

# From the Editor Chris Malikoff

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**Drime** 

A great event

The inaugural "AAIC2011" (Australian Astro Imaging Conference) has just concluded on the Gold Coast in Queensland. Attracting over 100 attendees from all over the country, both local and international speakers enlightened us with their expert-level knowledge on what makes astro photography tick. A short article here describes the fantastic time had by everyone who went along. A full write-up will appear in Australian Sky & Telescope in due course.

Welcome to the July edition of our new Prime Focus.

#### A completely new Prime Focus still needs new contributors

I'm taking this opportunity to ask MAS members who haven't contributed to Prime Focus to maybe consider doing so. Being interested in astronomy, and all things "space", makes you a perfect candidate to help fish out those elusive news stories and happenings in our universe and let the rest of the society know about them. If you've written any short stories of your own, we're very keen to give you a place to tell them.

I hope that you're enjoying reading Prime Focus as much as we're having fun producing it. Bigger and better things to come...

Clear skies....



### President's Report

#### Welcome!

Last month Dr Lisa Harvey-Smith gave us a talk on the SKA (Square Kilometre Array). Members were very happy to get an insight into not only what has happened in Western Australia so far, but what is planned for the coming months and years.

This month we welcome astronomer Dr. Mike Ireland (Sydney University) to the Macarthur Astronomy Forum. Mike will be talking about "The Birth and Death of Exoplanets with Telescopes Big and Small." Mike has published in the sub-fields of direct imaging of extrasolar planets, fundamental parameters of young stars and brown dwarfs, and modeling and observing the extended atmospheres of Mira variables and Asymptotic Giant Branch stars.

#### Later in the year:

**15th Aug**. Prof. Geraint Lewis (Sydney University) "Just what do we know about the Universe?"

19th Sep. Chris Malikoff (Macarthur Astronomical Society) tba
17th Oct. Gary Kopff - Wildcard Innovations - Argo Navis
21st Nov. Prof. Bryan Gaensler (Sydney University)

Please remember that all meetings are subject to possible last minute changes. The details can be confirmed on our 'What's On Page' two weeks in advance and should be checked before leaving home in case of any late alterations to time, venue or guest speaker's details.

Viewing nights have been a bit variable of late. Stargard on 25th June was quite a nice night, with thirteen telescopes and sixteen members. The Forest on 1st/2nd of July didn't go as well. Friday night clouded up at 8pm and the reports from the intrepid few who attended, Saturday night was worse. Let's hope 28th/29th July fare better for everyone.

Trevor Rhodes

Our Public Outreach Night for Wollondilly Anglican School turned out to be a success. After enjoying the BBQ put on by the School and watching "The Universe" in the auditorium, we ventured out to find the weather holding out just long enough for us to keep the students interested and asking questions.

Looking forward to "doin' it" with you in the dark ...

Trevor Rhodes



**Next Meeting:** Monday 18th July 2011 at 7.30 pm

> Lecture Room 5, Building 22, University of Western Sydney, Campbelltown Campus

Guest Speaker: **Dr Mike Ireland** (Sydney University)

#### Topic:

"The Birth and Death of Exoplanets with Telescopes Big and Small"



# Page 3

Secretaries do far more than push paper...just ask Roger Powell

Subject of our new "Page 3" section this month is MAS member Roger Powell. Roger is our very able Secretary, and does much within the club to keep our lines of communication open, and documents meeting minutes like no other!

For those who haven't been to either Stargard or Forest nights for a while, you may not realise just how



dedicated Roger is to enjoying what the stars above have to offer.

He has amassed quite a collection of equipment in recent months, and if this needed quantifying, one could say he carries about a "large boot-full".

His instrument of choice is a 200mm Meade LX-90 Schmidt Cassegrain reflector on a computerised English Fork alt-azimuth mount.

He has recently been leaving his eyepieces in the boot of the car, and has instead been attaching his Canon EOS 60D DSLR camera at both prime-focus and to the fitted piggyback mount. Roger is taking an evergrowing collection of superb planetary and deep sky astro photographs and hopes to be able to polar align his scope soon to go even deeper.

### Secretary's Column Re-branding M.A.S.

Roger Powell

Societies like ours need to move with the times - but we all tend to like doing things the same way we always have. Sometimes we just need to be nudged along slowly because when change is pushed too hard it will always encounter resistance. If the right person is nudging us along, then the way the Society operates can slowly change for the better.

In 2008, the committee decided the Society needed a bit of a facelift. It began by running a competition to choose a new MAS logo to replace the old "Starry Ram and Telescope" logo that had served the Society so well during the formative years of it's existence. A number of members submitted their designs and the winning entry by Chris Malikoff was adopted. Since then you have seen it on all our documentation; on our mugs, shirts and other merchandise; and it and will undoubtedly remain our main logo for many years.

