

Reflections

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As you probably all know, the first Resurrected Geoff Welch Literary Prize has been attributed.

As per the new rules, this year prize has been shared by 3 authors: Lydia Bell, Peter Nosworthy and myself.

Each of us received a copy of "Humankind and the Cosmos", Geoff Welch's book, a \$50 cheque and a certificate.

The 2012 competition is therefore now open and entries will close with the July edition of Reflections.

Everybody can enter and the more articles you submit the more chances you have to win.

Reading this issue, you will certainly agree with me that we already have a bunch of serious entrants but I expect, I hope, they are going to have a lot of challengers!

Cheerio,

Jean-Luc Gaubicher

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President's Message

Here we are at the end of the NSAS year, and about to celebrate our 25th Anniversary!

I would imagine that most special interest clubs and associations would be lucky to make it to 5 years, much less 25, so we should be very proud that we have been able to carry on the traditions of the Northern Districts Society of Amateur Astronomers, as it was started in October 1986 with 10 members.

That was the time of the last appearance of Halley's Comet and it excited such interest that NDSAA was formed as a group. Initially meeting at a member's house, NSAS has since then moved to St. Ignatius and grown and waned in membership. It has presently over 80 members.

The Society is well-known in the northern part of Sydney through its outreach programs to the public, schools and Scouts and it has a strong association with Macquarie University.

While the Society may not be as technically oriented as it was in the early days, programs such as the Theory Group and the New Astronomers Group make an appropriate level of cosmological and observational knowledge available to the membership. And the Society continues to get excellent speakers from the professional astronomical community for its General Meetings.

Observational astronomy has progressed

alongside the growth in visual astronomy apertures for amateur telescopes and there are many 10" and 12" telescopes, and even a 16" Dobsonian, at observing events. Some members, such as me, dabble in astrophotography whenever we have clear skies in Sydney.

It hasn't always been plain sailing and the Society has had its down periods but past Presidents, such as Kel Eggins and Ron Washington, pulled the Society out of the hole and I've tried to build on their foundation over the last 2 ½ years.

As many of you know, this is my last year as President since I've taken on other commitments but I will continue on the Committee to help a new President make the transition.

NSAS has depended on all its membership contributing to the success of the Society as an organisation but this means that newer members must make the time to help out, even if they feel they don't have the skills. There are plenty of opportunities in the appointed positions and as project managers for outreach programs.

As I've said many times on this page, what you get out of NSAS is very much related to what you put in.

The coming year for NSAS will no doubt be as exciting as the last few have been. In the short term, we will try to make the

field trip to Coonabarabran at the end of November as interesting as the one to Parkes in June.

The new Committee will no doubt continue to emphasize outreach and already there are plans to repeat the very successful Cameraygal Public Star Party held in September.

The Theory Group will continue to work its way through "Understanding the Universe" and, once there is sufficient demand, the NAG will restart with a new group of interested observers. No doubt some new ideas will come with new blood, so don't hesitate to let the Committee know what you'd like to see from the Society in the future.

I'd like to thank everyone who has worked quietly and unrewarded in various positions as Committee members, appointed jobs, and in support of outreach over the last year. I'd also like to thank the members who have voted with their renewals year after year for the ideals of

NSAS and I say keep up the good work. Our Society should be on its way for another 25 years!



Bob Fuller

Calendar

General Meetings:

October 18th
November 15th
December 20th

Annual General Meeting
Guest Speaker: Dr. David Malin
Christmas Party

Annual Barbecue:

October 23rd

Theory Group Meetings:

October 11th - November 8th - December 13th

NAG Meetings:

TBA. Will resume in the new year

Observing Nights:

Consult NSAS' web site at <http://nsas.org.au/observing/>

Deadline:

Please send your contributions to the October issue of Reflections in time to reach the editor **before December 15th** to nsas.editor@ozemail.com.au

Neptune's 1st Birthday

On July 12th 2011, the planet Neptune was exactly one Neptunian year or 164.79 Earth years old since its discovery on 24 September 1846.

Neptune is about 4.4 billion kilometres away from the Earth and in 1989 the probe Voyager 2 flew within 5000km and took the first close up pictures.

