



PRIME FOCUS

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

mas
macarthur
astronomical
society

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volume 17 issue 9

Curiosity
Image Credit: JPL/NASA

from the editor's desk

Welcome to the September 2012 edition of Prime Focus - volume 17, edition 9.

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.

We are constantly seeking articles about your experiences as an amateur astronomer and member of MAS, on any astronomy-related topic about which you hold a particular interest. Please submit any articles to the Editor at editor@macastro.org.au at any time. Original type-written material on A4 paper may also be submitted as they are able to be scanned. Please ensure that the quality of type is good so that it will scan properly.

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

<http://www.macastro.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@macastro.org.au. File sizes can reach 35Mb+.

If amateur astronomy-related vendors would like to advertise in Prime Focus please send an email to the Secretary with your details, and we will endeavour to come back to you with a suitable plan.

Please enjoy this September edition - our ninth for the year 2012.

Clear Skies!
Chris Malikoff

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M.A.S. Hysteria!!!

Hello Members

Another month slips by. I confess that my work level has been registering off the dial for the past few months, so may I offer my sincere apologies to you all for not being able to keep up as regular a correspondence schedule on MAS issues as I'd have liked to. I know that my response to emails on several issues has been lacking, and for this I'm very sorry indeed. Hopefully as the year draws to a close I'll be a little more free to keep in touch.

The most significant project that M.A.S., as a society, has ever embarked upon is gaining momentum. I write, of course, of the Dharawal Observatory we are proposing to build. We don't have a working name for it yet, so this is as good as any for the moment.

A rather large and complicated proposal is being formulated by our observatory team consisting of Roger, Tony and Trevor. Roger is doing a fantastic job in penning the proposal itself. It's a very comprehensive, informative and well constructed document that should do a great job in putting our case forward to the right local and state government officials as well as the Aboriginal Land Council and concerned private companies and individuals. It will be costed and justified.

We aren't holding back on what we'd like to come out of it all with - it will be a fantastic facility if it all goes to plan and we are granted land and funds to build a super observatory. It would be made available to members of M.A.S. as well as be used to host members of the public on specially-arranged nights. It could also serve as a scientific data gathering facility - providing data to organisations around the world with information on local weather patterns, sky quality, spectral analysis and variable star observations. It will host a high-end photographic system with a plethora of filters designed to collect this data. This sort of gear will be housed in 6.7m and 3.5m domes. Serious stuff! The larger dome will be designed to house a large Dobsonian-mounted Newtonian reflector for visual observation by members and the invited public. It will be large enough to house quite a group inside the dome for demonstrations.

We'll keep you all in the loop as things progress. This is not a short term exercise. We expect the site to go through a full remediation process that will take at least two years first. The advantage we have in coming in on the bottom floor is that we have a great opportunity to put our case forward early, and this will see certain aspects of the current site left alone for us to use as the basis of the build. Stay tuned!

I wish to welcome a long-time friend of the Macarthur Astronomical Society, Prof. Geraint Lewis, back to our Macarthur Astronomical Forum to speak again on the wonders of our cosmos.

Clearest of skies!

Chris

Schedule Planner

September 2012
to
October 2012

| DATE | EVENT | SUMMARY | TIMES |
|------------------------|-----------------------------------|--|----------------------|
| 14-15th September | The Forest | MAS members private observing nights (Fri/Sat) at The Forest | MS 15:55 SS 17:48 |
| 17th September | Macarthur Astronomy Forum | Guest speaker Prof. G. Lewis - UWS Bldg 21, Rm 6 | |
| 18th October (CHANGED) | Bunnings Narellan - Student Night | The first of a series of high school student nights hosted by Bunnings & MAS | MS 22:25 SS 19:13 |
| 10th November | Wedderburn Airfield | Dinner, and a night showing members of the NSW Sport Aero Club the heavens | MS 15:27 SS 19:34 |

AUGUST 2012
HUMAYUN QURESHI

BY ROGER POWELL



I began this "Speaker Watch" series because I felt that some of the things our guest speakers were telling us were far too important to be completely lost - despite the obvious risk posed by condensing a talk down to a few paragraphs. This is particularly true in the case of Humayun Qureshi, who shared his best images with us at the August Forum and provided many tips for the Society's growing army of astro-imagers. Reducing all of his tips into a single article is not easy.

Humayun's talk was called "Delivering Aesthetically Pleasing DSLR Images". He described himself as both a "technical person" and a "creative person." I think he should also have added "very patient person" because he does not appear to be a man who churns out astro-images in large quantities. Rather, he concentrates on planning a stunning image and takes as much time as he deems necessary in order to achieve just that.

Whereas perhaps many of us might just "point and shoot" and worry about the details later, Humayun will be spending a great deal of time, prior to even going outside with his equipment, first selecting the initial target, then determining how best to frame, compose and orient the contents of the image and deciding how many exposures he will need to achieve a great image. He will then spend many long hours exposing the images - often over a period of many nights spread across many months - and then spend many more hours patiently stacking, cropping and processing his images to bring out the best contrast and colour.

Some of Humayun's best tips? Image no more than one object per night. Image only high in the sky, where the atmosphere is thinnest and light pollution is minimised. Apply the "Rule of Thirds:" which means the focal points in any composition should fall on the horizontal and/or vertical "lines of thirds," because our minds seem to pick up on thirds, making the image more pleasing.

The colder the better - camera noise doubles for every six degree temperature rise. Do test exposures. Use the histograms provided on DSLR camera images. Use a focal reducer. Know the absolute limitations of your ISO settings, which can vary between cameras and can improve with technology. Always do dark frames before, during and after the main images and then combine them. Take 16-25 flat frames (at the lowest ISO) - e.g. an image of a white wall or a light box - and combine them to enable the subtraction of dirt and dust residue in the camera.

If you use Photoshop CS4, use the "Vibrance" command. When taking landscape images, do so only around dawn or dusk, during the "Golden Hour." To get diffraction spikes - use black cotton (or light fishing line) fixed with blue tack.

Two years ago, Humayun embarked on a new long-term challenge, that of photographing a mosaic of sixteen adjacent sky images and stitching them into one large composition. He's well into it and he showed us the results in progress: an astonishingly detailed wide field image of the Rho Ophiuchi region.

Humayun uses the following free software: Iris ; Canon EOS Utility and Canon Digital Photo Professional (both come with your Canon camera); Deep Sky Stacker.

He uses the following purchased software: Photoshop (\$1,061 for CS6 download); Starry Night Pro Plus (\$250.00); and Pixinsight (171 Euros); Diffraction Limited Maxim DL (\$199-\$665); Skysurvey.org (\$2.99 app)

Humayun's is a member of the Canberra Astronomical Society and his best images are available in his Google+ Image Gallery:

<https://plus.google.com/photos/105538468557560833220/albums/5776462316403951729>

AT THE MACARTHUR ASTRONOMY FORUM:

This month: Cosmologist, Professor Geraint Lewis.
October: Astronomer, Dr. Simon O'Toole.

Vixen "Polarie"

Chris Malikoff

My back simply isn't as good as it used to be. Being passionate about astrophotography means lugging necessarily-heavy equipment to and from dark sky sites if you don't have access to the luxury of a permanent observatory. Not being able to lift my Losmandy G-11 and associated refractors into the car any more without it resulting in a week's holiday on my back has meant that I had simply lost the inclination to photograph anything.

Roger Powell to the rescue. Although I'd heard of, and was even familiar with the Vixen Polarie in pictures, I'd never seen one in the flesh. Roger bought one recently and was recently kind enough to let me see his. I was sold. The build quality is reassuringly solid. Along with others of similar ilk such as the Losmandy StarLapse and British AstroTrac, the Polarie was the light weight solution to my problem!



