
Amateur Astronomy 64

News for, by, and about Amateur Astronomers around the world!

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Australian Skies - Deepest South Texas Star Safari *by Charlie Warren*

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Deepest South Texas Star Safari



Article & Photos by Charlie Warren

Group photo of the DSTSS 2009 participants: Front Row (left to right) - Charlie Warren, David Moody, Anne Adkins, Gary Kopff **Middle row (L to R):** Fred Koch, Brad Young, John Bozeman, Mark Lyon, Beth Moody, Mai Tran, Joan Fry, John Bambury, William & Carol Warfield, **Back row (L to R)** Paul Winalski, Eliot Lyon, Lachlan MacDonald (on ladder), Robert Werkman, Becky & Bob Hill, Jason Fry, Tony Buckley, Mike Roos, Bruce Sayre, Andrew Murrell, Bob Douglas, Petra deRuyter & David Chandler

The Deepest South Texas Star Safari is an event I can highly recommend to all who can work out the costs and logistics. It probably represents one of the best values in Amateur Astronomy travel events thanks to the efforts of Anne Adkins, who acts as the unpaid self appointed organizer and primary “cat herder”, and the folks at the Three Rivers Foundation (<http://www.3rf.com.au>).

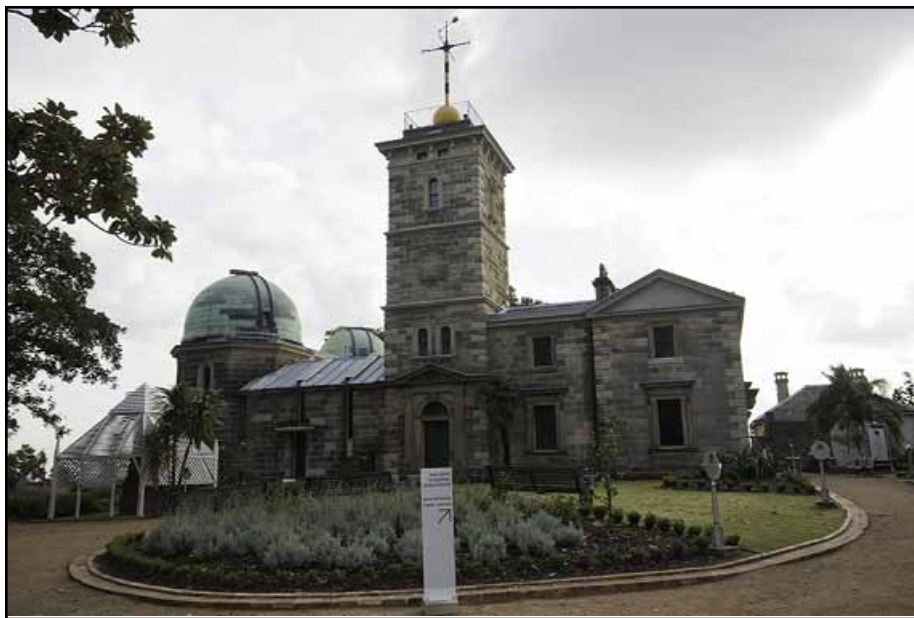
If you're not familiar with 3RF they are a non-profit dedicated to educating the public about the sciences and promoting astronomy. They have a presence here in the US (Comanche Springs, Texas) as well as in Australia. Due to gracious participation of Fred Koch and 3RF, we had a bevy of phenomenal scopes set up for us to use. The \$250 deposit that I put down for the Star Safari covered a welcome dinner in Sydney, two BBQs dinners in Coonabarabran and the overhead for

our Australian sky guides and scopes (18"-30") that were set up. The equipment set up for our use included; a 30-inch f/4.5 SDM dobsonian, two 25's, five 18's, a 22-inch binocular telescope, giant Fujinon binoculars, and a motorized binocular chair with joy stick. Each scope has a set of quality eyepiece, but I suggest also bringing a favorite eyepiece or two. Some folks also brought their bino-viewers and fully paired eyepiece sets. Most of the scopes were equipped with Argo Navis. This large assortment of high quality equipment made available to participants certainly qualifies as an exceptional value by any estimation. We had the gracious support of Tony Buckley and Lachlan MacDonald who not only acted as our Southern hemisphere star guides, but also doubled as our daytime tour guides for side trips and hikes during our stay in Coonabarabran. Our other star guides

were Andrew Murrell, John Bambury, Gary Kopff and Mai Tran of Argo Navis, and Peter Read of SDM telescopes.

If you decide to go, you will need a current passport, and a travel visa. If your passport is current, the short-term travel visa is easy to acquire in short order online (<http://www.eta.immi.gov.au/>). It costs only \$20 and can be “attached” to your plane ticket reservation.

The event has a nice open structure with an extended format of optional side trips. The formal event is eight days of observing under the very dark skies of Coonabarabran, New South Wales. Anne organizes some additional activities that include a few days of sightseeing in Sydney during the four preceding days. You are free to participate in as many or few as you like. If



Front entrance of the historic Sydney Observatory, which overlooks Sydney harbor

it is your first trip to Oz, I recommend the side trips, which this year included a bus (photo op) excursion to the various scenic areas of Sydney including Bondi Beach, the upper end neighborhoods of Paddington, Manly and sea-side areas of North Head and Watson's Bay as well as The Rocks down by the world famous opera house and harbor bridge. Another trip carried us by bus to Featherstone Nature Park and the Blue Mountains for some majestic overlooks and lunch at a mountainside club. We also toured the historic Sydney Observatory and from Coonabarabran, the observatories at Siding Springs and the Compact Array at Narrabri. I will detail these observatory side trips in separate articles.

