

PRIME FOCUS

M A S S O C I E T Y J O U R N A L

mas
macarthur
astronomical
society

Oct 2012

volume 17 issue 10

Artist's impression of a colliding wind binary.
Image Credit: NASA/C. Reed

from the editor's desk

Welcome to the October 2012 edition of Prime Focus - volume 17, edition 10.

Prime Focus is the Society's monthly electronic journal, containing information about Society affairs and on the subjects of astronomy and space exploration from both members and external contributors.

Both "print" (large high-quality PDF) and "screen" (small low-quality PDF) electronic versions of this October edition are now available at the "*Members/Prime Focus/2012*" menu link on our website at:

<http://www.macaastro.org.au> for members to download at their leisure.

Other astronomical societies, as well as industry-related vendors, may request a copy of this edition of Prime Focus in electronic form by sending an email to secretary@macaastro.org.au. File sizes can reach 35Mb+.

Please enjoy this October edition - our tenth, and final, for the year 2012.

Clear Skies!
Chris Malikoff

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M.A.S. Hysteria!!!

Hello Members

At this month's Forum we're delighted to host Dr. Simon O'Toole, Deputy Gemini Scientist currently stationed at the A.A.O. as an adjunct to the Australian Gemini Office. He is a member of the Kepler Asteroseismic Science Consortium. This group uses data taken by the Kepler spacecraft to investigate the interiors of stars using a technique known as asteroseismology. I look forward to introducing him to our Forum.

This is a busy period for MAS. On the 18th of October, a Thursday evening, we will be co-hosting thirty year eleven students from three local high schools at the Bunnings store in Narellan. Divided into two groups, each will cycle through both an indoor and an outdoor session which are designed to impart a little information on what amateur astronomy is all about. We intend to tell them what is involved in picking up a telescope and using it to explore our night sky. Hopefully this will catch on and we'll run more of these with Bunnings in the future - maybe even once a quarter. Bunnings are very, very excited by this, and are very keen to extend their current level of involvement in our local community even more. I think that this is going to be a great success. If you've committed to coming along and lending a hand, please do. Dinner is supplied by Bunnings.

We have another public night at Dudley Chesham Sportsground at the Oaks this coming Saturday. I know how close these two events are, but please make the extra effort and come along. These are always fun nights.

MAS were in the paper this week. I don't think that I'm wrong in thinking that this may be a first. We made the front page. Our Dharawal Observatory project is starting to gain real momentum, and the Editor at the Macarthur Advertiser, Jeff McGill has put together a great amount of editorial dedicated to astronomy in our area and in particular our proposal to open a facility at the old North Cliff Colliery. Mr. McGill intends to run more articles over the next three weeks as well. If this doesn't put our case forward, nothing will. We must thank the Macarthur Advertiser, and Jeff in particular, for their very strong support.

Sadly, this will be the last edition of Prime Focus in this format. Regrettably, my work schedule has increased to the point where if I don't trim a few things from my schedule, I'll have no personal time whatsoever. A recent resurgence in my street photography has shown me that I can actually get out and have some time to myself, so this is what I've chosen to do. I actually find that I'm enjoying fashion and stage photography as well. I hope that someone else takes over the reins, but that would be a difficult and very time-consuming task for them. They'll need a Macintosh for one thing, otherwise the current layouts would need to be scrapped and the whole thing started again. I'm investigating a new website blogging system that may take over part of the content, and the rest may yet appear in either a bi-annual or third-yearly version in printed form. I can't see that happening yet, but we'll see what transpires.

I'd dearly like to thank my regular contributors, and especially Bob Bee, Davy Jones and Roger Powell for making my tenure as editor a real pleasure.

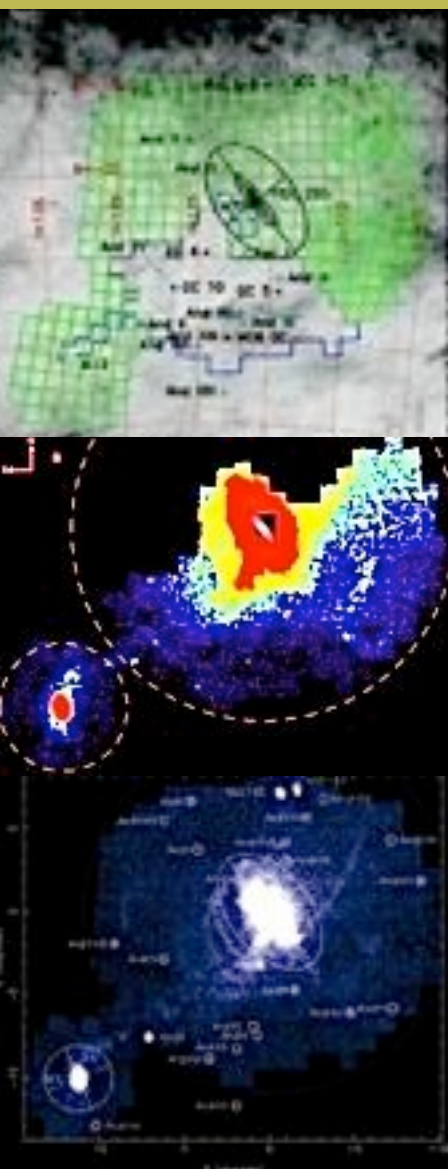
Clearest of skies!

Chris

DATE	EVENT	SUMMARY	TIMES
15th October	Macarthur Astronomy Forum	Guest speaker Dr. S. O'Toole - UWS Bldg 21, Rm 6	7:30pm
18th October (Thur)	Bunnings Narellan - Student Night	The first of a series of high school student nights hosted by Bunnings & MAS	MS 22:25 SS 19:13
20 th October	Public Night - The Oaks	Dudley Chesham Sportsground	
10th November	Wedderburn Airfield	Dinner, and a night showing members of the NSW Sport Aero Club the heavens	MS 15:27 SS 19:34

SEPTEMBER 2012
Prof. Geraint Lewis

BY ROGER POWELL



"*Andromeda and the 30 Dwarfs*" was the title of Professor Geraint Lewis's September talk to Macarthur Astronomical Society.

This was a talk about cosmological archaeology at the galactic scale– the subjects being our neighbouring Andromeda galaxy (Messier 31) and the nearby Triangulum galaxy, (Messier 33).

Geraint is a collaborator in the Pan-Andromeda Archaeological Survey, PAndAS, carried out at the Canada-France-Hawaii Telescope, which is examining the structure and content of the regions surrounding M31 and M33 in unprecedented detail. The survey is still proceeding.

Image 1: The beautiful M31 galaxy we see in most published images forms just a tiny part of the surveyed area, as shown in Image 1 and hidden within the vast segments of sky explored by PAndAS surrounding M31 and M33 lie remnants of their evolution.

The complete PAndAS survey area is expected to cover 350 square degrees of sky, covering the halo of the Andromeda galaxy out to a maximum projected diameter of nearly 1,000,000 light years and the halo of the smaller M33 (Triangulum) out to a maximum projected radius of 50 kpc.

Image 2: Image 2 shows the outer suburbs of the Andromeda and Triangulum galaxies, as published in 'Nature'. They are located more than 2,500,000 light years away from us, and the dashed lines mark circles around Andromeda and Triangulum with diameters equivalent to approximately 900,000 light years and 300,000 light years, respectively.

The enhanced image shows faint structures that are the fossils from the formation of M31 and from subsequent encounters with other galaxies.

Many of these relics are recent discoveries by PandAS, and include various streams of stars, very small ("dwarf") galaxies, and a distortion around the disk of Triangulum which is evidence that it is strongly interacting with its more massive neighbour, M31. Pictures of the disks of these galaxies, as they normally appear, are overlaid at their positions, and an image of the full moon is included (top left) for scale. The image has been stretched so as to show the faint structures more clearly. (The picture of the disk of Triangulum is credited to T. A. Rector).

These stars and dwarf galaxies consist of the remnants of galaxies that have collided with M31 and been ripped apart in the process. The debris is shown to extend in streams swirling around M31 at great distances and even as far as M33 and is the archaeological record of the violent and destructive past of M31, as it devoured and destroyed any smaller galaxy which it encountered.

Image 3: Andromeda and the Thirty Dwarfs.

The PandAS survey, which is now stretching into its second decade, has found not only a halo of previously undetected stars but also around thirty faint dwarf companion galaxies around M31, stretching out half a million light years in radius. These are shown in Image 3. For the record, astronomers have suspected for some time that our Milky Way and M31 are on a collision course. This year, they confirmed that a direct collision will occur in about four billion years time, with M33 also a likely participant.

This was another great talk by Geraint Lewis, who was making his fifth address to the Macarthur Astronomy Forum – a record!

Here are some great links to follow if you want to learn more:

PandAS survey website: <https://www.astrosci.ca/users/alan/PANDAS/Home.html>

Geraint Lewis Website: <http://www.physics.usyd.edu.au/~gfl/Home.html>

Geraint Lewis Blogsite (recommended): <http://cosmic-horizons.blogspot.com.au/>

"AT THE MACARTUR ASTRONOMY FORUM:

This month: Astronomer, Dr. Simon O'Toole.

November: Astronomer, Dr. Emil Lenc."