Milky Way - a series of six 300 second images at ISO400 stacked and aligned in Photoshop CS4.

According to my scales, the main unit weighs 728g. Add to this the ball head on which you mount your camera and the camera I use itself, the whole lot weighs in at a tiny 1,625 grams. Throw in your standard tripod and you have a complete system that comes in at around 5kg. A big difference to 75kg for my other setup.

With a standard DSLR and lens at a reasonable ISO400, I have accurately tracked the sky for five full minutes at a time. With a polar scope, you can align even more accurately than by the super-simple method of compass and inclinometer. I'm hoping for full 600 second exposures in the near future - all from a system that fits in your glove box. More information to come in future editions of Prime Focus.





Some more photos of the proposed MAS observatory site at the old North Cliff Mine site within the new Dharawal National Park.





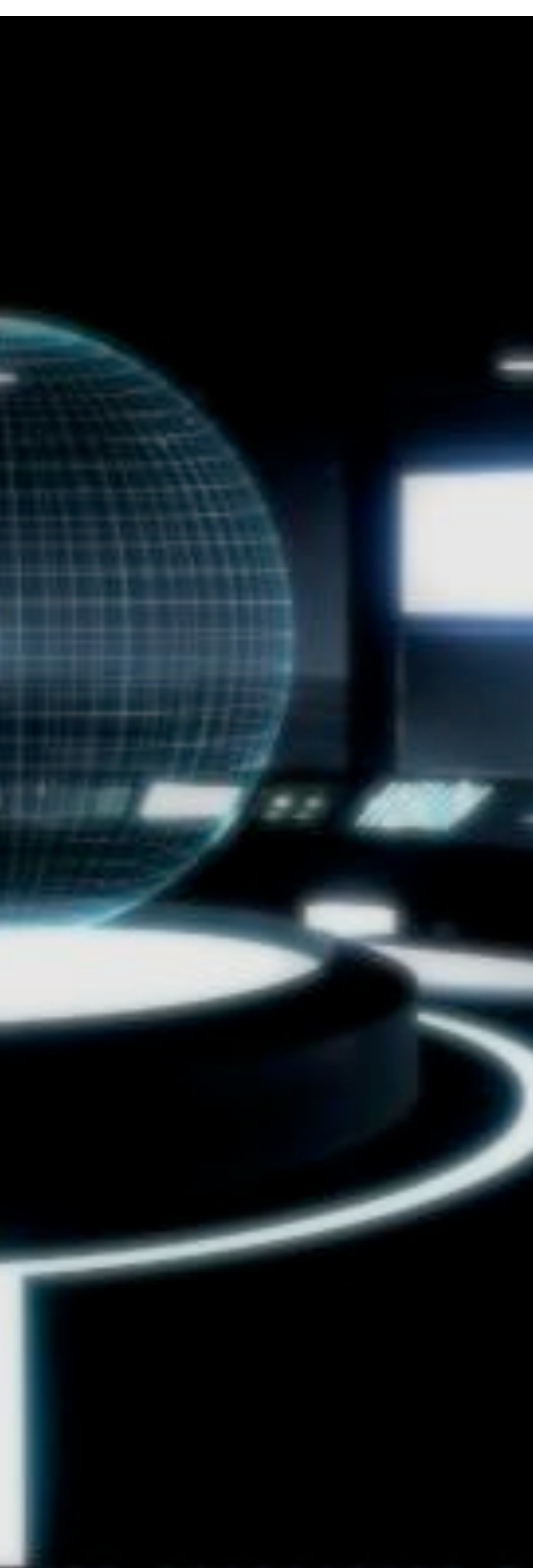
Tony Law setting up for an evening's astrophotography.

Debbie Taylor aligning the finder on her 16" Newtonian at a recent public night at Dudley Chesham Sportsground



Jack Goralewski collimating his 30cm
Newtonian for the public night ahead.





“Gravity Keeps Falling on my Head”

Bob Bee

The blinding light from the supernova triggered the automatic shutters, sealing the Ship from the universe outside. In the violet after-image, Commander K'laag sensed, rather than saw, the green disc that had been R'gur, his home planet. R'gur, once 'Tranquil Water', was now supersonic steam, adding its atoms to their dead star's reseeded space.

"Commander, Ship's secure." First Officer K'guur stood stiffly to attention, his six broad legs spaced in strictly regulation rows. "Your orders?"

"Lighten up, K'guur," K'laag snapped, then recognised the irony of his comment. The Ship was still at zero gravity, so they could hardly be lighter. "We've prepared for this moment for decades. Our course is locked in." He indicated the cross-hairs on the navigation board. "In seven generations, the Ship will arrive at our designated star. Then we... they... will know if our learned astronomers were correct about the existence of planets."

"If not...sir?"

"Then may a sister Ship have greater fortune at their star."

"And what are our chances of finding a compatible water-bound planet?"

"A weighty question, Number One... speaking of which, you asked for orders. So... energise the gravity field. A leader should have all six feet firmly on the deck when starting an epic voyage."

Commander K'laag felt the reassuring pressure of the deck return to his foot pads. He watched the bridge crew settle back into their posts. Conscious of his scrutiny, they ensured their articulated backs were locked straight and regulation parallel to the deck.

So, we begin. "Engage main drive," he ordered. "And may the unknown waters and aborigines of the new world welcome our descendants."

* * *

"Admit it, dad," the teenager faced his father over the computer monitor. "There's no money in the environmental investigations business. It's a turkey."

Stewart McFarlane raised himself to full sitting height. "McFarlane Environmental Safety and Security Investigations Enterprises, young man, is not in the poultry business. And if it was," he added, "it would only lay golden eggs."

His son's retort was cut off by the phone beside the computer.

"Hello? Jackie. This is my day off, you know. Can't it wait? I'm teaching Angus the finer points of chook farming."

"Apparently not, boss. There's been an explosion at Yarrunga Hydro station. The station manager, Peter Grainger, specifically asked for you."

"Hydro stations don't explode."

"Tell that to the hole in their roof. He's on hold waiting for a reply."

The inexorable wheels of logic rolled in Stewart's brain. "I'm not sure what he expects..."

"It's not the explosion he wants you about, boss. It's the...other thing." Jackie whispered.

"What...other thing?" Stewart whispered back.

"He wouldn't say over the phone."

"Put him on...Hello? Stewart McFarlane, your problem is our environment. How can..."

The station manager cut off Stewart's spiel and spoke in an earnest but shaky voice for a full uninterrupted minute. "You come well recommended," he concluded. "Can you help?"

"Fascinating," Stewart said. "Yes, I'll be there. Three hours." He hung up without saying goodbye, an uncharacteristic lapse.

"What happened, Dad?"

"The impossible." He smiled at his son, tucked his hands into his armpits and flapped his wings.

"Blaark bluck bluck bluck...blaaaark."

* * *

By the time he turned his Mercedes off the Kangaroo Valley Road towards Lake Yarrunga, Stewart had already calculated the limited range of possibilities facing him. His analytical abilities were surpassed only by his self-confidence. Using his extensive knowledge of physics and engineering, he had discarded all but one explanation as he entered the gates of Yarrunga Power Station.

Peter Grainger was waiting for him at the main entrance. "Mister McFarlane, is it?" The station manager offered his hand, while looking up at Stewart's two-metre frame.

"It is." Stewart shook hands, then fixed his gaze on Grainger's nose tip. "Show me. This I've got to see."

Grainger crossed his eyes to check his nose, then realised Stewart had passed him, moving in gigantic strides towards the building.

The four hydro generators stood in a line down the long turbine house hall. At least, three did. The second in line was missing, as was a section of the high vaulted roof, directly overhead. The floor was carpeted with water.