A few months after that, Chris developed a new and very professional looking MAS website, which is the envy of many other societies and has now received over 125,000 hits. The fact that our Society then started to increase in membership cannot be dismissed as a coincidence.

Earlier this year, the committee decided to "brand" our general meetings as the "Macarthur Astronomy Forum" and Chris came up with a great new logo for that. Following this, Chris took over as Editor of "Prime Focus" magazine and whilst few people were surprised that he gave our journal a complete new look, many were just flabbergasted at the quality!

Finally, at our last committee meeting, we made another decision, this time to run MAS public events under the "Magnitude" brand name that has been used in the past to publicise our DVDs and our 2010 photographic exhibition at the Campbelltown Arts Centre. Needless to say Chris came up with a third logo which will be used in any future public outreach publicity. You can see it on the website, along with the other two logos.

So, with many thanks to Chris, we now have a great range of assets (website, journal, merchandise, Astronomy Forum and public events) with their own complimentary promotional designs which will be used to promote MAS for a long time to come. As I said at the top of this column, with the right person nudging us to adopt improvements, we can move to a new level. Chris has done that quietly, without pressing for big changes and he has certainly stamped his professional experience on MAS. As a result, MAS now has a very professional public face. All this has come at just the right time, because the Society is now facing increased costs next year for the UWS meeting room and The Forest cabin hire. The Committee hopes that our "branding" of events and our professional public image will eventually lead to advertising income to cover these costs.

As well as looking outwards, we need to look at our internal activities and see what other updating needs to be carried out. The committee is conscious that one of the primary aims of the Society is to encourage the improved use of astronomical telescopes amongst it's members (and indeed amongst the public). This is a vital activity for us and we are now also having a look at the "Section Leader" activities to see how that can be improved.

In the meantime, any member with questions on how to use their equipment should never hesitate to ask other members or raise an issue on the Website Forum. We have a number of very experienced and talented amateur astronomers in the Society and I think it is fair to say that every one of them enjoys helping newer members get acquainted with their telescopes.

The committee is particularly looking at the option of running telescope *workshops* at either Stargard or The Forest, prior to sunset. What do you think?

Society Schedule

July 2011 18/07/2011 Macarthur Astro Forum 23/07/2011 Stargard 29-30/07/2011 The Forest

August 2011

15/08/2011 Macarthur Astro Forum 20/08/2011 The Forest - Students 26-27/08/2011 The Forest

4AIC2011 Astrophotography school

Tony Law

What a weekend!

MAS was very well represented at the conference, in fact probably the biggest contingent from any individual society, though delegates came from all over the country. Chris Malikoff, Humayun Qureshi and I drove up and Carol McVeigh and Deb Taylor flew – the boys won, arriving an hour ahead!

When we convened on Friday morning there were one hundred delegates in total, presentations started at 8.30am and continued until 5.00pm with half our breaks mid morning and afternoon and an hour for lunch. Major sponsors were FLI (Finger Lakes Instruments), ably supported by Griffith University, Sirius Observatories, Bintel, AS&T, Sirius Optics, Star Optics and Star Tools.

The Keynote speaker was David Malin, and he spent a lot of time with us during the whole three days of the conference (Chris will possibly be building his website!). His talk "*Microscope to the Telescope: The Journey of a Lifetime*" told of his personal route to astro imaging.

Two of America's foremost experts in imaging, Ken Crawford and Rogelio Andreo, gave very detailed talks on



processing images - Ken using CCDStack and Adobe Photoshop, and Rogelio preferring Pleiades Astrophoto's "PixInsight".



All of the speakers gave excellent presentations with something for astro-imagers at all levels of experience. Everyone was very approachable and open to discussion I would encourage all members interested in imaging to attend the next conference, slated for 2013 – most likely in NSW or Vic, but that is wide open at the moment.





As a complete novice to imaging, the whole conference was a very steep learning curve – with much more to come! I am going to try Star Tools, developed locally by Ivo Jaeger, which looks to be a very user friendly starter for those new to the 'art'. Will let you know via Prime Focus how I go!

At the end of the conference David Malin stepped in to the breach as Anthony Wesley had flight problems and could not be there. He talked about the colours of stars, always an excellent and entertaining speaker.



As the Conference drew to a close several prizes, donated by the sponsors, were drawn by lots and we were very lucky, Deb Taylor won a voucher (\$400.00) covering her fees for the next conference, and I won an Orion StarShoot Autoguider (\$499.00)!! What a great end to a fantastic Conference.

Chris was responsible for the AAIC logo and putting together the Conference Handbook and website (www.aaic2011.com). He took a lot of photos and a

few are attached to these comments.

Clear Skies...

Tony Law

PS - the boys lost the race back!





