

The next WAS meeting will be held on Wednesday 6th of September 2017 at 7:30 pm at Carter Observatory, Upland Rd, Kelburn, Wellington

Space Safari of Dying Stars—Thomas Murphy



Thomas Murphy will give a tour of the most unstable stars in our galaxy and what will happen when they finally kick the bucket.

Thomas has a BSc (Hons) and MSc in Physics, the latter working on the Cosmic Dust Analyzer on Cassini. He has since callously abandoned professional physics, and now works as a technical project manager for a web development company.

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2017 — 2018 SUBSCRIPTIONS DUE

The new subscription year begins 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 2017-2018

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

It appears that quite a few members from last year have not yet renewed their subscriptions. If this is an oversight, can you please remedy it as soon as possible.

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
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Council

Andrew Fuller

Edward Wilcock

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Janine Bidmead

Murray Forbes

Peter Woods

Sarah Taylor

Postal Address: Wellington Astronomical Society, PO Box 3181, Wellington 6140, New Zealand

WAS ON FACEBOOK

Our Facebook page "Wellington Astronomical Society" is now operational. You can search for it on Facebook or click on this link <https://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" <https://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 <https://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 September 2017

WAS September Meeting

Space Safari of Dying Stars

Thomas Murphy will give a tour of the most unstable stars in our galaxy and what will happen when they finally kick the bucket.

Thomas has a BSc(hons) and MSc in

Physics, the latter working on the Cosmic Dust Analyzer on Cassini. He has since callously abandoned professional physics, and now works as a technical project manager for a web development company.

Date: Wednesday 6th September

Time: 7:30pm,

Venue: Space Place at Carter Observatory

Cassini-Huygens: This is Your Life Party

Join us as we celebrate the amazing work of the Cassini-Huygens spacecraft and bid it a final farewell. BYOB and potluck!

Dates: Saturday 16th September

Time: 7:00pm.

Venue: Wellington Collegians Club,

Anderson Park, Botanical Gardens.

WAS Astrophotography group / Dark Sky Observing

We are hoping to get special access to this site again both for astrophotography and dark sky observing. Please be at the gates by 7:15pm. The gates will be opened for cars to drive in and closed again at 7:30pm. There won't be anyone there to let you in if you

are late. Any updates will be posted on the [WAS Astrophotography Group](#) Facebook page closer to the time. For further details or cancellations contact Edward 021_08304802 or Chris 021_890222.

Date: Saturday 23rd September

Time: 7:30pm,

Venue (to be confirmed): Brooklyn Hill Turbine

WAS Observing Evening

See many wonderful objects, star clusters, galaxies, dying stars and nebulae. We will be focusing on objects around the galactic centre like the Lagoon, Trifid, Swan, and Eagle nebulae as well as a number of other Messier objects prominent in this part of the night sky. Both Jupiter and Saturn will be visible from early evening. Come and learn

how to star-hop through the night sky to find many of the various astronomical objects using the Society's Dobsonian telescopes.

Chris is often there on Friday evenings too so feel free to come along though it would be best to give him a ring on 021_890222 to check on conditions.

Dates: Saturday 30th September

Time: 7:00pm,

Venue: Tawa College

WAS & Wairarapa Astronomical Society

We will be running a joint public observing event with the Wairarapa Astronomical Society in Martinborough to support the Martinborough Library.

Dates: Saturday 30th September

Time: 7:00pm.

Venue: Martinborough (actually ven-

ue to be confirmed).



WAS Mid-winter Dinner

Thanks to everyone who came to our midwinter dinner on 15 July in Johnsonville. It was great to celebrate the occasion with you all and the food was excellent. We hope to run a similar event next year so if you are interested, please let us know!