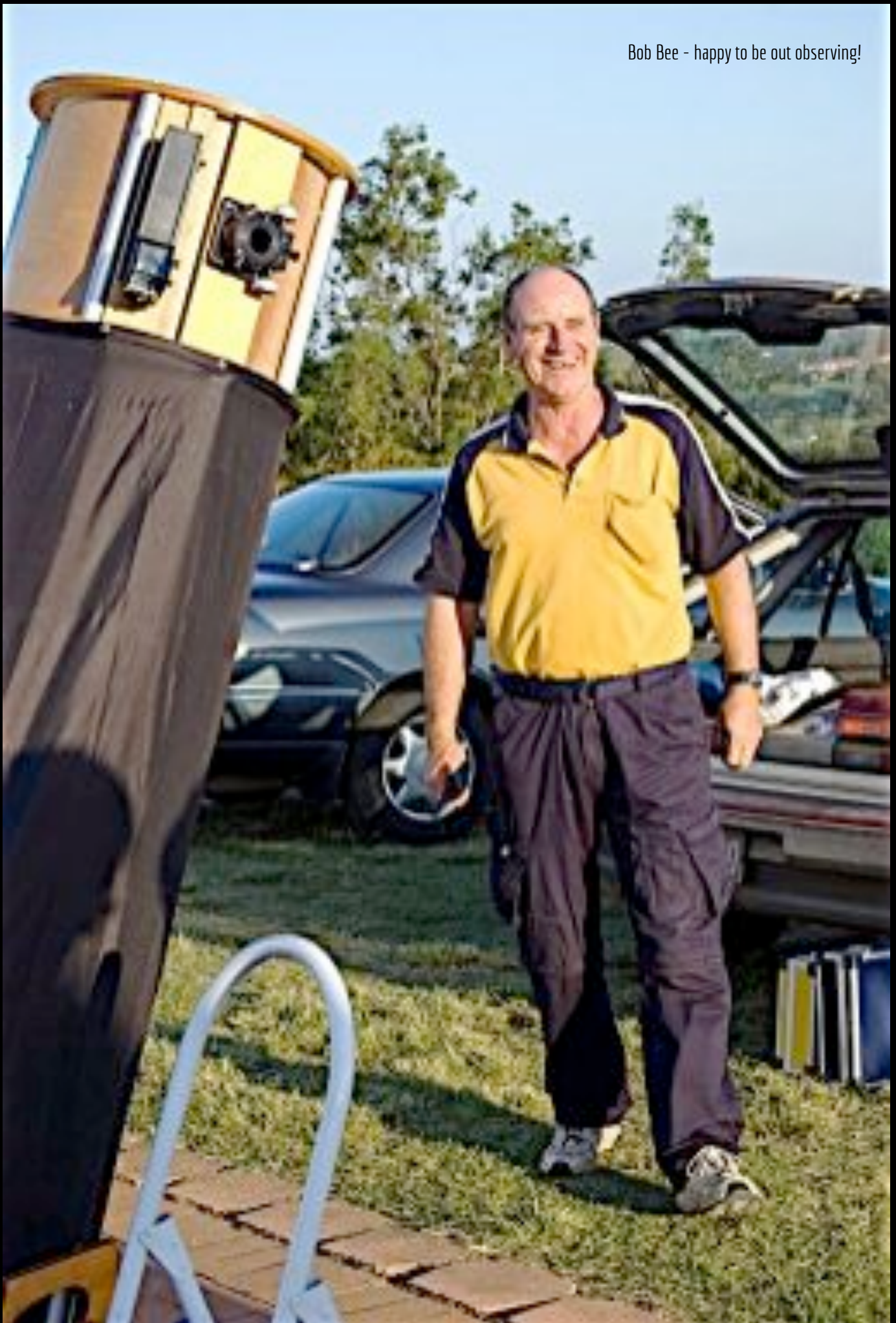
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Roger setting up for an evening's observing session - March 2009.

MAS getting going on a public night during the 2009 "Year of Astronomy".



Bob Bee - happy to be out observing!



Humayun Qureshi - at the Forest





“A Happy Thousand Turns”

Bob Bee

It was a fine day for an adventure. The yellow sky pressed in comfortably from horizon to horizon while the soothing drizzling rain promised more of the good weather Vaaz had experienced since his hatching day a thousand turns ago.

In the distance his totem mountain, Mount Vazzuum, majestically belched its yellow stomach contents into the sky and sent red glowing rivers down its slopes to add to the creeping lava lake at its feet before cascading in fiery falls down the deep ravine.

Vaaz double checked the ties holding his raft to its skid carrier. Yes, all was correct. He turned, waved a tentacle to his proud birth-seniors watching from the arch of their humble cave, turned his trunk towards Mount Vazzuum and began his trundle to adventure and thousand-turn-hood.

Although his vision stalks could not pierce the dense ochre sky, he sensed the heat giving orb above it. Vola, the giver of all life, who makes the rocks flow as sources of nourishment, who warms the days and nights alike, who keeps the sustaining acid clouds in the sky.

Vaaz felt exhilarated, his multiple legs rotating with youthful ease, the flat pads of each foot touching briefly on the viscous rock surface. As he rolled forward his long trunk harvested the nutrients from the falling rain, and he occasionally stopped a moment to drive his tungsten tipped secondary proboscis into the ground-rock to extract mineral manna.

Yes, he decided, it was a fine day for adventure.

As Vaaz approached the glowing shore of Lake Vazzuum, he saw other thousand-dayers converging from adjacent hills, all hauling their lava rafts behind them. Some waved, which he returned with his spare tentacles, while others frolicked, throwing lava balls or shooting each other with trunks of acid rain.

“Vaaz, over here”, called Vuul, his best friend. Vuul had his raft already set up, ready to ride the lava rapids only two hundred pad-steps down lake. “What kept you”, Vuul teased, “too busy sky grazing? This is my third rapids ride already, and you’ve just got here.” He flapped his upper tentacles mockingly.

“You’re full of it Vuul”, Vaaz replied with a stiff vertical tentacle. “Let’s go.”

Pushing their rafts onto the lake’s surface, Vaaz and Vuul quickly trundled aboard, making the lava slop redly over the sides. Then with their hind-tentacles, they paddled towards the ravine where the lake languidly poured down to the next level. The danger was the unmelted rocks submerged beneath the flowing lava. One could easily break a tentacle or crack a cranium if they were tipped off the raft and sunk beneath the lava. But... you were only a thousand-turner once in your life.

*

It had been a good day, one which Vaaz and Vuul would never forget. But as Vaaz packed up his raft ready for sledding back to his home-cave, he had a

disturbing thought. Is that it? Shouldn't his One Thousand-turn Day be something special? Shouldn't...

"Look-out Vaaz", Vuul trumpeted.

Vaaz turned to Vuul to see his friend tentacling at the sky, his vision pods almost exploding in their stalks. Vaaz looked up at the billowing yellow sky to see a monstrous rock falling upon him, but slowly, at lava flow speed. It had four stiff legs spread beneath it and white flames belched from pods under its flat belly.

"Vola help me", Vaaz yelped and trundled aside as fast as his hundred legs would let him.

The strange object missed Vaaz but, sadly, not Vaaz's beautiful raft, a present from his birth-seniors. Vaaz stared, his eye stalks quivering, as the large rock settled onto the debris of his raft, the legs straddling it and the flames now gone. But it wasn't a rock. Its shape was too... unround. Vaaz had never seen a shape like it.

Vaaz, Vuul and a number of other daring one-thousand-turners rolled closer to the strange object, their senses taut, wary of any dangerous movement. The object didn't seem to be made of rock but a strange shiny material which was starting to glow a dull red colour as if to match the landscape.

They all rolled back hastily when the raft killer suddenly shed a part of its hide, revealing a round hole covered by a clear membrane. They took more pad-steps back when, out of the top of the object, a long stalk appeared with short stiff tentacles standing out from it. Then it just sat there, unmoving, glowing redly, atop Vaaz's prize raft.

Vaaz had seen enough. He'd lost his thousand-turn gift from his birth-seniors to this intruder, this raft killer. If there was one thing his male-senior had taught him it was this: If some-Vrug tentacle-strikes you, you tentacle-strike him back – hard.

Vaaz sized the raft killer up and decided a tentacle wouldn't hurt this thing. Then he knew what he must do.

*

There was a collective groan from the JPL control room. The Venus Pioneer 10 probe had seemed so promising. While the earlier probes had been destroyed mid-descent from the crushing 90 atmosphere pressure and the searing 470°C lead melting temperature, this one had been designed to withstand those conditions. It had a particularly strong casing, able to survive contact with the hardest rock and the crushing surface atmospheric pressure.

"I don't believe it. That was a 200 million dollar probe we just lost. What the blazes happened to it?" the project director yelled over the hubbub.

"It was doing great, boss", the probe integrity monitoring technician said. "It was sitting on the surface and all systems were in the green."

"So, what went wrong?"

"It looks like it just got a hole punched in it", the technician said.

"Bullshit", the director snarled. "That probe had the strongest casing we could build. It would take a tungsten-tipped drill to get through it."

*

Vaaz held his second proboscis in the raft killer's side where he had plunged it right up to his second joint.

Nothing happened. Then he withdrew it and a stream of cool vapour blew from the hole, to instantly boil to nothing. A low grinding sound followed, and the strangely shaped object slowly buckled and bent in upon itself, growing more compact, the clear membrane shattering and black smoke curling out from its innards.

Vaaz stood staring at the deflated object. Then he turned to his Vrug friends and trumpeted victoriously. "Well, that was something special. Happy Thousand-Turns."

