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CASMAG

The official magazine of the Canterbury Astronomical Society

www.cas.org.nz, www.facebook.com/CanterburyAstronomicalSociety

Monthly Meeting: TUESDAY 21st MAY 2019

From 7:30p.m, room 701on the 7th floor of the West building (Old Rutherford) (Physics and Astronomy) at the University of Canterbury (see page 4 for a detailed map).
Refreshments start at 7.30. Meeting starts at 8pm

MAY MEETING:

PROF DR PHILIPP RICHTER

Erskine Fellow University of Canterbury

THE DIFFUSE UNIVERSE:

Stars contain only a small fraction of the visible matter. Forming the largest reservoir are filament-like structures made of gas, which cross the entire Universe. Research of these structures reveals a great deal about the formation and development of galaxies. In this talk I will provide a overview of the diffuse matter component of the universe and will present results from international research colorations

CAS Membership Subscriptions for 2019-2020

THIS YEARS SUBSCRIPTIONS ARE NOW DUE FOR PAYMENT

Payment made before 31st May is at the discounted price!!!

Please use your name and member number as a reference when banking, then email membership@cas.org.nz to advise so payments can be matched to you correctly.

PLEASE also include any changes to your contact details (eg: phone, email, address)

Full details are included on the last page of this newsletter.

You are also welcome to pay by cash or cheque at our monthly meetings.

IN THIS MONTHS ISSUE

CAS Calendar, MAY 2019 – JULY 2019

May 2019

Sunday 5th	New Moon
Sunday 12th	First Quarter
Tuesday 14th	Committee Meeting
Sunday 19th	Full Moon
Tuesday 21st	Members Meeting from 7.30pm
Saturday 25th	Members Night at Observatory
Monday 27th	Last Quarter

June 2019

Monday 3rd	Queens Birthday Holiday
	New Moon
Monday 10th	First Quarter
Tuesday 11th	Committee Meeting
Monday 17th	Full Moon
Tuesday 18th	Members Meeting from 7.30pm
Saturday 22nd	Mid-Winter Bonfire Night at Observatory
Tuesday 25th	Last Quarter

July 2019

Wednesday 3th	New Moon
Saturday 6th	KIDSFEST Starts at Observatory (nightly to Saturday 20th)
Tuesday 9th	Committee Meeting
	First Quarter
Tuesday 16th	Members Meeting from 7.30pm
Wednesday 17th	Full Moon
Saturday 20th	Last night of KIDSFEST 2019
Thursday 25th	Last Quarter

UPCOMING EVENTS:

PUBLIC OPEN NIGHTS 2019

This years Fridays Public Open Nights are listed below and we always welcome volunteers for these events
17th, 24th 31st May
7th,14th, 21st, 28th June
26th July (see below as the rest of July is Kidsfeast)
2nd, 9th, 16th, 23rd, 30th August
6th, 13th,20th, 27th September
Volunteers are always required to help run these events, New members are always welcome to come along and help. Information and Notifications will be on our website with contact details. If you would like to help please contact the open night organisers, Helpers MUST be members of the Society, These open nights are a great way to get training and experience using the society's telescopes, as there are always experienced members on hand to help you.

KIDSFEST 2019

Provisional dates for this are Saturday 6th July—Saturday 20th July
Excluding both Tuesday's 9th and 16th, This event runs every night during this set time
As in the past years your support and help with these events are what makes them the huge success that they are
Rob Glassey is the society's contact for both Open nights, Kidsfest and Group Bookings, and can be contacted at vice.predident@cas.org.nz

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MID-WINTER BONFIRE/BBQ NIGHT 22ND JUNE 2019.

This is always a fun event for all the family, BBQ to start the evening
CAS will supply Meat/Bread/. Please bring a salad/hot item or desert to share with all.
We have a very large bon-fire pile ready for this night,
and of course marshmallows will be supplied,
Event will be held regardless of the weather.
More details will be on our website in the next couple of weeks

Photo from last years event:

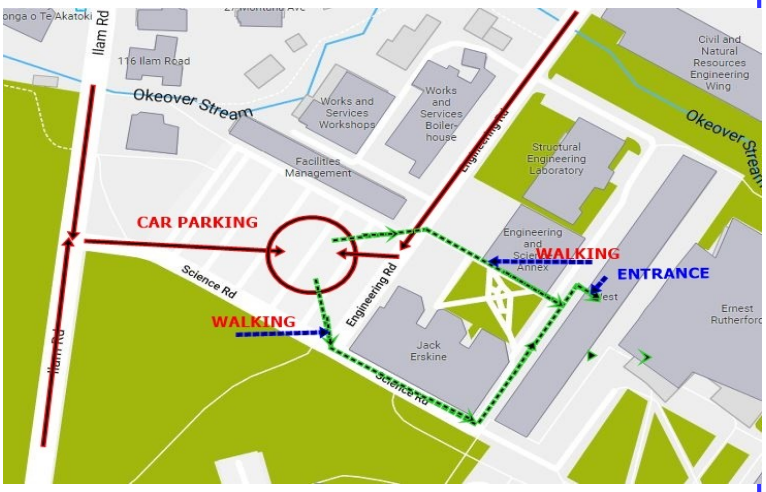
(Terry has said he will try not to start the Bonfire with such a huge bang this year)

MONTHLY MEETINGS:

Carol McAlavey has asked for you, our members to make suggestions or offer to give a talk at our monthly meetings

If you have any suggestions for topics please contact
Carol via cstars@xtra.conz
The meeting venue is now held in room 701 on the 7th floor of the West building (Old Rutherford) (Physics and Astronomy) of the University of Canterbury
Car parking is available in the car park with entrances in Science Road or Engineering Road.