Stewart stopped unexpectedly, causing Grainger to double back through a puddle.

"Da da da dummmmm," Stewart hummed.

"Pardon?" The station manager's face revealed the doubts he was having on his selection of consultants.

"Very neat. Landed in the pondage I assume?"

Stewart walked to the gaping hole in the floor and looked down. He winced. "Hope you've got a spare."

* * *

In the control room, Stewart met the operator who was in charge at the time of the incident. He was off duty but had bravely awaited Stewart's arrival.

"Tell me about it... please," Stewart prompted.

Between nervous twitches, the operator retold the story. The Number Two turbine had been on full load, humming quietly, when there was the grandmother of all water hammers in the main pipe, as if all the taps in the world had been suddenly turned off at once. Teeth rattling, his head had snapped up in

time to see the generator and its drive shaft disappearing through the roof.

Then, to Stewart's embarrassment, the operator began to cry. A soft exhaled sigh, a trembling bottom lip, a drowning fish impersonation. Finally, a series of gut-wrenching sobs deafened the onlookers until, exhausted, he slumped into his chair. With what appeared to be his last gram of strength, he feebly pointed to the control panel on the wall.

"Ah...thank you." Stewart took three brisk strides to the Number One turbine control panel, knowing exactly what to look for. Two meters sat side by side, but worlds apart in the stories they told.

"Peter...please correct me, but the main water inlet valve is one fifth open, which would give an electrical output of..."

"Twenty percent maximum rating," the Station Manager responded, his voice strangely dull. Defeated. Maybe it was time to retire and get his stamp collection in order.

"Yes, I thought so. Fascinating." Stewart hummed some Beethoven while he stared at the power output meter which sat, rock solid, at one hundred percent maximum rating. "Of course, you know what this means?"

"No, I don't." Peter, trying to comfort his operator, finally snapped. "That's why we're paying your obscene fee. What the hell does it mean?"

"It means I need a cappuccino. This is no time for cafe bar brew."

* * *

Stewart watched the sugar sink into the chocolate sprinkled froth. His table provided a view of the rustic shops across the street. "Yee Olde Coffee Shoppe", in the quiet village of Kangaroo Valley, was a short drive from the enigma at Yarrunga power station. It had an ambience of peace, tranquillity and ... coffee. The perfect pick-me-up for the shock Stewart had received.

Of course, with his giant intellect, Stewart already knew how the generator was producing five times as much power as the water going into the turbine should provide. The maths were inevitable. The only thing he didn't know was...why? Or, more to the point...who?

He finished his cappuccino and ordered another, with apricot Danish. While waiting for their arrival, he closed his eyes to contemplate the mystery. He felt the warm sun basking his face, the rich aroma of coffee beans tickling his dilated nostrils, something soft and furry rubbing against his leg...

"Lucifer," a reproachful female voice hissed.

Stewart snapped out of his reverie to see a huge black cat with evil golden eyes staring up at him. Two tables away sat a witch.

"Yours?" Stewart asked the witch, with admirable aplomb.

"Please excuse Lucifer. It must be your aura. Strange."

"It's a day for strange things. And it's quite alright. Me and my aura needed a good rub." Stewart winked at the cat.

"I'm not really a witch."

"Eh?" Stewart's aplomb landed like a bomb. "Did I say you were?"

"Didn't have to. I read minds." The non-witch smiled, her emerald eyes sparkling in amusement. "Vine, Jasmine Vine. Seer, fortune teller, reader of palms... and occasional minds."

Stewart smiled at Jasmine, taking in her gaudy scarf, bright silk kaftan, jewel-encrusted rings on every finger.

"One has to dress to meet one's client's expectations." Jasmine explained.

"One must, I agree entirely." Stewart thanked the waitress for his coffee and Danish. "However, my client's expectations are for more than flamboyant appearances."

"Yes," Jasmine sighed in a dramatic 'seeing' sort of way. "A matter of gravity."

Stewart choked on his cappuccino. "Ordinarily, Miss Vine..."

"Jasmine, please."

"... I would discount you as a clever charlatan..."

"Only clever?"

"...but seeing what I saw this afternoon, your supernatural tricks..."

"Gifts."

"...which I will accept for the moment as genuine..."

"Thank you."

"...still pale into insignificance."

"Pale, maybe," Jasmine preened her flaming red hair.

"Insignificant, never."

"Then how would you explain water, falling from a height of one hundred metres, having a pressure of a five hundred metre drop?" Stewart pointed the Danish dramatically at Jasmine, like a teacher with a blackboard duster.

"Heavy," Jasmine said in a husky voice.

"Yes, heavy. But ...why?" Stewart slurped the chocolate foam noisily.

"Don't you mean 'who'?" Jasmine fixed him with her green eyes.

"Can you see anything not already in my mind?"

"Do you have an object from..."

Stewart took a small lump of metal from his pocket and handed it to Jasmine. "This is the remains of a sheared-off holding bolt for the late lamented and erstwhile airborne number two turbine. May it rest in pieces."

"I see...I see..." Jasmine rolled her eyes upwards and moaned softly. "Fear...a giant world... a desperate flight..."

Lucifer hissed approval.

"...a void...water...weightless... weight...much weight... safe." Jasmine opened her eyes. "That's all."

"That's enough. Would you consider a job as a consultant?"

* * *

Peter Grainger's eyes all but popped out. "Aliens? In the pipe?"

"Not just aliens," Stewart corrected him. "High gravity generating aliens. Refugees from their lost dense world."

"Of course. How could I have forgotten that?"

Peter backed away, wondering if he should call for security. This consultant was a nut.

"You're not convinced." Stewart reached into his breast pocket.

The Station Manager gave a cry and ducked under his office desk. "Don't shoot," he pleaded in a muffled voice.

Stewart McFarlane strode across to the desk and sat heavily on one corner, causing the imitation mahogany to groan dangerously. "Mister Grainger, what do you take me for? Some kind of nut? Am I going to shoot you with my Parker pen? I assure you that McFarlane etcetera Enterprises doesn't indulge in such theatrics. Besides, it's bad form to terminate a client before payment." He knocked on the desk. "Now, will you please come out and listen to my explanation." Peter Grainger crawled out and sat heavily on the chair. "I thought..."

"Yes, yes, I understand." Stewart unscrewed his pen top and pulled an invoice from Peter's inwards tray, turning to its blank back page. "Not an uncommon reaction from some of my clients. I must find out why some day. However...back to the aliens."

"Must we?"

"We must. Look here." Stewart drew a simple sketch of the power station reservoir, its two feeder pipes and the four turbines at the bottom. "Not Picasso, but it will suffice." Then, in his best teacher voice, waving his Parker like a ruler, Stewart spelt out the situation.

"Units three and four share the second pipe. And everything is perfectly normal. Correct?"

"Uh, correct." Peter waited, curious now. His engineering instincts had taken charge over his initial fear. And he figured Stewart couldn't be dangerous while he was talking. He hoped.

"Units one and two share the first pipe. Unit one wasn't running when Unit two went up-up-and-away. Correct?" Stewart didn't wait for a reply. He was running hot, like Unit one. "Now, Unit one is running at an output five times its input. Correct?" This time he waited.

"Uh, correct," Peter said on cue.

"So, where is all this power coming from?" Stewart asked rhetorically, and was visibly annoyed to receive an answer.

"UFOs," Peter suggested.

"Wherever did you get that crazy idea?" Stewart snapped.

"You said..."

"Never mind what I said. Pay attention to the lesson." Stewart rapped Peter's knuckles with his pen. "UFOs. Spare me."

Stewart spent the next ten minutes eliminating impossible causes of the excess power.

"And you know what Sherlock Holmes said, eh Watson?" Stewart drew a heavy circle around the letter 'G' he'd drawn.