* * *

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"in a flat spin"

Part 10 - May The Force Be With You

A SERIES OF ARTICLES BY
MAS MEMBER **DAVY JONES**

The Guardian, Thursday 2nd September 2010 – promoting the launch of Stephen Hawking's book, *The Grand Design*, stated that Hawking argued the Big Bang – rather than occurring following the intercession of a divine being, was predictable, due to the law of gravity. Conversely, Professor Michio Kaku, the Japanese-American theoretical physicist, suggests that in some sense gravity does not exist. Instead, he proposed, what moves the stars and planets is the distortion of space and time.

Whilst the scientists may or may not entirely agree about the character of gravity, much emphasis is placed on its role throughout the universe. Gravity, however, is not the only fundamental force that should be taken into consideration. Physicists generally agree there are four basic forces of nature; these forces being described as:

1. The Strong Force 2. The Weak Force 3. The Electromagnetic Force 4. Gravity

Delving too deeply into the properties of these four fundamental forces is obviously well beyond the scope of this short article. Nevertheless, it is worth the effort of exploring the basic ideas to get some appreciation of the powers that compel movement throughout the universe. In the first place it is necessary to understand that two sets of laws (of physics) have to be applied – rather than simply

relying on the classical laws of physics. Classifying the realm of the very small requires the application of quantum physics, whilst for the larger universe, the laws of relativity are clearly appropriate. For our purposes, it really only requires one to understand whilst the 'gravity' of relativity theory makes sense of the mechanics of galaxies and why planets orbit suns, the same rules simply do not apply at the level of particle physics.

Both the strong and weak nuclear forces were revealed to the world back in the 1930s. (see Max Planck et al.) Suffice to say, the quantum theory of the atom came about in order to explain how electrons could remain in orbit around the nucleus of an atom – defying both Newton's laws of motion and Maxwell's laws of classical electromagnetism.

In short then, it is the strong nuclear force that ties atoms together. Left to their own (natural) devices, protons – being positively charged, would – as with like pole magnets – rapidly repel each other. This would have the rather unfortunate effect of preventing atoms forming. No atoms = no universe! So, the strong nuclear force actually binds the protons and neutrons (neutrons have no charge) together to form the extremely dense nucleus or core of the ubiquitous and practically eternal, atom. The process that brings this about requires us to delve

*"The greatest enemy of
knowledge is not
ignorance - it is the
illusion of knowledge."*

S. Hawking

into the realm of quarks and gluons – a task I will relegate to those whose curiosity needs further slaking.

The weak nuclear force, plays many essential roles, including responsibility for the radioactive decay of subatomic particles; it also initiates the process we call hydrogen fusion in stars. Weak interactions affect all known fermions – which are, as far as I can determine, particles whose spin is a half-integer. If nothing else, at this point, the reader will understand the gloomy depths into which this discussion could lead. Despite its fragile sounding label – the weak nuclear force is in fact estimated to be: ten billion, billion, billion times stronger than gravity! It therefore follows, the strong nuclear force is almost immeasurably greater still. It is thus surprising to find, the term ‘strong nuclear force’ rather odd, when we discover both the strong and weak nuclear force’s control or influence, extends the rather insignificant distance of only one-hundred-thousandth of the diameter of an atom!

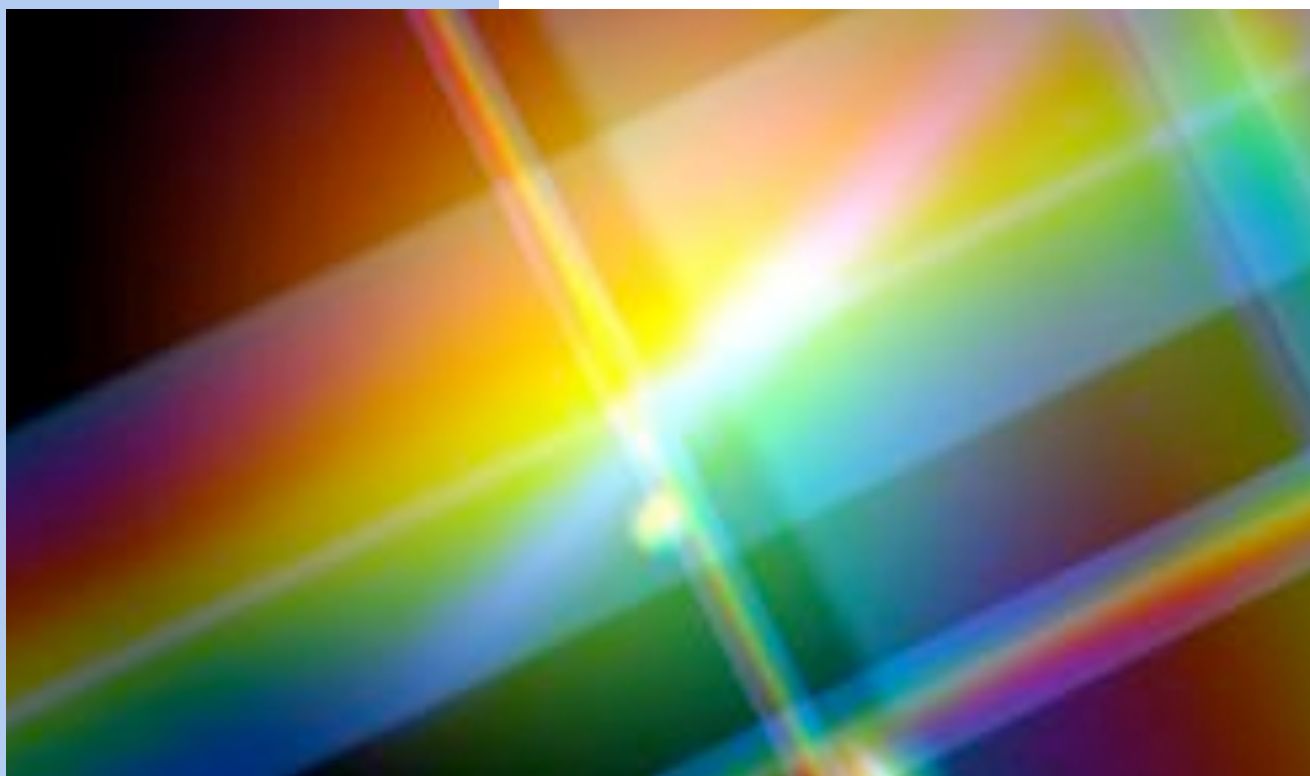
Electromagnetism: a word that perhaps brings to mind those large machines seen in car-breaking yards. A crane with a large electromagnet swinging from its arm – at the flick of a switch the electromagnet is activated and lifts considerable weight – once moved, another flick of the switch releases the load, depositing it at the required spot: **ELECTROMAGNETISM!**

Sorry to disillusion anyone, but our terrestrial interpretations once again fail us miserably. The electromagnet referred to above is of course a product – one aspect – of the electromagnetic spectrum that we employ to help us in our daily lives.

To utilize a pun - I’m sure a light will go on for many of those who are not conversant with the properties of the electromagnetic spectrum. Electromagnetic radiation can be technically explained as a stream of massless photons, traveling at the speed of light, in a wave-like pattern. The only difference between the various forms of electromagnetic radiation is the quantity of energy found in the photons.

This all becomes a lot clearer when the Electromagnetic (EM) Spectrum is defined – from the lowest energy level to the highest energy level: radio – microwave – infrared – visible – ultraviolet – X-ray and gamma-rays. Ergo – more familiarly known to us as - The Light Spectrum – radiation in all its glory; this then is the electromagnetism of the universe. It’s properties and by-products are employed regularly by us to enhance our daily lives – often I suspect with little or no thought for what we are actually using.

And so we return to dear old gravity – that which we are all at least familiar with – or think we are! Gravity is simply described as an attractive force between all matter; a force that ranges in strength



according to the mass of that matter. More mass equals more gravity. Gravity is considered to be the weakest of the four fundamental forces. Whilst today we more readily associate the properties of gravity with Albert Einstein and his interpretation; we mustn't forget it was Sir Isaac Newton (1642-1727) who gave us the first mathematical portrayal of gravity, with his laws of universal gravitation. Whilst considered the weakest force – we, for example, can defy its power as we often lift significant weights against its pull – we should not forget the required escape velocity from Earth is still approximately eleven kilometres per second; the thrust to achieve this speed is not inconsiderable. Even this figure is miniscule when compared to the escape velocity required to break away from, for example, a black hole – which requires an object to perform the impossible, and exceed the speed of light - 299792.458 km/s!

In summary: Now the four fundamental forces shall control the motions of objects, mass and matter. And these are gravity, the strong force, the nuclear weak force and electromagnetism. Gravity shall act on mass. The strong force shall hold the quarks together in a neutron and a proton. The weak force shall lead to certain rare decays of nuclei. Electromagnetism shall act on charges and on currents and be the binding force in atoms and in molecules. – JSP 1997

Michio Kaku – Henry Semat Professor of Theoretical Physics at the City College of New York, in presenting yet another view, demonstrates that whilst all of the above have satisfied our perception of the universe to date – our knowledge may yet be incomplete. He asserts, that scientists have puzzled for the past fifty years as to why the four fundamental forces differ so greatly. Kaku hypothesizes in his book – *Hyperspace* (2009) – just how the hyperspace theory would permit the possibility of explaining the four forces of nature as well as an apparently chance collection of subatomic particles in – what he terms – a truly elegant fashion.

Following this line of research would of course lead us deeply into the murky world of superstring or supergravity theory. As fascinating as some might find the prospect, I think I'll leave that avenue of thought to the theorists for now. I have enough problems dealing with the world we can see around us – without turning everything we observe into mere vibrations, that theoretically ripple endlessly through the fabric of space and time.