Neptune's discovery was a triumph for theoretical astronomy and mathematics.

Uranus, the next planet in towards the Sun, did not follow the path that Newton's gravity laws predicted.

It was hypothesised that perhaps another planet, yet undiscovered, was disturbing it!

The search for this eighth planet began. French mathematician Urbain Le Verrier (1811-1879) and Englishman John Couch Adams (1819-1892) produced similar results and are now given joint credit for the discovery.

At the Berlin Observatory in Germany, on the night of September 23rd 1846, Johann Gottfried Galle found Neptune after only an hour or so of observing, exactly where Le Verrier had predicted it would be.

Dr Alan Chapman, author of the "Victorian Amateur Astronomer" said "It was such an incredible mathematical business, it makes searching for a needle in a haystack look like a 10-minute job for a child".

Many claim that it was not Galle but Galileo who documented the planet first!

In his famous book "The Starry Messenger" Galileo made drawings from



Neptune as seen by Voyager 2
Photo Credit: NASA

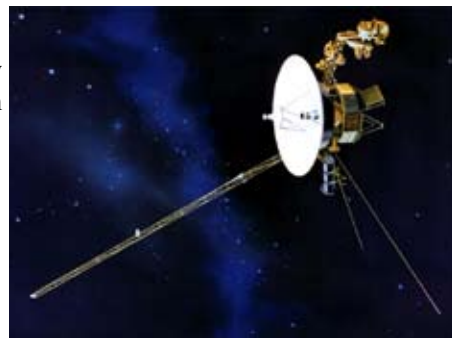
his observations in January 1613 of Jupiter and its moons with an object labelled as a "fixed star" which may be Neptune!

We know still little about Neptune. Dr Chapman calls it "a frozen lump of frozen gases".

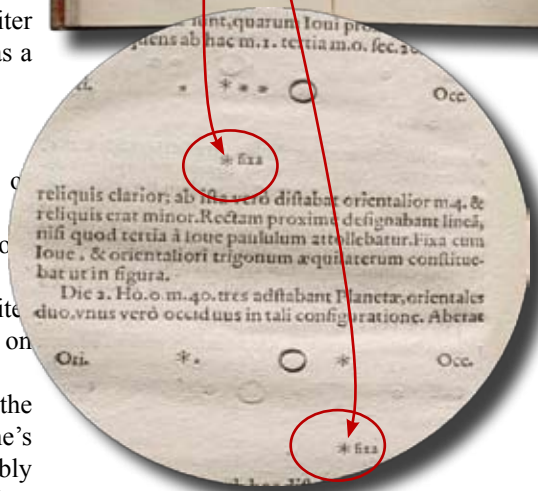
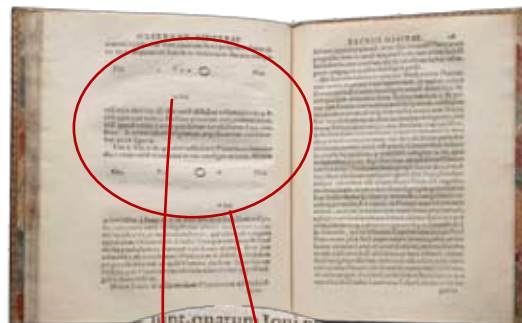
NASA missions to discover more about the planet have been postponed due to budget restrictions and the Neptune Orbiter mission, planned for 2016, is no longer on NASA proposed mission list.

New Horizons, the mission to Pluto and the Kuiper Belt, due to pass through Neptune's orbit in August 2014, has regrettably not been organized to closely monitor Neptune.

Ray Harraway



Voyager 2
Image Credit: NASA



Sidereus Nuncius
Courtesy rarebookroom.org

Back to Basics: Dark Matter

Cosmologists are a strange breed of scientists.

When they make observations that do not fit their theories they tend to patch the latter up by thinking up new concepts. And in this domain, they sure don't lack imagination! Just think of Einstein and his cosmological constant.

Dark matter is another of these elaborations and, today, we are going to try and shed some light on it.