Janine Bidmead



Aoraki Mackenzie Starlight Festival



To celebrate New Zealand's International Dark Sky Reserve, the third Aoraki Mackenzie Starlight Festival will be held at the Hermitage, Aoraki, Mount Cook from 13th to 15th October,

Three international keynote speakers will be at the festival:

- Dr Natalie Batalha from NASA Ames, who will be talking on 'A planet for Goldilocks'. Natalie was a principal scientist on the highly successful Kepler mission to find Earth-like planets, and was named by Time Magazine as one of the 100 most influential people on Earth for 2017.
- Kevin Govender from the IAU Office of Astronomy for Development in Cape Town, who will be talking about Astronomy for Humankind
- Sze-leung Cheung from the IAU

Office for Astronomy Outreach in Tokyo, who will be talking about light pollution and the dangers of LEDs for dark skies.

In addition:

- The renowned astro-photographer Mark Gee from Wellington will conduct an astrophotography workshop to tell you about his techniques for perfect astro-photographs.
- Mark Gee, Steve Chadwick and Fraser Gunn, will be showing their latest astronomy night-sky time-lapse animations
- There will be an astrophotography exhibition featuring nine of New Zealand's top astro-photographers.
- The digital planetarium at the Hillary Alpine Centre at Mt Cook will be the venue for two

special planetarium shows for the Festival.

- For school students (or in fact for people of all ages) there will be a Galileoscope workshop hosted by a team from _Science Alive!_ from Christchurch.
- There will be videos, exhibitions and stargazing at the new Mt Cook Observatory.
- Finally, Mt John Observatory will host an open day on the afternoon of Sunday October 15th.

For further details please visit their web-site at

<http://www.starlightfestival.org.nz>,

or their Facebook page at

<http://www.facebook.com/AorakiMackenzieStarlightFestival/>.

“Measuring the Earth” Course



Victoria University Wellington still has some places left for their “Measuring the Earth” course

The course is being run by Peter Gainsford, and will cover how the early Greek scientists attempted to measure the Earth's size and shape. It will particularly focus on how the Greek mathematician Eratosthenes was able to accurately calculate the

earth's circumference, long before anyone else.

The course starts on Wednesday 13th September. For further information, you can visit the course web-page <http://ce.victoria.ac.nz/courses/546-measuring-the-earth-classical-calculations-about-the-worlds-size-and-shape>, or contact the university by email at conted@vuw.ac.nz or by phone on 04 463 6556.

2017 Eclipse Experience



I recently had the opportunity to visit Oregon, USA for the 2017 solar eclipse; and what an unforgettable experience it was! Luckily enough, my two sisters live in Portland, Oregon and when I heard of the 2017 total solar eclipse was going through the state I knew I had to go. Missing my chance while in Australia for the 2012 eclipse, something I still regret to this day, there was no way I was going to miss this one. Even better, this eclipse had the added bonus of an unforgettable family reunion with my sisters, and brother, who also flew in from Colorado for the event. After spending a month in Alaska working on a fishing boat, I boarded my flight to Portland in the early morning of 20 Aug, the day before the eclipse. We weren't chancing the huge road travel delays that were predicted from the millions travelling in, and left for our planned campsite in Buena Vista, Oregon just after I landed, at 4:30am.

Luckily, traffic was nowhere to be found at this time and we had a nice hassle free carpool down to the chosen site, about 100km south of Portland. As fate would have it, a good friend of mine's family that I met in New Zealand has a farm that was directly in the path of totality. Almost dead centre in fact, less than 1km away. So we had a nice long 1 minute and 53 seconds of totality to

look forward to. When we arrived the vibes were already high, with friends and family coming in from all over the country to camp out for the days preceding what was being dubbed the 'Great American Eclipse', the first to grace the country completely from west to east coast in 99 years, and the first to visit America only in its 241-year history as a country.

