MACARTHUR ASTRONOMICAL SOCIETY Inc.

Journal

PRIME FOCUS

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President's Report

Welcome back. I hope everyone had a great Christmas and New Year. Well, last time we met was in November and we were treated to an excellent guest speaker, namely Dr Dick Hunstead from the University of Sydney. He spoke on Quasars but also touched upon other subjects such as cosmology.

I took some notes around his discussions and came away knowing a little more about this wonderful world of astronomy. What I liked was the terminology he used and I supply the following for your perusal

Backward Light Cones
Recession Velocity
Quasi Stella
Doppler Boosting
Heavy Hydrogen
Baryonic Matter
Phenomenology, (my favourite)

What I am still getting my head around is that the stars we see in the sky are not travelling away from us, it's the space between us and these stars that's expanding, like dots on an inflating balloon. What a talk!

Tonight we should have a few slides to see, some general items of discussion and Dick Everett has agreed to bring us up to date with some news items. Afterwards it's time for coffee and a chat. Should be a good chance to catch up after the break.

Our Christmas party was a rather bleak affair, not the company but the weather. For a large part of November and December it's been rather cloudy with some good doses of rain thrown in to boot. The party was a lot of fun, the kids had a ball while the grown ups had a chance to eat, greet and be merry. Maybe we can hold a few picnics or get togethers throughout the year, a chance for us to relax and give a chance to our astronomically challenged partners to compare notes.

A personal viewpoint.

As alluded to previously it is my understanding that we will come to a standstill with our activities involving the Campbelltown Rotary Observatory. This is such a shame as the night sky this year looks very exciting. Around mid May and possibly visible to the naked eye will be two comets in the night time sky at the same time. Wouldn't the views from the 16 inch be fantastic.

Saturn is putting on a marvellous display of its rings, opposition took place earlier this month and looks good to, say, early May. The May evening sky will play host to the Moon, Venus, Mars, Saturn and Jupiter. If we factor in successful landings of the two Martian rovers and the discoveries that may ensue than it will be a huge year.

It's my personal belief that an ongoing and fully operational observatory would have many benefits, not only for society members but the general public, schools and the community itself. Over time we have built a solid reputation amongst the community and our peers as being a vibrant and credible society in which we educate and foster the overall experience in Astronomy. This of course could never have been achieved without the dedication and hard work of our members.

I have previously made successful approaches to Campbelltown council over light pollution issues and they have been most cooperative in this regard. They are aware of the Observatory's sensitivities to light spill and are complying with the new Australian standards for urban lighting on all new estates and developments, and boy there's lots happening on that front. This is a very valuable connection for the society as light pollution will always be an ongoing concern. I would like to keep a strong leverage point happening here with an active observatory programme.

The above is my viewpoint and I dare say some members may not carry the same passions that I do, and that's fair enough. However, as a society I think it's important for us to canvas the views of the wider membership and bring those views to the attention of the committee, whatever they may be.

At time of writing I am still hopeful that Dr Ragir Bhattal, the director of the observatory will discuss the issues with us at one of our meetings, hopefully as soon as possible.

Other items

John Rombi has kindly agreed to arrange the dates for our field nights for this year coming and detailed below are some dates to kick us off. Thanks John. I have arranged some Forest nights, however these will need confirming with International House upon their return from the break. I am reasonably sure it will be OK, but check closer to the date. Peter Druery has agreed to pick up the keys for those dates - thanks Pete.

Confirmed dates

I have also secured our meeting room for another year, always the 3rd Monday of the month. Don't forget!

24/1/04 The Oaks; **14/2/04** The Oaks;
16/2/04 Gen. Meeting; **21/2/04** Forest;
13/3/04 The Oaks; **15/3/04** Gen. Meeting;
20/3/04 Forest; **19/4/04** AGM.