"No, but I'm sure you're going to tell me," Peter said, staring at the vandalised invoice and the circled letter. "Once you have eliminated the impossible, whatever remains, no matter how improbable, is the answer," Stewart recited reverently. "Or words to that affect. So, there's your cause." Stewart gave a satisfied smile "Where?"

Stewart handed Peter three folded pages of calculations. "Study them later. The bottom line is that somewhere in your number one pipe, there is a source of gravity fifteen times that of Earth's." He sat back, smugly pleased with his conclusion. Peter gasped. "Fifteen times?"

"And when it was first switched on, it caused that almighty water hammer that sent your operating number two turbine through the roof...literally."

Peter had a déjà vu moment that this might be a good time for a cappuccino. "But where does all this gravity...if it exists...come from?"

"It does exist, and I thought I told you. Aliens!" Stewart shook his head in frustration. "I wish you'd listen, Peter."

"But I said..."

"You said UFOs. There's a difference." Stewart pocketed his pen.

Peter lurched to his feet, the stress of the day's extraordinary events taking its toll. "You are nuts. This is bumph straight out the X-Files." He thumped his desk, then clutched his hand in pain.

Stewart drew himself to his full two-metre height. "Sir, I'll remind you that X-Files is fictitious bumph." He pointed at the papers Peter was holding. "That bumph...is real."

* * *

The two giant steel encased pipes loomed on either side of the concrete stairway. Peter and Stewart had almost reached halfway.

Stewart pivoted carefully on the steep stairs and looked down onto the roof of the power station. "I don't remember my contract including mountain climbing," he sighed. Then he looked up past Peter's feet toward the skyline. "We should be close. Be careful."

"Of what?"

"For one thing, of your head being pushed between your collarbones."

"You're kidding?"

"I rarely joke when I am afraid of falling to my death. And a fifteen gravity push would make a very spectacular — and messy — fall."

"If it's that dangerous, what are we doing up here?" Peter tried to cling to the concrete steps.

"Do the words 'I won't believe this fifteen gees crap until I see it with my own eyes' strike a chord?"

Stewart started to squeeze past Peter on the narrow steps. "I'll lead from here. I wouldn't want to lose a client. Not..."

"...before payment," Peter chuckled.

Stewart slowly crept up the next three steps, then stopped.

"How do you see wind?" Stewart whispered as he stared up at the number one pipe on his right.

Here we go again, Peter thought. "You can't, but you can see its effects. A tree's leaves moving, the dust..."

"How do you see gravity, Peter?" Stewart interrupted while reaching into his coat pocket.

"You can't," Peter said flatly.

"Wanna bet?" Stewart pulled out a rich, ripe tomato and like an army commando, lobbed it hard up the stairway beside the pipe. Then he ducked and hugged the concrete like there was no tomorrow. "Incoming," he yelled.

"What on earth?" Peter stared at the tomato. The red projectile seemed to stop in mid-arc, as if entrapped in an invisible web. Then the tomato leapt downwards as if shot from a cannon. It struck him square on the nose, spreading tomato paste from forehead to chin.

Stewart calmly reached into a pocket and produced a small mirror, which he handed to Peter.

"Behold, with your own eyes. Fifteen gravities."

* * *

"Talk to them? How?" Peter Grainger's nose still smarted, but not as much as his pride.

Stewart sipped his Cafe Bar brew. How he longed for Yee Olde Coffee Shoppe and a good leg rub. "Ah, that would come under 'trade secret' I imagine. At least," he smiled at the mental image of Peter's red dripping face, "until I've signed a new contract."

"What would you talk about?"

Stewart McFarlane leaned back in the station manager's leather armchair and smiled enigmatically.

"I'm sure I'll think of something. Blaaaak bluck bluck bluck...blaaaark!"

*

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"in a flat spin"

Part 9 - What's the Attraction?

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

At the time of writing, exciting developments have occurred in the world of physics. I note though, the initial jubilation and general media interest has quickly evaporated. My crystal ball tells me the opposite is true in the real world of physics, where the apparent discovery of the Higgs' Boson has set fresh adrenalin pumping. For the likes of the humble scribbler and amateur researcher, life goes on until something conclusive is resolved; meanwhile, we work with what we have. I sincerely hope I'm around to witness the new revelations.

In 1944 - just 67 years ago - I began life in a small, one up one down, cottage in the South-West of England. The cottage had no electricity. We had one coal-gas light in the downstairs room. The gas was produced at the local gas works. We had a wireless - which was powered by an accumulator. The accumulator had to be taken to the 'electricity shop' for regular recharging. We did have a gas stove, tucked underneath an outside lean-to roof, and a dark, dingy dunny - full of cobwebs. At night, our one bedroom was illuminated by the guttering, reflected light of a gas streetlamp, which stood close by. Across the road stood a sentinel red phone box, complete with a penny in the slot - button A and button B 'Bakelite' phone. My parents didn't use such appliances; they didn't know people with phones. I raise the subject here as a simple

reminder of how far (we think) we've come in the intervening years. Today, we imagine ourselves to be 'on the cusp of a new technological age' - and conveniently forget how ignorant we were 'just yesterday'. On reflection - whilst many great advances in technology were made during the 20th century - much of what has occurred since has only been development and improvement of those original advances. A car is still a car - a phone - a phone. Telescopes are still telescopes, and computers that once filled many floors, are still just computers. Real breakthroughs are hard won - and even then often unintentionally so. And thus it has been in science and physics - astronomy and cosmology throughout history. One step forward and two steps back.

It is a well established fact that matter is concentrated energy - very concentrated energy! For example - the amount of energy stored in a glass marble, is equivalent to that released in the explosion of a 500

kiloton hydrogen bomb! A corny example, which means little - except that it highlights our inability to actually release that potential energy. Nature has no such problem; but nature also has a bigger laboratory and cares not about collateral damage. It is the sheer size of nature's laboratory and grasping the implications of 'what exactly is exercising its influence on what' that baffles even the most assiduous mind.

*"The only reason for
time is so that
everything doesn't
happen at once."*

A. Einstein

It was only during the 1980s, with the development of better telescopes and associated hardware, that the authenticity of superclusters gradually became accepted. Briefly, these cosmic structures are generally described as being - long, thin strands of clusters and galaxies, intra-cluster gases - and, it is assumed - "dark matter" on a two dimensional surface. Typically, the strands are represented as scattered and surrounded by large voids, which are presumed to be nearly devoid of any matter. This remains the basic scenario to this present day, and supports modern galaxy-formation theory. Contrary to current information in 1982 - when it was 'discovered' that the universe appeared to be moving apart - it was revealed that, the Milky Way, and its neighbours were in fact moving in concert through the cosmos. Another insoluble anomaly had presented itself.

Journalist, Walter Sullivan, reporting in The New York Times - May 5th, 1987: Astronomers believe they have located an extraordinary concentration of galaxies, far more massive than any other known, whose gravity is pulling the Milky Way and many thousands more galaxies in its direction. The story was extensive and detailed, as it attempted to correlate any number of opposing assumptions being made at that time.

In the first instance - this 'mysterious cluster', as it was called - was christened with an aptly mystifying name: The Great Attractor. Not very original - but what else would one call such an object? At that point, astronomers thought they had found the cause behind the recent discovery that at least a part of the universe appeared to be moving in concert - as opposed to 'flying apart' - as theory had calculated.