It is in 1933 that Fritz Zwicky, a Swiss born astronomer, discovered that something was wrong in the way galaxies behave.

His intention was to calculate the total mass of a galaxy by measuring its rotational speed and applying Kepler's 3rd law.

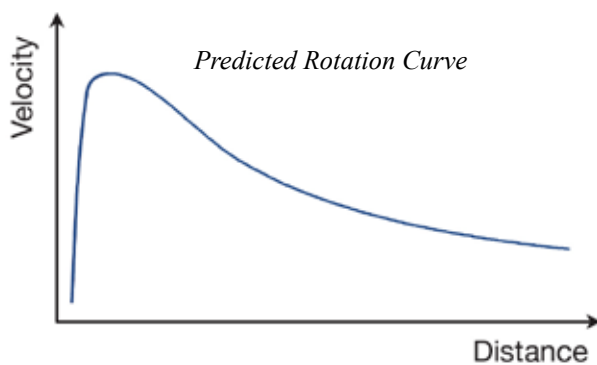
In its Newtonian form, Kepler's 3rd law is expressed as:

$$T^2 = \frac{4\pi^2 * a^3}{G * M}$$

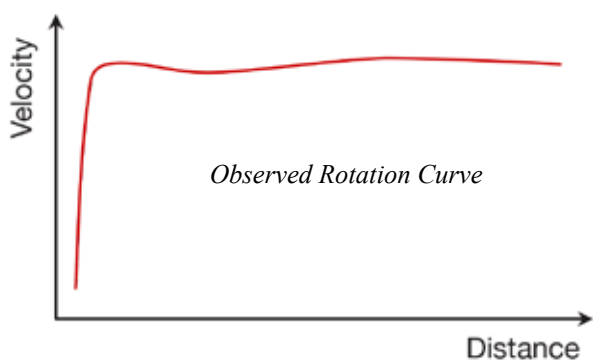
where T is the orbital period, a the semi-major axis, G the gravitational constant and M the sum of the masses.

According to this equation the velocity decreases with the inverse of the distance to the galaxy centre.

For a spiral galaxy this would be represented by the following diagram:



The velocity should drop with the distance to the galaxy centre but, in reality, the speed of the stars that lies outside of the



central remains more or less constant: Zwicky then embarked on the study of 7 galaxies in the Coma cluster and he observed that the speed of these galaxies were way too high for their estimated mass. He calculated that these galaxies should be approximately 400 times heavier than expected from their luminosity.

Zwicky proposed that most of the matter in a galaxy was dark and invisible but none of his colleagues agreed with him, mainly because of the uncertainties of his observations but also because of his difficult relationships with them.

Sinclair Smith observed this phenomenon again in 1936 when he tried to calculate the mass of the Virgo cluster. In this instance he found a total mass 200 times greater than estimated by Edwin Hubble.

The puzzle posed by this missing matter was all but forgotten for 40 years and it is only in the 70s that it came back to the fore.

An American astronomer, Vera Rubin, set out to study the rotation curves of individual galaxies.

From her study of the Andromeda galaxy she inferred that spiral galaxies were bathing in a halo of something the mass of which was 5 to 10 times greater than that of the visible matter.

This something was later labelled "dark matter" because it is invisible to us: it does not shine and it does not reflect light.

Rubin preliminary results were later confirmed by the study of 200 other galaxies and, today, it is generally accepted that

the ratio of dark matter over visible matter is 6.

The existence of this dark matter is now the preferred explanation for the observed rotation curves: it's a simple, down-to earth (?) explanation that does not question Kepler and Newton.

This being established, 2 types of dark matter

are now competing for the heart of the astrophysicists: Hot Dark Matter (HDM) and Cold Dark Matter (CDM.)

HDM is hypothesised to mainly consist of nonbaryonic matter, for the most part neutrinos.

Neutrinos are very energetic small subatomic particles that have a tiny mass and travel close to the speed of light.

CDM could be formed of either nonbaryonic matter such as the hypothetical neutralinos and WIMPs, and/or by less exotic baryonic matter in the form of MACHOs!