Disabled parking is in Engineering Rd



Upcoming Meetings

21st MAY 2019
Prof Philipp Richter
Erskine at University of Canterbury
18th JUNE 2019 **TBC**
16th JULY 2019 **TBC**
20th AUGUST 2019 **TBC**
17th SEPTEMBER 2019 **Members Soapbox**
17TH OCTOBER 2019 **TBC**
18TH OCTOBER 2019 **BEATRICE HILL TINSLEY 2019 LEATURE**
Babak A.Tafreshi
19TH NOVEMBER 2019 **TBC**

(correct as at 12th May 2019, Subject to change as required)

Many thanks go to Orlon Petterson and Rosalie Reilly from the School of Physical and Chemical Sciences, University of Canterbury for arranging the meeting room for CAS this year

Also Thanks to Associate Professor Karen Pollard for organising the Lecture theatres for our public talks

WELCOME TO OUR NEW MEMBERS:

A warm welcome to our new members, We look forward to meeting you at our meetings or events, Please make yourselves known to others.
The following were accepted as members at the April Committee meeting

Welcome to:

Colin & Diane Rose
Richard Leonard
Sophie Morton

OBSERVATORY NEWS

ALARM AT THE OBSERVATORY

The installation of our ALARM at the observatory is now fully operational, Ask a committee member for the password.

GRAEME KERSHAW SKY CAMERA

The Graeme Kershaw All Sky Camera is located at the RF Joyce Observatory In West Melton, The static image will update every time the page is refreshed. At night you will see Stars, the moon and planets as well as the occasional meteor.

This camera was made possible by the generous donation from the Kershaw Family and is a tribute to Graeme's tireless work in the field of Astronomy.

http://richardson.geek.nz/allsky/

THANKS:

From your Committee and Terry our Observatory Director
Huge thanks to those who have been able to come out and help with our working bee's and all the assorted things that keep the observatory running so smoothly.
Please keep an eye out on the website for up and coming projects

From Your Editor

I have added a new item/feature to the CASMAG;
Photos from our members, So please email your favourite photo with details for me to include in future issues
As always I look forward to receiving your items to include in future issues and I welcome contributions or suggestions and encourage you to send any articles or ideas you would like to be see included in upcoming issues.
Remember you can have your advert added in the future casmag's, Contact me for detail's
Please email to editor@cas.org.nz
Dale Kershaw

METEOR SHOWERS FOR 2019

Shower	Dates		Moon	Peak Rate	RA	Dec	Near Star
	Active	Peak	2019				
Centaurids	Jan 28 - Feb 21	Feb 8	3 days after New moon	5 (-25)	14.1	-59	β Cen
gamma-Normids	Feb 25 - Mar 22	Mar 13	1 day before First quarter	8	16.6	-51	γ Nor
pi-Puppids	Apr 15 - Apr 28	Apr 23	4 days before Last quarter	var to 40	7.3	-45	σ Pup
eta-Aquariads	Apr 19 - May 28	May 5	New moon	60	22.5	-1	η Aqr
Pisces Austrinids	Jul 15 - Aug 10	Jul 27	2 days after Last quarter	5	22.7	-30	α PsA
alpha-Capricornids	Jul 3 - Aug 15	Jul 30	2 days before New moon	4	20.5	-10	α Cap
Southern delta-Aquarids	Jul 15 - Aug 25	Jul 27	5 days before New moon	20	22.6	-16	δ Aqr
Southern iota-Aquarids	Jul 25 - Aug 15	Aug 4	3 days after New moon	2	22.3	-15	ι Aqr
Northern delta-Aquarids	Jul 15 - Aug 25	Aug 13	3 days before Full moon	4	22.3	-5	θ Aqr
Northern iota-Aquarids	Aug 11 - Aug 31	Aug 19	3 days after Full moon	3	21.8	-6	β Aqr
Piscids	Sep 1 - Sep 30	Sep 19	3 days before Last quarter	3	0.3	-1	λ Psc
Orionids	Oct 2 - Nov 7	Oct 21	1 day before Last quarter	20	6.3	+16	γ Gem
Leonids	Nov 14 - Nov 21	Nov 17	3 days before Last quarter	100+	10.2	+22	γ Leo
alpha-Monocerotids	Nov 15 - Nov 25	Nov 27	New moon	var to 5	7.9	+1	δ Mon
Pheonicids	Nov 28 - Dec 9	Dec 6	2 days after First quarter	var	1.2	+53	Achernar
Geminids	Dec 7 - Dec 14	Dec 14	2 days after Full moon	120	7.3	+33	Castor

Information from the Royal Astronomical Society New Zealand website http/www.rasnz.org.nz

Canterbury CAMS Observers pick up Outburst from Comet Grigg-Mellish

Peter Jenniskens and Jack Baggaley announced in CBET telegram 4617 that Ian Crumpton and Peter Aldous of CAMS NewZealand detected a brief outburst of 5 meteors from comet C/1907 G1 (Grigg-Mellish) on March 31 in the nine minutes between 17:36 and 17:45 UTC (see the CAMS radiant map for March 31). According to Jenniskens, this is the first instrumental evidence that this comet is a meteor shower parent, after visual observers long reported an annual shower named the delta Pavonids (IAU 120, DPA) radiating from the theoretical radiant of this comet. The poorly observed comet could be of long period type (orbital period > 200 years), in which case the outburst is dust ejected in the previous return and future outbursts can now be predicted. If the comet is of Halley-type (orbital period 112-200 years), then the outburst could be from a number of different returns and the activity could signal the return of the comet.

https://www.seti.org/southern-hemisphere-meteor-outburst

This outburst was predicted from calculations by Esko Lyytinen (P. Jenniskens, Meteor Showers and their Parent Comets, Table 3). He expected it this year at 17:26 UTC, and we found it at 17:36-45 UTC.

The comet name is C/1907 G1 (Grigg-Mellish). Grigg was a New Zealander of course. The 1874 transit of Venus awakened his interest in astronomy, which he pursued full-time starting in 1894. He began systematic searches for comets in that year. He is best known for his co-discovery of the periodic comet 26P/Grigg-Skjellerup in 1902.