Also remember that membership renewal fees are due as at 29/2/2004. For those who have joined in October 2003 or onwards you are covered for this year. If you wish to express an interest in holding a position in the committee than please let it be known or grab an application. We still have 3 months to go before the AGM so there is enough time to give it a thought if so desired.

Again I hope that everyone had a great break over Christmas and New Year. I know I am really itching to get that scope out and look forward to our upcoming field nights. That's about it for now, all the best.

Regards
Noel Sharpe (President)

Antarctic Eclipse

Well, I thought I would do an article about the Eclipse Flight down to Antarctica which I have been involved with for the last two years.

We lifted off from Melbourne on Monday morning 24/11/03 at 2.00am. The first 5 hours we saw no scenery, then just before we were preparing for the Solar Eclipse intercept we found a clear area and decended to 10,000 feet to look at the Antarctic landscape. That was just amazing to see, as by this stage we had expected to have at least an hour or so of scenic viewing completed. By this time people were expecting us to be in a holding pattern to start about an 80 nautical mile intercept. However, due to the opportunity of seeing the landscape we recalculated the intercept from our position and went from low level scenic flying straight up to 30,000 feet for the intercept. Some people were really wondering if we would make the intercept after this divergence from plan but we had it under control and Glenn Schieder, the Hubble Space Telescope Astronomer, myself, John Dennis the Captain, another captain and two first officers on the flight deck, we were constantly checking our figures and had it all under control. The energy that was on the flight deck was incredible, everyone had a job to do and did it well.

The Solar Eclipse intercept was just spot on and we had 2.5 minutes in the eclipse, the whole contact phase lasted around 20 minutes. The sky went dark and the stars were sparkling and Venus looked terrific nearby, especially with the corona effect. People seem to think eclipse chasers are a crazy bunch of people. Well after seeing the eclipse visually, I can now understand why these people go to all parts of the earth to do their eclipse chasing.

Bobbie was also on the flight and we are now both hooked, so we want to become eclipse chasers too!! We both agree it was one of the greatest experiences of our life. There is just no way of explaining how spectacular it was, no picture does the true experience justice. Bobbie and I have been fortunate enough to have viewed some incredible sites through large telescopes, but this was awesome.

During and after the eclipse people on the aircraft just erupted in excitement, people on the right hand side of the aircraft paid up to $10,000 to $15,000 per seat for the experience, even families were on board. Once the excitement settled we descended back down for some fantastic viewing over Queen Mary Land. Unfortunately Casey had a blizzard and so did the Russian station so we did not see them. The Pack Ice is incredible and ice-burgs were huge.

We left Antarctica and the only other aircraft that was planned down there was an Airbus A340 from South America and a group of Japanese eclipse chasers had chartered that aircraft. Actually, I think all first class on our flight was booked out by the Japanese eclipse chasers. The left hand side of the aircraft was just Antarctic viewing and these people paid about a fifth of what the people on the right hand side paid. However, they all saw the Moon,s shadow move across the landscape creating darkness and some were lucky enough to see through some kind people's windows on the right hand side.

We got back into Melbourne 13hrs and 58 minutes later, a world record for the longest domestic flight which is going in the Guinness Book of records, and a new achievement of the first eclipse ever being observed in Antarctica, as the last one in 1985 was not observed by anyone down there at the time.

The next eclipse is 1,000km out in the Pacific Ocean and Glenn Schnieder is planning that one already, so Bobbie and I are keen on April 2005, then another up in the Greek Islands 2006. Gee, we'll need a lotto win between now and then.

We highly recommend doing an Antarctic flight quite a few are flown this time of year so if you're interested let me know I will put you onto the right people.

Anyway I do hope you find this interesting. We do not usually write emails this long but just wanted to share the experience and encourage others to do the same one day.

Cheers

Pete and Bobbie Elston

Jupiter's Satellites ...the winner is...