Neutralinos, as predicted by supersymmetry, are heavy stable particles and, in theory, should be abundant enough to account for the majority of the matter in the Universe.

WIMPs or Weakly Interactive Massive Particles are extremely difficult to detect. To date, despite their supposed abundance (1 billion WIMPs would have passed through your body since you've started reading this article), their mass (100 times the mass of a proton) and the enormous efforts put into identifying them, one experiment, the Cryogenic Dark Matter Search has detected a meagre 2 events that could be attributed to WIMPs and another one, the Cryogenic Rare Event Search with Superconducting Thermometers, has found only 67 events that may have been caused by WIMPs.

A new theory has been put forward to explain these disappointing results: WIMPs formed during the first nanosecond after the Big Bang might have been instable and they would have disintegrated in another kind of particles even darker than the WIMPs, the Super-Wimps! These Super-



CDMS II Installations - Sudan Mine
Photo Credit: Fermilab - Reidar Hahn

Wimps would interact with the normal matter only through gravity and it would therefore be impossible to detect them directly.

Clear with a Chance of Meteor Shower

Every time a comet passes close to the Sun, it sheds particles into space.

The tiny ones are spread out, becoming space dust, whereas those having enough mass stay together moving along the comet's orbit.

If it happens that the Earth's orbit intercepts the comet's path, then every year at about the same time, the Earth passes through these clouds of comet debris (meteoroids), that then fall into the atmosphere.

The heat generated by the friction with the air volatilizes the material of the falling particles (meteors) producing a flash of light. That's what we call a "shooting star."

When the meteoroid is big enough, the friction with the atmosphere can break it apart in a very bright and sometimes loud explosion (fireball). These fragments could disintegrate as well or hit the surface of the Earth (meteorite).

The collection and study of these meteorites can bring a lot of valuable information to solve important questions about the history of the planet, such as the origin of the heavy elements that abound on the surface of the Earth, when it would be expected to find them only at the core, as it has been pointed out recently¹.

Due to the perspective, meteors or fireballs belonging to the same meteoroid stream seem to come from the same point in the sky (radiant), taking the name of the constellation (or nearest star and constellation) in which this point is located.

In general each meteor shower is associated to a specific comet. For example, the radiant of meteors coming from the constellation of Leo (Leonids) indicates that those meteors come from debris of the Tempel-Tuttle comet. Geminids and Quadrantids meteor showers are exceptions, their parent objects are the asteroid 3200 Phaethon and the minor planet 2003 EH1 respectively.

However, sometimes, meteors can be seen having a trajectory that does not belong to any known radiant. If the number of meteors is small, less than 4 with the same apparent unknown radiant in the night of observation, these are classified as sporadic, just random pieces of interplanetary dust. But sometimes it could be something more exciting!

Long period comets, with orbits taking between 200 to 10,000 years, or even more, can leave behind them enough density of material to fall into the Earth's atmosphere, generating brief meteor showers.

These events are very rare but one of those was observed the night of February 4 this year during a routine observation with NASA's

Cameras for Allsky Meteor Surveillance (www.cams.seti.org).

CAMS are actually used for confirmation of previously discovered radiants but, after the data analysis, the presence of a 53-year period object was inferred.² This is an example of the utility of meteor showers observation and recording, as a new potential hazardous object was discovered before the object itself has been seen, if it still exists.

Hence, the study of those interception spots between Earth and comet orbits can bring valuable information about those objects that could turn into a few years of warning of a potential hazard.

The contribution of amateur astronomers in the study of meteor showers is very important.

The International Meteor Organization (<http://www.imo.net>) was created in 1988 aiming to coordinate the collaborative work of amateur astronomers studying meteors activities around the world.

As they say in their introductory page, "the collection of meteor observations by several methods from all around the world ensures the comprehensive study of meteor showers and their relation to comets and interplanetary dust"

So, how can we watch meteor showers? There are a lot of techniques used to observe, register and report meteor showers. Visual observation is the most common among amateur astronomers, and the easiest one as no equipment is needed. However, the use of photography, video and radio equipment, as well as telescopes, is becoming popular as the technology advances. I will cover this subject in a future article.