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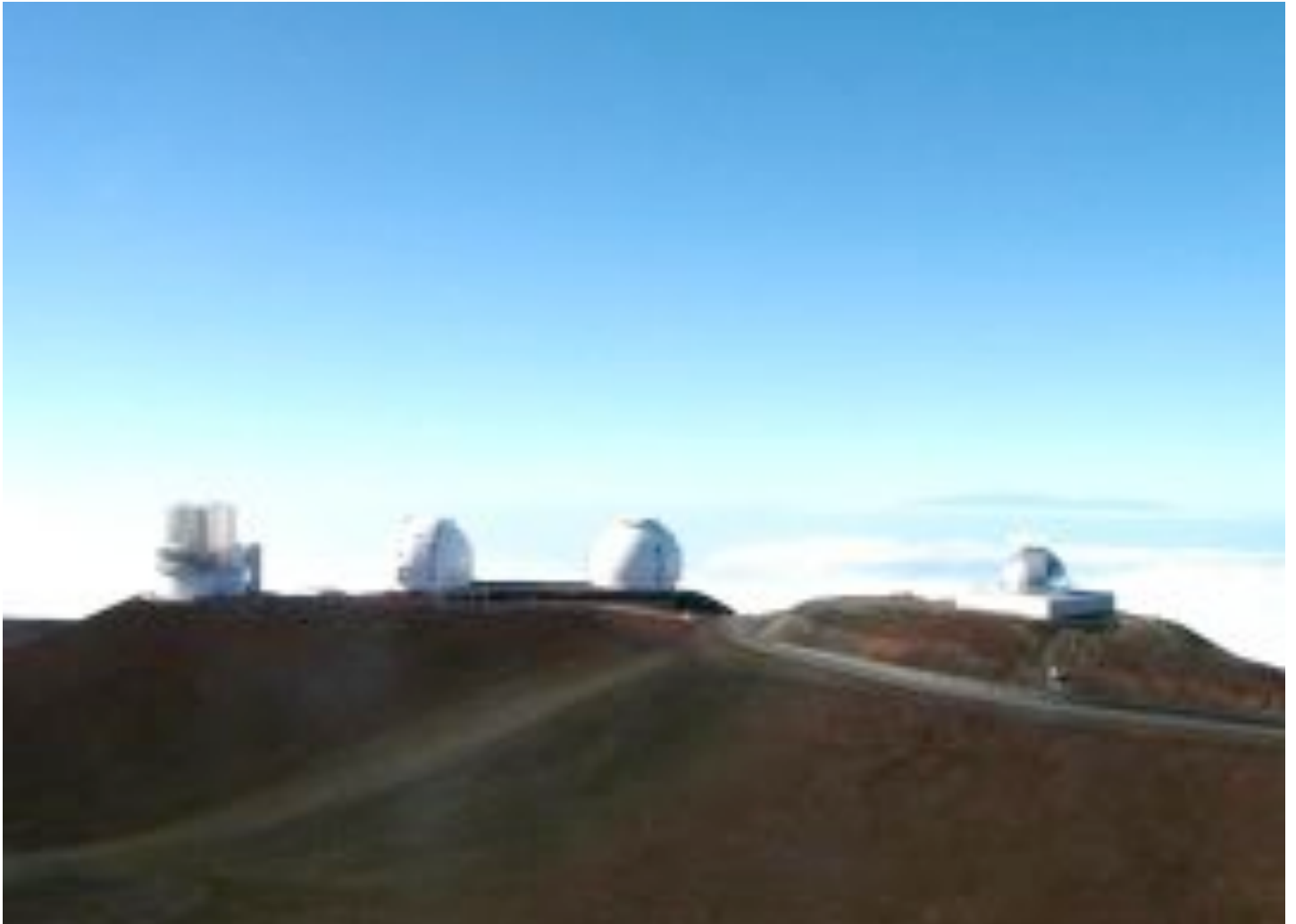
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MAS 2013: mauna kea countdown

MAS Field Trip

Tony Law

Another reminder to MAS members - we are arranging a trip to the 'Big Island' of Hawaii in 2013.

Planned itinerary is for 5 nights viewing on Mauna Kea, Hawaii (Hilo) and four days on Oahu (Honolulu). Hilo is the start point for visiting the major telescopes on the summit and observing from the Onikuza Visitors centre. A trip to the Kilauea Volcano is also envisaged.

On Oahu we will stay in Waikiki and visit Pearl Harbor, the Polynesian cultural centre, Pipeline (surf beach), etc However itinerary here is flexible, some may wish to go elsewhere from here, we will discuss closer to the time.

The anticipated total cost will be around \$1,250.00 for airfares, \$1,000 for accommodation and \$500.00 for food etc. Another couple of hundred for transport so about \$3,000.00 in total. Add a couple of hundred for incidental tours. We'll provide more details much closer to the time.

To help MAS Members save for this trip, we have set up a special bank account. You may pay in whatever and whenever you wish by direct debit or by cash over the counter. You must ensure that you include your name in the reference when you make the deposit so that it can be refunded if required. This is a non-interest-bearing account.

We look forward to hearing from all interested.

Contact Barry via email or call Tony on 0419 215199 if you have any questions or would like to know the bank account details.



Planned Itinerary - Updated

Depart: Sydney Wednesday 4th September 18.00

Arrive: Honolulu Wednesday 4th September 07.45 - we cross the dateline!

Depart: Honolulu Wednesday 4th September 11.48

Arrive: Hilo Wednesday 4th September 12.50

Accommodation: see <http://www.seasidehotelshawaii.com/HotelHilo.aspx>

Nights of 5-9th on Mauna Kea. See weather forecasts: <http://mkwc.ifa.hawaii.edu/forecast/mko/>

Friday 6th September – Special visit to Gemini North and one of IRTF, CFHT, or the UH 2.2 meter, plus the Keck visitors observation room.

Saturday 7th and Sunday 8th September – drive Mauna Kea summit in convoy for night time viewing

Bus trip to Volcanoes National Park is 12 hours and costs \$179.00 - probably not advisable as we want to do MK each night! By Helicopter 1 hour @ \$230.00. See <http://www.hawaiiactive.com/activities/bigisland-paradise-helicopter.html>

Depart: Hilo Tuesday 10th September 13.18

Arrive: Honolulu Tuesday 10th September 12.07

Accom: <http://www.outrigger.com/hotels-resorts/hawaiian-islands/oahu-waikiki/ohana-waikiki-east#tab-prop-detail-rooms>

Wednesday 11th: Pearl Harbour, Arizona, Missouri etc \$70.00

Thursday 12th: Polynesian Cultural Centre, tour, dinner and show \$150.00

Friday 13th: Shopping/sightseeing in Honolulu/Waikiki

Depart: Honolulu Saturday 14th September 12.45 (or your own itinerary from here)

Arrive: Sydney Sunday 15th September 19.30 -dateline crossed!

Tentative total:

Flights	\$ 1200.00
Accom.	\$ 500.00 based on twin share
Heli tour	\$ 230.00 optional
Pearl Hbr.	\$ 70.00 optional
PCC	\$ 150.00 optional
Meals	\$ 400.00
Veh Hire Hilo	\$ 100.00

Total Cost \$2650.00 excluding discretionary shopping!!!

In order for MAS Members to save for this trip we have set up a special bank account. You may pay in whatever and whenever you wish by direct debit or by cash over the counter. Account is at the Commonwealth Bank, name is Macarthur Astronomical Society BSB 062656 a/c no. 10243417. You must ensure that you include your name in the reference when you make the deposit. Please advise me when you make your initial deposit so that we can start a spreadsheet with all those making payments.

the forest - please come along!

Tony Law

This is the most under utilised resource that MAS provides. It amazes me that so few visit but suspect we have not promoted it enough.

Where is it you might ask? It takes approximately 50 minutes to get there from Campbelltown, along the Hume Highway until you see the Belanglo Road sign, just past the Sutton Forest turn off. You turn right across the highway and follow the dirt road (Belanglo Road, formerly Bunnigalore Road) for approx 4km then turn right in to Dalys Road and the cabin is the first property on the right. Keep a close watch for roos and wombats at all times!

The facility offers bunk beds for a maximum of 12 but you can also camp on the property as Ned and Chris do on most occasions, bring your own bed linen or sleeping bags. There is hot and cold running water, showers and toilets. There is a complete kitchen with stove, two microwaves and sufficient crockery and cutlery. Just bring your own food and drink.

The nights are cool in summer and freezing in winter! Always ensure you have warm clothing with you and for those who intend to observe to the wee hours of the morning a freezer suit and freezer/ski boots are highly recommended.

Of course you do not have to stay overnight, the Cabin is usually open from around 3pm on a Friday afternoon until Sunday morning but you can visit for a few hours or a few days. We need to know in advance if you are intending to stay on for three nights. You will be amazed at the dark skies – you can always call ahead to check on the viewing conditions.





The surrounding forest is full of wildlife, there are many walks you can do during the day, look out for our regular visitors to the cabin, roos, wombats, yellow tailed black cockatoos (and many other birds) and we even had an echidna visit in February!

Overall “The Forest” is a great place to unwind, relax, meet up with friends, chat about everything, eat, drink and enjoy what nature has to offer and hopefully spot those elusive galaxies, globular clusters and other favourites of the night sky!

Hope to see you there soon!

