



The next WAS meeting will be held on Wednesday 5th of October 2016 at 7:30 pm at Carter Observatory, Upland Rd, Kelburn, Wellington

WAS Meeting Talk - 4000 Years in 40 Minutes

Speaker - Jay Èvett



Hear about some of the world's greatest scientific achievements in astronomy in just one night. In this fast-paced presentation Jay Èvett will give us a glimpse of the astronomical world and the effects it has on today's society.

Jay is a Visitor Services Host at the Wellington Museum Trust and based at Space Place at Carter Observatory and the Cable Car Museum. He studies Italian, International Relations and Religious Studies at Victoria University and is president of the VUW Italian Society where he recently directed a play. He has had an interest in astronomy since childhood.

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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 2015-2016

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 2015 AGM

President: Antony Gomez

Vice President: Duncan Hall

Secretary/Telescope custodian: Chris Monigatti

Treasurer: John Homes

Website (joint): John Homes & John Talbot

Councilors

Frank Andrews

Janine Bidmead

Peter Graham

Aline Homes

Murray Forbes

James Smith

Peter Woods

Newsletter Editor: editor@was.org.nz

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.

Wellington Astronomical Society October 2016 Events

WAS October Meeting

4000 Years in 40 Minutes – Jay Èvett

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Wellington Museum Trust and based at Space Place at Carter Observatory and the Cable Car Museum. He studies Italian, International Relations and Religious Studies at Victoria University and is president of the VUW Italian Society where he recently directed a play. He has had an interest in astronomy since childhood.

Time: 7:30 pm

Date: Wednesday, 5th October

Venue: Space Place (formerly Carter Observatory)

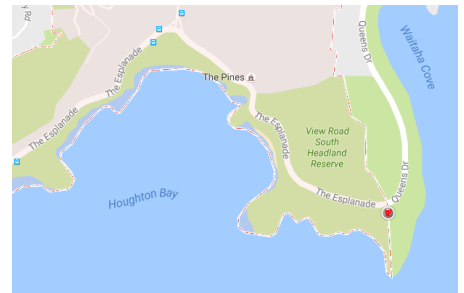
WAS Astrophotography group

This is our first gathering of the WAS Astrophotography group. 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 your interest through the event on the WAS Facebook page. For further details or cancellations contact Edward 021_08304802 or Chris 021_890222.

Time: 7:00 pm

Date: Saturday, 1st October

Venue: Te Raekaihau Point, South coast between Lyall Bay and Houghton Bay, Queens Drive (see map opposite).



Where to next - Moon or Mars? – David MacLennan

NASA's long-term vision is for a human mission to Mars, but its strategy for getting there is flawed, as it does not include the most logical intermediate step: a return to the Moon. Instead, NASA's proposed intermediate step is to retrieve a large boulder from an asteroid and send an astronaut crew out to investigate it – a plan that is not getting much support from either Congress or the scientific community. A return to the Moon would be a better way to prepare for a journey to Mars, as much

of the technology needed for a Mars mission, such as habitats, life-support systems, rovers, tools and instruments, could be first proven under real off-world conditions on the Moon. In addition, recent robotic missions have shown the Moon to be a worthwhile scientific target in its own right.

David MacLennan has been lecturing and writing about space exploration for over four decades. A founder and former President of the NZ Spaceflight Associa-

tion, he also edited the Association's journal *Liftoff* for many years. If the sky is clear, we'll go outside after the talk and look at the night sky through telescopes.

Time: 6:30 pm

Date: Friday, 7th October

Venue: Lower Hutt War Memorial Library

WAS Observing Evening - International Observe the Moon Night

This month's WAS observing evening coincides with International Observe the Moon Night (InOMN). This is a worldwide, public celebration of lunar science and exploration held annually since 2010. One day each year, every-

one on Earth is invited to observe and learn about the moon together, and to celebrate the cultural and personal connections we all have with Earth's nearest neighbour. Mars and Saturn will be visible through telescopes as well.