In the meantime, getting familiarised with the constellations, finding a dark spot, extending a reclining chair, covering yourself with a blanket, having some chips and enjoying the show is a good way to start, especially if the forecast is clear with a chance of meteor showers!!!

Irene Justiniano

References

- 1.- Willbold, M et al. (2011) The tungsten isotopic composition of the Earth's mantle before the terminal bombardment. *Nature*, 477:195-198
- 2.- Jenniskens, P and Gural, P (2011) Discovery of the February Eta Draconids (FED IAU#427): the dust trail of potentially hazardous long-period comet. *WGN Journal of the International Meteor Organization*. Vol 39. In press.
- 3.- <http://stardate.org/nightsky/meteors>
<http://www.imo.net/calendar/2011#octdec>



Leonids Shower of 1833: The night of the raining fire shower

Oncoming Meteor Showers (Oct-Dec 2011)³

Shower	Active	Max	Parent Object	ZHR*	Moon
Draconids (DRA)	October 6-10	Oct 8	Comet 21P/Giacobini-Zinner	Up to storm	Nearly full
Orionids (ORI)	October 15-29	Oct 21	Comet Halley	25	Rises after midnight
Leonids (LEO)	November 6-30	Nov 18	Comet 55P/Tempel-Tuttle	20+?	Rises around midnight
Geminids (GEM)	December 7-17	Dec 9	Asteroid 3200 Phaethon	120	Just Past full
Quadrantids (QUA)	Dec 28- Jan 12	Jan 4	Minor planet 2003 EH1	120	New

*Zenithal Hourly Rate: number of meteors a single observer would see in one hour under a clear dark sky if the radiant of the shower was at the zenith.

Lane Cove West Public School Event

An Astronomy Night was held at Lane Cove West Public School on Wednesday 3rd August 2011

While the request for this Astronomy Night came from Tim Glanville, specifically for grade 3 and 4 pupils, all age groups were present that evening. It turned out to be a very good evening – the weather was very

Outside, we had 4 scopes in all – Gary Maass, Peter Nosworthy, Graham Nicholson & Josephine Lindquist and Gordon Ogborne who setup after his presentation.

Gary with his 10” Dobsonian focussed specially on the Moon but Saturn, Omega Centauri and the Jewel Box were targeted too.

Graham & Josephine with their 125 Meade started with Saturn and then concentrated on the Jewel Box.

Peter had his scope trained on Saturn all night due to the high demand for this planet. Peter found it interesting that quite a few children, and parents, said that Saturn looked like it was painted onto the lens.

Gordon had his Dobsonian scope set on Antares but also showed the Moon, Saturn and Omega Centauri at some stage.

thank Lane Cove West Public School for the generous donation of the money that was collected as entry fees on that evening.

Peter Korber



(1)
kind to us.

The night began with Gordon Ogborne’s PowerPoint presentation of The Solar System in the school hall.

There were some 200 people, parents and children, all listening very intently for the full 45 minutes it went on.

This went very well and Gordon was bombarded by plenty good questions especially from the boys and girls

Laser pointers were used as usual to show where some of the objects were in the sky. One of the boys questioned whether these were actually legal, just showing some kids were really on the ball. (They weren’t to know that societies like ours are permitted to use them.)

NSAS is very grateful and would like to



(2)



(4)



(3)

Photos by the author:

(1) & (2) Gary

(3) & (4) Graham and Josephine

Breaking News: ALMA opens its eyes

ALMA, Atacama Large Millimeter/submillimeter Array, the most powerful millimeter/submillimeter-wavelength telescope in the world opens for business and reveals its first image.

At present, around a third of ALMA’s eventual 66 radio antennas make up the growing array on the Chajnantor plateau in northern Chile, at an elevation of 5,000 meters. And yet, even under construction, ALMA has become the best telescope of its kind – as reflected by the extraordinary

number of astronomers who requested to observe with ALMA.

ALMA observes at much longer wavelengths than the HST, which makes it much harder to obtain comparably sharp images. However, when the full ALMA array is completed its vision will be up to ten times sharper than Hubble.