#### Shedding Some Light

Davy Jones

Before moving into the scientific complexities of the 20<sup>th</sup> century, it is worth consolidating the synoptic view created over the past few articles. I began this series by asking: 'What is Energy'; and continued with an examination of the early growth of human scientific thought. It became apparent that certain human traits and conditions stymied human logic and the development of scientific reflection. Identified amongst these traits and conditions were religion and spiritual fantasy, economics, politics, cultural needs or desires, and fluctuating levels of human curiosity; not to mention professional envy.

Our primary interest is astronomy and cosmology, so I don't intend to stray too far down a philosophical or psychological path. However, to achieve the objective of

understanding s c i e n t i fi c development, we should be

cognizant of human needs. 'Maslow's Hierarchy of Needs' plays a large part in o u r in t ell e c t u a l development. Without going too deeply into this phenomenon, suffice to say, Maslow maintained

that without a full belly, and the basic needs of life, humans tend not to be too concerned with deeply intellectual or academic matters. One can imagine many periods of human history where the sole concern was basic survival – not scientific advancement.

Another aspect worth considering is the difference between 'scientific development' and 'technological development' – two distinctly differing fields of human enterprise. The Egyptians, for example, were without doubt technologically advanced. However, they weren't necessarily scientifically astute! Quite simply; they made many items that made life easier, without necessarily understanding the scientific principles that underpinned them. Much the same could be said today – many of us drive technologically advanced vehicles – few understand what makes them work!

One other point worth consideration; in earlier times, it had been possible, if one were among a privileged few, to 'know all there was to know'. The sum of

human knowledge was such that, without modern day distractions, a person could study to 'understand everything'. The last statement must be taken cautiously; but reflects how little was understood scientifically. As the Enlightenment progressed into the Industrial Revolution, science and physics started to get serious. Pandora's Box inched to open. Scientists began to specialise in their own areas of interest. The world was still a large place at the end of the 19<sup>th</sup> century, with poor infrastructures. Nevertheless, progress was made and information started to be collated.

By this time, the three classical states of matter, liquid, solids and gas had been investigated seriously. This would lead to study into non-classical states – glass and crystal etc. With the coming of quantum physics, the field would widen again into low temperature states, high-energy states, very-high energy states and ever onward into other proposed states. Hypothesis built on hypothesis as theories were proven or disproved; perfect unadulterated science thrived. The First and Second World Wars

> would drive further discoveries – some more welcome than others. Year by year, scientists presented the human race with a growing array of deepening mysteries; mysteries that would stretch ordinary mortal mental capacities beyond normal limits. Some of these discoveries have led us to rethink reality itself. Take the

following examples; I take the liberty of assuming most readers are aware of the properties of an atom in general terms:

If one accepts the world human population now to be 6,000,000,000 ( $6x10^9$ ) – and the number of atoms in the human body on average to be 7,000,000,000,000,000,000,000,000 ( $7x10^{27}$ ) then the whole human race comprises:  $6x10^9 x$  $7x10^{27} = 4.2 \times 10^{37}$  atoms. Now strip away the outer layers of those atoms, leaving only their nuclei – <u>matter</u>. The space required to 'store' the whole human race is now reduced to something akin to the volume of a sugar lump.

Or conversely: the density of a neutron star – about 20km in diameter - is such that one teaspoon of its substance has a mass of about 100 million tons, which is about as much weight as a good-sized mountain. The consequential force of gravity, so powerful, that if an object were to fall from just one metre high it would hit the surface of the star at around 2,000 kms per second, or 4.3 million mph.

The less one knows about the universe, the easier it is to explain... Leon Brunschvieg, 1869-1944 These statements are tricky for people to comprehend, because they lay outside the confines of 'common sense'; but remember, 'common sense' was once a reason for accepting the geocentric model of the universe!

Today, there are still those who support the notion of a flat earth. Religion and superstition still retain an iron grip on the human psyche. Economics often restricts funding for scientific research, and professional jealousy still gets in the way of progress. Increasingly, politics in this modern age has an unfortunate habit of creating misleading 'scientific facts' for purely political ends. In spite of these negatives, whilst it may have slowed, genuine scientific knowledge continues to develop apace.

Having indulged in a little consolidation, we can now examine some of the specific areas of scientific development concerning the nature of the universe. As we have seen scientific arguments and debates have raged throughout history. That is the essential strength of science - one must always question the results. Darwin's Theory - may be termed 'only a theory' - but since first proposed, all subsequent evidence has only supported the 'theory'. Nothing has cast serious doubt upon Darwin's empirical evidence and ensuing conclusions. Conversely, the scientific debate that raged for years over the existence of cosmic ether as the medium by which light moved through the universe, was eventually lost; in spite of assertions - there 'must be something' in which light could travel. Common sense again!

Since the Ancient Greeks, it was speculated that light had a finite speed. Our old champion, Galileo, actually carried out some crude research attempting to establish the speed of light. Some seventy years later, the Danish astronomer, Ole Roemer estimated the speed of light at about 220,000 km/s – nearly 26% lower than its correct value. It wasn't until 1849, that Armand-Hippolyte-Louis Fizeau (1819-1896) made a reasonably successful attempt to establish the actual speed of light. In coming years, eminent scientists from Leon Foucault to Mittelstaedt through to Bergstrand, in 1951, struggled to achieve a correct result.

The American, Albert Abraham Michelson (1852-1931), typified the calibre of those whose efforts would lead to an accurate assessment of the speed of light. Michelson is particularly interesting because his greatest claim to fame was a failed experiment, which lasted an agonising seven years. Michelson initially set out to prove the existence of the enigmatic substance - 'ether'. Finally - he proved beyond doubt that ether didn't exist. (See Michelson-Morley experiment) Incidentally, in 1880 - Michelson estimated the speed of light to be: 2990,910 km/s. Although incorrect, it was however a respectable estimate. In 1921-22, Michelson, in association with Francis Pease, became the first to measure the diameter of a star, other than the Sun. Using an 'astronomical interferometer' at the Mt Wilson

Observatory, they successfully measured the supergiant star – Betelgeuse.

In 1905, Albert Einstein demonstrated that the velocity of light was an essential constant - and in fact the definitive speed for any object. ln 1951, using a Kerr Cell shutter, an instrument previously used as early as 1875, Erik Bergstrand put the speed of light at 299,793.1 km/s - an error of just 0.3. Accumulated knowledge and advances in technology were finally closing the gap on the elusive ancient speculation. In the second half of the 20th century, methods such as cavity resonance techniques, and later laser interferometer techniques ensured increasingly accurate measurements of the speed of light. In 1983, the metre was redefined to increase the accuracy of various methods of measurement the current definition now reads: "the metre is the length of the path travelled by light in a vacuum during a time interval of 1/299 792 458 of a second.' As a consequence of this reclassification the value of the speed of light in a vacuum is now given as 299,792,458 m/s by the International System of Units (SI). Finally - it is worth remembering, when we talk of the 'speed of light' - we are in fact referring to the 'speed of electromagnetic radiation'. What we call, visible light is only a small part of that greater electromagnetic spectrum.

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## Hunting For Messiers

lan Cook

Those intrepid observers, who hunt for Charles Messier's 110 objects, understand too well that Sydney's latitude of 33 degrees south means that some Messiers are twice as hard for us to find because of their far north latitude and the amount of atmosphere we have to hunt through. Moreover, about ten objects are impossible to sight from here, so we can only ever hope to find 100 of the original unless we travel to North Queensland.

Hartung in his book "Objects for Southern Telescopes" gives an 86-object extension to Messer's list, many of them naked eye. Now it would be legitimate to take ten of the easiest sights and substitute them for the ten original Messiers', but that would be just too easy.

At great cost of time and labour a genuine ten substitutes have been assembled from Hartung, and

presented here for your enjoyment and challenge. Wherever possible the objects are identical in type, magnitude and size. They are also identically located in reverse declination. This means that if the original object is at +63 degrees, then the substitute is at – 63 degrees, giving us an appropriate equality with our northern colleagues.

Henceforth these objects could be known as "MSM" – *MAS Substitute Messier* with the same Messier Number

	NGC #	Туре	Constellation	RA	DEC	Size '	Mag	Dist	Name	
MSM 40	Hj 4524	Dbl Star	Crux	12 28.1	-60 02		8.0/9.9	sep 30"	54' from epsilon	
MSM 52	6025	OC	Tri Aust	16.03.7	-60.30	12	6.0	800 pc		
MSM 76	3918	Pneb	Centaurus	11.50.3	-57.11	12"	8.1	<mark>80</mark> 0 pc	Blue Planetary	
MSM 81	5128	Galaxy	Centaurus	13.25.5	-43.01	18*14	6.8	3.5 mpc	Centaurus A	
MSM 82	6744	Galaxy	Pavo	19.09.8	-63.51	16*10	8.4	8 mpc		
MSM 97	3132	Pneb	Vela	10.07.7	-40.26	45"	9.2	800 pc	Eight Burst Nebula	
MSM 101	300	Galaxy	Sculptor	00.54.9	-37.41	20*15	8.1	2 mpc		
MSM 102	1549	Galaxy	Dorado	04.15.7	-55.36	4*3	9.9	12 mpc		
MSM 103	4103	OC	Crux	12.06.7	-61.15	7	7.4	1.9 kpc		
MSM 108	1365	Galaxy	Fornax	03.33.6	-36.08	10*6	9.5	11 mpc		
MSM 109	1398	Galaxy	Fornax	03.38.9	-26.20	7*5	9.5	17 mpc		
	One more for good measure									
	1316	Galaxy	Fornax	03.22.7	-37.12	7*6	8.3	17 mpc	Fornax A	



Winter is a great time of year for amateur astronomers. The air is cold and crisp, and seeing conditions are generally better as the ground radiates less stored heat during the night. Darkness falls earlier in the evening - meaning that our "bang for buck" is better during the time of year where days are shorter and nights longer.

Conditions for us have generally been terrible for the past year of so. Weather has conspired against us on most organised occasions, leaving us precious little time to get our there and either view the skies or photograph them.

For the few photographers we have in the society, it is particularly difficult when the weather rolls in shortly after dark. Equipment setup times can be very lengthy in comparison to what visual observers must go through particularly when a "proper" polar alignment procedure may take the best part of an hour or two. This eats into the night, leaving the rest of the night to get down and do what we do *if* the weather holds.

One way to beat the polar alignment blues is to take short focal length photographs of very wide fields with a piggy-backed camera and lens instead of a telescope at prime focus. These photo sessions are far less critical on the accuracy of your alignment as the Earth has to rotate in relatively large amounts before star trailing becomes overly evident in the photograph.

If you do manage to polar align, and still wish to take widefield images, then these become even better. This image of the Milky Way was taken on the 25th of June with a Canon EOS 5D-Mark II and 17-40mm F/4L lens wide open at F/4 for 600 seconds (ten minutes).

(The Milky Way - by Chris Malikoff

### An Ares Christmas

#### A short story by Robert Bee

The inaugural Christmas Day was shaping to be an unmitigated disaster. The mistletoe, imported at energy-consuming expense, hung wilting beneath the mess hall lintel, doomed never to bless a stolen kiss. The festive tree, crafted from beaten aluminium foil, glowed an unholy and unseasonal purple, and the turkey, freshly defrosted and richly marinated, was a masterpiece of cordon black at the bottom of a smoking baking dish.

After all the organisation, project management, mega-budget expense and sheer gutsy determination to be where they were at all, the impending inevitable failure of a simple birthday celebration was absolutely

galling.

"Cheer up Peter, it's not that bad." Valerie Sharpe, the project's Medical Officer, tried her professional best to soothe the team leader's mounting depression, while desperately fighting back a case of the giggles.

"Isn't it?" Peter Davids turned from the fluorescing tree, tendrils of corona crackling from the wings of the tinselled angel perched on its apex. "My people are as far from home as one can hope to be. The very least I can do as their leader is give them a sense of Christmas. It will anchor them to their origins, make home...and family...closer." He cast a despairing look at the turkey ashes. "And it's a nightmare."

"Peter, it's not as if most of the team hold your same sentiment for Christmas." Sharpe tentatively reached a hand out towards the tree, but the eerie rising of the down on her arm doused her curiosity. "Face it. They are all scientists. I'm sure they won't be as disappointed as you fear." The M.O. ticked off her still tingling fingers. "Boole is a mathematician who published a book called 'The Statistical Improbability of God'. Our biologist Verrier is Vice President of the Communist League Francaise. Smirnoff is... Smirnoff and never let's us forget it, and I'm, at best, an agnostic on a good day. The other three Areologists are so absorbed in their experiments I doubt they know what month it is, let alone what day." She tried a confident smile. "I really doubt that the birthday of baby Jesus will rate highly on their personal priorities."

Peter Davids turned to gaze out the triple thickness glass of the accommodation module, past the nuclear power plant, the laboratory, the air scrubber unit and the communications pod with its five metre dish aimed at an invisible point in the pink sky. "Davids' Town" one of them...he thought it was Smirnoff...had dubbed it on its completion Lord only knew how many months ago.

The barren red rock strewn landscape that spread for kilometres to the horizon...a horizon dominated by the monster volcano which was incredibly two hundred kilometers over that horizon...had never seemed so alien as at that very moment. He thought about his team and his abortive attempts to give them a Christmas they probably didn't want.

Suddenly he felt alone. Perhaps, he mused ironically, life on Mars was finally getting to him.

It was a nameless barn sized chunk of dirty snow, hurtling erratically from between Saturn and Jupiter like a hapless pinball bouncing off invisible cushions. Smirnoff saw it first, to no-one's surprise, and commented on how it appeared to approach and then hang motionless over the colony. "But then", he added bluntly, "that won't last. At 60,000 kilometres

"You think so, do you?"

per hour, it'll soon be gone towards Earth to be named Comet Blah Blah by some lucky astronomer."

With nothing better to do that night, the protein concentrates that substituted for the cremated turkey making a poor dinner to linger over, all eight donned their suits and ventured into the sub-zero temperature and cruelly thin atmosphere to watch the star shining over Davids' City.

And so it snowed that Christmas eve, and eight worldly, lonely scientists watched in awed silence.

Inevitably, scientific curiosity stirred the group and Verrier led the rush to fetch containers to capture comet samples for future testing. History would be made this day. Valerie Sharpe and Peter Davids were the last to move, reluctant to turn away from the white blanket slowly settling on the ground like icing

sugar over a cake.



"Don't get too carried away with the symbolism, Peter", Valerie warned as they headed for the laboratory module. "Remember what I said earlier about your team members' indifference to Christmas."

But Peter's mind was too far away to hear or heed.

It was a busy morning collecting

But Smirnoff was wrong. As they watched in astonishment, the comet blazed brighter and brighter, casting eerie shadows amongst the complex of buildings, and they were all suddenly afraid. While they silently contemplated the option, and then futility, of trying to run for shelter, the comet plummeted into Mars' thin but effective upper atmosphere, boiling off as it went until, finally, it was a comet no more.

Valerie Sharpe sobbed quietly in relief as the twenty kilometer wide cloud from the melted comet rained down on them. Literally. But as the comet's atomised debris approached the barren ground, the sub-zero temperature snap froze the water vapour into bizarre icy flakes, a reincarnation of its original muddy crud.

comet snow and a tired but happy team fell gratefully into their beds as the Sun rose on Christmas Day over Olympus Mons.

Peter was the last to retire. Preparing for bed, he smiled in the dark as he suddenly remembered Valerie's words of warning. But his smile, if anyone could have seen it, was tempered with a frown of concern. His leadership was about to be sorely tested. Did he dare drink the concoction that Smirnoff had left with the dehydrated carrot on the mess table, and what on Mars was he going to put in those seven socks he'd found hanging over the space heater?



### Far side of the Sun

STEREO sees the complete far side

The STEREO spacecraft reached opposition (180° separation) on February 6 but part of the sun was in a c c e s i b l e to the ir combined view until June 1. This image represents the first day when the entire far side could be seen. The far side unveiled! This is the first complete image of the solar far side, the half of the sun invisible from Earth. Captured on June 1, 2011, the composite image was assembled from NASA's two Solar TErrestrial RElations Observatory (STEREO) spacecraft. STEREO-Ahead's data is shown on the left half of image and STEREO-Behind's data on the right.

The image is aligned so that solar north is directly up. The seam between the two images is inclined because the plane of Earth's -and STEREO's -- orbit, known as the "ecliptic", is inclined with respect to the sun's axis of rotation. The data was collected by STEREO's Extreme Ultraviolet Imagers in the SECCHI instrument suites.

STEREO was built and is operated for NASA by the Applied Physical Laboratory of the Johns Hopkins University; the spacecraft were launched on October 25, 2006 aboard a Delta II. The SECCHI instrument suite is a collaboration led by the Naval Research Laboratory, and the EUVI instruments were built by the Lockheed Martin Solar and Astrophysics Laboratory.

**Credit:** NASA Goddard Space Flight Center

# A Night of Exploration

Bob Bee

A Night of Exploration in Ara the Altar

Unable to attend the MAS night at Stargard on Saturday 25th June, I set up my scope in my Mt Annan backyard on the Friday before. Not as good a sky, to be sure, hindered by fresh street light globes (how many watts do they put in those things?) but still moonless and relatively dark sheltered behind my garage wall.

What to observe? Try something different, my muse said. Question: What's up there I haven't looked deeply into before? Answer: Lots! Solution: Let's start with the letter 'A'. So Ara was it.

I did some quick research and found there were eight NGC (and IC) objects in Ara that should be

NGC	Туре	Mag.	Dia (')	RA	Dec
6397	GC	5.7	26	17h 41.64m	-53° 40.32'
6193	OC	5.2	15	16h 42.16m	-48° 47.29'
6352	GC	5.9	8	17h 26.37m	-48° 25.57
IC4651	OC	6.9	12	17h 25.59m	-49° 57.58'
6200	OC	7.4	12	16h 54.05m	-47° 30.24'
6208	OC	7.2	16	16h 50.42m	-53° 50.15'
6204	OC	8.2	5	16h 47.35m	-47° 02.20'
6250	OC	5.9	8	16h 58.84m	-45° 49.02

within reach of my 235mm SCT. (I suspect there are more but these are the ones I came up with quickly.

You notice that for NGC6204, with its magnitude and apparent diameter, I was showing extreme optimism to include it in my list, but hey, one has to think big (or in this case, small).



The location of these objects in the constellation Ara are shown in this chart to the left. <<



That night I was using my trusty Celestron 235mm SCT on the Losmandy equatorial mount. It was faithful as ever, helping me star hop (eventually) to each object but, ironically, I was to regret my choice of telescope much later in the night.

Hopefully the following account of my observations will be useful, or at least interesting, to you. It may provide some encouragement to our newer members still finding their way around the sky and aching to try out their new telescopes. You may wish to try your hand at capturing these objects yourself. If all else fails with your manual hopping, you can resort to your GoTo from the NGC numbers or RAs and Decs provided above.

I started with the easy one, NGC6397. This is one of my favourite globular clusters, having a certain sentimental value. Back in the early days of MAS when I had only binoculars, we were at a dark site at Wilton and I was exploring the sky with my binocs. I chanced to spy this smudge of light and it caught my curiosity. I asked one of the telescoped members to point his instrument in the direction of my object and find the RA and dec (approximately) in that part of sky. We then looked at a chart to identify the constellation with those coordinates (Hey - we were all learning from scratch back then), looked at the chart closely and discovered there was a globular cluster there -NGC6397. The discovery process appealed to me and I remember NGC6397 ever since.

On Friday, having found it again in my binoculars (hello old friend) just 2° off the midway point of the  $\alpha$  –  $\beta$  line, I was able to take my scope's finder scope to it quickly (a faint circular smudge of light) and then enjoy the glob in the higher mag of the eyepiece. In the 40mm (x59) eyepiece, it looked like a classic glob but with no discernible central concentration. Using my 16mm (x147) eyepiece, more stars were resolved but still with no discernible central concentration but the impression of radial strings of stars. Pretty!

I then concentrated on the area around  $\boldsymbol{\alpha}$  Arae to locate IC4651. It conveniently lies just 1.1° beyond  $\alpha$ Arae opposite  $\theta$  Arae and about 9' to the right. That's the theory. I was expecting it to be a bit more obvious, but then at mag. 6.9 spread over 12' dia, that was a bit hopeful. Knowing where it should be helped. I soon realised that very faint smudge of light in my finder was it. Averted vision helped my confidence. Locking the mount, I switched view to the main eyepiece at low (x59) mag. It revealed a very delicate, evenly spread sprinkling of stars, with some reds visible amongst them. While not gob-smacking, it was very pretty in a delicate sense. I certainly wouldn't want to use any higher magnification as it would lose the 'cluster' perspective. Here's how the two roughly looked to me.





Moving on...

Another globular cluster, NGC 6352. While of similar magnitude to 6397, it is less than one third its apparent diameter. If I was expecting this to be easy, it wasn't! But that's the fun of it (I kept telling myself). It should have been relatively easy, so close  $(1.5^{\circ})$  to  $\alpha$  Arae, but it led me a merry chase, mostly because my chart gave so few distinctive guide stars in that area. My main problem, I realised in hindsight, was that I was expecting it to look like a glob. Big mistake! Eventually, having twigged to the fact it formed a nice right angle triangle with IC4651 and  $\alpha$  Arae I was able to judge its location in my finder scope and lock onto it. I checked the main eyepiece at x59. Where was it? I tracked about a tad, getting more frustrated by the minute.

Then... aha... gotcha! It was an extremely faint smudge of light – exactly where I had first estimated it to be. But was it a glob? Under x147, it gave a suggestion of some central concentration, but not much. Yes, it was of very small diameter. Once I grew used to watching it for a while, particularly with averted vision, its 'globular' character came a bit more obvious. Faint sensation of satisfaction – nailed it!

Then came NGC6208 - another one that should have been 'easy' to locate but wasn't, again because of the diffuseness of its nature. The star hopping should have been simple. Follow the line from  $\alpha$  to  $\epsilon 1$ and past  $\epsilon 1$  by 1.75° and you land right on 6208. Simple. My only problem was by this time of night, Ara had moved to nearly overhead, almost in my zenith. I was losing control of the tracking of my equatorial, with the scope almost pointing vertically. This involved me crouching below a very lowly positioned finder scope - a very uncomfortable position for the information of those who have never tried it. So many times I identified the spot in my finder scope (there was NO WAY it could actually be seen in the finder scope), but on attempting to reach around the equatorial mount and lock the clutches, the scope would drift off target. Maintaining the tracking along the  $\alpha - \epsilon$  line with the wobbling scope was guite difficult. Eventually I was able lock on target (with the help of a nearby triangular asterism) and

checked the main eye piece. What I saw in the image below right is pretty much as I saw it. The cluster was so sparse I couldn't be sure it was the target cluster. However, by the usual trick of tracking away from the object in all directions and seeing the density of stars lessen, I was able to be confident I had found NGC6208. Rapturous satisfaction! Aching cramps!



By this stage the experience I'd had with my SCT pointing up to zenith discouraged me from attempting to locate the remaining four objects. At least for that night. I could have set up my 250mm Dob which is more forgiving for zenith observing, but finally decided – I've had enough fun for one night. Time to go back into a warm house and watch the tennis. The remaining four NGCs in Ara can wait until a later month when they are not so high.

## The flames of Betelgeuse

Spectacular nebulosity around a very large star...

This recent picture of the dramatic nebula around the bright red supergiant star Betelgeuse was created from images taken with the VISIR infrared camera on ESO's Very Large Telescope (VLT). This structure, resembling flames emanating from the star, forms because the behemoth is shedding its material into space. The earlier NACO observations of the plumes are reproduced in the central disc. The small red circle in the middle has a diameter about four and half times that of the Earth's orbit and represents the location of Betelgeuse's visible surface. The black disc corresponds to a very bright part of the image that was masked to allow the fainter nebula to be seen.





# Members Observing Nights

Make sure you remember to bring your woolies...!

On observing nights, at any venue, you must arrange your own transport and please try to arrive well before sunset, to enable you to familiarise yourself with the surroundings before darkness sets in. If arriving later, make sure that your approach to the final gate is only with parking lights and ask someone to guide you into the observing area from the gate. It is essential - for your own safety and that of others - that you bring a red torch with you to observing nights. If weather conditions look doubtful, please check the website "What's On" page before leaving home. If Stargard is cancelled, sometimes an unscheduled observing night will be held later that week.

During the course of the evening, please consider the needs of others around you, especially when using laser pointers, camera screens, computer monitors, car boot lights etc. Please read our Field Etiquette page on our website for reference.

Stargard nights are free to members and invited guests. Please contact the President before inviting anyone. Beginners are encouraged to observe at Stargard before progressing to the Forest.

To cover our costs, the charge for The Forest is \$8.00 per member per evening, whether attending just for the evening or staying all night. Experienced amateur astronomers who are non-members may be invited to attend the Forest subject to prior clearance from the President and will be charged \$12.00 per person per evening. Please see Ned Pastor on your arrival to make your payment and try to have the exact amount. Limited sleeping accommodation is available but not guaranteed. 240vAC field power is available.





Mercury's surface in exaggerated colour

**Explanation:** The robotic MESSENGER spacecraft recently completed over 100 orbits of Mercury. MESSENGER's cameras have recorded detailed pictures utilising eight different colours across visible and near infrared light, exploring the surface composition and looking for clues to the history and evolution of the solar system's innermost planet. This sharp image combines three of the MESSENGER wide angle camera's colours, but in exaggerated fashion. Otherwise, to the unaided human eye, Mercury's surface colours would appear comparatively muted. The image is about 1,000 kilometers across and features as small as a single kilometer are discernible at the original resolution.



#### Credit: NASA/JHU APL/CIW, June 16 2011



Targeted colour imaging – Degas crater

This spectacular view of the crater Degas was obtained as a high-resolution targeted observation (90 m/pixel). Impact melt coats its floor, and as the melt cooled and shrank, it formed the cracks observed across the crater. For context, Mariner 10's view of Degas is shown at left. Degas is 52 km in diameter and is centered at 37.1° N, 232.8° E.

Image Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie Institution of Washington

#### Parkes & Hawaii Trips

It's travellin' time...

A weekend trip has been proposed to visit the famous CSIRO Parkes Radio Telescope. This will be a weekend trip in October, leaving on Friday and returning on Sunday, but only if we see enough members registering an interest. It coincides with the Observatory's Open Day, which is held every two years, and gives us all the only opportunity to see what really goes on behind the scenes.

During the trip, we will also be making time to visit the Dubbo Observatory. Please let Tony Law know immediately if you wish to register your interest.





We are also proposing a trip to Hawaii to see the telescopes at Mauna Kea. This would probably take place in 2012 or 2013 if enough members are interested. Please register your interest with our Treasurer, Tony Law. We are looking into the logistics involved in setting up a savings plan system whereby you could deposit small weekly funds into a traceable joint MAS account to spread out the cost.



![](_page_22_Picture_0.jpeg)

(The Sun - by Lloyd Wright

![](_page_23_Picture_1.jpeg)

![](_page_23_Picture_2.jpeg)

macarthu astronom

Abstract: Since the first extrasolar planets were definitively discovered 15 years ago, we've answered many questions about how common planets are and what kind of planetary systems are out there. There are many gaps in our knowledge, like where and how planets form before they start their migration processes, and how a planet affects its parent star as it is engulfed at the end of its life.

I will describe my attempts to answer some of these questions by detecting the faint glow of newly-formed exoplanets using the world's largest telescopes, as well as a new project to detect planets around giant stars with 12-16 inch telescopes and new optical technology.

![](_page_24_Picture_0.jpeg)

Right time, right place.... dawn in Surfer's Paradise at the AAIC2011 Astrophotography Conference