I landed on Saturday morning (May 16) after losing Friday somewhere over the Pacific ocean. I rented a car at the airport in Sydney due to my booking separate accommodations in the outskirts of town (North Ryde). I had some Embassy points to burn, and so I departed from the rest of the group staying downtown at the Travel Lodge. I would not necessarily recommend renting a car in Sydney, which can be an expensive proposition. The car rental is not bad, but driving on the toll roads at around \$5 per pass and parking downtown can run \$18-\$20 for a few hours and I paid \$42 for the night on the return trip when I stayed downtown. Don't worry if you miss a toll or

two, they will catch up by mail upon your return to the states – with a \$10 penalty of course. I did manage to miss a few toll gates in efforts to follow my GPS instructions, which were incredibly challenging due to the multiple close highway splits in Sydney. I did enjoy the convenience of instant transportation, which allowed a few extra side trips to Ku-Ring-Gai Nat'l park on the North side and the Technology museum downtown, but the white knuckle experience of immersing myself in driving on the other side of the road amidst world class Sydney traffic was probably a poor trade off. The benefit was my being able to drive my car to Coonabarabran and back

rather than taking the train to Dubbo and renting a car there, like the rest of the group. After Sydney, driving on the left out in the country was fun, save an encounter with one of the local large footed residents or two, but I will get to that later. By the time I left Sydney, I had stopped washing my windshield every time I wanted to signal for a turn and even managed the converse, (eventually) turning on my windshield wipers without using my turn signals to indicate my intentions to clear my windshield.

My first view of the Australian skies came following a sidewalk dinner in Sydney at a delicious Thai restaurant where we got together for the first time with our Australian sky guides Tony Buckley & Lachlan MacDonald. Even with the city lights brightening the sky, Canopus was riding high over the tops of the tall buildings and the Southern Cross was almost overhead.

The Sydney experience finished with a group welcome dinner at Phillips Foote, an unusual dining experience down in The Rocks, where you pick your cut of meat and lop it on the grill and cook it yourself. It is a fun time and good opportunity to meet all your fellow DSTSS attendees if you had not before this.

The 6-7 hour drive to Coonabarabran was pleasant. From North Ryde, it was easy to escape the city, and the trip through the Blue Mountains was a delight. Since my counterparts were on

Coonabarabran: Astronomy capital of Australia - town square and clock tower



the train, I had ample time to stop for some photo ops and sightseeing along the way. One area worth stopping is the lovely valley of Mudgee where a large portion of the grapes for Australian wine is grown. Many of the vineyards are open for tours and sampling their products.

Even with my sightseeing, I arrived at Coonabarabran ahead of everyone else, and got my room assignment. My roommates were Dr. Robert Werkman & John (Wildman) Bozeman, who turned out to be delightful and as entertaining as spending the week with “the odd couple”. I settled in and took a quick vehicle tour up to Warrumbungle National Park (17 kms). The rest of the pack arrived about dusk and we got together for a dinner at the motel, which was edible and reasonable. A few scopes were set up on the field (some 18” and 25”), but the skies were quite overcast, so we did not rush through dinner.

Finally someone did pop their head out and stated that the skies were clearing, so we all headed back to our rooms to “gear up”. As I stepped from the room’s back door onto the adjacent observing field, I was initially blind and noted the extreme darkness, but not much else. As my eyes dark adapted, I beheld an incredible treat that I would become accustomed to (spoiled by) over the next 8 days. A few of our group were already seated on plastic chairs just out from the backdoor of the room. I could just make them out from their shadows against the glow from the extremely bright Milky Way (yes, the Milky Way is a source of light pollution here). They were just looking up with no optical aids. I grabbed a chair and plopped down beside them and did the same. The string of expressive, nonsensical language that poured from my lips was greeted with laughs from my fellow travelers with a chorus of “exactly what we said”. The photo does not do justice to the impact that the very bright, rising southern Milky Way has on your psyche, if this is your first dark sky trip down under. And there, for the first time, staring me boldly in the face was the Large Magellanic Cloud. I sat stunned, bathing my eyes in this rich



Top image is a 2 minute exposure with an unmodified Canon DSLR (D40). of the or the Coal Sack and the bottom photo is of the observing field out behind the Warrumbungle Motel, with scopes ready to explore Southern gems.

celestial feast. I continued to just look up and enjoy the skies naked eye, and tried to get my bearings for about 45 minutes. It was a ritual I continued almost every night for the next week. These skies were so gorgeous, it did not require any astronomical equipment to enjoy them, and there was a host of objects on my lists that could be located and identified unaided. Before I even looked through my first scope, I knew this would be an experience I would long remember and one I would need to repeat as frequently as possible.

I brought a simple imaging rig with me so that I could capture some wide field shots with my DSLR, but on this night, I did not want to be encumbered with any equipment setup. Once I had my

bearings and visual appetizer, I wandered over to the area where the scopes and our sky guides were under way steering optics towards the substantial eye candy that many of us had never observed before. I did not feel a bit guilty for going after the boldest and brightest objects. On my first night, I wanted to ruin my dark adaptation with the bright Southern sky “classics”. I was in no way disappointed! For a good portion of my observing, I spent my time on the “showcase objects” around the Southern pole. It was like starting in astronomy all over again, but with greater knowledge and observing skills. In my seven nights of observing, I did not even cover this range of object, though I did keep up a fairly rigorous pace. I also revisited



The Milky Way arches high overhead in this series of 5 stacked 2 minute exposures shot with the Canon D40 through a wide angle 10-20 mm lens at f/4 shooting with the camera set at 800 ISO

more than a few night after night. I did get opportunity to view several faint, challenging objects as well, thanks to the efforts of some of our fellow participants who have visited before, and particularly one of our star guides (Andrew Murrell), who is an observer of the ilk of Barbara Wilson. With Andrew, anything brighter than magnitude 12 endangers your light adaptation. Some of Andrews objects required concerted inverted imagination even under these dark skies, but still it provided a nice balance since so many of us were southern sky neophytes and focused on the more conspicuous objects. Andrew has an object named for him, which is a tough target. I unofficially named "M1" the "invisible man" after several attempts with the 25" scope failed. It became the source of much humor on the field during the week.

A few of the highlights of night one: My first view of the **Eta Carina** nebula almost overhead through the 25" drew an inadvertent expletive from my lips. I have only viewed it previously a few times from WSP as it skimmed the

horizon. I tried to regain my composure, but it was simply stunning! We looked mostly with lower power wide eyepiece at this point, but later in the week during a time of exceptional clarity and good seeing, I would discover my favorite object of all from this trip – the Homunculus. Viewed at 428 X with an 8mm eyepiece in the 30" scope, its subtle beauty literally brought tears to my eyes. I will discuss that in detail, but for now, surfing this cosmic cloud of gas and dust at low power was a narcotic. The dark dust and billowing clouds looked three dimensional, and the trailing gas tendrils seemed to go on forever as we surfed its length and breadth. Someone mentioned the Homunculus, but this night's transparency was not sufficient to reveal its true glory and I underestimated it as a worthy target on this first night.