For more information go to:
<http://www.almaobservatory.org/>



*ALMA antennas on the Chajnantor plateau
Image credit: ALMA (ESO/NAOJ/NRAO)/W.Garnier*

Paul's Corner

On the 23rd October, the day the 25th anniversary of our Society is to be held at St Ignatius College together with our annual barbecue, a meteor will be visible to the low East in the evening sky, traveling southwards for some 9 minutes from 5.47pm to 5.56pm.

Meteor Priroda is an object at a distance of only 2288 km with an estimated magnitude of 2.5. As it is approximately 40 meters long and weighing 3,800 kg, maybe we should get ready to duck. If we were able to see Pegasus rising in the twilight we could see it very close to the bright star in the square of Pegasus called Alpheratz, which I always called the brightest star in Andromeda.

Well, fear not: this object is no more than a man made satellite; it's the name of Meteor that attracted my attention. Meteor Priroda is one of a series of 5 Russian Earth land resources satellites launched between 1974 and 1981.

were utilized to form Libra as the new 12th sign of the Zodiac. It was one of the two claws that scorpions have. And its name, from Arabic al-zuban al-janūbiyy, means "southern claw".

Looking southward the Southern Cross is lying very low but the LMC is rising on the left side of the circumpolar stars with bright Canopus helping us to pinpoint its location.

This can be checked with a clump diffuse area called the Tarantula nebula. That area was of intense interest in 1987 as a brilliant new Supernova called 87A was sighted and the spectacle of which was exclusively for southern viewers as a naked eye object.

I consider that its sudden appearance in our skies rekindled general public interest in astronomy after the hype of the Comet Halley had past with some lingering disappointments. This was indeed the case with myself as I then joined the then

NDSAA (now NSAS.)

When David Malin started producing numerous new stunning images, photography became an obsession. Some new eye-catching effects began to catch our interest: time lapse

minutes to clearly tell apart the blue stars from the red ones and some landscapes with native trees and objects being shown. To the extent that astrophotography would even use flashes as well car headlights, buildings, headlands, trees, all became 'fair game'.

For the interest of newer members without an investment in expensive gear, all you need is a tripod and, of course, a camera with a B (bulb) setting.

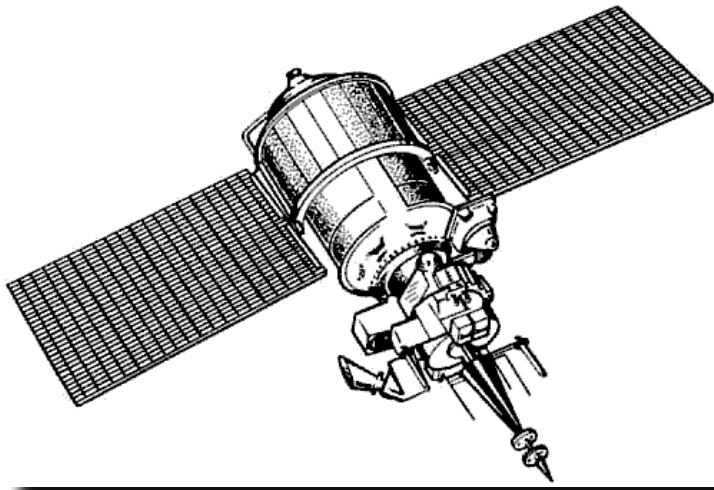
There is a new calendar for next year, 2012, that shows a plethora of images taken by amateur photographers from the general public as opposed to the usual calendars that use highly defined deep space images by the Guys with deep pockets.

One such image was taken by myself with blood, frozen sweat and tears for over 4 and half hours in the depth of night at a freezing cold high point of the Blue Mountains.

'My Bowling Ball' is a whole sky rotation using a fish-eye lens to capture a 180-degree scene, hill to hill, trees to trees. Prominent is the Milky Way and major stars showing their true colours.

This was planned as an image to answer a question that was lingering in my own mind: so if the southern stars give a neat round circulation, how does that fit in with stars located north near the equator, all in one image? This photo gave me the answer.

Paul Shallow



Meteor Priroda

Picture Credit: NASA

In the West just after the Sun has set we will be entertained by yet another conjunction caused by brilliant Venus at -3.5 mag and Mercury at 0.3 mag with a 3rd entry by a mag 2.8 star with the hard to say name of Zubenelgenubi. Zubenelgenubi used to be in Scorpio until the ancients split this constellation to form

circumpolar photos, defocus images to catch and enhance the colour of the various stars, groups of stars like our Southern Cross or Orion being allowed to trail up to 45

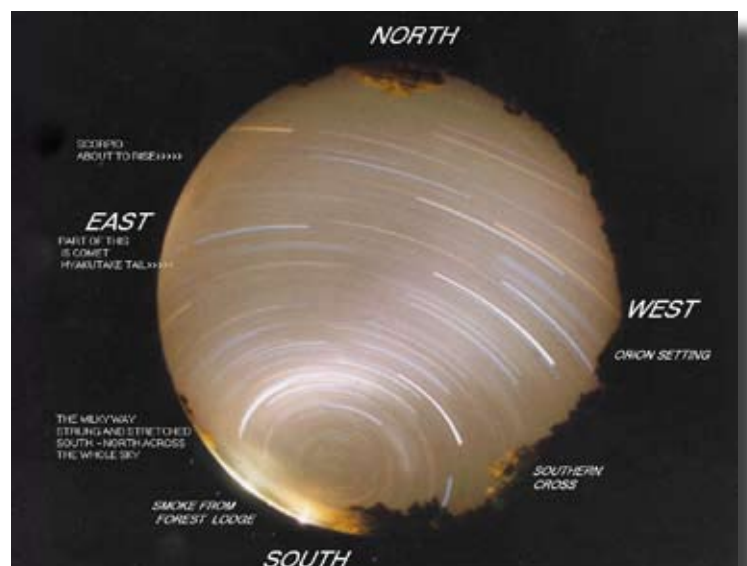
Image taken from Forest Lodge at Eden, a small hamlet near Jenolan Caves, at the top of the plateau some 4000ft + altitude. The nearest light apart from Forest Lodge is the reflected light of the fireplace smoke drifting over the Southern Cross and the other nearby light within Coo-ee were on the other side of the Jamison Valley and I measured the light source on a map the next day, it was the hotel tower at Blackheath, 40 km distant and only a dull light.

Image taken from about 11 pm to 3am

Film Camera Fujica AE SLR with 100 ASA Fuji film

Lens Fisheye 7mm at f8 - B setting with release cable - Exposure over 4 to 4 half hours

Lens pointed straight up with camera set on tripod stabilized with 2 bricks.



Cameraygal Festival Stargazing Night

Each year Lane Cove Council holds the Cameraygal Festival in honour of the Cammeraygal (yes, the spelling is different) people who occupied the northern Sydney area prior to white settlement.

The festival runs for two months from early August and comprises many community oriented events. This year, for the 20th Cameraygal Festival, NSAS held a stargazing evening for the public.

The event took place on Saturday September 3rd at Kingsford Smith Oval at Longueville. The field proved to be an excellent site, being very wide and flat with a good horizon in all directions and minimal local lighting.

The weather for the event was excellent and we arrived at about 5.30pm to set up our nine telescopes in a big circle on the field for a 6pm start. The moon was a crescent and was high enough to be visible for the whole evening so we concentrated on this as the first visitors began to arrive before it got completely dark.

We had a steady stream of visitors for the first couple of hours, enough to keep us busy most of the time but with occasional quiet spots.

In the week prior to the event, Gordon

and I had distributed flyers to letter boxes covering most of the Longueville and Riverview areas. This probably accounted for a large proportion of the visitors on the night.

Once it got a bit darker, Saturn became the most popular target for the first hour or so

with many exclamations of awe from first time viewers. However, the planet soon sank out of sight in the west.

I then pointed my scope at M57 (the Ring Nebula) for the rest of the evening, while others targeted some of the brighter globular clusters, nebulae, binary stars and comet Garradd (C/2009 P1) that was nicely positioned in the Coathanger cluster, making it relatively easy to find.

We had planned a 9pm finish but the crowd dwindled by about 8.30pm and we began packing up early.

The response from visitors on the night was very good. Many people, having never looked through a telescope before, were awestruck by views of the Moon and Saturn in particular. In the following days we also received some very positive e-mails from members of the public who enjoyed the evening enormously.

The success of the night will certainly increase our profile in the local community and we might even make it an annual event.

Thanks to all who participated, both with and without telescopes.

Peter Nosworthy



*At the ready, waiting for the first visitors
Photo Credit: Jean-Luc Gaubicher*



The Binocular and Telescope Shop
84 Wentworth Park Road
Glebe NSW 2037
Phone: (02) 9518 7255
www.bintelshop.com.au

Dark Matter

Continued from page 3

MACHOs or Massive Astrophysical Compact Halo Objects are hypothesised to be made of less exciting objects such as black holes, neutron stars and brown, red or white dwarfs that emits little or no radiation.

But, to make MACHOs a bit more thrilling, it was proposed in 1995 that they could form clusters called Robust Association of Massive Baryonic Objects or... RAMBOs!

However searches for MACHO and RAMBO candidates have, so far, failed.

Lost? So am I but hang on a second! To make it even more confusing the existence of Warm Dark Matter has now been suggested! As its name implies, WDM is hypothesised to have properties intermediate between HDM and CDM and to be composed of sterile neutrinos, axions and light gravitinos, whatever they are...

Jean-Luc Gaubicher

Sources:

- Wikipedia
- Dossier pour la Science N°71
- Jonathan Feng: The search for clues in our cold dark universe (<http://vod.grassrootstv.org/vodcontent/9251-1.wmv>)
- Mark Trodden: Modern cosmology and the building blocks of the universe (<http://www.sas.upenn.edu/home/news/troddenandabbate/trodden.html>)

Stars in the Outback

Belonging to a 4WD Club has lots of advantages and one of the best is Dark Sky viewing

The people with whom I travel are used to me looking for a tent spot well away from trees.

Rolling out of the tent several times during the night, often still in my sleeping bag, means lots of stars overall but I have to be careful if I wander to faraway from my tent: travellers have other reasons for leaving their tent at night than looking to the stars...

The six and a half weeks I spent on the Canning Stock Route and the Anne Beadell Highway, all desert stuff, gave me lots of opportunities to revel in star gazing. The moon was very well behaved, rising late and a glory to behold as it rose.

The movement in different parts of the sky is so fascinating to watch: the circling around the South Celestial Pole, the arc overhead and the horizontal movement at the Northern horizon

As I forget constellations very quickly I sometimes had to check my star chart if I had the time to do it as I packed up my tent in the morning.

I also kept notes so that I could write about my viewings later.

The dark sky meant that I could see the Milky Way. I had forgotten how breathtakingly beautiful it is and I was able to see it setting and rising.

The Magellanic Clouds showed up well and did their rotating beautifully.

I have binoculars small enough to hang around my neck; these are ideal to look at the glories of star clusters and nebulae. So imagine my horror one night when one eyepiece was missing but, fortunately, it turned up loose on the floor of my tent.

Some strange stuff:

Satellite: One was seen around the camp fire, one night (August 2).

Object 'A' ...August 4, overhead and about 90° arc., 2 times a satellite speed, red with a blue-green tail. Shooting star during night

August 9 ...a huge satellite (Jupiter size) went over S to N

August 17 ...a vertical (like an aurora) plume of light (1/2 moon width) went over, N of Milky Way, moved across to East, moved across the Milky Way, narrowed to 10-15°, E of Milky Way,

August 18 ...a plume, similar to a vapour trail, but it didn't spread at all, rather like a slow second hand of a clock, 20° -> 30° of arc.

Object 'B' ...August 24 rising slightly (15°) in the East, an array [see sketch]

¼ hour after moonrise [narrow crescent moon]. It rose (normal star rise time) then remained stationary, for 30-45 minutes, then faded away.

Each night, the sky seemed slightly lit up. Only on Aug 26/27 did the sky seem very dark.

I must add, I was without a watch that worked: the minute hand slips around on my \$12 watch!

Lydia Bell