Situated along the Willamette river, away from the masses of crowds at the local parks, we were in a very relaxed and beautiful location to embrace the weekend. The weather on Aug 20, the first day at camp, was warm and sunny but had a slight haze of cloud in the air. This caused a little bit of worry, but the cloud cover was thin enough to still have decent views of the Sun's photosphere. I was having a particularly good time using the solar binoculars and tripod I had purchased for the occasion. The sunspots were plentiful, 8 visible, which I thought would make the eclipse even more interesting to watch. The rest of the day we spent kayaking around on the river and making some mediocre camp food that was eaten with chopsticks that we fashioned from sticks due to forgetting cutlery. Good times. As night-time sent in, we did a bit of stargazing and storytelling then went to bed fairly early so we could have an

early rise for the big day, 21 Aug 2017.

Upon waking up around 7am, I was greeted to a brilliant blue sunny sky without a cloud in sight. How joyous a moment that was! After so much planning and anticipation, I knew at the moment it was all going to happen, and felt so grateful to be there. After a quick breakfast, we got our viewing area prepped with blankets, the solar binoculars and a pinhole projector. The whole camp area was buzzing with excitement, and many had high end cameras set up about. Directly on our right was a lovely older couple from San Francisco, who had some absolutely great stories to tell from being in their young twenties during the summer of love in San Francisco, 1969.

The first point of contact was 9:05am, and watching with anxious anticipation sure enough, there was the unmistakable sight of the moon beginning to creep over the Sun at 9:05am. Hooting and hollering was heard about and then began the hour or so wait to totality. As the minutes ticked by there was no denying that it was beginning to get dimmer around us as the Moon moved across the Sun and sunspots were gobbled up. About a half hour or so in, the lighting started to become very noticeable; this was no ordinary light.

It was unlike the light from a sunset, as that passes through our atmosphere from a full Sun.

This was strange and eerie, a partially blocked Sun high in the sky. The senses were becoming more alive than I can ever remember. In the final 10 minutes or so, a light breeze began to pick up from a previously completely still air, caused by the changing of pressures due to the changing incoming solar radiation. All of this combines and hits right to the core of your existence as a sentient being flying on a rock in space.

There were a couple hot air balloons and planes in the distance, people who had chosen to witness it from the air. I'm sure that would have been quite a spectacle. In the final 2 minutes before totality, the lighting began to get dramatically different. Almost as if everything as far as the eye can see was being evenly lit by candlelight. Looking down at the timer and seeing 1 minute left to totality I made a loud callout, "1 minute!" At this point, my eyes became glued to the binoculars waiting for the 'Bailey's Beads' to occur, the uneven surface of the mountains and craters of the Moon which causes dramatic flashes of light in the final seconds before the Sun's photosphere disappears from view. And there they were! Finally, the very last moment before totality. Brilliant glistening beads of light going off like fireworks. And then, unmistakably, totality hit and everything changed instantly.

"Totality!" I proclaimed, and everyone removed their glasses and gazed upwards and witnessed the Corona of the Sun glowing eerily high in the sky. Time seemed to stop. Darkness fell, and Venus bright and bold was glistening nearby to the right of the Sun. The temperature plummeted degrees in seconds, and in the far off distance a pseudo-sunset effect of the area of Earth not in the umbra was seen. Gleeful cheers and expressions of awe were heard all around us in those first moments. And then silence as everyone became transfixed. Silence from the birds and insects. It was a moment in time that I'm finding hard to stop thinking about and truly won't ever forget. So very moving. The view of the Corona through a pair of regular binoculars during totality is something I urge everyone to try to experience sometime, those wispy strands of angelic awesomeness blew my mind. And then, in what seemed to be the fastest 1 minute and 53 seconds of my life, the Bailey's Beads returned and an explosion of light came back as the visible photosphere returned and we exited the umbra of the Moon.

And in that moment everyone just looked at each other, dumbfounded, and started hugging. There wasn't anything else to do except embrace how fantastic that was. Even those without a passing interest in astronomy seemed moved to their core. This feeling of a surreal cosmic connection was very real. And then, that feeling was starkly interrupted by the crowing

of a rooster thinking the day was beginning once again. How funny that was to hear, and everyone burst out in laughter. In a way, I think the rooster was right as it really did feel like a new day after that. Complete with a new perspective of the possible beauty of the Cosmos.