Omega Centauri was beautiful as ever, but then I have seen it many times from South Florida's steady skies, still it is always worthy of scope time. My views of **Tucanae 47 (NGC 104)** were

my first, and it was high on my list of showcase objects. All the locals raved about how much more they liked it than Omega. Heresy, I thought. That was until I spent some time on this stellar gem. On first glimpse, it is certainly less flashy than Omega, but the more I viewed it, the better I liked it. The ultimate experience with it came when we queued up a pair of 13mm Ethos in the bino-viewers loaded in the 18". Wow! I could look for hours at the trailing stars and sinuous patterns these pearl drops created on the inky backdrop of this dark sky. After my initial reservations, I came to agree with the locals that Tuc 47 is certainly a good rival, if not champion of the globular clusters. Tuc 47 is just east of the Small Magellanic Cloud (NGC 292), which was another dramatic first for me this night. The SMC does not have as many interesting objects within it as the LMC, but particularly in the large Fujinons, it was a breath taking sight. Looking up at any hour and seeing either the LMC or SMC was a quick reminder that I was not in Kansas anymore.

Top right: Some of the scopes graciously provided for us by Three Rivers Foundation. The biggest being the 30"

Center: 22" ATM bino scope
Lower Right: 2-minute exposure of the central portion of the Milky Way star clouds and dust lanes around the Sagittarius star cloud

Crux: **Alpha Crux** is a very nice double/double star with a rich blue color. The main components are an easy split with even the smaller scopes on the field. Crux also has two other nice multiple stars that I observed this first night; **Gamma**, which is another nice triple worthy of your list and **Iota**, which has a lovely golden hue.

While in the area, we had to take a look at the **Jewel Box (NGC 4755)**. This became one of my nightly rituals. If you like color and you like open clusters, you will love the Jewel Box. Here are my notes. *Stunning colors in this gem of a cluster that is defined by its brightest stars forming a triangular pattern. Beautiful red, yellow and blue. Without compare, this is the most colorful open cluster I have ever viewed. View often to ward off any feelings of gloom or depression.*

And you cannot view this area without mentioning of one of the most dramatic dark nebula in the sky. **The Coalsack** lies just east of Alpha Crux and spans about 1 degree. It is stunning in binoculars and naked eye. The brightness of the Milky Way and the surrounding bright stars (including the Jewel Box, which is just to the North) makes its inky blackness even more dramatic. In binoculars or a rich field scope you can trace its dark fingers. One of the appendages is "V" shaped and referred to as the Emu's beak. Speaking of Emu, there are an abundance of these large birds running around the park. The full dark lane of the Milky Way is called the Emu by the aborigines, and all of us picked up the moniker, which as my Milky Way image testifies to, is a valid description.

I have imaged and observed the radio galaxy Centaurus A (**NGC 5128**) on many occasions, but never this high in the sky. I commandeered views through the 25" scope for this one, and the



detailed bands of the warped dust lane that appears to encircle this irregular galaxy looked photographic. My CCD image taken from Florida truly looks like what I saw in the scope this night, sans color. Centaurus A subtends 31' x 23' and glows conspicuously brighter on the south end of the dust lane.

M 83, the Southern Pinwheel is another object I have observed many times, but it was a treat to see it nearing dobs hole in the 25" under these pristine skies. We also had to take a quick look at M 104 – The Sombrero. The dust lane and bright core did not disappoint.

The skies got softer about 2:30, and my weariness from the drive took over while sitting and waiting for things to clear, so I decided to pack it in and save some for the next night.

The nights that followed brought a host of new astronomical discoveries as I worked my way through a number of observing lists on the assorted scopes set up on the field. I will detail my favorites below, but will also post several observing lists that I found helpful on the web site with about 400 worthy objects. Check the supplements page of the web site to download, or link to these other lists.

Our second day in Coonabarabran (Thursday 5/20) I enjoyed a leisurely morning at the motel walking the grounds and photographing the abundant bird life that frequented the surrounding forests. The group then gathered for a short hike and some wildlife observing at Warrumbungle National Park. On the way to the park, we passed a number of private observatories as well as the entrance to Siding Springs Observatories. Coonabarabran hails itself as the astronomy capital of Australia. This is well founded based on the dark skies and large amount of

astronomical endeavors that take place here. I was amused to discover that astro-photos graced practically every business in the small town, including the Laundromat.

We spotted a large number of Kangaroos, Emu, some Wallaroos and

for our nightly dinner. The motel staff prepares a limited but tasty menu most nights at a nominal cost. After dinner we headed into town to join a meeting of the local astronomy group, after which we scurried back to the motel and out for more Southern skies. This night I set up my camera for a few pic-

tures. I brought a heavy duty camera tripod equipped with two ball-heads and an "AstroTrac". The AstroTrac worked well for wide field shots, but the polar alignment scope was useless in the Southern hemisphere, despite its claims to the contrary. I polar aligned by simply eyeballing through the loop of the polar scope holder, by using the intersecting lines running through Gamma and Alpha Crux and Beta and Gamma Triangulum. This did get me close enough for widefield shots (10mm-20mm) up to 4 minutes, but I still got trails when shooting anything more than 60 seconds at 100mm and up. Robert Werkman set up his Gary Honis modified DSLR beside me and we had a blast ripping some amazing shots with only 60-120 second exposures. Robert's modified Canon Rebel camera captured surprising depth with 60-120 second shots using a 50mm lens. My 40D is unmodified, but I used a fast (70-200mm f/2.8) lens and pushed the ISO to 1000, and even 1600. The



Giant Fujinon binoculars made available for us by 3RF

a large number of exotic tropical birds on our first tour through the park, which is also host to a number of very scenic overlooks. Many of the trees also looked exotic to those of us from the US. Australia has a number of unique trees, some of which are thousands of years old. Some of the landscape looks fairly familiar to those who have visited the Davis Mountains in west Texas, but with quite a bit more foliage. In fact the mountains and rock formations are the result of similar volcanic activity around the same time, some 14 million years ago.