Time: 7:00 pm

Date: Saturday, 8th October

Venue: Wellington Waterfront by the bridge near the lagoon

Observe the Sun and Moon Day

Both the Moon and Sun will be visible in the sky this afternoon. Look through telescopes designed especially to observe sunspots and flares on the Sun and other telescopes to see the craters of the Moon during daylight.

Time: 2:00 to 5:00 pm

Date: Sunday, 8th October

Venue: Wellington Waterfront by the bridge near the lagoon

Astronomy Club Nights

There are two local Astronomy Club Nights this month. Both consist of a short presentation and observing the night sky. Anyone is welcome to join in.

Time: 7:00 pm

Date: Thursday, 13th October

Venue: Hutt International Boys School

Time: 7:00 pm

Date: Thursday, 27th October

Venue: St Bernard's College, Lower Hutt



One Incredible Galaxy Cluster Yields Two Types of Gravitational Lenses

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!

There is this great idea that if you look hard enough and long enough at any region of space, your line of sight will eventually run into a luminous object: a star, a galaxy or a cluster of galaxies. In reality, the universe is finite in age, so this isn't quite the case. There are objects that emit light from the past 13.7 billion years—99 percent of the age of the universe—but none before that. Even in theory, there are no stars or galaxies to see beyond that time, as light is limited by the amount of time it has to travel.

But with the advent of large, powerful space telescopes that can collect data for the equivalent of millions of seconds of observing time, in both visible light and infrared wavelengths, we can see

nearly to the edge of all that's accessible to us.

The most massive compact, bound structures in the universe are galaxy clusters that are hundreds or even thousands of times the mass of the Milky Way. One of them, Abell S1063, was the target of a recent set of Hubble Space Telescope observations as part of the Frontier Fields program. While the Advanced Camera for Surveys instrument imaged the cluster, another instrument, the Wide Field Camera 3, used an optical trick to image a parallel field, offset by just a few arc minutes. Then the technique was reversed, giving us an unprecedentedly deep view of two closely aligned fields simultaneously,

with wavelengths ranging from 435 to 1600 nanometers.

With a huge, towering galaxy cluster in one field and no comparably massive objects in the other, the effects of both weak and strong gravitational lensing are readily apparent. The galaxy cluster—over 100 trillion times the mass of our sun—warps the fabric of space. This causes background light to bend around it, converging on our eyes another four billion light years away. From behind the cluster, the light from distant galaxies is stretched, magnified, distorted, and bent into arcs and multiple images: a classic example of strong gravitational lensing. shapes along concentric circles surrounding the cluster.

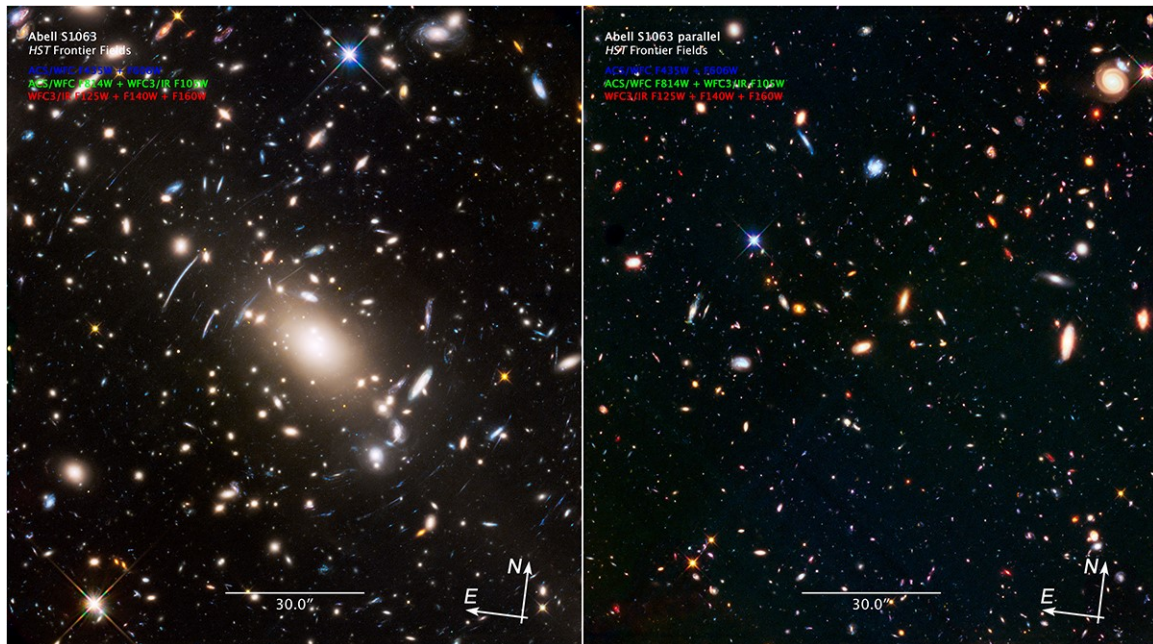
But in a subtler fashion, the less optimally aligned galaxies are distorted as well; they are stretched into elliptical shapes along concentric circles surrounding the cluster.