Thank you to Ian Crumpton for this information

CRAIG SPENCER
DIED 21/04/2019, AGED 70

Starman, Hippy, Craig – he answered to them all.
It is with much sadness that I let you know that Craig has passed away. Those of us who were at Stardate SI last year found out he was battling a terrible disease which ultimately claimed him.
Craig was interested in anything astronomy, and loved to discuss it all with anyone who would listen.
There was hardly a Stardate, Stargazers Getaway, or RASNZ Conference that he didn't attend, many a time with his son Regan.
I remember going to see Craig many years ago when he was living in Kingston, right opposite the Kingston Flyer. He had constructed a number of small buildings on the property using the existing trees as corners and filled them with things he had acquired over time, and then opened up his "museum" for passengers to look through, for a small fee. It was mainly so that he could talk about astronomy and our wonderful Southern skies.
Craig was very much an individual who travelled his own path, and who enriched the lives of those with whom he came into contact with, especially his many astronomy friends.
He will be sadly missed.

Thank you Carol McAlavey for this article

NOTES FROM YOUR COMMITTEE

The Committee would like to acknowledge the length of membership of Elgar Dickson who joined CAS in 1975, Elgar has now decided to not continue with his membership, but it was decided we still will send him a monthly copy of casmag.

The 1st Aid Kit located in the lodge has been checked and updated, Thanks to Terry's wife Nagire for doing this

Aside from our normal Friday Night Public Open nights, We also run group bookings on every 2nd Wednesday, For this we need volunteers to assist on these nights, Rob Glassey is the organiser for these events and can be contacted via vice.president@cas.org.nz

2019 Membership Subs:

A reminder these are now due and can be paid by the following options: (Paid before 31st May is at our discounted price)
Cash/Cheque: In person at a Meeting, Members night.
Bank Deposit/Internet Banking: Account details are included on the last page of your CASMAG
Online: Via the Website
Please also advise of any changes: Address, Phone, Email via email to membership@cas.org.nz / or in writing to PO Box

NEW ZEALAND STARLIGHT CONFERENCE October 2019

We are planning a conference on Dark Skies, Combatting Light Pollution and Star Gazing to be held at Lake Tekapo in the worlds largest International Dark Sky Reserve,
(see http:/starlightconference.org/)
The Dates will be 6pm on Sunday 20th October 2019 till 4.30pm on Wednesday 23rd October 2019.
The New Zealand Starlight Conference is supported by the International Dark Sky Association and Hosted by Aoraki Mackenzie International Dark Sky Reserve Board.
More details will be posted on the website above in the coming months, Members of RASNZ and Affiliated societies will be most welcome as participants
We hope to see many New Zealanders at the conference

John Hearnshaw (Chair of AMIDSR Board)

PHOTOS FROM OUR MEMBERS PAGE

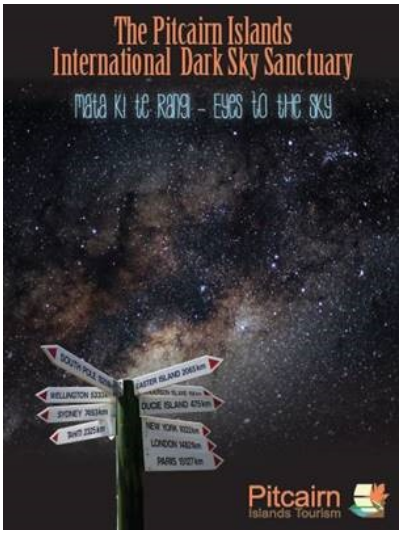
CORONA AUSTRALIS MOLECULAR CLOUD SV80ST 0.8FRFF - CEM60 - ASI071MC Pro 60 x 300' subs - processed in Pixinsight

NGC 6357 - the Lobster Nebula - narrowband band Hubble pallette - 40 x 180' HA 30 x 180' SII and 40 x 180' unity gain - ASI1600MM-Cool - Astronomik NB Filter Set - EFW8 - Stellarvue SV80ST - Celestron CGX - Processed in Pix-insight - My first ever full hubble PI processed image!