We returned to the motel and gathered

new chips and software do a remarkable job of minimizing noise even at these fast ISO settings.

Robert also brought a small 66 mm refractor and some image stabilized binoculars with him. Between setting up imaging runs, we enjoyed some great wide field views of the larger objects, of which there is no short supply around the south pole. Robert had some nebula filters made for the binoculars, and with these attached, the views through the binoculars were phenomenal. Surfing the skies with these instruments did a lot toward helping us learn our way around the Southern

skies, since neither of us had been this far south before, we really enjoyed the views. Viewing with these modest aperture instruments became part of our nightly routine after setting up our cameras for imaging runs.

BOLIDE!:

Not long after our initial setup, one of the finest bolides I have ever seen ripped across the sky. A good bolide is always a special event. The only one that rivaled this one in all my years of star gazing was during the pre-dawn hours of TSP in 2001. Below is Paul Winalski's description from his observing notes, which captured it well.

At 8:12 PM we all got startled by a very bright flash of light. It was a bolide meteor passing roughly west to east through Scorpius and across the Ara Milky Way before fading out in the east. The head of the bolide was like someone waving a burning strip of magnesium across the sky. We estimate it at magnitude -10. It left a multicolored trail behind it for about 90 degrees of sky that persisted for almost a whole minute. I've never seen one this bright before.

Unfortunately my camera was aimed South (Murphy's Third Law) capturing the Large Magellanic Cloud at the time. I would have loved to have captured this event for posterity and shared it with my readers.

Highlights with small aperture were: Coal Sack, Eta Carina and the Keyhole nebulae, LMC, SMC, Tarantula nebula (NGC 2070), Omega Centauri, 47 Tuc, "The Dark Doodad" in Musca, The Jewel Box, and the entire area around the Sagittarius, Scorpio region of the Milky Way, which flies very high in the sky down here.

I worked through a good number of objects on my list, mostly using one of the 18" telescopes, but I bounced around to view some of the objects in one of the 25" scopes as well. The field was busy with different groups working through their lists, but periodically voices in the dark called out for "wit-



Big Bob holding his namesake creation "The Big Bob Burger", which rates as the ultimate "works" burger in NSW. Available on the outskirts of town at the Coona Top Shop

nesses" to a number of "firsts" and impressive spectacles that required sharing. The number of object observed throughout the week was large, and I moved through many quickly chronicling short entries. Below I have summarized my favorites in detail, but will leave the less well documented for purposes of brevity. This article would encompass the entire issue if I did not.

As mentioned above, I have uploaded some of the lists I used to the magazine's website under the "Supplements" section, but in addition, below are some more observing lists of Southern hemisphere objects that you might find useful. Of course there are many repeats between them, but part of the fun of planning a trip like this is distilling out your own list. I have included my "favorites" list on the web site as well.

Observing lists:

Bennett Catalog

<http://www.seds.org/messier/xtra/similar/bennett.html>

John Caldwell's best Sky Objects from SAAO latitudes

<http://www.seds.org/messier/xtra/similar/JCaldw.html>

James Dunlop 100

<http://www.seds.org/messier/xtra/similar/dunlop100.html>

Astronomical Leagues, Southern Skies Telescopic Club

<http://www.astroleague.org/al/obsclub/southsky/sskylist.htm>

Glen Cozens 110 Deep Sky Highlights

<http://www.seds.org/messier/xtra/similar/cozens.html>

On Friday, we toured the Compact radio telescope array at Narrabri. This was a special tour that deserves greater attention, so I will describe it completely in a separate article, but suffice it to say, this is definitely worth the time. On return we stopped at a small town to enjoy a traditional Australian "Pie Shop". Australian Pie Shops are a cross between a burger restaurant and a meeting place café. This was a two story establishment where you could pick up your pie and head up to devour it while overlooking the town from a balcony table. In case you are not familiar, Australian meat pies are pretty much what we refer to in the US as pot pies. Various fillings are baked into a crispy pie crust. They eat them in their hands like we do burgers, and it is customary to top them with a liberal amount of tomato sauce (catsup). Unlike US burger establishments, these culinary fast stops also have traditional pastries. Our group felt obligated to sample more than a few of these as well.

Note: In almost all my travel logs and

astronomical adventures, you will note that I periodically dedicate space to gastronomical endeavors. Margie says it is because I am a self-avowed “foodie”. This is a title I do not deny and bear proudly, but I also note that there seems to be an intimate connection between gastronomy and astronomy, or at least some cosmic link in our affections. That is my story, and I am sticking to it.

The next phase of our day tour was to the Sand Caves, a beautiful and mystical place that also deserves a visit when in this area of New South Wales. You can view a (PDF) photo slide show of this and a variety of other experiences from my trip on this page of the magazine web site.

<http://www.amateurastronomy.com/AustraliaGallery.html>

Just download any of the selections and select “full screen mode” from the View menu, and the PDF slide show should start.

Saturday: We had no organized day tours. Several of us decided to head over to the South Pacific Star Party, which was taking place in Wiruna, about ½ way back to Sydney (about 3 hours drive). Most of our party elected to stay and enjoy the night skies from Coona. They were the smart ones as it turned out, but I wanted to at least say hi to Mike Smith and some other Aussie friends that were attending and hoped to do a story on SPSP. I drove and Dr. Robert Werkman rode shotgun in my car. We followed Lachlan and Tony. As Robert said, Lachlan drives like a kangaroo on fire with flames coming out of his butt. As we neared the location, the weather turned colder and wetter. Here is my report from **SPSP 2009**.

Nasty weather and clouds. It rained!

