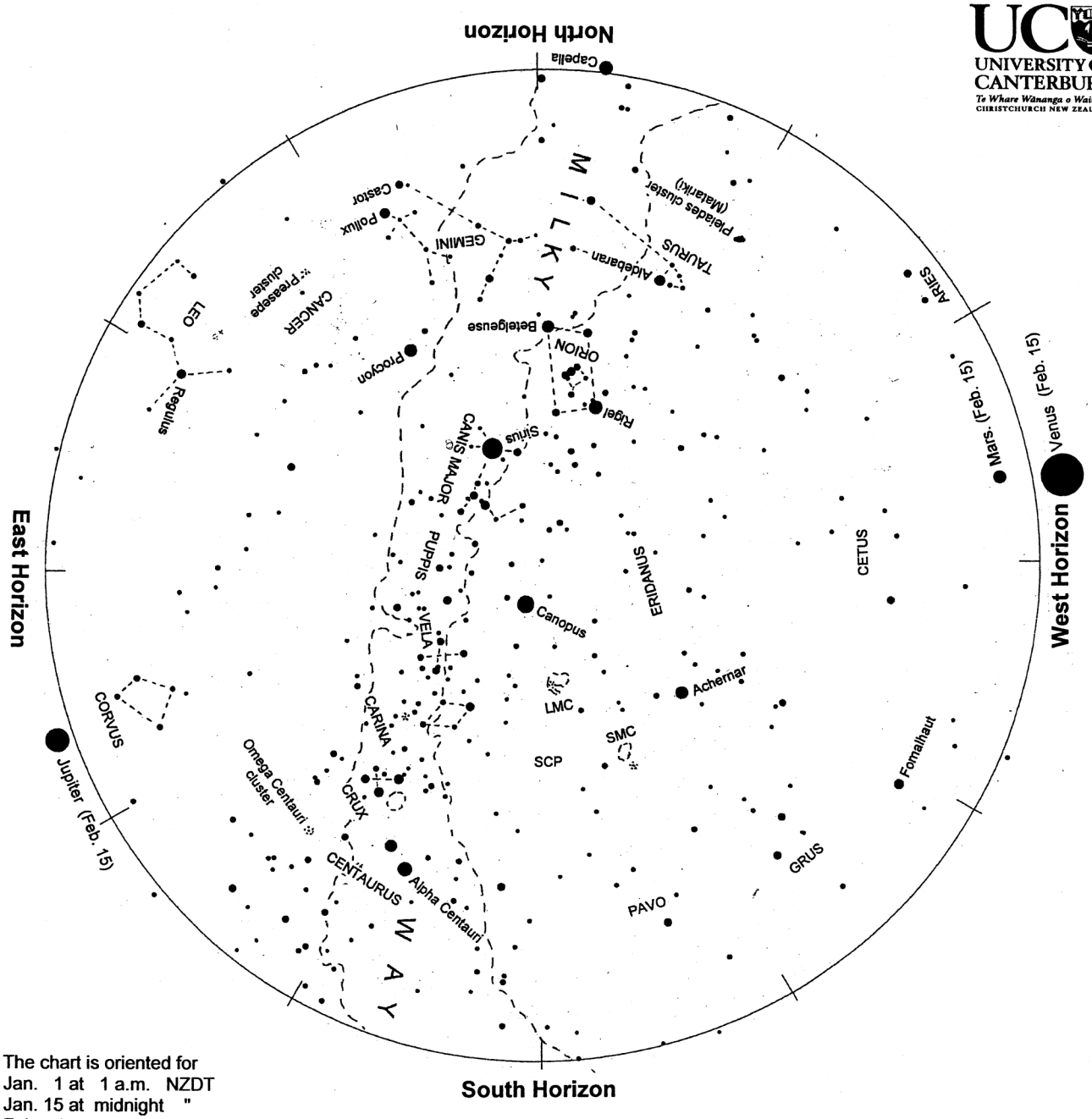

The chart is oriented for
Jan. 1 at 1 a.m. NZDT
Jan. 15 at midnight "
Feb. 1 at 11 p.m. "
Feb. 15 at 10 p.m. "

Evening sky in February 2017

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 is the brilliant 'evening star' appearing in the west at sunset. It sets 90 minutes after the sun at the beginning of the month, shrinking to 30 minutes by the end. Reddish Mars is above Venus but much fainter. Jupiter is the brightest 'star' in the late-night sky. It rises due east at midnight at the beginning of month; by 10 pm at the end. Sirius, the brightest true 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. Below and left of Orion are Taurus and the Pleiades/Matariki star cluster. The Southern Cross and Pointers are midway up the southeast sky. The Clouds of Magellan, LMC and SMC, two nearby galaxies, are high in the south 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

The Night Sky in February

Brilliant Venus is the 'evening star', appearing due west soon after sunset. It sets progressively earlier: 90 minutes after the sun at the beginning of the month, shrinking to 30 minutes after sunset at the end. A telescope shows Venus as a thinning crescent as it comes between us and the sun. It is 66 million km away mid-month. Mars is above and right of Venus, a lone reddish 'star' much fainter than Venus. Mars sets more than 90 minutes after the sun all month. At mid-month Mars is 291 million km away on the far side of the sun. The moon will be above Mars on the 1st.

Jupiter rises due east before midnight at the beginning of the month; before 10 pm at the end. It is the brightest 'star' in the late-night sky and shines with a steady golden light. A telescope will easily show Jupiter's four bright moons. Binoculars often show one or two of them looking like faint stars close to the planet. Jupiter is 725 million km from us mid-month. It is 11 times Earth's diameter and 320 times Earth's mass. Beside Jupiter is Spica, the brightest star in Virgo. The Moon, past full, will be near Jupiter on the night of the 15th-16th.

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, upside down. 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 and left of Sirius are bluish Rigel and orange 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, a fainter line of stars above the bright three. At its centre is the Orion Nebula; a glowing gas cloud around 1300 light years away.

Orion's belt points down and left to the orange star Aldebaran. Continuing the line finds the Pleiades or Matariki star cluster. Aldebaran is Arabic for 'the eye of the bull'. It is on one tip of an upside-down V that makes the face of Taurus. The V-shaped group is called the Hyades cluster. It is 130 light years away. Aldebaran is not a member of the cluster but merely on the line of sight, 65 light years from us. It is 145 times brighter than the sun. The Pleiades/Matariki star cluster is also known as the Seven Sisters and Subaru among many names. Six stars are seen by eye; dozens are visible in binoculars. The cluster is 440 light years from us. From northern New Zealand the bright star Capella is on the north skyline. It is 90,000 times brighter than the sun and 3300 light years away.

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.

Saturn (not shown) rises in the southeast before 3 a.m. at the beginning of the month; around 1 a.m. by the end. It has a creamy colour and is the brightest 'star' in that part of the sky. It is always worth a look in a telescope. Saturn is 1570 million km away mid-month. The Moon will be near Saturn on the 21st.

Mercury appears below and right of Saturn, rising around 4:30 a.m. at the beginning of the month, two hours before the sun. It slowly sinks into the twilight and disappears before month's end as it moves to the far side of the sun. It is 200 million km away mid-month.

*A light year (l.y.) is the distance that light travels in one year: nearly 10 million million km or 1013 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, P.O. Box 56, Lake Tekapo 7945, New Zealand.

www.canterbury.ac.nz