The second half of the eclipse was a bit more relaxed as the Sun continued to brighten. We still watched periodically, but mostly the mood changed to excited chit chat between the attendees. I watched the last moments of the eclipse through the solar binoculars, as the Moon crept away from the Sun and the Sun returned to normal. We all tried to pinpoint the moment the Moon left, and then that was it. Just wow. We finished our eclipse day with some more kayaking on the river, and soaking up the much appreciated energy of the Sun. Everyone truly just seemed to be in the best of moods and grateful for the unforgettable experience. It's quite easy to understand how ancient people would have thought the end of the world was upon them as the Sun disappeared the way it did. It's almost a welcome relief when it comes back, as much as you don't want totality to end. All in all, it was a terrific experience and I couldn't have hoped for it going any better. We were all so moved by the occasion that we've even started making plans for the July 2019 total eclipse in Chile. Hope to see you there!

Alex Thom



Alex overlooking Kachemak Bay, Alaska.



Looking up at the constellation of Ursa Major.

Spectacular shots of the 2017 Eclipse



Notification for the Annual General Meeting 2017

The 2017 Annual General Meeting will be held on the **Wednesday 1st November** at Space Place, Carter Observatory.

If you have any resolutions for the AGM or nominations for Council that you would like to forward, please email the secretary@was.org.nz. We need to have any resolu-

tions and nominations submitted before Monday 8th October so it can be printed in the November newsletter. If you need help with submitting a resolution please contact Chris 021_890_222 or Antony 021_253_4979.

Strategic Planning Meeting

On **Saturday 9th September** the WAS Council will be holding a Strategic Planning Meeting. At this meeting we will be reviewing our activities over the past year and set down plans for the coming year and following years.

We will be looking at the role of the Society and the objectives as listed in our Constitution. Some of our goals include the building of a remote access observatory for members to use, the hosting of the RASNZ Centenary

Conference in Wellington in 2020 and our own 50th Jubilee in 2023.

If you would like to contribute to this planning meeting or would like to offer any comments or suggestions please contact Chris 021_890_222 or Antony 021_253_4979.

Occultations for September 2017

Total Lunar Occultations

- All of this month's lunar occultations occur on the same night (Thursday 28th September), as the moon travels across the open star cluster M25. Not surprisingly, most of these are double or multiple stars but only one component is listed for each star as the other components are too faint to see. There is also a considerable time interval between the disappearances of the components, with the negative value indicating the fainter component is occulted first. The first three events take place between 8pm and 9pm.
- The last event for that evening takes place a few hours later, after the moon has travelled back out the other 'side' of the cluster. This is a single star but is listed as a variable so may be fainter on the night than listed in the table above. Fingers crossed for good weather that evening.

day			Time			P	Star		Sp	Mag	Mag		%	Elon	Sun	Moon	
y	m	d	h	m	s		No	D		v	r	V	ill		Alt	Alt	Az
17	Sep	28	08	17	41.2	D	2687	S	G1	6.6	6.0	V	52+	092		57	303
multiple AB 6.9 9.1 66" 252.0, dT = -192sec (other components less than mag 16)																	
17	Sep	28	08	32	34	D	2685	S	K1	6.8	6.4	s	52+	092		55	299
multiple AB 4.7 14.1 2.8" 170.0, dT = -43sec (other components less than mag 15)																	
17	Sep	28	08	53	50.6	D	161582	w	G3	7.0	6.3		52+	092		55	293
double AB 7.1 9.6 69" 261.8, dT = -200sec																	
17	Sep	28	10	44	57.6	D	2699		M3	6.8	5.8	v	53+	093		31	271

There's only one minor planet occultation predicted for the month, on Thursday 14th September at 08h 33m 18s UT – a very civilised time of the evening at 8:33pm. The shadow is predicted to track a bit south of Wellington but the uncertainty in the prediction is large enough that it's still worthwhile for all WAS observers to attempt this event. The star is fairly faint (magnitude 10.2) so I'd recommend using a pre-point star to locate the target star. There are a couple of pre-point stars that evening before the event but one (SAO 184415) is only five minutes before the occultation. I've also listed some bright pre-point stars that can be used the previous night. The minor planet is quite small, with an estimated diameter of 16 km. This means the occultation will be brief, being at most 0.7 seconds long. The minor planet is a lot fainter than the star, and so the star will seem to disappear completely during the event. The moon is only 38% illuminated and is 154° away, so won't cause any problems.