I did experience my first “works burger” however. I know – that foodie thing again - but unless you ate or drank, you did not have much else to do at SPSP this year. For the record (and my fellow foodies), a works burger is a large burger topped with lettuce, tomato, onions, beets, fried eggs and Canadian bacon. Of course I downed one of these not knowing that someone would



Charlie Warren, Lachlan McDonald and the SDM (size does matter) 30 inch scope with Argo Navis and ServoCat drive set up on the observing field

bequeath me a ticket to the famous roast dinner as well. After I finished the works burger and then polished off the Roast dinner, Robert offered me a free colonoscopy at his clinic to satisfy his curiosity regarding my intestinal constitution. At this event gastronomy topped astronomy, but not necessarily by popular choice. The crowd was walking about looking wet, dejected and generally lower than a snake’s belly in a wagon rut as the forecast for the next nights looked no more favorable. I did get to meet Mike Smith and some other long distance acquaintances and also listened to an interesting lecture by Dr Charles Lineweaver from Australian National University. After the dinner, we decided to head back to Coona, where the forecast was “clear skies”.

The drive back was a bit tedious, but about 50 km out we got a natural shot of adrenaline as we topped a ridge. The

night was very dark with no street lights, or light showing through the thoroughly clouded skies. I was following Lachlan’s tail lights at about 100km per hour when for no apparent reason he signaled right and veered into the oncoming traffic lane. Too late, his reasoning did become apparent as my headlights lit up the body of a large grey kangaroo that had a recent encounter with another automobile. With no chance to slow, I put the large creature between the tires, but neither bottom clearance, nor wheelbase permitted the desired low-impact effect, and the kangaroo speed bump made quite an impression on Robert, myself and the vehicle. If the first car did not take care of him, I certainly put him out of his misery. I am quite certain that Robert’s finger prints are permanently imbedded on the dashboard of the vehicle.

About 60 km later, a large fox ran in



Emu rising. The southern Milky Way rises from the Coonabarabran landscape. Imaged with Canon 40D DSLR with Sigma 10-20mm lens at f/4. ISO 800, 20-60 second exposures sigma combined.

with this region, all of these fit in the FOV with the 13mm Ethos at about 200x. It would be a worthy endeavor on future visits to spend the time to split some out at higher power.

Heading south and almost due east of the LMC is another conspicuous area worthy of attention. The complex including **NGC 1962-66 & 70** is a knot of nebulous haze and small open clusters. Three more nice little clusters lie just south of this complex. Use some magnification for **NGC 1983, 1984 & 1994**. In the 13mm Ethos, I captured all of these as well as the little globular **NGC 2009**, which is just north of these three. Again, it would be nice to pump these up above the 200x I was using. This whole area would be a beautiful target with a CCD camera and some focal length.

I swung west, into the heart of the **LMC** to pick out some of the targets within. The first one that popped out was in the mid-southern portion and it stood out impressively. **NGC 1910** is a lovely open cluster with knots of nebu-

losity. It has 40-50 stars and a dark lane that runs through it. The brightest portion almost looks like miniature spiral arms and covers about ¼ of the 13mm Ethos.

Just south and west is another, much less impressive area of emission nebula that was barely visible, until I put in the O-III filter, which did reveal it for what it was, but still not nearly as impressive as 1910.

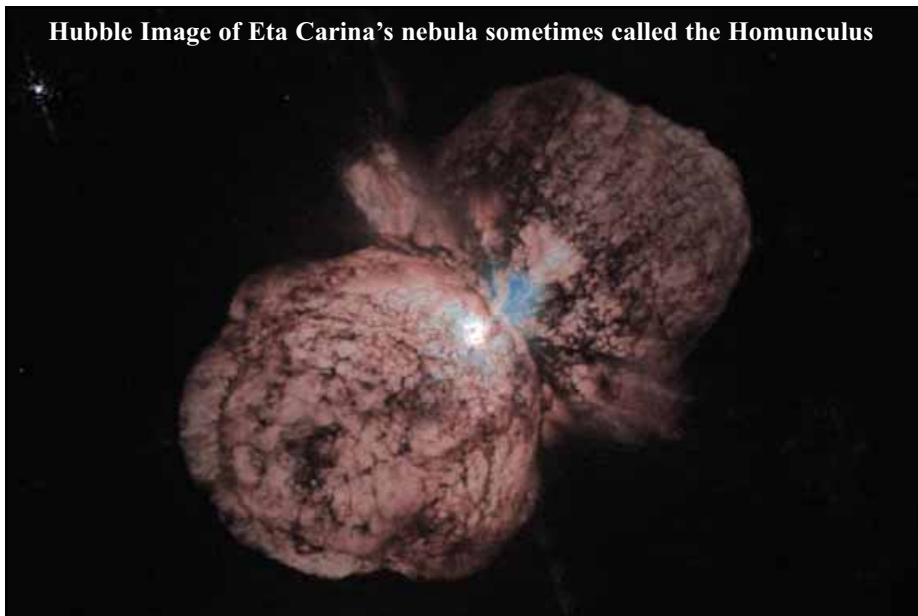
Moving south again in the LMC, I spotted a nice line of open and globular clusters that ran the diameter of the 13mm FOV. **NGC 1850** is the brightest (mag. 9 globular) and prettiest of the bunch, but the whole line made an impressive sight. In a line to the south were the others; **1854 (GC), 1855 (OC), 1856 (GC), and 1858 (OC)**. This eyepiece full was a very nice surprise, and a must for LMC viewers. It was one of my favorite views in the LMC region, apart from the showy Tarantula.

I plugged back in the 31mm Nagler and swept the area a little further afield for areas of interest. I was glad I did,

because I picked up two really nice areas that had objects not contained in my list. The first area had a nice star field with several distinctive nebulous patches and a really lovely open cluster (**NGC 2004**). With 2004 centered, there were four patches of open clusters and nebulosity visible (**2035, 2014, 1955 & 1968**). I popped the 13 Ethos back in, and enjoyed each individually. The most impressive was the emission nebula **NGC 2035** (also had second designation 2034). 2035 did reveal significantly more detail with the O-III filter. The other gem at higher power in this bouquet was the open cluster **NGC 2004**, which had a tight core and sprays of stars fanning out from it. This is another object I would like to revisit with more power than the 200 x I was using.