Professor Sandra Faber, of the University of California's Lick Observatory (also born in 1944 - 67 years ago) - suggested at the time that galaxies and

smaller clusters were being pulled toward this apparent 'megacluster' from all sides. She assumed because of the sheer size of the movement - and our relatively obscured vantage point on Earth, that what was being observed was the illusion of the Milky Way and close-by galaxies streaming together in a single direction. Naturally, even in the 1980s, there was much tentative conjecture about 'dark matter' - 'galactic sheets or filaments' - 'unknown material with unknown composition' and so forth. It was agreed, even then, that perhaps as much as 99% of the universe consisted of this strange 'dark matter'. At that time of course - mapping of the universe was incomplete - and astrophysicists remained far from any consensus on how exactly the cosmos evolved from a universe which in its formative years had obviously been uniform and homogenous. And so the debate continued, and small advances in knowledge were gained; one step forward - two steps back.



It was actually 1986 when a location for The Great Attractor was initially determined. It was said to be 250 million light years distant from the Milky Way - and in the direction of the Hydra and Centaurus constellations. The Norma cluster being the principal cluster dominating that area of the universe. The Norma cluster contains a vast number of old galaxies - many of which are colliding with their neighbours, and or radiating hefty amounts of radio waves. These discoveries led to - not so much - 'A Star is Born' - but rather to the creation of - 'A Cosmic Bermuda Triangle'. The human race loves a mystery. So often when the reality of the mystery is

revealed though - it is often a disappointing anti-climax. The Great Attractor would remain an unresolved incongruity for the foreseeable future. As interesting as it was - something didn't quite add up.

In December of 2005, a New Scientist article reporting on a new x-ray survey had additional information relating directly to this now long-standing riddle. The survey, not unsurprisingly, confirmed the Milky Way to be just one of any number of 'local galaxies' flowing towards a distant point in the universe. However, instead of the 'object' being 250 million light years distant - it was now being reported at twice that distance - at 500 million light years away. Even allowing for a margin of error, the disparity was glaringly large. To add to this, the survey also now appeared to confirm the local galaxies were not being drawn towards the aforementioned Great Attractor at all - but rather to an even more massive area far beyond that point - the Shapley Supercluster (first observed by Harlow Shapley in 1930). This supercluster - described as - the most massive known structure in the observable universe - is thought to be a mass of perhaps seventeen clusters of galaxies - at a more precise distance of 490 million light years. The Shapley Supercluster (SSC), extends for more than 120 million light years, and its volume is thought to be equal to a sphere of 80 million light years in radius. In concluding the article, the author points out, even at such immense distances - the remotest objects certainly do influence our own, and many other celestial dynamics. One has to simply say: an overpowering source of gravity will affect - whatever is within reach or its ability to influence!

The movement of our own Milky Way and tens of thousands of galaxies racing through the universe at an estimated 22 million kilometres per hour - toward this distant point in the universe continues to excite and intrigue scientists to this day. Professor Sandra Faber, who made those early assumptions way back in the 1980s, is still seeking answers. Today her research centres on the formation and evolution of galaxies and the evolution of structure in the universe. Currently, she is completing a project to measure large-scale peculiar motion of local galaxies - comparing results with density maps from the Infrared Astronomical Satellite project (IRAS) and optical galaxy catalogues.

Her other projects include another long-term project on mass-to-light ratios and stellar populations of elliptical galaxies; and methods to

disentangle age and metallicity for stars in elliptical galaxies. <http://www.ucolick.org/~faber/>

One cannot help but wonder at how the world has changed for the good professor - and how her views on the universe and our world have altered over the years. One step forward two steps back! As always, I have only scraped the surface in this short article and for those who wish to pursue the subject matter - I can assure you, there is much to occupy the inquisitive mind.

To be continued...

Refs:

Anon. (Various). Superclusters. Retrieved July 26, 2012, from Review of the Universe: <http://universe-review.ca/F03-supercluster.htm>

Dominique Proust, e. a. (2006, June). The Shapley Supercluster: the Largest Matter Concentration in the Local Universe. Retrieved August 15, 2012, from The Messenger: <http://www.eso.org/sci/publications/messenger/archive/no.124-jun06/messenger-no124-30-31.pdf>

Jones, A. Z. (2012). What are the Fundamental Forces of Physics? Retrieved July 25, 2012, from About.com Physics: http://physics.about.com/od/physics101thebasics/f/fund_forces.htm

Kazan, C. (2012). What Is The Milky Way Speeding Towards at 22 Million KPH? Retrieved August 3, 2012, from Dave Reneke's World of Space and Astronomy: <http://www.davidreneke.com/the-great-attractor/>

McKee, M. (2005, December 15). Milky Way feels tug of largest mass in the universe. Retrieved August 3, 2012, from New Scientist: <http://www.newscientist.com/article/dn8471-milky-way-feels-tug-of-largest-mass-in-the-universe.html>

SULLIVAN, W. (1987, May 5). The Great Attractor Scientists May Have Discovered A Massive Collection Of Galaxies... Retrieved July 26, 2012, from SunSentina



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 Onikuzo 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.

Donated Computing for Astronomy

Roger Powell

As massive new radio telescope arrays such as ASKAP, MEERKAT, MWA and (coming soon) the SKA come on line, it's becoming more apparent than ever before that the future of astronomy is becoming inextricably tied to the need for colossal computing power to process the raw data.

For example, the data produced by ASKAP and the MWA is being handled by a large data processing centre run by the International Centre for Radio Astronomy Research (ICRAR), located in Perth, which is also expected to handle the Australian SKA data when it begins streaming at the end of the decade. Yet, despite the capabilities of its own massive computer centre, ICRAR also recognises the savings it can make by utilising the power of idle home computers. This is generally called "Grid Computing" or "Distributed Computing." Maybe "Donated Computing" or "Volunteer Computing" would be just as accurate.

ICRAR makes it's "SkyNet" and "SkyNet Pogs" projects available using two distributed computing methods, to assist them with the analysis of the massive amounts of data produced by Australian and world-wide radio telescopes. Large chunks of data are broken down into small work units, which are then distributed to volunteer home computers for processing.

The Large Hadron Collider is another example of massive data output and much of the data processing of the results from it's experiments is outsourced to major computer centres throughout the world. Yet it, too, also uses the power of home computers - through [LHC@home](http://lhc@home) - as an LHC simulator to provide scientists with the best settings with which to carry out their exquisitely detailed experiments.

Other astronomy related computing projects include Cosmology@home, Milky Way@home, SETI@home and my personal favourite, Einstein@home, which searches for new pulsars and gravity waves. To date, forty-six contributors to the Einstein project have discovered new radio pulsars!

These projects all share the BOINC project manager platform.

To run one or more of these projects, all you need to do is install the BOINC project management software, available at <http://boinc.berkeley.edu/> and choose which scientific projects you want it to manage for you. That's about all it entails. It uses your computer's idle time and it runs in the background using the limits you set for it. It costs you almost nothing to donate some of the unused processing capacity from your computer for the benefit of scientific research and if scientists can reduce the data processing cost this way, they might have more money to spend on more sensitive telescopes.

I know that some MAS members tried ICRAR's "theSkyNet" (using Nereus) over the last few months and became disillusioned by the way it grabbed computer resources - particularly on older single processor machines. The BOINC project manager is not like that. You need not fear it eating up your computer resources, because you have complete control over the resources you allocate to it. It is quite suitable for all home computers, (Windows, Mac or Linux) no matter how old they are. I hope that more members will consider trying it, so they can donate their idle computer time to the advancement of astronomy. ICRAR has recognised the problems associated with Nereus and has now placed it's new SkyNet Pogs project onto the BOINC platform.

I hope you think about signing up to BOINC projects - 2.4 million people around the world can't be wrong - and when you do, don't forget to join the "Macarthur Astronomical Society" BOINC team!



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



NASA Watch: Kepler Discovers Multiple Planets Orbiting a Pair of Stars

Coming less than a year after the announcement of the first circumbinary planet, Kepler-16b, NASA's Kepler mission has discovered multiple transiting planets orbiting two suns for the first time. This system, known as a circumbinary planetary system, is 4,900 light-years from Earth in the constellation Cygnus.