Point				J2000				Dec		
Time			Star	RA		Dec		Offset	SAO	
h	m	s	mag	h	m	o	'	ArcMin		
08	27	59	1.1	16	29.4	-26	26	-18.7	184415	
07	57	29	2.9	15	58.9	-26	7	-37.1	183987	
Previous evening										
12	53	34	4.1	20	51.8	-26	55	4.2	189781	
11	09	02	3.3	19	6.9	-27	40	51.6		
10	57	23	2.1	18	55.3	-26	18	-30.5	187448	
10	47	48	3.2	18	45.7	-26	59	11.4	187239	

43592 2001 QC72 occults TYC 6803-1589-1 on 2017 Sep 14 from 8h 26m to 8h 35m UT

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Star:
Mv = 10.2  Mp = 10.2  Mr = 10.2
RA = 16 34 44.4883 (J2000)
Dec = -26 44 45.667  ...
[Of Date: 16 35 49, -26 46 47]
Prediction of 2017 Aug 12.0

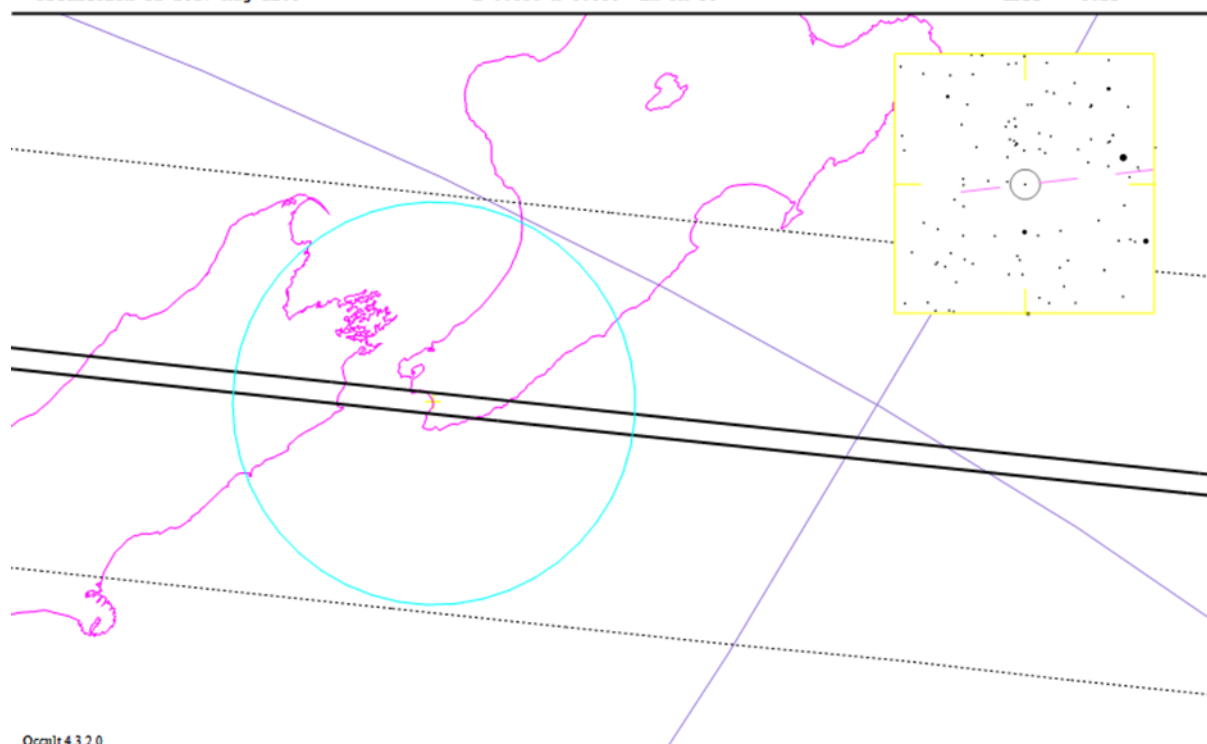
```

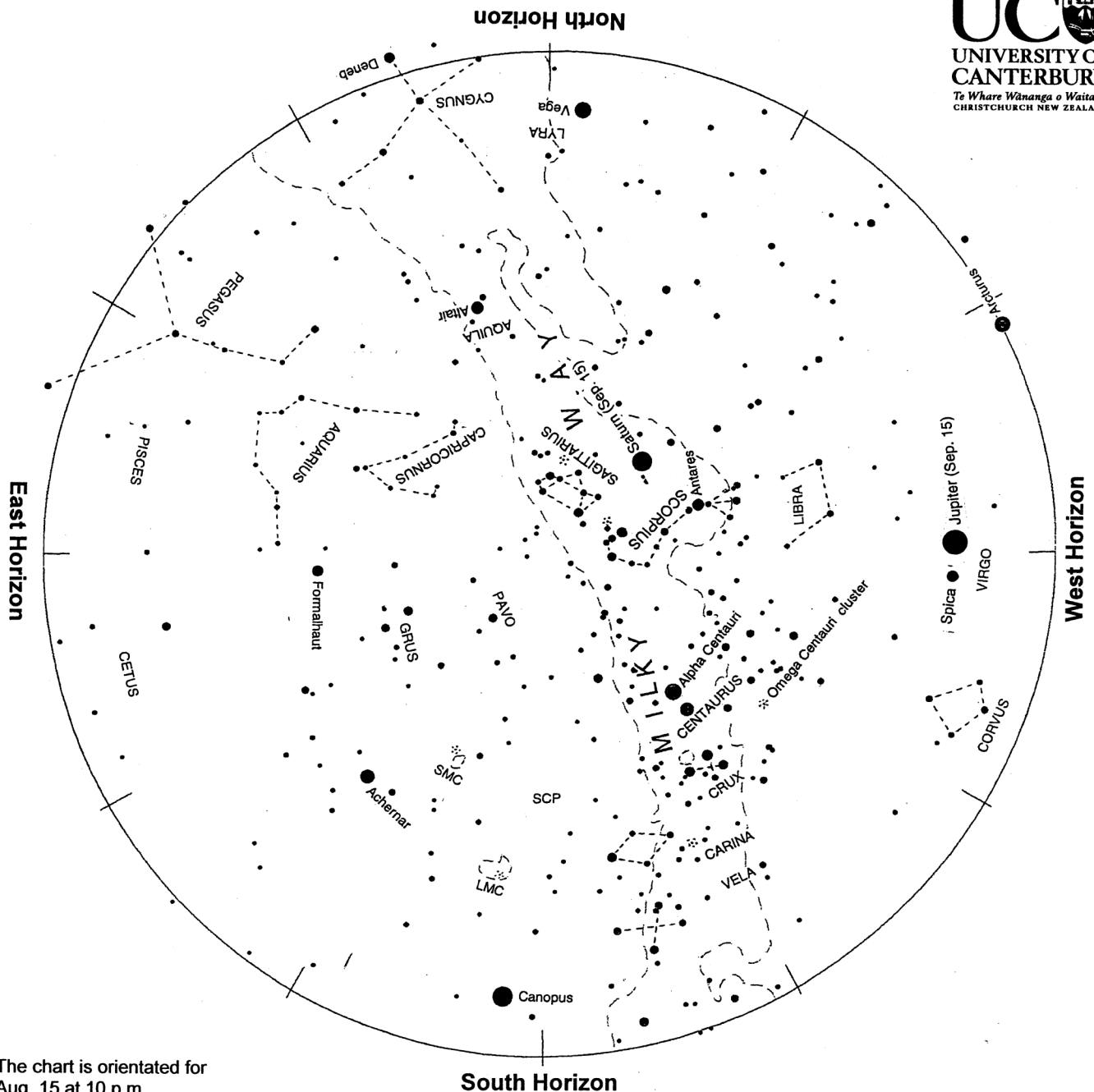
Max Duration = 0.7 secs
Mag Drop = 8.0 (7.6r)
Sun : Dist = 79 deg
Moon: Dist = 154 deg
 : illum = 38 %
E 0.080"x 0.080" in PA 90