My next entry was one of those nice serendipitous discoveries. I accidentally bumped the scope off target (to the north) and square in the center of the eyepiece was what initially looked like a small galaxy. It looked like an elliptical with a fairly bright core, but on

Hubble Image of Eta Carina's nebula sometimes called the Homunculus



created by the 7,500 light year distant massive star Eta Carinae about 165 years ago when the star became the second brightest in the sky and then sloughed off more mass than our sun to produce the double lobes of ionized gas and dust that formed a distinctive cloud before itself fading to obscurity. You may have seen the incredible Hubble picture of it (above). Eta still undergoes unexpected outbursts, and its high mass and volatility indicate that it is a candidate to explode in a spectacular supernova event sometime within the next million years or so.

From the first night, Lachlan would ask if I had viewed the Homunculus and kept saying that it was like looking into the eye of God. Pretty dramatic stuff, which I could not confirm based on my first several occasions of viewing it. Then came "that brief moment" when the seeing and the transparency combined to yield a special time that all of us who observe regularly come to relish. It is all the more special because even under good skies, it happens infrequently. My first awe inspiring view came with the 13mm Ethos through the 25" scope. What I saw confirmed Lachlan's enthusiasm, and when I went over to share my excitement with him, he asked me to hang out for a bit. After the line on the 30" dwindled for the current object being viewed, he centered the big scope on the Homunculus and loaded in an 8mm eyepiece. Even from the faint glow of the Milky Way, I could tell he was beaming when he came down the ladder and invited me to take a gander.

The view was truly awe-inspiring and the beauty of this fantastic object literally brought tears to my eyes.

Here are the notes from my journal: *Both lobes are visibly detailed, each with double orange concentric loops and striation of dark details lacing through each lobe. What a phenomenal sight! No words can capture the surge that emanated from the core of my being when I viewed this remarkable object at over 400X! Lachlan was kind in allowing me to hog the eyepiece for an extended period of time before announcing to the crowds and inviting*

closer inspection, suspiciously had resolved stars spanning out from it. Using the Argo, I identified it as the globular cluster **NGC 1978**, which I confirmed with charts later. There is something thrilling about an accidental discovery that makes the view even sweeter.

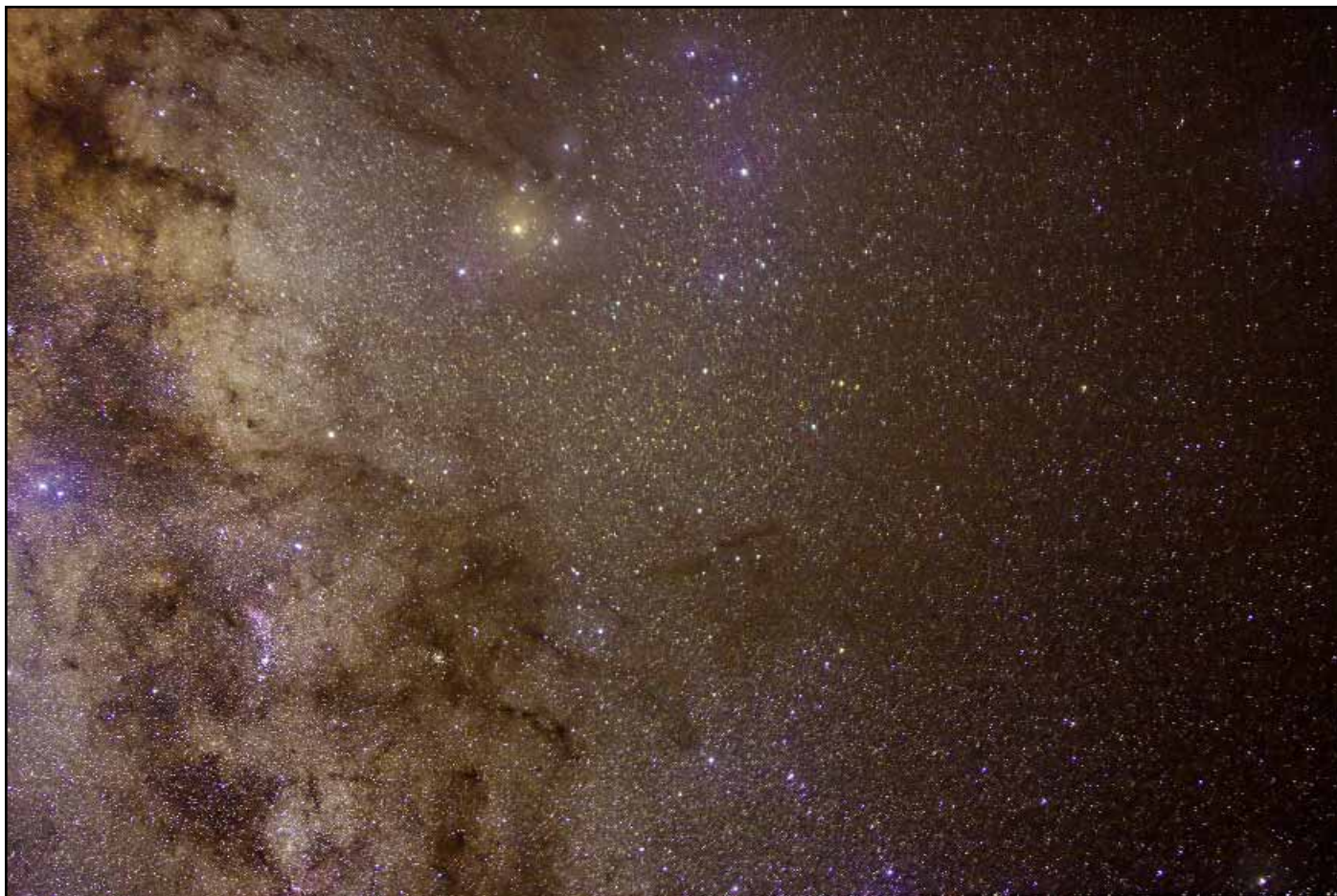
Unfortunately my survey of the LMC and surrounding areas was stopped short this night due to some clouds moving in that resulted in poor transparency. I retreated to the coffee pot and nightly snacks to share some goodies and observing experiences with the other group members who had already congregated there. I never got back to this area to complete my tour, but this will be at the top of my list upon my return to Coonabarabran.

The only other area of sky that I dissected fairly thoroughly was the Eta Carina Nebula. My entries came from observations over several nights and through multiple scopes. Most were with the 25", but several notable views were through the 30", particularly the Homunculus, which I will finish with since it is the core of the whole complex, and certainly one of my most notable views of the entire trip.

From my notes: **NGC 3372** is everything I expected and more. It is one of the most incredible sights in the heavens. Packed with star clusters, dark nebula and billowing clouds of gas! Great in the big binos, and little scopes (66mm). But surfing the nebula in the

25" is worth the trip down here alone. It spills well out of the FOV with the 31 mm Nagler and it has all the showy appeal of the Great Orion nebula, but is even larger. The dust of the Keyhole nebula is inky black and bold against the very bright portions of emission nebula. Even though the O-III increased the contrast, this nebula is so bright, I prefer the unfiltered views. At higher powers, you can perceive depth in the nebula, which looks like peering into a cumulus cloud with bulging lobes that fold over themselves. I traced the extremes of this nebula off into space until the wispy fingers of ionized gas faded to star pocked blackness. The dark dust sometimes looks like an abyss in the clouds and in other areas looks superimposed as foreground material, which adds to the complexity and depth of detail this object offers. Several Trumpler and Collinder objects are easily identified within the complex. **Trumpler 14** is a really nice open cluster of about 30 stars near the core and just west of that is **Collinder 232**, another bright open cluster of about 20 stars. Similar to this is **Trumpler 15** to the north. Brighter and to me the pick of the litter is **Trumpler 16**, just south of the center. Tr 16 has about 40-50 stars arranged in chains with a number of visual trios that make for a very aesthetic open cluster.

Now for the centerpiece diamond in this tiara, but first a little background. The **Homunculus** is an unusual nebula



Sagittarius / Scapio region of Milky Way. Imaged with Canon 40D DSLR, Canon 24-70mm lens at 28mm, f/3.5. ISO 800 20-180 second exposures sigma combined.

them for views. The only other experience I can remember affecting me like this was one of the first really good views of Saturn's rings at high power through a high quality scope early in my astronomical career.

IC 2602 – The Southern Pleiades: A poor comparison against the real thing. This is one that Northerners have over our Southern hemisphere counterparts. That being said, if you don't set yourself up for this comparison, this is a very lovely bright open star cluster in its own right and well worth the time to view it. There are about 20 brighter stars against a background of fainter stars with some nice color variation within the group of brighter stars varying from golden to blue/white. Forget the comparison and just enjoy it for what it is.

I like star clusters, and the constellation of Musca had a couple of nice globular clusters that were new to me.

NGC 4372: Bright stars in a loose pat-

tern for a globular. Several hundred stars. Takes some power to resolve, but nearly fills the 17mm Ethos in this (25") scope. Near the bright blue star Gamma (Musca), the stars are bright and fine. It looks like magic fairy dust sprinkled on a black velvet cloth (*what is in that Australian wine?*).

NGC 4833: Nice globular cluster with a dense core and open outer structure full of star chains. Center has some haze of unresolved stars with overlay of resolved stars for nice perception of depth in this starry ball. A nice bright golden foreground star accents the north side of the cluster.

About a half degree to the northeast is **Delta Musca**, which makes a nice, colorful (orange and blue) visual pair with a nearby 6th magnitude star. Check it out while in the area.

One other object that you have to check out while scanning Musca is the "**Spiral Planetary**" **NGC 5189**. In the 30" my notes read. *Stunning irregular planetary that looks a bit like an irregular face-on spiral bar galaxy at first*

blush. Fair sized with good detail in the central portion. At high power (400x) visible filament and knots. Add to favorites list!

Centaurus

NGC 4945 – Add to favorites! – Large, nearly edge on galaxy with great dust lane detail, somewhat reminiscent of NGC 253. It runs the full FOV with the 17 Ethos in the 25". It has a mag. 13.4 companion galaxy just outside the eyepiece field (**4945 A**)

NGC 3818 – The Blue Planetary – Beautiful turquoise blue color

NGC 3766 – Very bright with lots of star chains with an overall clover pattern. About 100 stars

NGC 5286 – Lovely and delicate globular cluster with bright core of partially resolved stars (25" and 13mm Ethos). Like a small pile of refined sugar on black marble with a sprinkling of stars spilled out from the defined core to a colorful 4.6 magnitude orange field star on the south fringe.

IC 2944: The talk at the local club a



few nights ago covered some interesting details about naming confusion with this object, which made the observations even more interesting this evening. The IC # refers to the nebula, which is shaped like a “V” or winged bird. It also has an embedded star cluster, which is part of the source of the catalogue confusion. As the speaker pointed out though, a lot of it has to do with simple transcription errors as previously cataloged objects are assimilated into new ones.

ESO270-17: Picard Figaroa shred: This is a faint one presented by Andrew for all those fans of the stuff that most people miss. It is a very interesting and unusual galaxy that looks like a faint supernova remnant. Located in Centaurus and part of the NGC 5128 group, it is magnitude 11.86, but has a low surface brightness. Its absolute magnitude is -17.55 and spans about 90,000 light years in diameter and 6,000 thick.

While in this area we surfed much of the rest of the **5128 group**. The brightest of these are the namesake 5128, which is the fifth brightest galaxy in the sky and also one of the most powerful radio emitters. The other two bright members are **M83** and **NGC 4945** (logged earlier). This group contains 31 galaxies with 17-ESO, 2-PGC,

2-IC, 9-NGC and 1 Messier designation). The faintest range down to “big scope” country of magnitude 15, and were very challenging even in the 25”. My notes are extensive on some of these very bright to very challenging objects, so I will include them in a separate article for space allocation reasons. There are several such areas that experienced observers new to the Southern hemisphere could immerse themselves for an entire evening.