A visual inspection yields more of these tangential alignments than radial ones in the cluster field, while the parallel field exhibits no such shape distortion. This effect, known as weak gravi-

tational lensing, is a very powerful technique for obtaining galaxy cluster masses independent of any other conditions. In this serendipitous image, both types of lensing can be discerned by the naked eye. When the James Webb Space Telescope launches in 2018, gravitational lensing may well empower us to see all the way back to the very first stars and galaxies.

If you're interested in teaching kids about how these large telescopes "see," be sure to see our article on this topic at the NASA Space Place: <http://spaceplace.nasa.gov/telescope-mirrors/en/>

Ethan Siegel



Galaxy cluster Abell S1063 (left) as imaged with the Hubble Space Telescope as part of the Frontier Fields program. The distorted images of the background galaxies are a consequence of the warped space due to Einstein's general relativity; the parallel field (right) shows no such effects. Image credit: NASA, ESA and Jennifer Lotz (STScI)

Wellington Astronomical Society Annual General Meeting Reminder

Just an early reminder that the Wellington Astronomical Society Annual General Meeting will be held on Wednesday 2 November, at Space Place at Carter Observatory, beginning at 7:30pm. The WAS council will be advising in the October newsletter of several motions that will be presented to members:

- Classes of membership – create a new class that applies to members who live too far away to attend meetings and events. Wording of the amendment is being finalised.
- The registered office of WAS should be updated from the existing:

REGISTERED OFFICE

20.(1) The registered office of the Society shall be situated at

Carter Observatory, Botanic Gardens,
40 Salamanca Road, WELLINGTON

To:

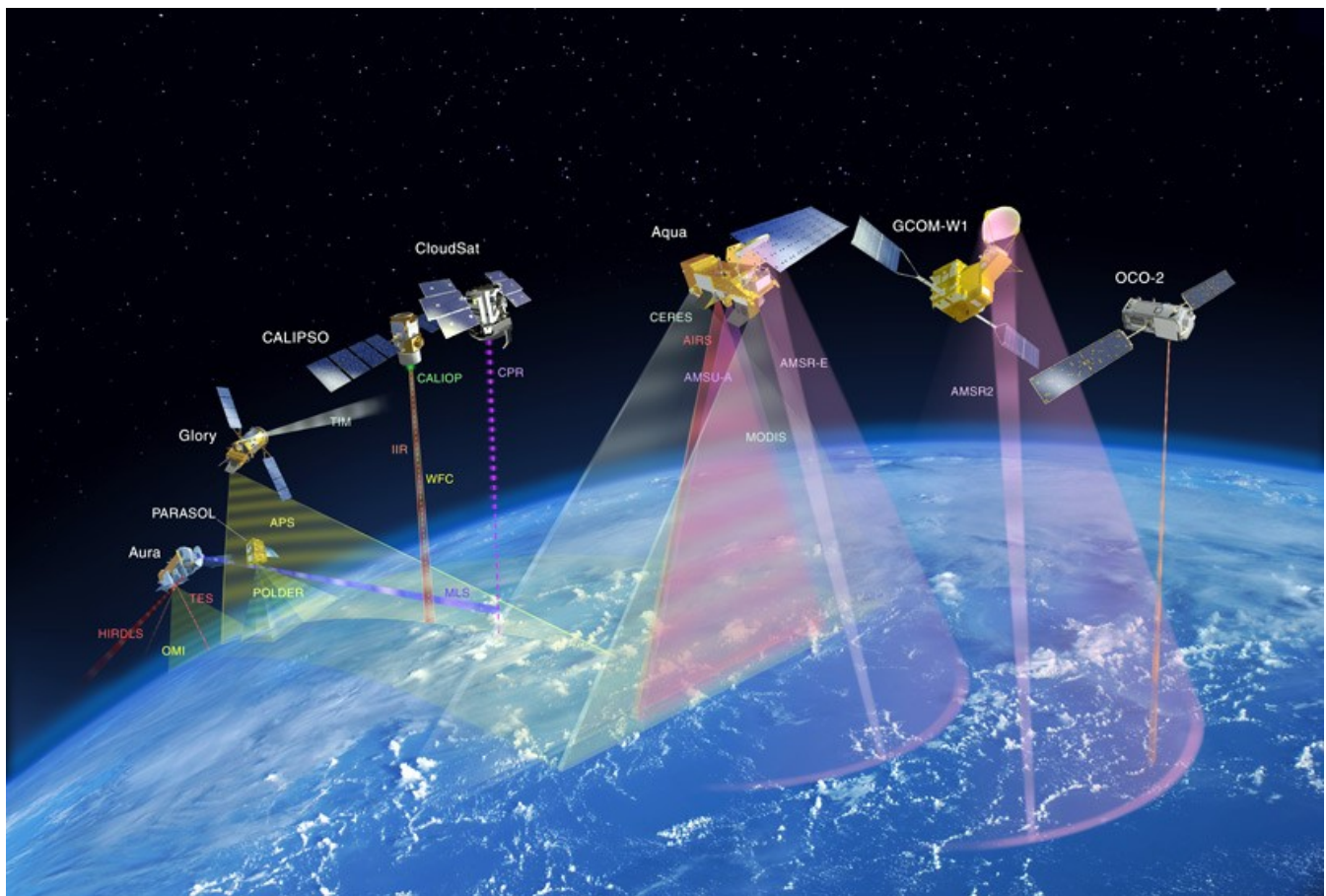
Space Place at Carter Observatory,
Botanic Gardens, 40 Salamanca Road,
WELLINGTON 6012.

If you would like to be more involved in the running of our society or events that we host, then you can:

- stand for the WAS council – nominations and seconder to secretary@was.org.nz at least 14 days before the AGM
- volunteer to be part of the 'Local organizing committee' – LOC – for the 2020 RASNZ conference in Wellington
- talk to Antony Gomez, Janine Bidmead or Chris Monigatti about joining us at outreach events.

Chris Monigatti

World Space Week 2016: Remote Sensing – Enabling Our Future



Since its United Nations declaration in 1999, World Space Week has grown into the largest public space event on Earth. More than 1,800 events in 73 countries celebrated the benefits of space and excitement about space exploration in 2015. With a new Theme “Remote Sensing – Enabling Our Future” the aim is to inspire even more events around the world in October 2016.