Tony Law



The Proper Names of Stars

When you look at a star chart or other astronomical references to stars, you will often see that they give a star a proper name either alone or along with its Beyer number. For example, they may have just Deneb as the star's name instead of its technical designation as Alpha (α) Cygni. This is in recognition of the historical names the stars lived with long before modern astronomy started attaching Greek letters to the constellations' stars. Besides, Zubenelgenubi sounds a lot more exotic than α Librae. These names are usually (but not always) of Arabic origin.

In the table provided below, there is a list of the proper names of stars with such exotic names. (Note: This list is not necessarily complete.) The list also includes (where applicable) the meaning of the name, any alternative names the star may have and the star's Beyer number which will identify the constellation it is in.

Like all historical names, there can be a degree of confusion, as well as ambiguity. For example, the very first two names on the list below share the same meaning – 'the end of the river'. Apart from the complexities of etymology, how can they both be the end? λ Eri is the 'other' end, so that makes three ends? It seems that originally in the times of Hipparchus and Ptolemy the river in the constellation from their latitude was seen to end at Acamar. Subsequently, the river was traced further southwards and α Eri (Achernar) became its end. So expect to see other stars with apparently different names having the same or similar meanings.

The list is given in alphabetical order of the proper names. Though a challenge to remember them, it's always impressive when you use the proper names at a star night. Why not try to learn a few (or more) to impress your friends.

Star Name	Name meaning (and alternative name)	Beyer Number
Acamar	The end of the river	θ Eri
Achernar	The river's end	α Eri
Acubens	The claw	α Cnc
Adhafera	The braid/curl	ζ Leo
Adhara	The virgins	ϵ CMa
Albali	The Swallower	ϵ Aqr
Albireo	The beak star, or the Hen's Beak	β Cyg
Alchiba	Tent	α Crv
Alcor	The Rider (to Mizar's 'Horse')	80 UMa
Alcyone	(a Pleiades sister)	η Tau
Aldebaran	The follower (of the Pleiades)	α Tau
Alderamin	The right arm	α Cep
Alfirk	Flock (of sheep)	β Cep
Algedi	The kid (Giedi)	α Cap
Algenib	The side	γ Peg
Algieba	The forehead	γ Leo
Algol	The demon	β Per
Algorab	The raven	δ Crv
Alhena	The Brand	γ Gem
Alioth	Fat tail of a sheep	ϵ UMa
Alkaid	Leader of the mourners (Benetnasch)	η UMa
Alkalurops	club, staff	μ Boo

Alkes	The cup	α Crt
Almaak	(Almach)	γ And
Alnair	The bright one	α Gru
Alnasi	The point (of arrow)	γ Sgr
Alnath	The butting one (Elnath)	β Tau
Alnilam	string of pearls	ϵ Ori
Alnitak	the girdle	ζ Ori
Alphard	The solitary one	α Hya
Alphekka	(Gemma)	α CrB
Alpheratz	(Sirrah)	α And.
Alrakis	The trotting camel, the dancer	μ Dra
Alescha	The cord	α Psc
Alshain	The falcon	β Aql
Altair	The flying eagle	α Aql
Aludra	The virgin	η CMa
Alya	Fat tail	θ Ser
Ankaa	The Phoenix	α Phe
Antares	Rival of Mars	α Sco
Arcturus	Bear keeper	α Boo
Arkab	Archilles tendon	β Sgr
Arneb	Hare	α Lep
Asellus Australis	Southern Donkey	δ Cnc
Asellus Borealis	Northern donkey	γ Cnc
Asterope	(a Pleiades sister)	21 Tau
Atlas	(Father, in Pleiades)	27 Tau
Baten Kaitos	Belly of the sea monster	ζ Cet
Bellatrix	The female warrior	γ Ori
Betelgeuse	Armpit of the giant	α Ori
Canopus	Name of pilot of Menelaus' ship	α Car
Capella	She goat	α Aur
Caph	The stained hand	β Cas
Castor	Name of one of the Gemini twins	α Gem
Cebalrai	The shepherd's dog	β Oph
Celaeno	(a Pleiades sister)	16 Tau
Chara	Joy	b CVn
Cor Caroli	Charles's heart	α CVn
Cursa	The footstool	β Eri
Dabih	The lucky stars of the slaughterer	β Cap
Deneb	tail (of the hen)	α Cyg
Deneb Algedi	The kid's tail	δ Cap
Deneb Kaitos	Tail (of the whale) (Diphda)	β Cet
Denebola	The lion's tail	β Leo
Diadem	Berenice's crown (also Al Dafira 'braid')	α Com
Dschubba	Forehead	δ Sco
Dubhe	The bear	α UMa
Electra	(a Pleiades sister)	17 Tau
Enif	The nose	ϵ Peg

Etamin	The serpent (Eltanin)	γ Dra
Fomalhaut	The fishes mouth	α PsA
Gienah	Wing	γ Crv
Gienah	Wing	ϵ Cyg
Gomeisa	The little bleary eyed one	β CMi
Graffias	Claws. Also Acrab (Scorpion)	β Sco
Hadar	(Agena)	β Cen
Hamal	Lamb	α Ari
Homam	Lucky star of the hero	ζ Peg
Izar	girdle, loincloth	ϵ Boo
Kaus Australis	Southern part of the bow	ϵ Sgr
Kaus Borealis	Northern part of the bow	λ Sgr
Kaus Media	Middle of the bow	δ Sgr
Kitalpha	The section of the horse	α Equ
Kochab	The north star (or Heavenly Body)	β UMi
Kornephorus	Club bearer	β Her
Lesath	Bite	ν Sco
Maia	(a Pleiades sister)	20 Tau
Markab	Shoulder	α Peg
Matar	Lucky rain	η Peg
Megrez	Root of the tail	δ UMa
Menkalinan	Shoulder of the charioteer	β Aur
Menkar	Nose (of the whale)	α Cet
Menkent	Shoulder of the centaur	θ Cen
Merak	Flank	β UMa
Merope	(a Pleiades sister)	23 Tau
Mesarthim	The extremely fat ram	γ Ari
Miaplacidus	Placid waters	β Car
Mimosa	Actor; or Third Star of the Cross	β Cru
Mintaka	Belt	δ Ori
Mira	The amazing one	α Cet
Mirach	Girdle	β And
Mirphak	elbow (Algenib)	α Per
Mirzam	The announcer	β CMa
Mizar	The Horse (to Alcor's 'Rider')	ζ UMa
Naos	Ship	ζ Pup
Nashira	Bearer of good news	γ Cap
Nekkar	ox driver	β Boo
Nihal	Quenching their thirst	β Lep
Nunki	Proclamation of the Sea	σ Sgr
Peacock	Peacock	α Pav
Phact	Ring dove	α Col
Phad	Thigh (Phecda)	γ UMa
Pherkad	The calf	γ UMi
Pleione	(Mother, in Pleiades)	BU Tau
Polaris	The North Star	α UMi
Pollux	Name of one of the Gemini Twins	β Gem

Porrima	Name of two goddesses of prophecy	γ Vir
Procyon	Preceding the dog	α CMi
Rasalgethi	The kneeler's head	α Her
Rasalhague	Head of the serpent collector	α Oph
Rastaban	Serpent's head	β Dra
Regulus	The little king	α Leo
Rigel	Foot	β Ori
Rigil Kentaurus	Foot of the centaur (Toliman)	α Cen
Rotanev	(Reverse of Venator)	β Del
Ruchbah	The knee	δ Cas
Rukbat	Knee (Alrami (Archer))	α Sgr
Sabik	One that precedes	η Oph
Sadachbia	Luck of the homes (tents)	γ Aqr
Sadalmelik	Lucky stars of the king	α Aqr
Sadalsuud	Luckiest of the lucky stars	β Aqr
Sadr	Breast	γ Cyg
Saiph	sword	κ Ori
Scheat	Shin	β Peg
Seginus	The guard	γ Boo
Shaula	Sting	λ Sco
Shedir	The breast	α Cas
Sheliak	The harp	β Lyr
Sheratan	Two	β Ari
Sirius	Searing scorching	α CMA
Skat	Wish	δ Aqr
Spica	Ear of wheat	α Vir
Sualocin	(Reverse of Nicolaus)	α Del
Sulafat	The tortoise	γ Lyr
Tarazed	The beam of the scale	γ Aql
Taygeta	(a Pleiades sister)	19 Tau
Thuban	Snake	α Dra
Unukalhai	The serpent's neck	α Ser
Vega	The swooping eagle	α Lyr
Vindemiatrix	Grape gatherer	ϵ Vir
Wasat	Middle	δ Gem
Wazn	Weight	β Col
Wezen	The weight	δ CMA
Yed Posterior	The following star of the hand	ϵ Oph
Yed Prior	The preceding star of the hand	δ Oph
Zavijava	Corner of the barking (dog); Alaraph	β Vir
Zosma	Girdle; (Duhr)	δ Leo
Zubeneelakrab	The northern claw	β Lib
Zubenelgenubi	The southern claw	α Lib
Zubeneschamali	The scorpions claw	γ Lib

NASA Watch: Mars Rock Touched by NASA Curiosity has Surprises

PASADENA, Calif. -- The first Martian rock NASA's Curiosity rover has reached out to touch presents a more varied composition than expected from previous missions. The rock also resembles some unusual rocks from Earth's interior.

The rover team used two instruments on Curiosity to study the chemical makeup of the football-size rock called "Jake Matijevic" (matt-EE-oh-vick). The results support some surprising recent measurements and provide an example of why identifying rocks' composition is such a major emphasis of the mission. Rock compositions tell stories about unseen environments and planetary processes.