The Pavo Galaxy Group: NGC 6876 Group – Another worthy galaxy group that will thrill all observers and particularly those who like to hunt faint fuzzies. This group has a number of interactive induced star forming active galaxies making it even more interesting. The group has an interesting assortment of morphological types as well. I used the Argo Navis, but this is one group that is fairly easy to star hop to, even if new to the southern skies. It lies almost 1/3 of the way and perfectly along the bisecting line going from Epsilon to Beta Pavo. I had to learn a number of new constellations, but for easy reference, it is about 20 degrees southeast of the SMC. The group lies about 180 million light years distant. The feature member (**NGC 6876**) is a mag. 11.3 E3 galaxy and its companion (**NGC 6877**) is a mag. 12.2 E6. The

other key member, and the most visually interesting is **NGC 6872**, which is an intriguing mag. 11.8 irregular spiral bar (type SB(s)b pec). The companion (**IC 4970 – ESO 73-33**) is mag. 14.6 and was challenging and lies just off one of the spiral arms. **NGC 6872** forms a tidally interacting pair with the companion **IC 4970**, which produces rich star forming regions. In the 25”, I observed detail in NGC 6876 and 6872 at 200x and greater. The third dominant member of this group is **NGC 6880**. It is a mag. 12.1 spiral (type SAB(s) with another faint companion **IC 4981 (PGC 64486)** mag. 13.1 irregular galaxy. Three other galaxies that are all visible in the 13 Ethos FOV are **IC 4972** (mag.15.2 spiral), **IC 4985** (mag. 14.7 SO) and **IC 4982** (mag. 15.2). The last was the most challenging for me, and it took younger eyes to point it out. Once, pointed out, I could confirm it. This completed a very interesting galaxy group that is quite an eyeful.

The last objects that I will detail for this article is the constellation Grus, which lies about 30 degrees east of the SMC. Grus is a galaxy rich group that rose a little later during this part of the winter season.

NGC 7462: Very nice mag. 11.2 edge on spiral galaxy with bright core and good mottling in the central dust lane at

Top: Peter Read of SDM telescopes “fiddles around” and entertains the group at the final BBQ dinner

Middle: Lachlan feeds Paul a heaping helping (not advised) of Vegemite during the Vegemite eating contest

Bottom: No shortage of wildlife for photo ops inside Warrumbungle National park. Imaged with Canon 40D and 70-200mm f/2.8L lens at 150mm, f/2.8, ISO 800, 1/25 second

higher magnification. An 11th magnitude star tips one edge of the galaxy. The opposite end has a brighter (active?) region just off a visible bisecting dust lane.

NGC 7424: Mag. 10.2 face on spiral (type SB(rs)) The core is slightly elongated and the halo has brighter areas that upon more intense visual scrutiny resolve into spiral arms and knots. Best with the 13mm in the 25”.

NGC 7462: Mag 11.3, edge-on spiral bar. Appears brighter than its designated magnitude in the 25”. Tapers with mottling at the end. Field star accents the eastern tip with a several others framing the galaxy for a pleasing FOV in the 13mm.

The Grus Quartet

Is a small group of four galaxies. Three of the members (**NGC 7582, 7590 & 7599**) are bunched fairly tightly so that they are all visible in the 25” with the 13mm Ethos. In the 18” I caught all four with the 17mm Ethos. Using low magnification with the 25” (31 Nagler) the galaxies are all easily detected in the same field of view. All the galaxies reveal smooth elongated disks. The outlier is **NGC 7552**, which is not as elongated. Using a higher magnification (327 X) on the close trio, I could observe more detail in the group of three galaxies. **NGC 7582** is clearly the brightest. It is an SB(s)a galaxy, and is an active (star-burst activity) galaxy, revealed in the brighter patches of the spiral arms at this power. **NGC 7552** is also a star-burst galaxy, but (to me) evidence is less apparent. Over all 7552 appears smooth with a brighter core and a faint outer halo that curves to one side towards a field star. A very few faint foreground stars are visible superimposed on the galaxy **NGC 7590**.



The balance of the days were highlighted by walks in Warrumbungle National Park, including one charted by an aboriginal guide who worked for the park. The guide was informative as to the aboriginal culture and culminated with a visit inside one of the (males only) ritual caves, where we were treated to a concert with a didgeridoo that topped off this special event. We toured the observatories at Siding Springs, which also included a private tour by Rob McNaught of his observatory and run down on his routine for bagging comets, which I will detail in a separate article as well.

Interesting talks were scheduled throughout the week and included the following:

ArgoNavis/ServoCat tutorial on the observing field by Gary Kopf, one of the principals of Argo

Hidden Galaxies: From Gamma-rays to radio waves and a virtual reality 3D presentation by Glen Mackie and Sarah Maddison from the Compact Array facility and another presentation by Sarah on Planet formation and how to observe it in action

The event was seasoned with great camaraderie and a final BBQ dinner that included a DSTSS attendee roast hosted by Tony Buckley, a Vegemite eating contest (winners John Bozeman – US and John Bambury of Australia) a few “fiddle” selections by Peter Read, maker of ATM telescopes. As it turns out Peter is quite an accomplished musician as well as telescope maker. Vegemite, for the uninitiated, is an interesting substance that tastes a bit like a combination of Vitamin-B, Seaweed and Salt with the consistency of axle grease. David Moody compiled a fun and humorous video from clips taken during the event and he also integrated a number of photos from other attendees.

The list of other objects observed could fill a small book and this article is already extremely long, so I will leave these for future articles. Apart from the individual observing targets, it was a real pleasure to begin to acquaint myself with a myriad of new constellations like; Grus, Phoenix, Octana, Tucana, Indus, Pavo, Apus, Ara, Crux, Triangulum Australis, Musca and Norma as well as more familiar ones

turned on their heads. It was dramatic to see Scorpio so high in the sky and watch it turn upside down as the evening progressed. I enjoyed many familiar objects in Scorpio and Saggiarius at much better sky positions. I confess that even by the end of the trip I still struggled delineating some of the Southern constellations, and frequently used the LMC, SMC and the bright stars of Crux as navigational aids, but I can honestly say that I came a long ways from my first night under these lovely dark skies. It will require future trips to get as familiar with them as their Northern sky counter parts, but then that is a worthy goal and a good reason to return many more times in the future. DSTSS was an incredibly good time with great observing, interesting (and entertaining) people, wonderful telescopes, and terrific sightseeing. It is an event I will repeat as often as possible and heartily recommend.

Charlie Warren

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