Jupiter's moons fall into four major groups:
1) The inner group were all discovered during the Voyager program except for Amalthea, all have diameters of less than 200 km and orbit at radii less than 200,000 km, and have orbital inclinations of less than half a degree.
2.) The Galilean moons were all discovered by Galileo Galilei, orbit between 400,000 and 2,000,000 km, and include the largest moons in the solar system.
3.) The third group were all discovered in the 20th century but before Voyager, have diameters less than 200 km, and orbit between 11,000,000 and 12,000,000 km with an orbital inclination between 26° and 29°.
4.) The outer moons were also discovered in the 20th century before Voyager, but have diameters under 50 km and orbit between 21,000,000 and 24,000,000 km. They are particularly notable for having retrograde orbits with inclinations between 147° and 163°.

It is thought that the three groups of smaller moons may each have a common origin, perhaps as a larger moon or captured body that broke up into the existing moons of each group.

Up until mid 2003 the total number of known moons of Jupiter was 61, currently the most of any planet in the solar system. 23 were from discoveries by Scott Sheppard et al by using the world's two largest digital cameras at the Subaru and Canada-France-Hawaii telescopes atop Mauna Kea in Hawaii.

Tne question was: How many are there now, as of 31/12/03?

I received a swag of 'bids' ranging from the 'pessimistic' (62) to the ultra-optimistic (92.)

After some initial confusion (one website reported a current total of 80 plus - you were looking good there, Lesley) I contacted Scott Shepperd himself and he confirmed to me the current total stands at... 61. It hasn't moved since June 2003.

So the **Winner** is... **Robert Zindler** with his estimate of 62. ***Congratulations Robert.!***

So, how do you like it...red or white?

A very good website on the planets' moons is www.ifa.hawaii.edu/~sheppard/satellites. This is updated on every new satellite discovery.

NOTE: Part 2 of John Casey's article on ***Light, Motion, Time & Space*** will appear in the February issue. Sorry John!

What IC this Month
January 19 – February 15, 2004

Because of daylight saving you will not see much of anything before 9.00pm. However after the Sun has gone you can orient yourself with the spread of constellations from Aquarius in the west to Libra in the east at 12 midnight.

Bright Lights at 9.30 pm
Looking south your eyes will be drawn to Sirius, Canopus, Fomalhaut and Achernar. Low on the horizon you can see Centaurus and the Cross circling the pole. Facing north you will automatically rove west to Venus, Mars, The Seven Sisters, The Horns of the Bull with his red eye, and Orion the Great Hunter. Low in the north catch a sight of glittery, sparkling Capella. In fact at this time of year we in the south are spoiled for choice of bright stars.

The Moon Diary

New Moon	Jan 22
First Qtr	Jan 29
Full Moon	Feb 6
Last Qtr	Feb 13

Evening Sky Planets
In the glow of western evening light you can catch **Neptune and Uranus** in Aquarius, but they will both be gone by 9.40 pm so be quick.

Venus also begins low in the west but climbs higher each night out of Aquarius into Pisces till the end of March before returning to pass in front of the Sun. It has been very close to Uranus earlier this month, and will pass close to a 3 day old crescent moon on the 24/01. Venus will grow in size this year leading up to the transit in June.

Saturn is at opposition in Gemini, rising about 7 pm to sail along with a full moon on Feb 2nd and gradually move eastward each evening for the next six months. The rings will noticeably begin to close this year, till we view them edge-on in 2009

Mars is still high and bright setting about midnight. Moving from Pisces to Aries, it is now less than half the size that it was last August and only very large surface features with colour differences can be hoped to be viewed even through telescopes.

Jupiter rises in the legs of Leo about 11 pm and will remain bright and shining every night till September, when it will sink with the Sun.

Morning Sky
Mercury has passed conjunction with the Sun. Rising in the morning sky it is at its

greatest distance from the Sun. A crescent moon keeps company with it on Jan 20th.

Comets
Although there are quite a list of comets for January none are brighter than 8th magnitude and they are in the western twilight.