"This rock is a close match in chemical composition to an unusual but well-known type of igneous rock found in many volcanic provinces on Earth," said Edward Stolper of the California Institute of Technology in Pasadena, who is a Curiosity co-investigator. "With only one Martian rock of this type, it is difficult to know whether the same processes were involved, but it is a reasonable place to start thinking about its origin."

On Earth, rocks with composition like the Jake rock typically come from processes in the planet's mantle beneath the crust, from crystallization of relatively water-rich magma at elevated pressure.

Jake was the first rock analyzed by the rover's arm-mounted Alpha Particle X-Ray Spectrometer (APXS) instrument and about the thirtieth rock examined by the Chemistry and Camera (ChemCam) instrument. Two penny-size spots on Jake were analyzed Sept. 22 by the rover's improved and faster version of earlier APXS devices on all previous Mars rovers, which have examined hundreds of rocks. That information has provided scientists a library of comparisons for what Curiosity sees.

"Jake is kind of an odd Martian rock," said APXS Principal Investigator Ralf Gellert of the University of Guelph in Ontario, Canada. "It's high in elements consistent with the mineral feldspar, and low in magnesium and iron."



ChemCam found unique compositions at each of 14 target points on the rock, hitting different mineral grains within it.

"ChemCam had been seeing compositions suggestive of feldspar since August, and we're getting closer to confirming that now with APXS data, although there are additional tests to be done," said ChemCam Principal Investigator Roger Wiens (WEENS) of Los Alamos National Laboratory in New Mexico.

Examination of Jake included the first comparison on Mars between APXS results and results from checking the same rock with ChemCam, which shoots laser pulses from the top of the rover's mast.

The wealth of information from the two instruments checking chemical elements in the same rock is just a preview. Curiosity also carries analytical laboratories inside the rover to provide other composition information about powder samples from rocks and soil. The mission is progressing toward getting the first soil sample into those analytical instruments during a "sol," or Martian day.

"Yestersol, we used Curiosity's first perfectly scooped sample for cleaning the interior surfaces of our 150-micron sample-processing chambers. It's our version of a Martian carwash," said Chris Roumeliotis (room-eel-ee-OH-tiss), lead turret rover planner at NASA's Jet Propulsion Laboratory in Pasadena, Calif.

Before proceeding, the team carefully studied the material for scooping at a sandy patch called "Rocknest," where Curiosity is spending about three weeks.

"That first sample was perfect, just the right particle-size distribution," said JPL's Luther Beegle, Curiosity sampling-system scientist. "We had a lot of steps to be sure it was safe to go through with the scooping and cleaning."

Following the work at Rocknest, the rover team plans to drive Curiosity about 100 yards eastward and select a rock in that area as the first target for using the drill.

During a two-year prime mission, researchers will use Curiosity's 10 instruments to assess whether the study area ever has offered environmental conditions favorable for microbial life. JPL, a division of Caltech, manages the project and built Curiosity. For more about the Mars Science Laboratory Curiosity rover mission, visit: <http://www.nasa.gov/msl> and <http://mars.jpl.nasa.gov/msl>.

You can follow the mission on Facebook and Twitter at: <http://www.facebook.com/marscuriosity> and <http://www.twitter.com/marscuriosity>.

ESO Watch: Surprising Spiral Structure Spotted by ALMA

10th October, 2012: Astronomers using the Atacama Large Millimeter/submillimeter Array (ALMA) have discovered a totally unexpected spiral structure in the material around the old star R Sculptoris. This is the first time that such a structure, along with an outer spherical shell, has been found around a red giant star. It is also the first time that astronomers could get full three-dimensional information about such a spiral. The strange shape was probably created by a hidden companion star orbiting the red giant. This work is one of the first ALMA early science results to be published and it appears in the journal *Nature* this week.

A team using the Atacama Large most powerful millimetre/submillimetre surprising spiral structure in the gas [1][2][3]. This means that there is companion star orbiting the star surprised to find that far more ejected by the red giant.

"We've seen shells but this is the first time we've coming out from a star, shell," says the lead author results, Matthias Maercker for Astronomy, University of

Because they blow out large R Sculptoris are major that provide the bulk of the raw generations of stars, planetary

Even in the Early Science phase, when the outperformed other submillimetre observatories.

"When we observed the star with ALMA, not even half its antennas were in place. It's really exciting to imagine what the full ALMA array will be able to do once it's completed in 2013," adds Wouter Vlemmings (Chalmers University of Technology, Sweden), a co-author of the study.

Late in their lives, stars with masses up to eight times that of the Sun become red giants and lose a large amount of their mass in a dense stellar wind. During the red giant stage stars also periodically undergo thermal pulses. These are short-lived phases of explosive helium burning in a shell around the stellar core. A thermal pulse leads to material being blown off the surface of the star at a much higher rate, resulting in the formation of a large shell of dust and gas around the star. After the pulse the rate at which the star loses mass falls again to its normal value.

Thermal pulses occur approximately every 10 000 to 50 000 years, and last only a few hundred years. The new observations of R Sculptoris show that it suffered a thermal pulse event about 1800 years ago that lasted for about 200 years. The companion star shaped the wind from R Sculptoris into a spiral structure.

"By taking advantage of the power of ALMA to see fine details, we can understand much better what happens to the star before, during and after the thermal pulse, by studying how the shell and the spiral structure are shaped," says Maercker. "We always expected ALMA to provide us with a new view of the Universe, but to be discovering unexpected new things already, with one of the first sets of observations is truly exciting."

"It's a real challenge to describe theoretically all the observed details coming from ALMA, but our computer models show that we really are on the right track. ALMA is giving us new insight into what's happening in these stars and what might happen to the Sun in a few billion years from now," says Shazrene Mohamed (Argelander Institute for Astronomy, Bonn, Germany and South African Astronomical Observatory), a co-author of the study.

"In the near future, observations of stars like R Sculptoris with ALMA will help us to understand how the elements we are made up of reached places like the Earth. They also give us a hint of what our own star's far future might be like," concludes Matthias Maercker.



Millimeter/submillimeter Array (ALMA), the telescope in the world, has discovered a around the red giant star R Sculptoris probably a previously unseen [4]. The astronomers were also material than expected had been

around this kind of star before, ever seen a spiral of material together with a surrounding on the paper presenting the (ESO and Argelander Institute Bonn, Germany).

amounts of material, red giants like contributors to the dust and gas materials for the formation of future systems and subsequently for life.

new observations were made, ALMA greatly Earlier observations had clearly shown a spherical shell around R Sculptoris, but neither the spiral structure nor a companion was found.

members observing nights

Make sure you remember to bring your woolies! It's cold at night.

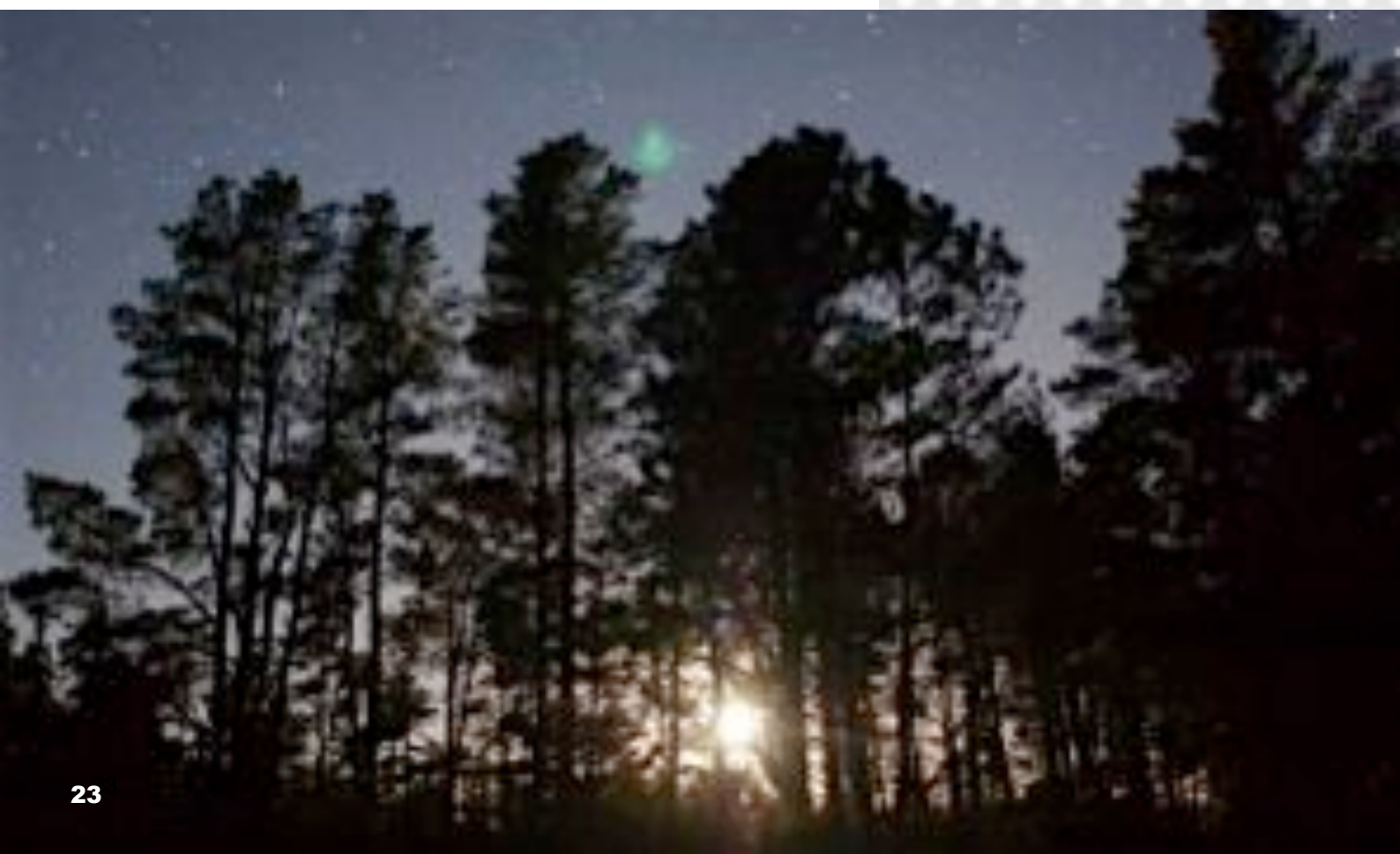
On observing nights, at any venue, you must arrange your own transport and please try to arrive well before sunset, to enable you to familiarise yourself with the surroundings before darkness sets in. If arriving later, make sure that your approach to the final gate is only with parking lights and ask 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 \$15.00 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 \$20.00 per visitor per evening. Please see Ned Pastor on your arrival to make your payment and please try to have the exact amount.