This discovery proves that more than one planet can form and persist in the stressful realm of a binary star and demonstrates the diversity of planetary systems in our galaxy.

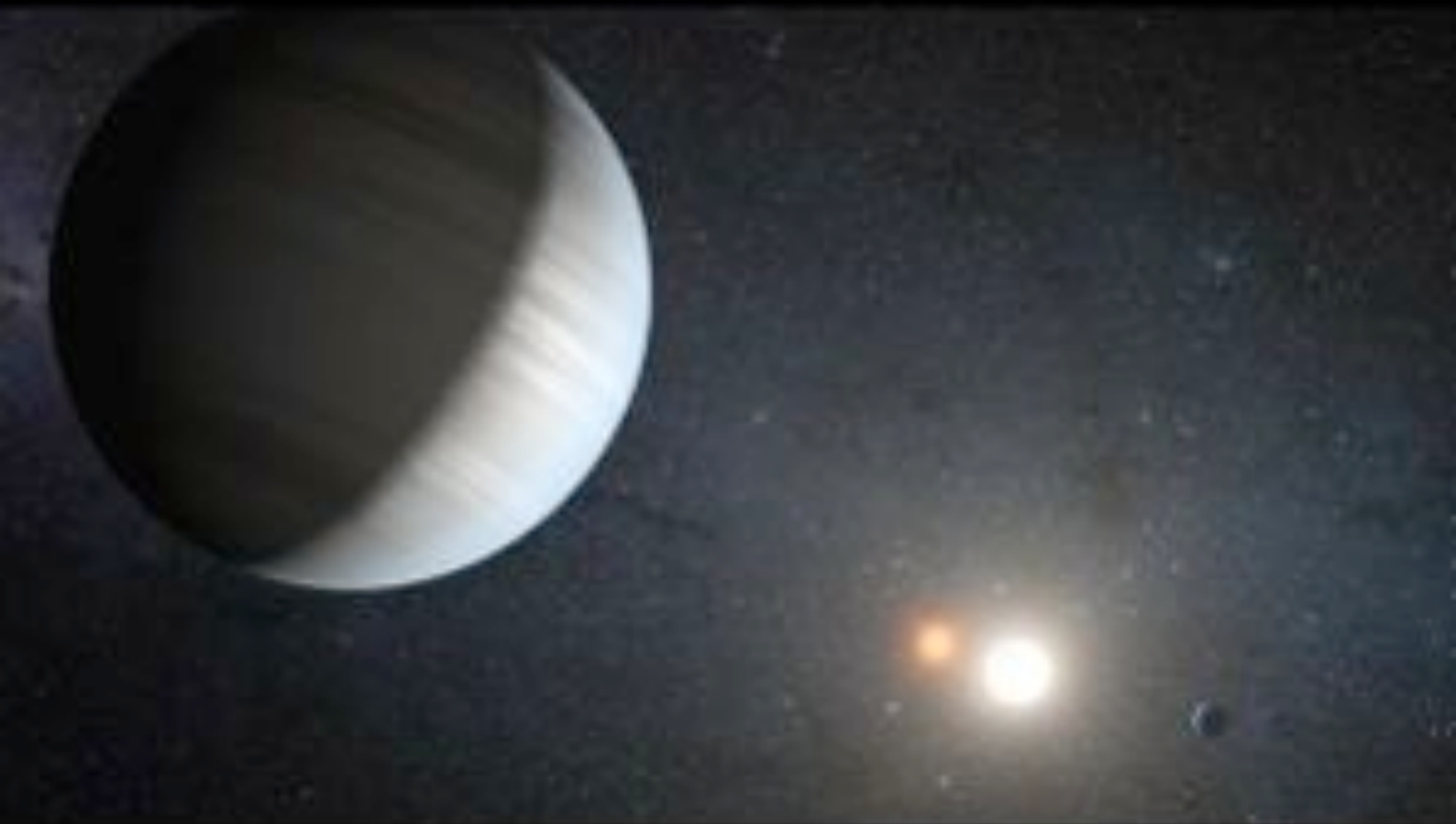
Astronomers detected two planets in the Kepler-47 system, a pair of orbiting stars that eclipse each other every 7.5 days from our vantage point on Earth. One star is similar to the sun in size, but only 84 percent as bright. The second star is diminutive, measuring only one-third the size of the sun and less than 1 percent as bright.

"In contrast to a single planet orbiting a single star, the planet in a circumbinary system must transit a 'moving target.' As a consequence, time intervals between the transits and their durations can vary substantially, sometimes short, other times long," said Jerome Orosz, associate professor of astronomy at San Diego State University and lead author of the paper. "The intervals were the telltale sign these planets are in circumbinary orbits."

The inner planet, Kepler-47b, orbits the pair of stars in less than 50 days. While it cannot be directly viewed, it is thought to be a sweltering world, where the destruction of methane in its super-heated atmosphere might lead to a thick haze that could blanket the planet. At three times the radius of Earth, Kepler-47b is the smallest known transiting circumbinary planet.

The outer planet, Kepler-47c, orbits its host pair every 303 days, placing it in the so-called "habitable zone," the region in a planetary system where liquid water might exist on the surface of a planet. While not a world hospitable for life, Kepler-47c is thought to be a gaseous giant slightly larger than Neptune, where an atmosphere of thick bright water-vapor clouds might exist.

"Unlike our sun, many stars are part of multiple-star systems where two or more stars orbit one another. The question always has been -- do they have planets and planetary systems? This Kepler discovery proves that they do," said William Borucki, Kepler mission principal investigator at NASA's Ames Research Center in Moffett Field, Calif. "In our search for habitable planets, we have found more opportunities for life to exist."



ESO Watch: A Sweet Result From ALMA

September 2012



A team of astronomers using the Atacama Large Millimeter/submillimeter Array (ALMA) has spotted sugar molecules in the gas surrounding a young Sun-like star. This is the first time sugar has been found in space around such a star, and the discovery shows that the building blocks of life are in the right place, at the right time, to be included in planets forming around the star.

The astronomers found molecules of glycolaldehyde — a simple form of sugar — in the gas surrounding a young binary star, with similar mass to the Sun, called IRAS 16293-2422. Glycolaldehyde has been seen in interstellar space before, but this is the first time it has been found so near to a Sun-like star, at distances comparable to the distance of Uranus from the Sun in the Solar System. This discovery shows that some of the chemical compounds needed for life existed in this system at the time of planet formation.

“In the disc of gas and dust surrounding this newly formed star, we found glycolaldehyde, which is a simple form of sugar, not much different to the sugar we put in coffee,” explains Jes Jørgensen (Niels Bohr Institute, Denmark), the lead author of the paper. “This molecule is one of the ingredients in the formation of RNA, which — like DNA, to which it is related — is one of the building blocks of life.”

The high sensitivity of ALMA — even at the technically challenging shortest wavelengths at which it operates — was critical for these observations, which were made with a partial array of antennas during the observatory’s Science Verification phase.