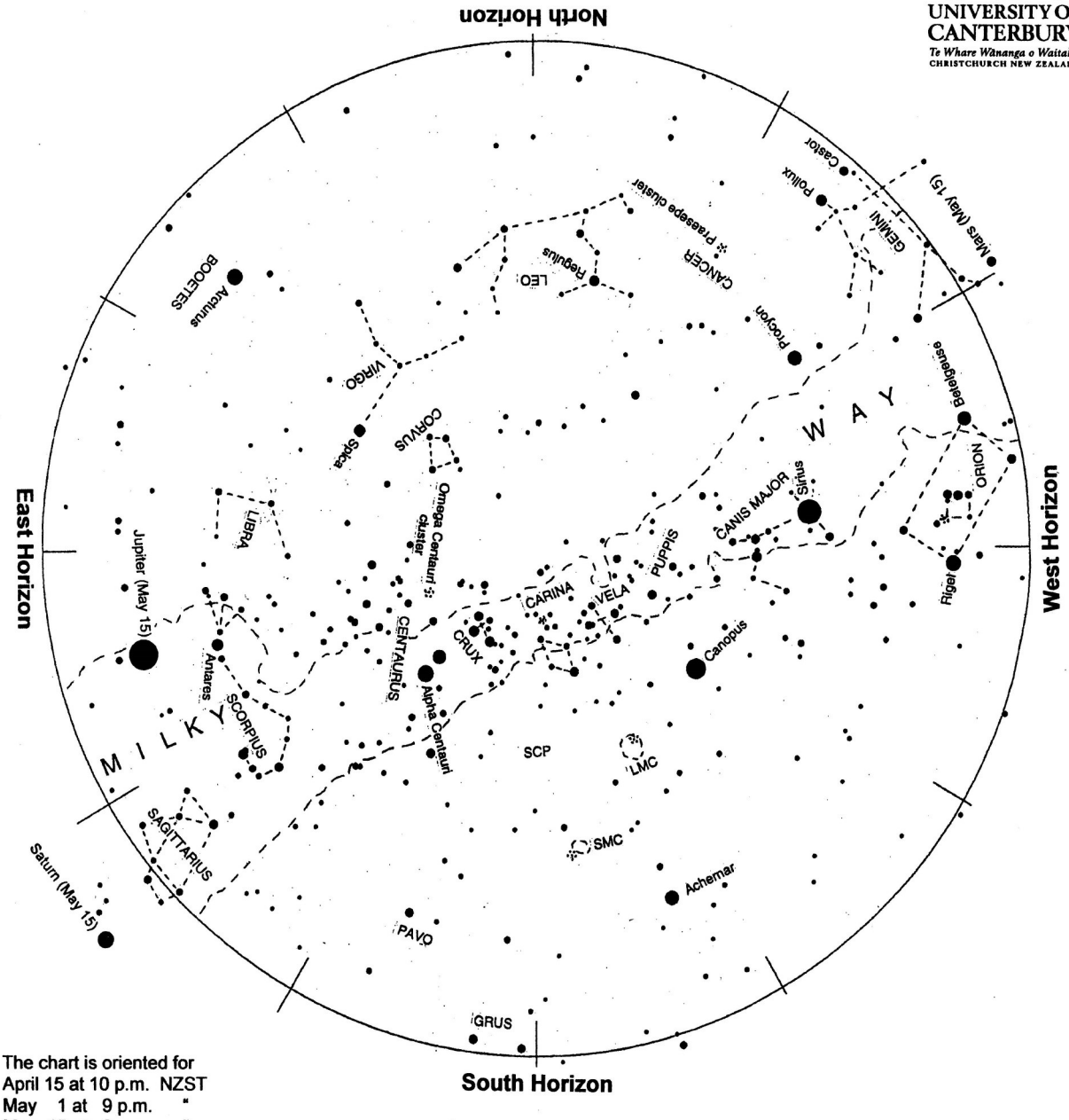
Photos taken by Simon Lewis at his Greendale Observatory

PITCAIRN ISLANDS WORLD'S NEWEST ASTRO TOURISM DESTINATION

The remote Pitcairn Islands group has become one of only 8 International Dark Sky Association (IDA) designated Dark Sky Sanctuaries in the world.
Pitcairn's Mata ki te Rangi – Eyes to the Sky International Dark Sky Sanctuary encompasses all 4 islands in the group, it is a designation that means everything in the world of night sky conservation and international astro-tourism. Additionally, the Pitcairn Islands Group is the first British Overseas Territory, and only island group in the world, to have been granted IDA Dark Sky Sanctuary status.
The Pitcairn Islands group first made news in the conservation world in 1988 when its largest island, Henderson, became a UNESCO World Heritage Site – securing protection of its 10 endemic plants and 4 land birds.
More recently, in 2015, the United Kingdom declared the waters surrounding the Pitcairn Islands as the largest protected ocean area in the world.
Today it remains the third largest Marine Protected Area in the world.
Today's Dark Sky Sanctuary announcement has strengthened Pitcairn's commitment to protect one of the planet's most remote and pristine multi-island environments for generations to come.
Located deep in the South Pacific, more than 500kms from its nearest populated neighbor, the Pitcairn Islands have amongst the world's clearest oceans and night skies in the world.
And, Pitcairn Islands Tourism is launching its astro-tourism profile in a most appropriate way. On July 2nd, a total solar eclipse will cross uninhabited Oeno Island, one of group's 4 islands, at 10:23 a.m. lasting for 2 minutes 51 seconds. Pitcairn Travel Coordinator, Heather Menzies said, "The July eclipse is a unique opportunity to celebrate being the world's newest Dark Sky Sanctuary.
We've released an 8-day Total Solar Eclipse Voyage, which has already sold-out - though we're accepting waitlist enquiries! The tour visits both Pitcairn and Oeno Islands, landing at Oeno for the eclipse and over-nighting at Pitcairn to soak up the warm hospitality of the descendants of the Bounty mutineers. Passengers will also share in the island's first Mata ki te Rangi - International Dark Sky Sanctuary community dinner.
2019 also marks the launch of Pitcairn's new shipping service, offering 21 round-trips annually between Mangareva in French Polynesia and Pitcairn Island.
This is up from 12 trips in 2018 providing visitors with greater access to Pitcairn than ever before.
In addition, Pitcairn Islands Tourism has also released a unique 4-island Explorers Voyage in October 2019, which will visit all 4 islands in the Mata ki te Rangi International Dark Sky Sanctuary – the Explorers Voyage still has limited availability.
Located between New Zealand and Peru, Pitcairn is home to the descendants of the Bounty mutineers. It is one of the most remote and undiscovered tourism destinations in the world. This new "International Dark Sky Sanctuary" designation will provide visitors with yet another compelling reason to visit this fascinating and remote destination.



Press release from Pitcairn Islands Tourism April 2019



The chart is oriented for
April 15 at 10 p.m. NZST
May 1 at 9 p.m. "
May 15 at 8 p.m. "
June 1 at 7 p.m. "

Evening sky in May 2019

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.

Golden Jupiter appears in the southeast soon after sunset, the brightest 'star' in the sky. Above it is orange Antares. Far left of Jupiter is orange Arcturus, often twinkling red and green. Sirius, the brightest true star, is midway down the western sky. Directly below it is Orion with bright stars Rigel and Betelgeuse, and 'The Pot'. Canopus is southwest of overhead. Crux, the Southern Cross, and the Pointers, Alpha and Beta Centauri, are southeast of the zenith. Saturn rises in the southeast in the later evening.