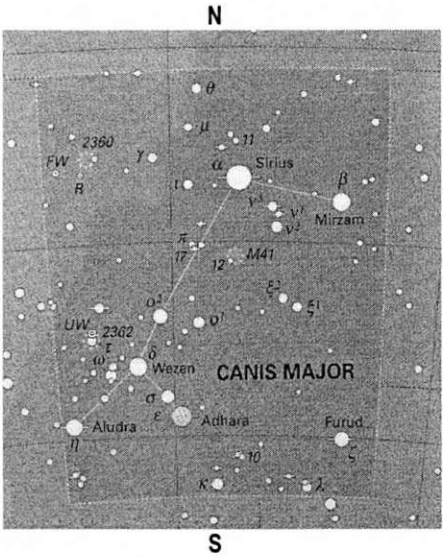
Portraits in The Sky

The Dogs of Orion

The stories concerning Orion's dogs are as varied as the tales of his death. ***Canis Major*** is the largest of Orion's two hunting dogs. Some say he is just crouching waiting, others say he might be chasing Lepus, the Rabbit, who is just in front of him. Perhaps he is looking to help Orion in his battle with Taurus the great bull.

The Athenian New Year began with the appearance of **Sirius –The Dog Star.** He was seen as two-headed, looking back at the past year and forward to the new one. Sirius was sometimes confused with another two-headed beast called Orthrus. This was Geryon's watchdog; his job was to guard the tyrant's cattle. However Heracles killed Orthrus when he captured the cattle as his Tenth Labour.

The Dog Star was already associated with the Sun in antiquity, since the Sun enters that part of the sky in July and August, the northern hemisphere hot summer months. While the brightest of stars, it was said to bring sickness and death, perhaps due to the fact that July and August were regularly the times of drought and disease. The name *Sirius* may come from the Greek meaning "scorching". Some Australian aborigine groups call Sirius 'The Eagle'.



Some Serious Facts:
Although the brightest star in the heavens, *Sirius* is rather like our Sun in size and luminescence; certainly it is no giant at an estimated 1.5 Sun diameters. Its brightness comes from the fact that it is very close to us. At 8.56 light years away it ranks as the sixth closest star.

The star is a binary, with a white dwarf companion which is very dim and very close. In 1834 Friedrich Bessel noticed a slight oscillation in Sirius' orbit. He made the calculations and predicted the existence of an unseen companion, but he died in 1846, before the companion was discovered in 1862 .

Named **Sirius B** or *The Pup*, it is an eighth-magnitude star with an estimated size about

twice the size of the earth. Yet its mass is nearly equal to that of the Sun, which creates a density so high that a tablespoon full of its matter would weigh over a ton.
Beta Canis Majoris is a pulsating giant with a variation too slight to be noticed by the naked eye. Its name, "Mirzam" means "The Announcer", as its appearance on the horizon signifies the approach of Sirius.

Double stars in Canis Major
Sirius B is 8.0 magnitude and separation of 4.6" with an orbit of 50 years. This requires very careful observation and some tricks of the trade.
μ CMa is a fixed multiple binary, with components B- 3", C- 88.5", and D 101".
ν1 is a wide pair orange and blue, 5.6/8.2 – 17"., and ***ε CMa*** is a white and slightly yellow shining double 1.5/7.4 with the companion at 7".

h3945 is a gorgeous mostly unheard of binary, gold and blue. Dick Everett put me on to this. It isn't terribly difficult to find nor to resolve, but when you do find it you will keep coming back to enjoy its colours. The primary is a fairly bright 5.0; the companion has a visual magnitude of 6.1 and has separation 26.6", easy on the eye.