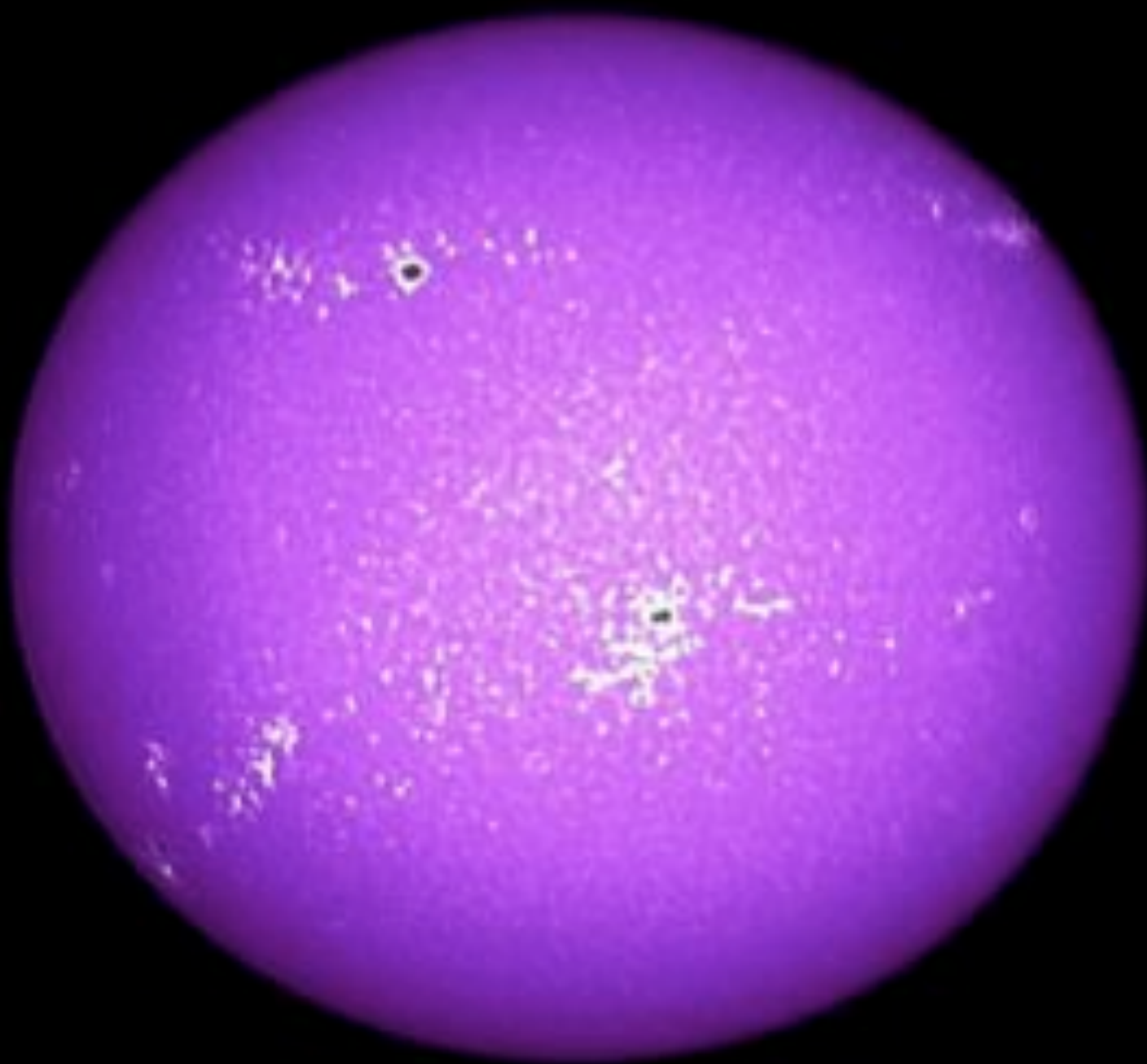
“What is really exciting about our findings is that the ALMA observations reveal that the sugar molecules are falling in towards one of the stars of the system,” says team member Cécile Favre (Aarhus University, Denmark). “The sugar molecules are not only in the right place to find their way onto a planet, but they are also going in the right direction.”

The gas and dust clouds that collapse to form new stars are extremely cold and many gases solidify as ice on the particles of dust where they then bond together and form more complex molecules. But once a star has been formed in the middle of a rotating cloud of gas and dust, it heats the inner parts of the cloud to around room temperature, evaporating the chemically complex molecules, and forming gases that emit their characteristic radiation as radio waves that can be mapped using powerful radio telescopes such as ALMA.

IRAS 16293-2422 is located around 400 light-years away, comparatively close to Earth, which makes it an excellent target for astronomers studying the molecules and chemistry around young stars. By harnessing the power of a new generation of telescopes such as ALMA, astronomers now have the opportunity to study fine details within the gas and dust clouds that are forming planetary systems.

“A big question is: how complex can these molecules become before they are incorporated into new planets? This could tell us something about how life might arise elsewhere, and ALMA observations are going to be vital to unravel this mystery,” concludes Jes Jørgensen.

The work is described in a paper to appear in the journal *Astrophysical Journal Letters*.



Sun through 60mm calcium Lunt solar telescope - Ned Pastor



Top: Tarantula in hydrogen alpha - Chris Malikoff Below: (transit) Gstar-ex, Daystar SolaRedi 0.5, Vixen 2x - Barlow Michael Clark



Musings...

"Theories Abound"

Davy Jones

In a lecture, hosted by Fairfax in May 2012, entitled – A Guide to the Universe – Nobel laureate, Professor Brian Schmidt outlined his early ambitions. He wanted, he said, to do something 'really big' – and the biggest challenge he could imagine was – Measuring the universes' past so he could understand its future! Professor Schmidt is also reported to have responded when asked the question – "Where is the universe expanding to?" – with the answer – "Into the future."

Remarks such as this generate thoughts; ideas of 'past' and 'future' – of 'beginnings' and 'endings', are undeniably fertile ground for the inquisitive mind. The same type of question has in the past arisen at Macarthur Astronomical Forum sessions, for example – 'where did the universe begin?' To which the general response seems to be – 'everywhere – all around us.' A response which, in my humble view, may not be quite correct!

Whilst a 2D or 3D vision of the universe is perhaps the more common view – I suggest, in light of Brian Schmidt's remarks, that the 4th dimension – TIME – is vital in clarifying remarks relating to 'aspects of the universe.' Therefore – rather than looking for a 'physical location' – which would be patently wrong – instead, the answer to – where did the universe begin – should simply be – 14 billion years ago.

Similarly – the debate persists regarding the 'shape of the universe'. With a little research, one quickly discovers a number of 'possible models' – often represented in mind-bending 'Escheresk – matrix detail' (see M.C.Escher). Again though, in reality, it is not too difficult to visualize a cosmos – taking all four dimensions into account – as starting from a 'point' and growing or expanding exponentially over billions of years into a 'bell-like shape'. Imagine, if possible, looking down the bell of this ever-growing cosmic trumpet. Again – TIME – must be a factor and an essential element of this model.

From my point of view, one could take a 2D slice across this trumpet-like representation of the universe at any point in the past 14 billion years. The resulting 'snap-shot' of exactly what the state - stage – and extent of the universe was at that exact point would then be revealed. Add and overlay slice upon ever-widening slice over millennia and one eventually arrives at today's complex cosmic arrangement. The only question remaining then is – what lies ahead? Ahh – more questions!

"Holiday in the Whatsundays" Part 2

Ursula Braatz

We are still here in the Whatsundays, and we will go home next Wednesday, the 19th of September. I observed the blue Moon in August, and in the morning sometimes I see Venus and Jupiter. On the 9th of September Jupiter was next to the half Moon and there were the constellations Taurus and Orion. Because we are next to the bathrooms there is too much light to observe the stars in the west.

So I get information about astronomy on the internet, and I watched on TV in SBS one: "In the Shadow of the Moon" last week. It was tribute for Neil Armstrong, the first man on the Moon. They did show about Apollo 11 and Apollo 14. Apollo 11 could have gone wrong, the Astronauts were lucky. I find it weird to stand on the Moon and see the Earth as a beautiful blue-white planet in the sky. To think that everything - space, the Moon, and all the other heavenly objects are so hostile and our life-giving planet is so far away. It is so interesting, but I would not like to be an astronaut. I believe that the Earth is not the only life-giving Planet in the Universe - a lot of planets have been discovered. Maybe one day we can see another Earth, but we never could reach it. But it is interesting to explore Mars and the other planets and the Moons of Jupiter and Saturn.