Chart produced by Guide 8 software; www.projectpluto.com. Labels and text added by Alan Gilmore,
Mt John Observatory of the University of Canterbury. www.canterbury.ac.nz

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The Evening Sky in May 2019

Golden **Jupiter** appears in the southeast in the early evening shining with a steady light. At the beginning of the month it rises around 8 pm. By the end of May it appears soon after sunset. As the sky darkens **Sirius**, the brightest of all the stars (but fainter than Jupiter), appears midway down the western sky. It twinkles with all colours when setting in the southwest around midnight. **Canopus**, second brightest star**,** is southwest of overhead. Midway up the southeast sky are 'The Pointers', Beta and **Alpha Centauri**.

Well left of Jupiter is orange **Arcturus**, the brightest star in the northern sky. It often twinkles red and green when low in the sky. Above Jupiter is orange **Antares** marking the body of the Scorpion. The Scorpion's upside down tail curves to the right of Antares.

Below Sirius are bluish **Rigel** and reddish **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', now tipped on its side. Sirius, 'the Dog Star', marks the head of **Canis Major** the big dog, now head down tail up in the west.

Crux, the Southern Cross, is southeast of the zenith, to the right of 'The Pointers'. **Alpha Centauri**, the brighter Pointer, 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 very luminous and distant: 13 000 times brighter than the sun and 300 light years away.

Antares is a red-giant star like Betelgeuse: around 12 times the mass of the sun but wider than Earth's orbit. It is 600 light years away and 19 000 times brighter than the sun. **Arcturus** is the brightest red star in the sky but, at 37 light years, is much closer than Antares. It is about 120 times brighter than the sun.

The **Milky Way** is brightest in the southeast toward **Scorpius** and **Sagittarius**. In a dark sky it can be traced up the sky 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, right of Jupiter. The nearby outer edge is by Orion where the Milky Way is faintest. A scan along the Milky Way with binoculars shows many clusters of stars and some glowing gas clouds, particularly in **Carina** and Scorpius.

The Clouds of Magellan, **LMC** and **SMC**, are midway down the southern sky, easily seen by eye on a dark moonless night. They are small galaxies. The Large Magellanic Cloud is 160 000 light years away and is about 5% the mass of our Milky Way galaxy. The Small Cloud is around 200 000 light years away and 3% the mass of our galaxy. That's still many billions of stars in each.

In mid-May **Jupiter** is north of overhead around 3 a.m. Jupiter is 660 million km away. It is always worth a look in a telescope. Its four big moons look like faint stars lined up near the planet. One or two can be seen in binoculars if you can hold them steadily enough. All four are easily seen in any telescope magnifying 20x or more. The Moon will be near Jupiter on the 20th.

Saturn rises in the southeast around 10 p.m. at the beginning of the month; around 8 p.m. at the end. It looks like a moderately-bright cream-coloured star, a bit fainter than Arcturus. It is 1,400 million km away. Saturn is a great sight in any telescope. Titan, its biggest moon, orbits four ring diameters from the planet. The Moon will be above Saturn on the 22nd and below it on the 23rd.

Brilliant **Venus** (not shown on the chart) rises around 5:30 a.m. mid-month. It is 230 million km away, on the far side of the sun. The Moon will be near Venus on the morning of the 3rd. The bright 'star' below them is **Mercury**, soon disappearing around the far side of the sun.

*A **light year** (**l.y**.)is the distance that light travels in one year: nearly 10 million million km or 10^{13} km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes four years to reach the nearest star, Alpha Centauri.

Notes by Alan Gilmore, University of Canterbury's Mt John Observatory, P.O. Box 56, Lake Tekapo 7945, New Zealand.
www.canterbury.ac.nz 190405

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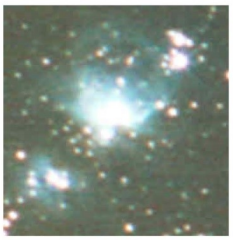
The Western Sky at Dusk in May

Orion the Hunter is prominent in the western evening sky, below **Sirius** the brightest star. Sirius marks the head of one of the two dogs following the hunter down the sky. **Procyon** marks the lesser dog. Well to the right of Orion are the pair of stars making **Gemini** the Twins Above and right of Castor and Pollux is the **Praesepe** star cluster marking the shell of **Cancer** the Crab.

Sirius is the brightest star, though star-like Venus and Jupiter, and sometimes Mars, are brighter. Sirius appears bright because it is both brighter than the sun -- 23 times brighter -- and relatively a close 8.6 light years* away. Sirius was often called 'the dog star' being the brightest star in Canis Major, one of the two dogs that follow Orion across the sky. Canis Major is heading down the western sky; the dog's hindquarters are marked by four bright stars above Sirius. Sirius, being bright, often twinkles like a diamond when low, as the air breaks its light into separate colours.

Orion the Hunter, or warrior, is now upside down in the west in our southern hemisphere view. Its brightest stars are **Rigel** and **Betelgeuse**. Rigel is a blue-giant star 40 000 times brighter than the sun and much hotter. It is 800 light years away. Betelgeuse is a red-giant star, cooler than the sun but hundreds of times bigger; 9 000 times brighter than the sun and 400 light years from us. Between them is a line of three stars: Orion's belt. The line of faint stars above and left of the belt form Orion's Sword in the northern view, hanging from his belt. To most southern hemisphere sky watchers the belt and sword form **The Pot** or The Saucepan, now lying on its side. In early June Orion can be seen both in the west at dusk and in the east at dawn.



The **Orion Nebula** is visible in binoculars as a misty glow around the middle star of Orion's Sword or the handle of The Pot. It is a vast cloud of dust and gas about 1300 l.y. away and more than 20 l.y. across. Ultra-violet light from a massive, extremely hot star in the cloud causes it to glow. Some stars in this region are around two million years old. The sun, by contrast, is 4.6 billion years old. Stars continue to form in a giant cloud behind the glowing nebula. There are many bright and dark nebulae in this region. The Horsehead nebula, a favourite of astronomy books, is beside the top star of Orion's Belt, but too faint to be seen in small telescopes.