Limited sleeping accommodation is available but not guaranteed. 240vAC field power is available (bring your own waterproofed extension leads) as are kitchen and washroom facilities.



CAMPBELLTOWN MACARTHUR Advertiser

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Bold plan: Chris Malikoff said the Dharawal observatory would be similar to the existing facility (pictured) at the University of Western Sydney at Campbelltown — but more accessible.
Picture Jeff de Pasquale

HEAVENLY IDEA

Campbelltown's own Dharawal National Park could do more than just preserve our city's rich natural heritage — it could also help transport us to galaxies far, far away.
Jeff McGill reports on a bold new plan unveiled this week.

MACARTHUR Astronomical Society wants to build an observatory, open to all local residents, in the new Dharawal National Park.

It would not be built on pristine bushland, the society is quick to point out, but rather the old North

Cliff Colliery site in the centre of the park, near Wedderburn.

Society president Chris Malikoff said he was excited about the prospect of rehabilitating a "scorched earth" site and using it for scientific and educational purposes.

Because of the high elevation and light-free environment it would be a beautiful spot to do some stargazing, Mr Malikoff said.

The site is still under lease to BHP Billiton, pending restoration. But, if successful, the society would

seek finance to erect two observatory domes and a cabin for members to meet, plan their observing and possibly get some sleep.

"Our footprint within the park would be barely detectable," he said.

Mr Malikoff was buoyed by the warm reception the idea received so far from local MPs, former mayor Anoulack Chanthivong, Aboriginals and environmentalists.

CONTINUED PAGE 3

Education cuts undermine O'Farrell's win

MORE than 70 per cent of people who voted for the O'Farrell state government last year would not have done so had they known about the savage cuts it would make to the education budget, according to a recent poll.

But Campbelltown Liberal MP Bryan Doyle said the cuts were the right move.

The survey of 1002 people by Auspoll found 41 per cent had a worse opinion of the Premier as a result of the \$1.7 billion cuts to the education budget. Of those surveyed, 38 per cent were Coalition voters.

A total of 72 per cent said they would not have voted for Barry O'Farrell had they known.

And given that Campbelltown is the most marginal seat in NSW, changes in voter attitudes could have a big local impact at the next election. But the local MP is backing his boss.

"I realise the decision to reduce the spending on education, in line with the budget, isn't popular," Mr Doyle told the *Advertiser*.

"But I think doing the right thing isn't always popular."

He said the decision had not been made lightly but the money was needed elsewhere.

"People voted for a change in responsible government and we're actually in the process of making NSW a better place to live."

More than half the people surveyed said maintaining or increasing education funding was more important than the other government commitments such as maintaining the state's triple-A credit rating and building the north-west rail line.

Mr Doyle disagreed.

"Go live in South Australia and see what it means when you lose your credit rating," he said.

"It means the loss of everything because you need to pay more interest."

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Great relationship already established out west

LOCAL astronomers are inspired by the famous relationship that exists between Siding Springs Observatory, near Coonabarabran, and the adjoining Warrumbungle National Park.

Thousands of visitors keen on the observatory also visit the park – and vice versa.

It's a "mutualism" that the Macarthur Astronomical Society is keen to replicate, despite the fact the observatory proposed for Dharawal National

Park would only be a tiny fraction the size of Siding Springs. "The domes we intend putting in would be comparable in size to those at the UWS Rotary Observatory," said society member Roger Powell.

Mr Powell said some of the private pursuits permitted in NSW national parks include ornithology, cycling, swimming, even rock climbing.

"Astronomy is also a healthy outdoor activity best pursued in remote locations," he said. "After lengthy examination, we have concluded that not only is Dharawal the best place for an observatory, it is almost certainly the only place."

A dark location is manna from heaven

FROM PAGE 1

The society will outline its proposal in more detail to the local branch of the National Parks Association in a special meeting later this month.

Mr Malikoff said Macarthur Astronomical Society was one of the most active in the nation, but had no observatory of its own and no access to sites owned by others, such as UWS.

He said the proposed Dharawal facility would be used by society members for their own private observing, astrophotography and research, and for free public outreach.

"We would seek to engage our community at every opportunity, and support upcoming local scientists in future generations."

Funding for construction would obviously be a big hurdle, but the society has ideas and is thankful for the theoretical support it has already received from local MPs Bryan Doyle and Jai Rowell.

Roger Powell of Leumeah, a founding member of the society, is enthusiastic.

"All current observing is carried out – with the member's own personal equipment – at two rented sites, one at The Oaks and the other in Belanglo State Forest," he said. "We have no possibility of developing either site as an observatory."

"Our site at The Oaks is progressively more difficult to observe from because of increased light pollution from the urban sprawl."

Dharawal is the perfect spot, he said, after a long search of likely sites.



Grand designs: Chris Malikoff at the existing UWS observatory. "It would be something similar to this, but be readily accessible by our society and the public." Picture: Jeff de Pasquale

"Whilst we are never going to find a perfectly light-pollution-free site within easy reach of Campbelltown, we considered that within this generally protected region [of Dharawal] we had

"We have increased light pollution from the urban sprawl, which makes it very difficult for members to observe from their backyards."

Roger Powell, Macarthur Astronomical Society

the best opportunity for obtaining the use of a small plot and developing it as an observatory with minimum light pollution," Mr Powell said.

"We considered federally-

owned Holsworthy inappropriate because of its proximity to Sydney and its potential for unexploded artillery shells; the Woronora region is poorly accessible from Campbelltown and the Cordeaux, Avon and Nepean areas are too far south."

He said involving the public in the campaign was an important factor.

"Throughout its existence, the society has sought to extend its activities into the public domain, by holding free public observing nights and private observing sessions for community groups."

"We do not charge the public who attend our public field nights, our Macarthur Astronomy Forum or our other activities – although we will accept donations."

Website: www.macaastro.org.au.

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Reminded of our place on the planet

I'VE met people who believe national parks should be made open to shooters, horse-riders and even loggers or miners.

I've also met people who believe national parks should only be *their* own private domain with "normal" visitors and family groups banned.

Like all things in life, I find the middle path between two extremes the best option.

And I can't see any problem with an observatory in our Dharawal National Park.

Particularly given the local astronomy buffs aren't interested in building on pristine bushland; instead they want to rehabilitate a "scorched earth" mining site. Brilliant.

I'm a great believer in getting people into national parks and proudly "adopting" them.

Of course, it's still early days for Campbelltown's Dharawal NP, given to us earlier this year by Premier Barry O'Farrell.

There are not yet any proper picnic areas, signed walking tracks or viewing platforms.

These things will come, it just takes a bit of time.

To put it in perspective, the fight to create a Warrumbungle National Park, in north-west NSW, began in the 1930s. It was finally declared in the 1950s but many proper access and tourist facilities came in the 1970s and 1980s.

I hope Dharawal will be



EDITOR'S NOTE
with Jeff McGill

quicker than that — but I cite Warrumbungle NP here because, firstly, I know it very well (my family originally hail from up there) and, secondly, because it has proven how successful a relationship between a park and an observatory (Sid-spring Springs) can be.

With great support from the Aboriginal people, I might add. Astronomy, of course, is *not* a purely European invention.

In the Warrumbungles, the Gamilaraay people have Dreaming stories recounting the creation of three constellations and specific words for shooting stars, the moon and the Milky Way.

And I'm sure the Dharawal people were just as interested in the night skies above them.

I can't say it any better than one chief ranger, Tim Lanyon, who in an interpretive plan described the evocative and inspirational setting of nature and noted "the power of the Warrumbungles to evoke some sense of deeper meaning to visitors about themselves — and their place on the planet."

The same could be said for our stunning gorge country. jmcgill@fairfaxmedia.com.au

READER OF THE WEEK



Your favourite meal at The Hermitage? On this current spring menu I'd have to say the assiette of salmon entree is a beauty.

How important is good food? Very. It helps introduce the changing of food trends, health, diet and greater awareness of saturated fats.

The most challenging part of your job? Creating new dishes for the seasonal menu changes and in turn challenging our guests to be adventurous.

If you could cook for one famous person, who would it be? Muhammad Ali. When we were kids there was only one world heavyweight title fight and the world would stop to watch it. Over my career I've had the pleasure of cooking for many famous people such as Princess Anne, Mel Gibson, Rod Stewart, Sam Neil, Cindy Lauper, Dick Smith, Neville Wran, Mike Munro, Mike Willesee and Don Burke.