```

Asteroid:
  Mag = 18.2
  Dia = 16km, 0.008"
  Parallax = 3.316"
  Hourly dRA = 3.332s
  dDec = -5.21"

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

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

Golden Jupiter is the 'evening star' appearing in the west soon after sunset. Saturn is northwest of the zenith, the brightest 'star' in that region. Left of it is orange Antares marking the Scorpion's heart. The Scorpion's tail, a.k.a. the fish-hook of Maui, curls toward the zenith. Arcturus twinkles red and green as it sets in the northwest. Crux, the Southern Cross, and the Pointers are in the south-west. Canopus twinkles like a diamond near the southern horizon. Vega shines on the north horizon. The Milky Way spans the sky from north to south.

The Night Sky in September

Jupiter is the 'evening star', appearing midway down the western sky soon after sunset. It sets before 9 pm mid-month. We are leaving Jupiter behind on the far side of the Sun. It is 940 million km away. A small telescope shows Jupiter's disk and the four 'Galilean' moons lined up on each side of it. The thin crescent Moon will be below Jupiter on the 22nd.

Saturn is the only other naked-eye planet in the evening sky. It is just north of overhead at dusk, the brightest 'star' in that area. It sets in the southwest around 1 a.m. Saturn is 1500 million km away mid-month. Saturn is worth a look in any telescope. Good binoculars will show it as an oval, the planet and rings blended together. The Moon will be near Saturn on the 27th.

Arcturus is on the northwest skyline. Canopus, the brightest true star in the sky, skims along the southern skyline. Both stars are shining through a lot of air which makes them twinkle colourfully. Canopus, being white, shows all colours like a diamond. Orange Arcturus twinkles red and green. Canopus is matched on the northern skyline by Vega, the second-brightest northern star after Arcturus.

Canopus is a truly bright star: 13 000 times the sun's brightness and 300 light years* away. Vega is 52 times brighter than the sun and 25 light years away. From northern New Zealand the star Deneb can be seen near the north skyline in the Milky Way. It is the brightest star in Cygnus the Swan. Deneb is around 1400 light years away and 50 000 times brighter than the Sun.

Orange Antares, well left of Saturn, marks the body of the Scorpion. The Scorpion's tail hooks toward the zenith like a back-to-front question mark. It is 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. It is a relatively cool 3000 C, hence its red-hot colour. 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 to Crux the Southern Cross. Alpha Centauri is the third brightest star. It is also the closest of the naked eye stars, 4.3 light years away. Beta Centauri, along with most of the stars in Crux, is a blue-giant star hundreds of light years away.

The Milky Way spans the sky from north to south. It 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, 27 000 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. 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 in the south sky. They are 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.

On moonless evenings in a dark sky the Zodiacal Light is visible in the west. It is a faint broad column of light surrounding Jupiter and extending upward toward Libra. It is sunlight reflecting off meteoric dust in the plane of the solar system. The dust may have come from a big comet, many centuries ago.

Venus (not shown on the chart) is the brilliant 'morning star' rising after 5 a.m. all month. It appears a bit north of due east. It is up 80 minutes before the sun at the beginning of September but only 50 minutes before the sun at the end. So it will be increasingly difficult to see from places with high hills to the east. Mars and Mercury are hidden low in the dawn twilight,

*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