The Milky Way is faint in this region as we are looking toward the nearby edge of the disk. Several star clusters visible in binoculars or small telescopes are marked with asterisks. The numbers beside them are from a catalogue compiled by Charles Messier, an 18th Century French comet searcher. **M47** is visible to the naked eye as a fuzzy spot though it is 1600 l.y. away. **M41**, **M50** and **M93** are best seen in a telescope. Messier also catalogued the Orion Nebula (M42) and the Praesepe cluster (M44).

Procyon is a relatively close star, just 11 years away. It's about 7 times brighter than the sun.

Pollux and **Castor** mark the heads of the Gemini, the twins. Though paired in myths, the two stars are not related at all. Castor is a hot white star like Sirius but 52 light years away. Golden Pollux is bigger and brighter but cooler than Sirius and 34 light years away.

The **Praesepe cluster** marks the shell of **Cancer** the crab. To the eye, in a dark sky, it is a spot of light bigger than the full moon. It is also known as the Beehive and binoculars show how it got that name: dozens of stars are seen like bees around a hive. The cluster is some 500 light years from us. It formed in a gas cloud about 700 million years ago.

*A **light year (l.y.)** is the distance light travels in one year: about 10 million million km (10^{13} km) or 6 million million miles. Light from the sun reaches us in 8 minutes. Light from the moon gets here in 1 second. Sunlight takes 4 hours to reach Neptune, the outermost significant planet, and 4 years to reach Alpha Centauri, the nearest star.

Picture and words by Alan Gilmore, University of Canterbury's Mt John Observatory, Lake Tekapo, New Zealand;
www.canterbury.ac.nz
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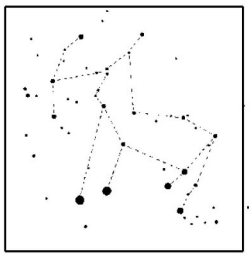
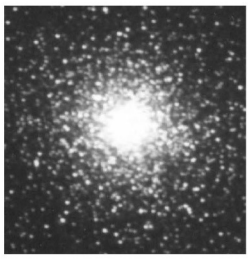
Interesting Objects in the Southern Sky



Centaurus, with the bright 'Pointers', and **Crux**, the Southern Cross are south-east of overhead, the tightest grouping of bright stars in the sky. Originally Crux was the hind legs of the Centaur, the horse-man of Greek mythology. The complete Centaur, with bow, is outlined at left. It was only in the 17th Century that Crux was split off as a separate constellation. The slow wobble of Earth's axis allowed this part of the sky to be seen from more northerly places in ancient times. The fainter Pointer and the three bluish-white stars of the Crux are all super-bright stars hundreds of light years away. Alpha Centauri is just 4.3 light years* away and the reddish top star of Crux is 90 light years from us.



cluster of millions of stars. Its total mass is six million times the sun's. It is 17 000 light years away and 200 light years across. Globular clusters are very ancient, around 10 billion years old, twice the age of the sun. Omega Centauri is the biggest of the hundred-odd globulars randomly orbiting our galaxy. It may originally have been the core of a small galaxy that collided with the Milky Way and was stripped of its outer stars.
47 Tucanae, by the SMC, is a similar sort of cluster 16 000 l.y. away.

Coalsack nebula, left of Crux, looks like a hole in the Milky Way. It is a cloud of dust and gas 600 light years away, dimming the distant stars in the Milky Way. Many 'dark nebulae' can be seen along the Milky Way, appearing as slots and holes.

The Jewel Box is a compact cluster of young bright stars about 7000 light years away. The cluster formed around 16 million years ago. To the eye it looks like a faint star close by the second-brightest star in Crux. A telescope is needed to see it well.

Eta Carinae nebula, a luminous spot in the Milky Way to the right of Crux, is a glowing gas cloud about 8000 light years from us. The thin gas glows in the ultra-violet light of nearby hot young stars.

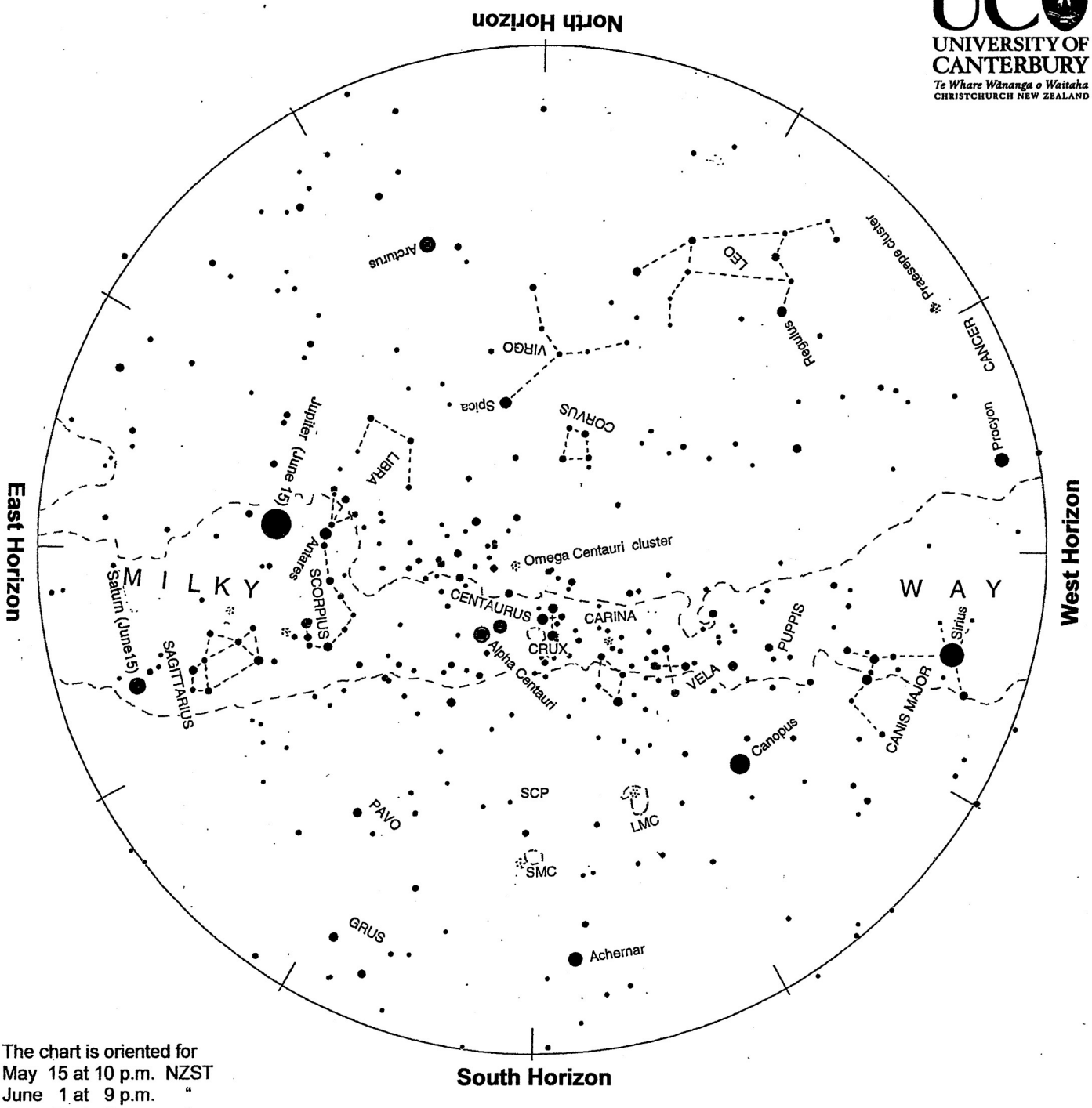
The golden star in the cloud, visible in binoculars, is Eta [Greek 'e'] Carinae. It is estimated to be to be 80 times heavier than the sun. It is four million times brighter than the sun but is dimmed by dust clouds around it. It is expected to explode as a supernova in the next few thousand years. Many star clusters are found in this part of the sky.