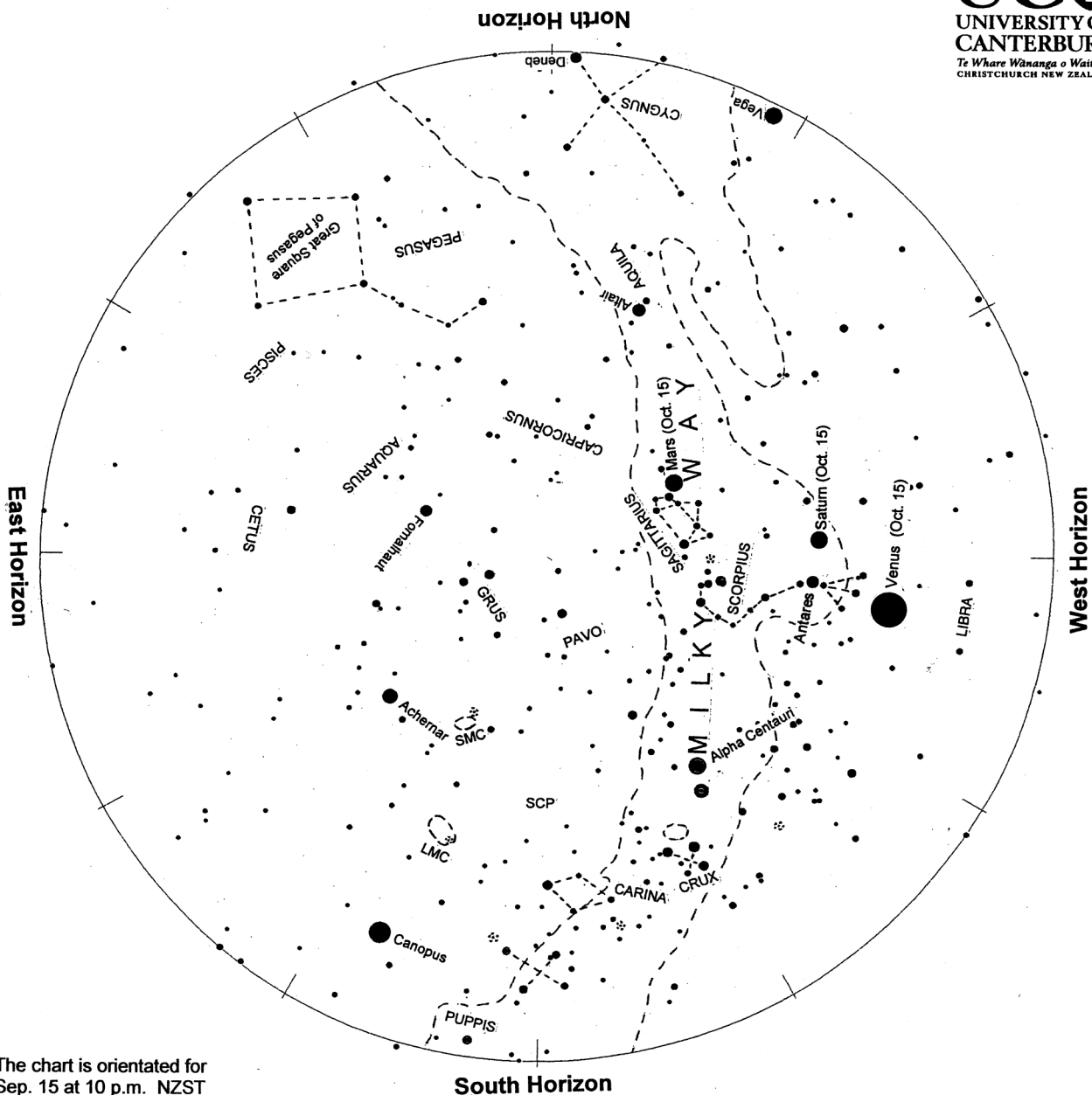
“The General Assembly declares 4 to 10 October World Space Week to celebrate each year at the international level the contributions of space science and technology to the betterment of the human condition” - UN General Assembly resolution, 6 December 1999

Each year, the World Space Week Association (WSWA) selects a theme for the upcoming World Space Week

(WSW) to provide a focus for the activities and events that take place throughout the world, during 4-10 October. WSWA is pleased to announce the theme for 2016: “Remote Sensing: Enabling Our Future,” an inward looking theme which celebrates Earth Observation from Space for the betterment of the human race. It means to highlight a host of classic Earth Observation missions such as the U.S. Landsat mission, the work of intergovernmental groups such as GEOSS Group on Earth Observations and emphasizes applications such as environment and agriculture monitoring, land use mapping and new uses such as location based services. Last year’s theme, “Discovery” celebrated the exciting discoveries in space, teaching us a lot about our origins and our future. According to Timiebi Aganaba-Jeanty, Executive Director, “The

focus this year of the benefits of remote sensing is very timely because the rising use of imagery and data is expected to stimulate market growth and revolutionize how powerful tools and data enhance lives and enable a future that we can impact positively.” We are convinced that this exciting theme will help inspire event organizers to set up wonderful events at schools, universities, science centers, planetaria, astronomy clubs, companies and museums, making World Space Week 2016 the biggest ever, remarked Goran Nikolasevic, Operations manager!

For more details, visit www.worldspaceweek.org



The chart is orientated for
 Sep. 15 at 10 p.m. NZST
 Oct. 1 at 10 p.m. NZDT
 Oct. 15 at 9 p.m. "

Evening sky in October 2016

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.

Venus is the brilliant 'evening star'. Above it, for most of the month, is Saturn, looking like a cream-coloured bright star with orange Antares to its left. Saturn and the stars slip lower night to night so Venus is between Saturn and Antares by month's end. Orange Mars holds its position high in the west above Venus. Canopus is low in the southeast, twinkling colourfully. Vega sets on the north horizon. Crux, the Southern Cross, and the Pointers are in the south-west. The Milky Way spans the sky from north through west and into the south. The Magellanic Clouds, nearby galaxies marked as LMC and SMC on the chart, are misty glows above Canopus.

The Night Sky in October

Venus is the brilliant evening star appearing in the west at sunset. Above it is Saturn with orange Antares to its left. Higher again is Mars, brighter than Saturn and distinctly orange-red in colour. Venus and Mars hold their elevations, night to night, but Saturn and the stars slip lower. In the last days of the month Venus is between Antares and Saturn. The crescent moon is well to the right of Venus on the 4th, Saturn on the 6th and Mars on the 8th.

The apparent proximity of planets is just a line-of-sight effect. We are moving to the far side of the sun from slow distant Saturn. It is 1590 million km away mid-month. We are also leaving Mars behind but it more nearly matches Earth's speed, hence it is slipping only slowly down the sky. It is 172 million km away on the 15th. Venus is catching us up on the inside lane, 193 million km away mid-month. Saturn is the only one worth a look in a telescope. Venus and Mars are small gibbous disks.

Antares marks the heart of the Scorpion. (Scorpions don't actually have hearts, but this is star lore not entomology.) The Scorpion's tail loops up the sky in the evening, making a back-to-front question mark with Antares being the dot. The curved tail 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. Red giants are dying stars, wringing the last of the thermonuclear energy from their cores. Massive ones like Antares end in a spectacular supernova explosion. Antares is about 20 times heavier than the sun. Above and 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.

Canopus is low in the southeast at

dusk often twinkling colourfully. It swings up into the eastern sky during the night. Canopus is 13 000 times the sun's brightness and 300 light years* away. On the north skyline is Vega, setting in the early evening. It is 50 times brighter than the sun, 25 light years away and the 5th brightest star in the sky.

In the southwest are 'The Pointers', Beta and Alpha Centauri, making a vertical pair. They point down to Crux the Southern Cross. Alpha Centauri, the top Pointer, is the closest naked eye star at 4.3 light years away. Beta Centauri is a blue-giant star, very hot and very luminous, hundreds of light years away.

The Milky Way is brightest and broadest in Scorpius and Sagittarius. In a dark sky it can be traced down to the south. In the north it meets the skyline right of Vega. 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. 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, with a black hole three or four million times the sun's mass, is hidden by dust clouds in space. Its direction is a little outside the Teapot's spout. The nearer 'interstellar' clouds appear as gaps and slots in the Milky Way. The dust and gas has come from old stars that have thrown much of their material back into space as they faded or blew up.

New stars eventually condense from this stuff. A scan along the Milky Way with binoculars shows many clusters of new stars and some glowing clouds of left-over gas. There are many in Scorpius and Sagittarius and in the Carina

region.

The Large and Small Clouds of Magellan, LMC and SMC, look like two misty patches of light in the southeast 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 about 5% the mass of our Galaxy and the small one 3%. That is still many billions of stars in each. The LMC is around 160 000 light years away; the SMC around 200 000 l.y.

On moonless evenings in a dark rural sky the Zodiacal Light is visible in the west. It looks like late twilight: a faint broad column of light around Venus, fading out at the Milky Way. 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.

At the end of the month golden Jupiter is on the dawn horizon at 5 a.m.

*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