"International House" Report

Henry Swierk

The event started with the arrival of students shortly after 3 pm on Sat, August 25th. It was a group of about 50 enthusiastic young people with 1 senior student in charge. MAS was ready standing by with a variety of 10 telescopes of different types and sizes. The following members were present: Bob Bee, Deb with a friend, Graeme, Ned, John, Tony, Lloyd, Barry, Jack, Henry and a new member.

Ned also had his solar scope set up, but by the time they arrived the Sun was behind the trees. The weather was not that great with some clouds passing over, but we managed to show some celestial wonders: Moon, Saturn, Mars, Omega Centauri, Jewel Box, Eta Carina and so on.

There was a lot of interest shown and many questions asked. Bob, John and others also talked to them on all astronomical topics brought up. Many students attempted to take pictures through eyepieces using their mobile phone cameras and some were reasonably successful. One young man came more prepared as he had his DSLR Canon camera fitted with an adaptor for a direct prime focus photography. I think he was quite happy with the results.

Overall the event went very well. The night was cold but there was a BBQ outside and the fire-place going on inside the cabin. The students were keen and interested and liked the experience. They left at about 9 pm.



Image Credit: Luke Williams



prof. geraint lewis

"Andromeda and the 30 Dwarfs"

We are living in an era where large telescopes are surveying huge areas of the sky and revealing some of the deepest secrets of the Universe. In this talk, I will update you on the Pan-Andromeda Archaeological Survey (PAndAS), our deepest and widest view of our cosmological neighbour. We find a whole host of dwarfs galaxies living in the halo of M31, and, rather strangely, are not distributed in the way we would expect. We'll try and understand what this actually means.

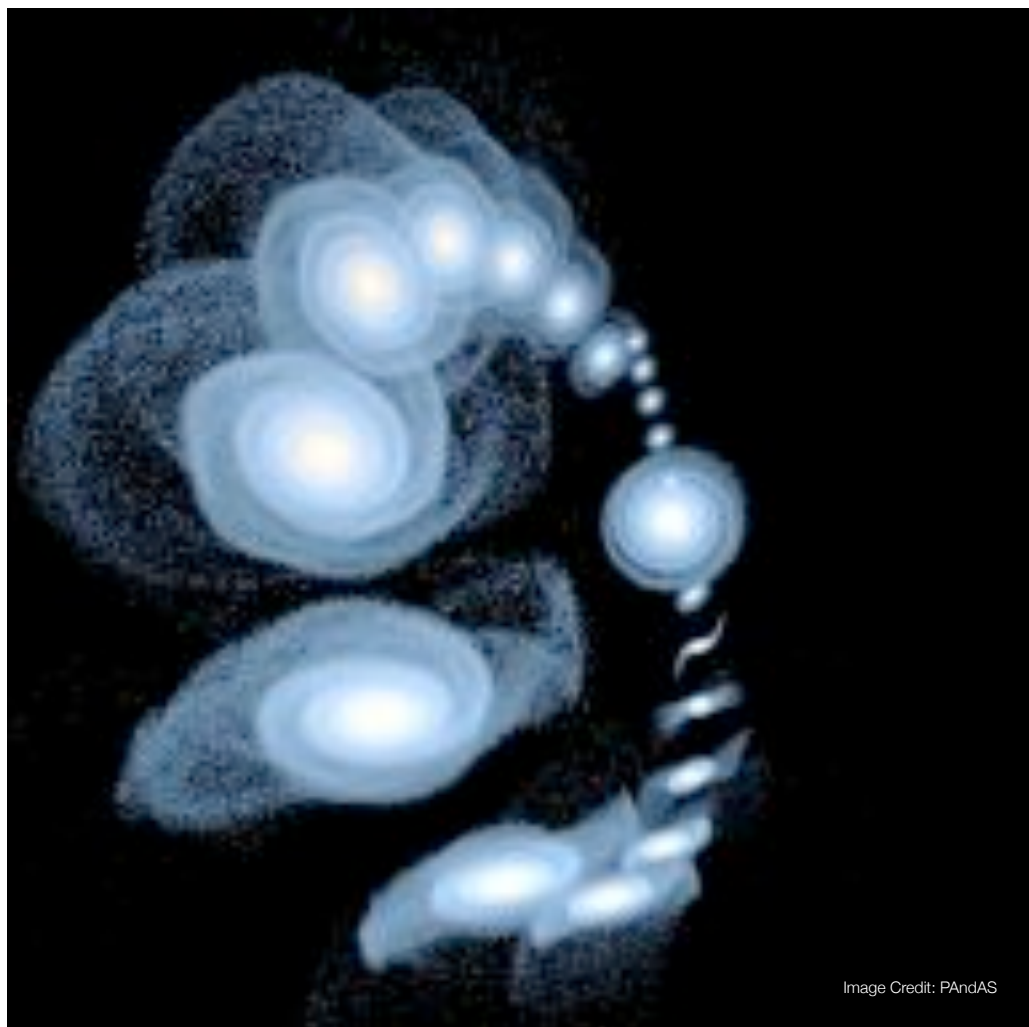


Image Credit: PAndAS

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.

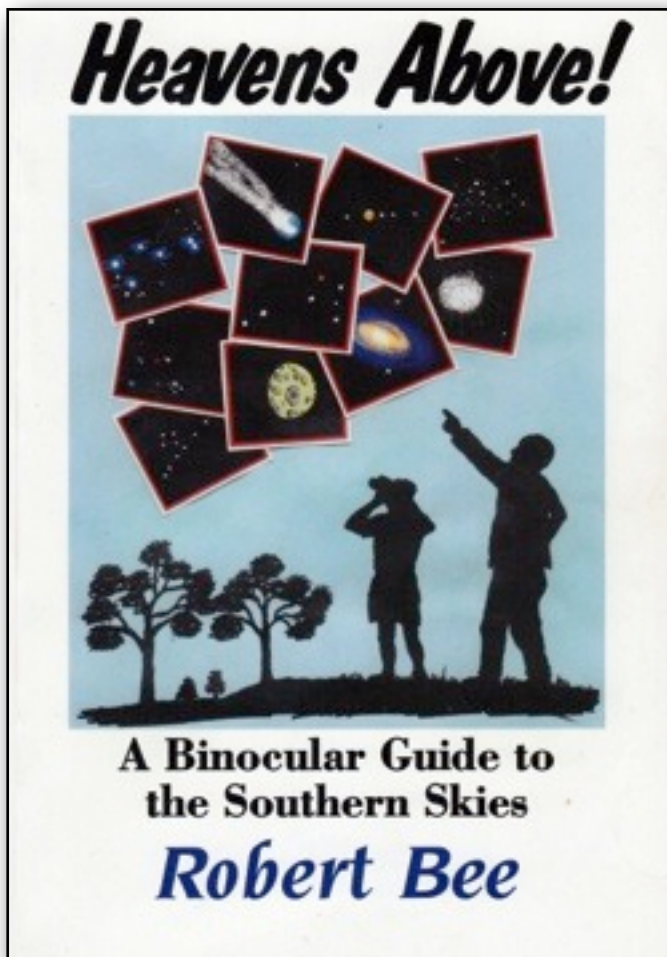
Robert's passion for astronomy began in his teens and has deepened over the ensuing years. With degrees in Electrical Engineering and Science, he enjoys both observing the starry sky and understanding the physical laws behind what he sees.

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

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.



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M.A.S. HYSTERIA !!!

STAR CRAVIN' MAD...