Large & Small Clouds of Magellan (LMC & SMC) appear as two luminous clouds, easily seen by eye in a dark sky. They are galaxies like the Milky Way but much smaller. Each is made of billions of stars. The Large Cloud contains many clusters of young bright stars seen as patches of light in binoculars. The Large Cloud is 160 000 light years away, the Small Cloud 200 000 light years; very close by for galaxies.

Tarantula nebula is a glowing gas cloud in the LMC. The gas glows in the ultra-violet light from a cluster of very hot stars at the centre of the nebula. The cloud is about 800 light years across. It is easily seen in binoculars and can be seen by eye on moonless nights. This nebula is one of the brightest known. If it was as close as the Orion nebula then it would be as bright as the full moon.

*A **light year** (**l.y**.)is the distance that light travels in one year: nearly 10 million million km, or 10^{13} km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes four years to reach the nearest star, Alpha Centauri.

Text and pictures by Alan Gilmore, University of Canterbury's Mt John Observatory,
P.O. Box 56, Lake Tekapo 7945, New Zealand. www.canterbury.ac.nz 120802



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

Evening sky in June 2019

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.

Four naked-eye planets appear in the evening sky in June. Golden Jupiter appears in the east soon after sunset, the brightest 'star' in the sky. Saturn rises in the south-east around 7 pm mid-month. Mars is an orange star of medium brightness setting toward the north-west around 7 pm (so not on the chart.) It is joined by Mercury mid-month, much brighter then Mars. Mercury and Mars will be a close pair till the end of June. Sirius, the brightest true star, twinkles colourfully in the west. Canopus is in the southwest. South of overhead are the Pointers, Alpha and Beta Centauri, with the Southern Cross (Crux) to their right. Orange Arcturus, low in the north, often twinkles red and green.

Chart produced by Guide 8 software; www.projectpluto.com. Labels and words added by Alan Gilmore, University of Canterbury
Mt John Observatory, P.O. Box 56, Lake Tekapo 7945, New Zealand. www.canterbury.ac.nz

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Evening Sky in June 2019

Jupiter appears in the east soon after sunset, the brightest 'star' in the sky. It shines with a steady golden light. Around 7 pm **Saturn** rises in the southeast, well below and right of Jupiter. It is the second brightest 'star' in that part of the sky. The Moon will be below Saturn on the 19th.

On the opposite side of the sky, very low, is **Mars**. It looks like an orange-red star to the left of the vertical pair of Castor and Pollux, setting around 7 pm (so not on the chart). Left of Mars, and brighter, is the orange star Betelgeuse in Orion (also not shown). In the third week of June **Mercury** moves up the twilight sky below and left of Mars. It is white and brighter than Mars. The two planets will make a close pair around the 18th. Mercury then moves higher than Mars.

Sirius, the brightest true star, appears in the west soon after sunset. It sets in the southwest around 9 pm, mid-month, twinkling like a diamond. Sirius appears bright both because it is 20 times brighter than the sun, and because it is relatively close at nine light years*. **Canopus**, the second brightest star, is in the southwest. It is a truly bright star, 310 light years away and 13,000 times brighter than the sun. Canopus is a 'circumpolar' star: it circles the South Celestial Pole (SCP on the chart) clockwise but never sets.

Arcturus, another orange star, appears in the lower north sky, often twinkling red and green when it is near the horizon.

Jupiter's disk and four 'Galilean' moons can be seen any telescope. We are seeing the moons' orbits nearly edge-on so they appear to move back and forth like beads on a string, swapping places night to night. Io, the closest to Jupiter, orbits in 1¾ days. Callisto, the farthest of the four, takes nearly 17 days to complete an orbit. Jupiter is 640 million km away. **Saturn** is 1,360 million km away. A small telescope shows its rings and its biggest moon, Titan, orbiting about four ring-diameters from the planet.

Crux, the Southern Cross, is south of the zenith. Beside it, and brighter, are Beta and **Alpha Centauri,** often called 'The Pointers' because they point at Crux. Alpha Centauri is the closest naked-eye star, 4.3 light years away. Beta Centauri and many of the stars in Crux are hot, extremely bright blue-giant stars hundreds of light years away.