JOHN NAZIM is head chef and co-director of The Hermitage Restaurant in Leumeah

Favourite thing about Campbelltown? It's growing but it still has that small-town feel.

What has working here taught you? Campbelltown is very different; it's tightknit and yet it's very diverse.

The best advice given to you? [Hermitage owner] Cliff Barry said: "Don't be greedy, don't go too fast, serve quality with quantity at reasonable prices and chip away slowly."

How do you spend your ideal day off? Come out of the surf, put my sunnies on, kick back with a beer with my wife Chier alongside.

Favourite sporting team? Wests Tigers! I played a lot of junior footy at Balmain [Tigers juniors area], Strathfield and Enfield [Wests Magpies juniors areas]. They're in my blood.

Check this out

Take a trip back in time at the Campbelltown Steam and Machinery Museum open weekend. There will be fun for the family with everything that whirs, hisses or bangs on show. Also tractor ploughing, wagon rides, vintage cars and food stalls. Off Menangle Road. Details: 0417 215 513. CampbelltownTourism.com.au

MAC CHAT



Another walk?

Speaking of Campbelltown's own Dharawal National Park...

The *Advertiser* and our good friends in the Macarthur branch of the National Parks Association have this year led several walking tours of local readers down to explore parts of the gorge country. We're just wondering if more people would like to join us on another bushwalk? If you're interested, send our editor an email (jmcgill@fairfaxmedia.com.au) and, depending on the response, we'll see if we can pencil in another date in the near future.

Reach for the stars

And speaking of astronomy, as we did on our front page...

How many astronomers does it take to change a light bulb? Two. One to change the bulb, the other to complain about the light pollution it causes. We're also reminded of a 2009 joke about the 40th anniversary of the moon landing: "To commemorate the event Neil Armstrong, Buzz Aldrin, and Michael Collins will arrive together in a limousine. Neil and Buzz will join the festivities and Michael will be left sitting in the car."

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Wednesday: 7pm - Tom White - Guitar/Vocal Tom's repertoire consists of easy listening music inspired by Pete Murray, Jack Johnson, John Mayer, Ian Moss, and bands such as Powderfinger, Matchbox 20, Crowded House and Hunters and Collectors.

Thursday: 7pm - John Watson "Piano Man" - Australia's leading Piano/Vocal Entertainer. Twice winner of ACE (Australian Club Entertainer) award.

Friday: 7pm - "Urban Gypsies Quartet". Beautiful mix of fusion guitar-cello compositions from the jazz tradition of improvisation and the rhythmic palette of gypsy, latin and world music.

Saturday afternoon: 12:00pm - Ross Maio- Solo Accordion
Winner of the Australian Club Entertainment Award 1998
Winner of the 20th MO AWARD for Best Variety Instrumentalist, awarded in 1995 (first solo Accordionist to win this award). Nominated consistently, for the Best Variety Instrumentalist since 1986.

Saturday night: 7pm - Singer/Songwriter/Pianist Bonnie J Jensen is appearing with her Quartet comprising some of the cream of Sydney's jazz scene. They will be presenting material from Bonnie's latest album *Shimmer* including her signature jazzy arrangements of pop tunes, songs from the Brazilian songbook swinging standards and blues.

Sunday Afternoon: 12:00pm - Don Hopkins - Master of Blues (Piano/Vocal)
The winner of the International Blues Challenge 2012 in Memphis USA.
An incredible mix of gospel, boogies, country blues. Nothing seems lacking, the bass lines are there, the easy going infectious beat, the expressive solo passages and the incessant piano riffs filling in around those blues drenched vocals of Dr. Don Hopkins.

Sunday night: 8:00pm - Ross Maio- Solo Accordion Winner of the Australian Club Entertainment Award 1998 Winner of the 20th MO AWARD for Best Variety Instrumentalist, awarded in 1995 (first solo Accordionist to win this award). Nominated consistently, for the Best Variety Instrumentalist since 1986.

BOOK NOW....

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Sat - 11:30 - till late | Sun - 11:30 - till late.
Entry through Airs Road, Next to lollipops play house



Top: Rho Ophiuchus - Roger Powell

Below: Milky Way - Roger Powell





Sun through 60mm Coronado Solar Telescope - Ned Pastor

heavens above! (Temporarily Out Of Stock)

It is a very common misconception by people on the fringe of amateur astronomy that you absolutely need a telescope to "see anything interesting".

This book comprises 158 pages and contains over 80 diagrams of the sky viewed from the Southern Hemisphere

In the book, the author takes you through all the constellations visible from the Southern Hemisphere which have objects visible through binoculars.

The planets and many globular clusters, open clusters, gaseous nebulae, galaxies, double stars and

This is an excellent introduction to observational astronomy for beginners of all ages.

To purchase your copy of this excellent book please forward your cheque or postal order (made out to Robert Bee) for AU\$19.50 to the author at the address below.

This includes postage and handling (within Australia).

Please contact Robert Bee at rmbee99@hotmail.com for more details about the book or Direct Deposit information.

Robert Bee,

8 Joseph Banks Court,

MOUNT ANNAN, NSW, 2567

About the Author:

Robert Bee lives at Mount Annan on the south-west outskirts of Sydney, NSW.

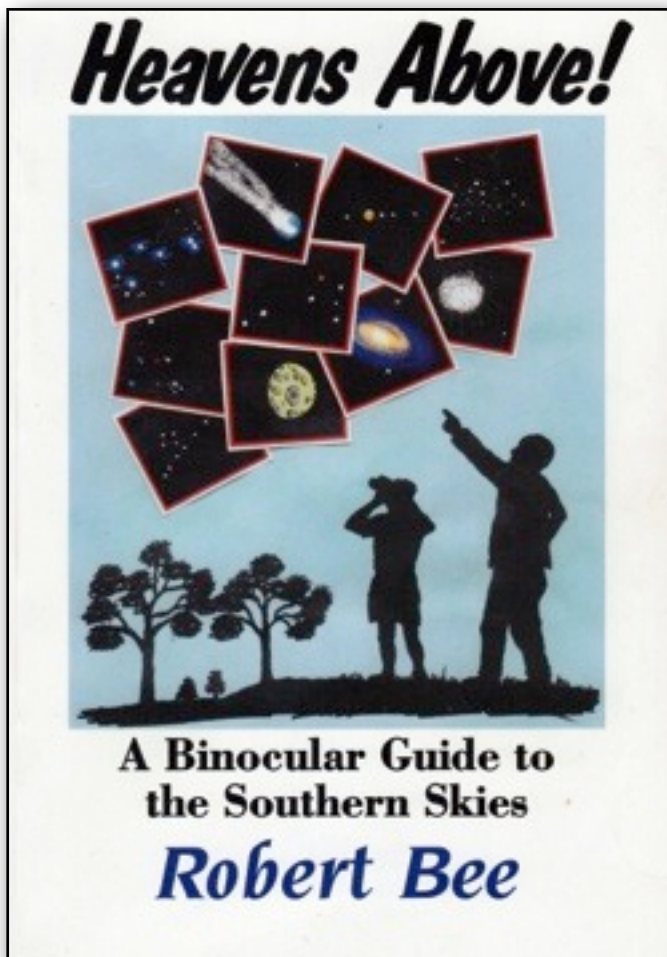
Robert's passion for astronomy began in his teens and has deepened over the ensuing years. With degrees in Electrical Engineering and Science, he enjoys both observing the starry sky and understanding the physical laws behind what he sees.

Robert is a member of the Macarthur Astronomical Society (MAS) and has edited and contributed to the Society's monthly journal "Prime Focus" since it commenced in 1996 up to 2006. He has carried several positions within the Society during that time.

He shares his passion for astronomy with the people of the Macarthur Region through a fortnightly column called "Heavens Above!" in the Macarthur Chronicle newspaper. This column commenced in 1998 and is aimed at those with no background in science or astronomy, just a sense of curiosity and a willingness to step outside the back door and have a look at the sky.

Robert also enjoys writing fiction, with a preference for science fiction and fantasy, and has had a number of short stories published in periodical magazines and successes in short story literary competitions. He currently has a children's science fiction novel, with an astronomy theme of course, in progress.

Robert enjoys talking to the public about astronomy and guiding them around the sky, both at public nights run by MAS and also at clubs, societies and schools.



asterisms can be found with your humble field glasses.

This book contains:-

- charts showing 56 of the 88 constellations with the locations of binocular objects they contain and description and details of each object.
- maps of each month of the year showing the location of the constellations in the sky to the north and south

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October: dr. simon o'toole

"A new view of planets and stars with the Kepler Space Telescope"

Finding new planets is big news. The more planets we find, the better the chances for life elsewhere in the Universe, and the closer we are to answering the ultimate question: "Are we alone?"

Going to space has had an enormous impact on this quest, and the Kepler spacecraft is leading the charge. It stares at one patch of sky, patiently waiting for a star's light to momentarily dim as a planet passes in front of it. As a bonus, we can also measure millions of tiny "starquakes", allowing us learn a huge amount about the stars themselves using the tools of seismology. In this talk I will discuss the tremendous leap forward in these fields that Kepler has enabled.



M.A.S. HYSTERIA !!!

THE MOST EXCITING
PHRASE TO HEAR IN SCIENCE IS
NOT "BURSKAI", BUT RATHER
"NOW... THAT'S FUNNY..."



ISAC ASIMOV