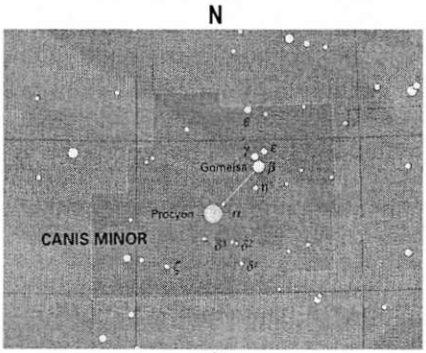
To locate this beauty start with τ CMa, which is just to the northeast of *δ CMa*. Now look north of τ CMa, about 1.75° and very very slightly to the west of due north. You should find the fairly bright primary with no problem. Its companion is easily visible, particularly if you enjoy clear dark skies. You will know when you find it; the colours are unmistakable.

Deep Sky Objects:

M41 is a globular cluster, known to Aristotle, located 4° south of Sirius. It looks more like an open cluster and low power works better than high. Out of a hundred stars, fifty of them are bright enough to be seen in binoculars, with a red giant star at the centre. The group is thought to be about 2,500 light years away.

NGC 2362 is a cluster surrounding the star τ CMa. Quick observation could mistake it for a globular but it is irregular in shape with about 40 stars, and the bright white light of τ CMa in the centre. This is a pleasing object in both binoculars and telescopes.

Canis Minor – The Little Dog



Canis Minor is Orion's second hunting dog, trailing behind in the skies. Much smaller than its mate, its only point of interest is its brightest star. ***Procyon*** along with Sirius and Betelgeuse in Orion form an equilateral triangle, which some people refer to as the **Southern Summer Triangle.** The name **Procyon** means "Before the Dog", referring

to the fact that in northern latitudes this star rises just before Sirius. Procyon is 11.4 light years away from the Earth.

Double stars in Canis Minor

Procyon A and Procyon B form an extremely difficult binary outside the range of medium aperture telescopes. Procyon is very bright at 0.4, and the companion a very faint 13.0, separated by 4.6". In fact the companion, which is a white dwarf only discovered in 1896, has a nearly circular orbit of 40 years and a diameter only twice the size of the Earth.

Good seeing IC

Spitzer the Difference

The universe can now be seen in much more of its glory, thanks to the Spitzer Space Telescope which has a unique infared vision, allowing it to study objects too cold or too distant to be otherwise seen through clouds of gas and dust. The telescope is able to detect the faint warmth of cool, distant objects by keeping its instruments extremely cold so that they are super-sensitive. Astronomers hope its sensors will help them discover new planets and the secret of star formation, among other things.

The telescope, which was launched in August 2003, is named in honour of the late Princeton astronomer Lyman Spitzer, who in 1946 was the first man to propose launching telescopes into space to avoid the obscuring effects of Earth's atmosphere. It is also the last of NASA's Great Observatories, a series conceived in the 1980s to scan space across the whole electromagnetic spectrum and whose members include the Hubble Space Telescope, launched in 1990 to observe in visible and ultraviolet light, the Compton Gamma Ray Observatory, launched in 1991, and the Chandra X-ray Observatory, orbited in 1999.

Instead of orbiting the Earth and dealing with heat pollution from the planet, the observatory is in a unique solar orbit that has it trailing the Earth by 8.7 million kilometres. The telescope operates at just 10° above absolute zero using the natural cold of space and 50 kilograms of liquid helium coolant.

The first images released from the telescope hint at the secrets to be unravelled in the future. The images of a huge gas cloud 2500 light-years from Earth called IC 1396, or the Elephant Trunk nebula, show a new-born star previously hidden in dust clouds. M81, a spiral galaxy 12 million light-years away comes alive in infrared light, with the sweeping arms showing bright, bulging areas of new star formation.

Other images show a young star called HH 46 with curved shock waves of gas blasting from it, while images of the nearby star Fomalhaut reveal the inner regions of a massive disc of circling planet-forming debris. John Bahcall, of the Institute for Advanced Study in Princeton, New Jersey, said "We will be able to see things that human beings have never before seen. This will change the way astronomers do astronomy." The observatory appears to be in perfect working order and has enough coolant to continue sending images of the universe for almost six years. "This gives us a powerful new capability that will enable us to see things not seen before and to answer questions we couldn't even ask before."