Antares, the orange star above Jupiter, marks the scorpion's body. It is a red giant star: 600 light years away and 19 000 times brighter than the sun. Below Scorpius and right of Jupiter is **Sagittarius**, its brighter stars making 'the teapot'.

The **Milky Way** is brightest and broadest in the southeast toward Scorpius and Sagittarius. It remains bright but narrower through Crux and Carina then fades in the western sky. 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. A scan along the Milky Way with binoculars will find many clusters of stars and some glowing gas clouds. Relatively nearby dark clouds of dust and gas look like holes and slots in the Milky Way. The dust, more like smoke, comes from old red stars like Antares. These clouds eventually coalesce into new stars.

The Clouds of Magellan, **LMC** and **SMC**, in the lower southern sky, are luminous patches easily seen by eye in a dark sky. They are two small galaxies about 160 000 and 200 000 light years away. The Large Cloud is about 5% the mass of the Milky Way; the Small Cloud is about 3%.

Brilliant **Venus** (not shown on the chart) rises in the northeast sky after 6 a.m. at the beginning of the month; around 7 a.m. at the end. Around the 12th Venus will be between the orange star Aldebaran, to its right, and the Matariki/Pleiades star cluster to its left. Twilight will be too bright to see Matariki by eye then but it should be easily visible a week later above and left of Venus.

*A **light year** (**l.y**.)is the distance that light travels in one year: nearly 10 million million km or 10^{13} km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes sunlight 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

CAS COMMITTEE AND OFFICERS 2019/2020

Public Nights and Group Bookings		bookings.liaison@cas.org.nz
President:	Euan Mason	president@cas.org.nz
Vice President:	Rob Glassey	vice.president@cas.org.nz
Treasurer:	David Brian	treasurer@cas.org.nz
Secretary:	Dale Kershaw	secretary@cas.org.nz
Observatory Director:	Terry Richardson	observatory.director@cas.org.nz
Editor:	Dale Kershaw	editor@cas.org.nz
Membership Secretary:	Simon Lewis	membership@cas.org.nz
Librarian:	Colin Fortune	librarian@cas.org.nz
Web Master:	Simon Lewis	casweb@cas.org.nz
Committee Members:	Carol McAlavey	member@cas.org.nz
	Josh Swan	member2@cas.org.nz
	Marc Bunyan	member3@cas.org.nz
	Tracey Richards	member4@cas.org.nz
	Malcolm Flain	casweb@cas.org.nz

For more specialized information please see the contact information page on www.cas.org.nz

CAS Contact Information

Canterbury Astronomical Society Inc.
PO Box 25-137
City East
Christchurch 8141
Web: www.cas.org.nz
Canterbury Astronomical Society Facebook Group:
www.facebook.com/groups/CanterburyAstronomicalSociety
West Melton Observatory: 43° 29' 55.5" S, 172° 20' 59.0" E 218 Bells Road, West Melton

CAS Members Meetings:

The CAS monthly members meetings are currently held from 7.30pm onwards every third Tuesday of the month (except December and January) in Room 701 on the 7th floor of the WEST BUILDING (old Rutherford) Physics and Astronomy at the University of Canterbury,
Any member of the public who is considering in joining the society are most welcome to attend the meetings.

CAS on Facebook:

Cas has a Facebook presence, Useful to keep up to date with events, interesting articles, asking for advice, For members please use the website forums for more detailed information etc

CAS on Twitter:

Cas is on Twitter at https://twitter.com/canterburyastro

CAS Membership:

Subscriptions are due 1st April each year
Fees for current members who renew before 31st May are at the discounted price shown on the membership form included on the back page of your Casmag, Full details are included on our website.

Contributions to CASMAG:

Member contributions to CASMAG are always most welcome (letters, observing notes, articles, news)
Please submit articles by email to editor@cas.org.nz
The deadline for each issue is the 1st of each month
Small personal advertisements are free to financial members, (less than 8 lines in a column)
Charges for larger items range from $5 to $40, email the editor for more details.

The Constitution of The Canterbury Astronomical Society Inc:

This can be found on our website, Please ask for the link if required

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Canterbury Astronomical Society Inc.

APPLICATION FOR MEMBERSHIP

To: **Membership Secretary**
Canterbury Astronomical Society Inc.
P.O.Box 25-137
City East
Christchurch 8141

Applicant's name in full (Block letters): _____

Address: (Note: a P.O. Box is NOT a legal address): _____

_____

Home phone: _____ Cell phone: _____

Email: _____ Date of Birth (if under 18): _____

Membership Category (*tick; subscription must accompany application)*
Discounted if membership is renewed before 31 May
Online banking details (Please identify your payment): 03 0802 0098273 00

		Discounted	Full
☐	Adult (any person 18 years of age or over who is not eligible for any other category)	$70	$80
☐	Family (two or more persons living at the same address) §	$105	$120
☐	Junior (under 18 years of age on 1 April of the current year)	$35	$40
☐	Senior (over 65 years)	$35	$40
☐	Community Services Card Holder	$35	$40
☐	Student (any person studying full-time at a tertiary institution; must reapply annually)	$35	$40
☐	Corporate (members have voting rights of one member but cannot take office)	$210	$240

§ If family membership, please list the other persons involved.

Name	Date of birth (if under 18)	Signature

All CAS members receive CASMag, a monthly newsletter. Would you prefer to receive this (please tick):

☐ by email as a .pdf attachment? ☐ or by post as a hard copy?

Do you have access to a telescope? What type and size? _____

I, the undersigned declare that the information given herein is true.

Signature: _____ Date: _____

By signing this application, the applicant agrees to comply with the Constitution and By-laws of the Canterbury Astronomical Society. A copy of the Constitution may be downloaded from http://www.cas.org.nz/constitution/CAS_constitution.pdf.

Date Approved: