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- The June 2015 Springs AstroCamp
- Measuring the light curve of NT Aps
- Observing the Hickson Compact Group 88
The Society (ASSA) can be contacted by post to the address above, or by e-mail to info@assa.org.au. Membership of the Society is open to all, with the only prerequisite being an interest in Astronomy.

Membership fees are:
- Full Member $75
- Concessional Member $60
- Subscribe e-Bulletin only; discount $20

Concession information and membership brochures can be obtained from the ASSA web site at: http://www.assa.org.au or by contacting The Secretary (see contacts page).

Member Submissions
Submissions for inclusion in The Bulletin are welcome from all members; submissions may be held over for later editions.

Wherever possible, text submissions should be sent via e-mail or posted on CD-ROM in almost any word processing format and may still be submitted handwritten or typed. Your name may be withheld only if requested at the time of submitting. Images should be high resolution and uncompressed, e.g. TIFF file formats, although high resolution JPEGs are acceptable. Your full name and object designation must be provided with each image and will be published. Equipment/exposure etc details are welcome but optional.

Advertising & Classifieds
Small adverts and classifieds are free for members (space permitting). Commercial advertising is available at a cost of $50.00 per quarter page per issue.

All enquiries and submissions should be addressed to The Editor and preferably sent by e-mail to: editor@assa.org.au

For large files (e.g. on CD) or hardcopy items, post to: Joe Grida Editor, The Bulletin PO Box 682, Mylor SA 5153

Contributions should reach the Editor no later than the 7th of each month, for publication in the following month’s issue of The Bulletin.

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Sister Society relationships with:
Orange County Astronomers
www.oacastronomers.org
Colorado Springs Astronomical Society
www.csastro.org
Central Arkansas Astronomical Society
www.caasastro.org

Get your copy now, and be prepared for 2015.
Available at the General Meetings or by mail order.
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Cover photo: Star Party Stockport 23 May 2015. Image by Stephen Muller. ISO 3200, 17mm f4 for 45 seconds. Equipment was Canon 5D MK3 and 17-40mm lens. The landscape image was same settings but 20mm focal length. Minor tweaks to contrast and clarity only.
**General Meeting**

Wednesday, 5 August, 2015  
@ 8:00pm  
Kerr Grant Lecture Theatre  
2nd Floor, Physics Blg  
University of Adelaide  
North Terrace, Adelaide  

**Guest Speaker:**  
Professor Fred Watson  
Astronomer in Charge  
Australian Astronomical Observatory  

*(See speaker bios on page 4)*

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**Astronomical Society of SA Inc & Australian Institute of Physics**  
**present Prof Fred Watson:**

**Australians vs The Galaxy: RAVE, GALAH and beyond**

The history and geography of our Milky Way Galaxy were poorly understood until the 1970s, when new large telescopes were built in the southern hemisphere.

Even then, our understanding was limited to what could be gleaned from imaging surveys of the southern sky, such as those carried out by the AAO’s UK Schmidt Telescope. But when pioneering experiments with fibre optics were conducted in Australia in the 1980s, the way was open for a new era in spectroscopic studies of stars by the hundreds of thousand. It took more than a decade for this technology to mature, but we are now seeing the fruits of these efforts, with the completion of the RAVE survey of half a million stars, and the start of the new GALAH survey with the Anglo-Australian Telescope.

In this entertaining and fully illustrated talk, Fred Watson explains the significance of these astronomical mega-surveys, describes some of the results from them, and looks to the future of Galactic astronomy in Australia.

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**August 2015 Calendar**

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<td>8:00pm General Meeting</td>
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<td>8:00pm Members’ Viewing Night – Stockport</td>
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<td>Fri</td>
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**Note:** Times shown above and throughout this document are:  
5 Oct 2014 to 5 Apr 2015: South Australia Summer Time (UTC+10:30)  
6 Apr 2015 to 3 Oct 2015: South Australia Standard Time (UTC+ 9:30)  
4 Oct 2015 to 3 Apr 2016: South Australia Summer Time (UTC+10:30)

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**Astronomy Education - Beginners’ Talks**

Please note that due to the joint meeting, there will NOT be an Astronomy Education session this month.

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**Planning on going observing?**

Save yourself unnecessary travel and time. If the weather looks doubtful where you are, check with the following people to see if the event is still on (or see www.assa.org.au after 5pm).

**Stockport Observatory (DO 3-13)**  
Observatory 8528 2284  
Lyn Grida 8388 5980  
Tony Beresford 8338 1231

**Heights Observatory (DO 3-34)**  
Robert Bronca 8266 7504

**Whyalla**  
Peter Mayfield 0408 410 895

**Tooperang**  
Jeff Lowrey 0429 690 610

**Northern Yorke Peninsula**  
Tony Henderson 0429 352 382

**Riverland**  
Tim Vivian 0407 800 225
ASSA Calendar Competition

As part of the fund raising program, the council has decided to produce a calendar for 2016. The images to populate the calendar will come from photographs supplied by members in a competition which will close in September.

This competition will be completely separate from the Astrophotography Awards. The only criteria for the images are that they must be taken by a member and have an astronomical theme. This means they could be planetary, solar, deep sky, wide field or it could even be an image from an ASSA event. They can be old images or ones that have previously been submitted in the imaging awards.

Please submit you entries to me at beginners@assa.org.au or any other media including a title to be included with the image on the calendar.

The winning entries will be decided by David Malin Award winner, Paul Haese, who will not be submitting an image. The 12 successful entrants will each receive a free calendar. Only one image per entrant will be included. This is a great opportunity to get your images out there and help ASSA raise some funds.

Colin Hill, Beginner’s Councillor

Guest Speaker Biography

August 2015 General Meeting

Professor Fred Watson

Fred Watson is an astronomer at the Australian Astronomical Observatory, where he is Astronomer-in-Charge and Head of Lighting and Environment.

Fred is best known for his radio and TV broadcasts, talks, and other outreach programs, which earned him the 2006 Australian Government Eureka Prize for Promoting Understanding of Science.

He has also written a number of award-winning books, and was made a Member of the Order of Australia in 2010.

Fred has an asteroid named after him (5691 Fredwatson), but says that if it hits the Earth, it won’t be his fault!

Sir Kerr Grant Memorial Prize in Astronomy

The ASSA has sponsored this $250 prize for many years, and is awarded annually to the student with the highest overall grade in ‘Astronomy I’ or ‘Space Science and Astrophysics I’ at the University of Adelaide.

Joe Grida (President) and Lyn Grida (Observatories Director) attended the prize ceremony at the University of Adelaide on June 4. The 2014 Sir Kerr Grant Prize winner was Lauren Fuge.

Kerr Grant graduated from the University of Melbourne (B.Sc 1900, M.Sc. 1903), where he developed his interest in physics under the teaching of Professor T.R. (later Sir Thomas) Lyle. After teaching physics and mathematics at the Ballarat School of Mines and a year overseas, mainly at the University of Göttingen, he was appointed lecturer in Natural Philosophy at Melbourne University. He came to the University of Adelaide in 1909 as a replacement for William Bragg while Bragg was on overseas leave, and on Bragg’s resignation the following year to join the Royal Institution in London was appointed to the chair of Physics, a position he held until his retirement in 1948.

Top right: Prof. Sir Kerr Grant, 1878-1967
Right: President Joe Grida presents Lauren Fuge with her certificate and prize.
Aboriginal astronomy

Paul Curnow (B.Ed) writes about the night skies of the aborigines of south-west WA

Night Skies of the Noongar

For thousands of years, Aboriginal Australians have watched the skies above. This fascination with the stars and the movement of the night sky extends to almost all indigenous cultures throughout the world.

Background image: The southern skies (image: Graeme Stanley) used with permission.

This allure and connection to the stars above has been fundamental in reaching a greater understanding of the universe in which we reside. And this basic need to be able to comprehend the cosmos still drives the passions of modern astronomers to this very day.

Aboriginal Australians did not use a written language; therefore knowledge of the night sky was passed on through oral narration; art and dance. This is contained within the wider framework of ‘The Dreaming’, which is seen as an ongoing process that contains explanations of how the sky and Earth were formed; humans and other animals came into existence; in addition to spiritual and cultural beliefs. Edwards (1988) writes: “this is thought of by Aboriginal people as the beginning of their existence, of their heritage and of their cultural life. The Dreaming was the period in which dramatic events took place which shaped the environment, its inhabitants and their life. Aboriginal people trace their ancestry to the beings which participated in these events.” Thus many stories about the celestial dance of the stars above were passed down from generation to generation. Additionally, contact with early explorers, missionaries, pioneers and ethnographers resulted in some stories being recorded.

Western Australia is our largest state with a total land area of 2,529,875 square kilometres. Moreover, to the north and west it is bounded by the Indian Ocean, and to the south the Great Australian Bight and Southern Ocean. On land it is bounded by the Northern Territory to the north-east and by South Australia to the south-east. Therefore, there are many Aboriginal Groups spread widely throughout, from coastal and tropical regions, to the arid interior.

One of the first major efforts to map the locations of Aboriginal Groups within Australia was by the anthropologist Norman Tindale in 1974. However, between 1988 and 1994 researchers from the Australian Institute of Aboriginal and Torres Strait Islander Studies embarked on an intensive mapping exercise of Aboriginal language regions within Australia. As a result of this study, researchers identified 99 traditional language groups within five language regions in the state of Western Australia. Consequently, if there is also variation in the way the sky and celestial objects are seen by different groups. Moreover, there is variation within the ‘cosmogony’ of Aboriginal Groups and the way they believe the cosmos came into being and the natural world functions.

One such group are the Noongar People (also spelt Nyungar, Nyoongar, Nyoongah) who live in the south-western corner of Western Australia, from Geraldton on the west coast to Esperance on the south coast. Also, the Noongar are made up of fourteen different language sub-groups. In the Noongar Dreaming, or Nyitting as it is known, the sky was once so close to the ground that trees and other tall plants could not grow. Therefore, the Noongar had to crawl when they moved around the country, and all the birds had to walk everywhere, instead of being able to fly around. The birds were tired of having to walk everywhere, so they decided to work together and they started gathering lots of sticks and branches. These clever birds would use the sticks to hold up the sky so they could fly about; but the sticks looked like they would break under the heavy strain. Nevertheless, the magpies were wise, so they placed some long sticks in their beaks and pushed it up until the sky eventually sprang up far above their heads, revealing the sun and in turn creating the first sunrise. Each dawn the ‘Koorbardi’, or magpie, sings its beautiful song to remind the descendants of this world of its importance in the creation of the first sunrise.

Without doubt the Southern Cross, or Crux, is one of the most recognisable constellations in the Southern Hemisphere. It is the smallest of the 88-constellations that were ratified by the International Astronomical Union in 1922. The Noongar believe the Southern Cross to be a group of women who once lived near the sea. In the Dreaming they speak of these women being camped near a forest some distance away from the local river. The Elders had realised that water was running low and therefore they sent four women to retrieve some water from the river in some bark cups. However, the Elders had warned them not to go near the sacred waterhole, which was forbidden to women. Nevertheless, the women became curious and ventured down to the sacred waterhole and filled their cups. Happy with their journey they then began to play around the waterhole.

Consequently, the men wondered why the young women
were taking so long and ventured out to search for them. The men arrived at the river and the women were nowhere to be seen. They then left and heard the chattering of the women coming from the vicinity of the sacred waterhole. Angered the men charged down after the women, which in turn ran out of fear when they saw the men coming. As the women ran as quick as they could a strong wind came along and swept them up into the sky. Clustered together in the sky – the angry men hurled their spears at them. In order not to be struck, the four women spread out into the familiar pattern that we now know as the Southern Cross. The women were so frightened that they dare not come back to Earth for fear of being speared and remain in the sky as the four brightest stars of the Southern Cross. Before this time it was believed that all stars lived in groups.

In Dreaming stories of the Noongar, there once lived a giant woman known as the ‘Charrnock woman’, often described as a giant evil spirit. This woman travelled from camp fire to camp fire, collecting spirit children, known as koolongurs. Moreover, the ‘Charrnock woman’ had long white hair and was much taller than the highest Karri (Eucalyptus diversicolor) and Jarrah (Eucalyptus marginata) trees. This giant woman used her hair as a type of net in order to keep and accumulate the spirit children in. However, this was forbidden, and the spirit ancestors tried to stop this woman from what she was doing, but they were unable to get close enough to her. Therefore, they decided to change themselves into a flock of koorlbardies (magpies) in order to get closer to her. They figured this way they could fly up and rescue the spirit children from her long white hair. Consequently, a great battle in the sky ensued, with many of the spirit children falling from the sky, and as they struck the Earth turning to stone. These stones are called Bwia-ee-Koolungur-Nyinna, basically meaning ‘the place where the young babies fell’. The ‘Charrnock woman’ eventually fled the koorlbardies by leaping even higher from the top of Wave Rock, which is located some 300km south east of Perth. To this day, the misty band of the Milky Way is described as the long hair of the woman, with the stars being the spirit children caught up within her hair.

In conclusion, today we are left with just a taste of the incredibly complex knowledge and understandings shared by groups like the Noongar and other Australian cultures. Optimistically, efforts will continue to safeguard these remaining snippets of stellar knowledge for future generations of indigenous descendants and night sky enthusiasts.

References:
Edwards, William Howell, 1988, An Introduction to Aboriginal Societies, Social Science Press, Wentworth Falls, N.S.W.
Hassell, Ethel, & Davidson, D.S., 1934, Myths and Folktales of the Wheelman Tribe of South-Western Australia, Taylor and Francis Ltd, London.
Nannup, Noel, 2014, Edith Cowan University, (personal communication)
Nannup, Noel, 2004, The Coming of the Colours (CD), Swan Catchment Council, W.A.
Thieberger, Nick, & McGregor, William, (Editors), 1994, Macquarie Aboriginal Words: Words from Australian Aboriginal and Torres Strait Islander Languages, Macquarie Dictionary Publishers Pty Ltd, Sydney.
On Friday the 12th of June, 2015, my daughter Genevieve and I packed our 4WD and set off with fellow ASSA member John Whitehead for The Springs in the Bendleby Rangers. It was a beautiful 4.5 hour drive north, passing through the Clare Valley and Jamestown, which is always beautiful this time of year as it’s so lush and green. It was at this point that my fellow traveller John produced a weather map predicting clouds and rain. I wasn’t having any of it. I told him to tear it up as this was my first Astro Camp that I’d FINALLY gotten into and nothing was going to spoil it for me.

I had, for the first time ever, given up going to the football that night, as this was the only camp for 2015 that I could get in to. Besides, John had agreed we’d drive back to the Orroroo pub that night to watch the game and then head back for a night of observing. From Jamestown we took the Orroroo exit and the long drive from there was spent discussing football (Port Adelaide of course!) Quantum Physics, religion, philosophy and bee keeping (John is an avid bee keeper). Once we hit the 50km dirt track to The Springs, my 12 year old daughter took her earphones off and enjoyed watching the many kangaroos and emus in paddocks either side of the track.

Arriving at The Springs we were greeted by a very excited and happy young farm dog that jumped onto my lap the moment I opened the car door. Hearing my daughter squeal with excitement and running off with this fur baby who went by the name of Freo (nothing to do with the footy team thankfully) I knew she wouldn’t have a dull moment on this camp. John and I greeted our fellow ASSA members and introduced ourselves to those we hadn’t met.

After unpacking the car we sat down to an enjoyable dinner, where to my delight I discovered a television that was connected to an antenna. We didn’t need to do the 1 hour drive to the pub to watch the game! This of course meant that we could eat without rushing. As it got dark the clouds John warned me about made an appearance. I couldn’t see any stars. I’d heard that on these camps there were often nights where conditions meant no viewing. I wasn’t too fazed; I had a footy game to watch.

At 7pm I turned on the TV to discover the only channel it
didn’t receive was the one I needed. I was crushed. No stars and no footy. Lyn suggested that I head over to the owners house and ask Warren and Jane if I could watch their TV. Sure enough I could hear the pre game song from their front door! I knocked and got a very friendly “come in”.

Warren was delighted to see a fellow Port supporter, wrapped in my Port Power colours, and insisted that I sit in his chair to watch the game. (He had to show me all his Port Power memorabilia first!) At 10pm, after Geelong defeated Port, (Joe smirked that they would) John and I said thank you and goodnight to our hosts. As I stepped out I looked up and was gobsmacked by the night sky.

There wasn’t a cloud in sight. The Sagittarius arm was lit up in all its splendour, the Magellanic Clouds were bright and there were stars from horizon to horizon. I had never seen the Milky Way from such a dark sky before. We headed straight over to our scope and spent the next 5 hours observing. It was incredible to see detail in planetary nebulae, made possible by the zero light pollution. Spiral arms in galaxies were clearer, the galaxy clusters in Markarian’s Chain were brighter, and the old favourites NGC 104, NGC 2070, NGC 3372 and NGC 5139 showed off their true magnificence. I saw the Helix Nebula in detail for the first time. I could make out the double edge of the Ring Nebula.

At 4am there was only a few of us awake to watch the moon rise. At 6am I was alone in watching the first rays of sunlight dance along the black horizon.

After several hours of sleep, we packed a picnic lunch and set off with Joe and Jeff Lowrey. We took our 4WDs to the top of a mountain range and enjoyed our lunch with an amazing view. We drank coffee while eagles soared overhead. Again, it’s not something that you see and experience often.

That evening we drove to the top of the Bendleby Ranges for cocktails and nibbles. The view was breathtaking. My 12 year old was so amazed by the view she sat on a rock the whole time and took it all in. The viewing that night wasn’t as clear as the previous evening but the clouds didn’t roll in until 1 am. When we put the scope away due to cloud cover, John and I sat in our chairs with a hot chocolate, whilst I outlined constellations with my laser, pointing out where certain Messier and NGC objects are.

By 3am we decided we couldn’t cope with the cold anymore and said goodnight. It was the last viewing night we had. We woke up to heavy rain on Sunday which didn’t stop until the following morning. Joe has always said the owners like ASSA members going there as we bring the rain with us. We spent an enjoyable day sitting around the dining table, drinking wine next to an open fire, trying to guess songs and artists that Jeff, Jamie and David had on their computers. I loved every minute of this camp and I’m looking forward to doing it again!

PS: See images on back cover of this issue of The Bulletin.

Above: Barry Neylon, Joe Grida and Jeff Lusher enjoy sunset drinks. The author is in the background. 
Below: The panoramic view from our sunset drinks location, on the North-South track at The Bendleby Ranges. Photos by Tom Valencic.
Moon engulfed in permanent, lopsided dust cloud

The moon is engulfed in a permanent but lopsided dust cloud that increases in density when annual events like the Geminids spew shooting stars, according to a new study led by University of Colorado Boulder.

The cloud is made up primarily of tiny dust grains kicked up from the moon’s surface by the impact of high-speed, interplanetary dust particles, said CU-Boulder physics Professor Mihaly Horanyi. A single dust particle from a comet striking the moon’s surface lofts thousands of smaller dust specks into the airless environment, and the lunar cloud is maintained by regular impacts from such particles, said Horanyi, also a research associate at CU-Boulder’s Laboratory for Atmospheric and Space Physics.

The cloud was discovered using data from NASA’s Lunar Atmosphere and Dust Environment Explorer, or LADEE, which launched in September 2013 and orbited the moon for about six months. A detector on board called the Lunar Dust Experiment (LDEX) designed and built by CU-Boulder charted more than 140,000 impacts during the six-month mission.

"Identifying this permanent dust cloud engulfing the moon was a nice gift from this mission," said Horanyi, the principal investigator on LDEX and lead study author. "We can carry these findings over to studies of other airless planetary objects like the moons of other planets and asteroids."

A paper on the subject appears in the June 17 issue of Nature. Co-authors include Jamey Szalay, Sascha Kempf, Eberhard Grun and Zoltan Sternovsky from CU-Boulder, Juergen Schmidt from the University Oulu in Finland and Ralf Srama from the University of Stuttgart in Germany.

Horanyi said the first hints of a cloud of dust around the moon came in the late 1960s when NASA cameras aboard unmanned moon landers captured a bright glow during lunar sunsets. Several years later, Apollo astronauts orbiting the moon reported a significant glow above the lunar surface when approaching sunrise, a phenomenon which was brighter than what the sun alone should have been able to generate at that location.

Since the new findings don’t square with the Apollo reports of a thicker, higher dust cloud, conditions back then may have been somewhat different, said Horanyi. The dust on the moon -- which is dark and sticky and regularly dirtied the suits of moonwalking astronauts -- was created over several billion years as interplanetary dust particles incessantly pounded the rocky lunar surface.

Knowledge of the dusty environments in space has practical applications, said Horanyi. Knowing where the dust is and where it is headed in the solar system, for example, could help mitigate hazards for future human exploration, including dust particles damaging spacecraft or harming astronauts.

Many of the cometary dust particles impacting the lunar surface are traveling at thousands of miles per hour in a retrograde, or counterclockwise orbit around the sun -- the opposite orbital direction of the solar system's planets. This causes high-speed, near head-on collisions with the dust particles and the moon's leading surface as the Earth-moon system travel together around the sun, said Horanyi.

The Geminid meteor showers occur each December when Earth plows through a cloud of debris from an oddball object called Phaethon, which some astronomers describe as a cross between an asteroid and a comet. "When these 'beams' we see from meteors at night hit the moon at the right time and place, we see the cloud density above the moon skyrocket for a few days," said Horanyi.

Horanyi also is the principal investigator on a CU-Boulder student dust-counting instrument on board NASA’s New Horizons spacecraft that performed a flyby of by Pluto on July 14, after a journey of more than nine years.

Story source:
Elusive Mercury returns to the evening sky this month. The diminutive planet only displays a disk of 5.2 arc-seconds. The best day to look at it would be on August 6, when Mercury, Jupiter and Regulus are all in a vertical line. The Sun sets at approx 5:34pm. By 6:00pm, the sky should be dark enough to show all 3 objects. Mercury will be 7° above the horizon, Jupiter 2° higher, and Regulus a further 1° higher. Seven degrees to the west, will be brilliant Venus. The 2-day old Moon will be 3.6° SW of Mercury on the evening of August 16.

Venus makes its last appearance in the evening sky this month, reaching inferior conjunction, when it’s between the Earth and the Sun, on August 16. It displays a massive 52.1 arc-second disk, and a brightness of -4.4.

The red planet Mars is now located in the eastern dawn sky, rising in Gemini, about 40 minutes before the Sun at the start of the month. By month’s end, it hasn’t risen high enough yet for easy observation. It’s now located in Cancer, but has closed the distance from Earth by 10 million kms to 377 million kms. It’s still so far away that it subtends a diameter of only 3.7 arc-seconds. That’s smaller than Mercury!

Jupiter also achieves solar conjunction this month, on August 26. It follows Venus, as they become lost in the Sun’s sunset glare. It’s interesting to follow the dance of the planets in the western sky. Jupiter’s grouping with Regulus and Mercury over several nights this month are worth having a look at.

Saturn is the only naked eye planet easily placed for observation this month. Still in Libra, it fades from magnitude +0.4 to +0.5. The rings are wide open at 24°, so they are a wonderful sight, and since Saturn is at its eastern quadrature (the Sun-Earth-Saturn angle is 90°), the shadow of the globe on the rings is at its maximum extent.

Uranus, in Pisces rises soon after 11:00pm at the beginning of the month. It is close to Zeta and 88 Piscium.

Neptune, in Aquarius, reaches opposition on August 31. It shines at magnitude +7.8, and displays a disk of 2.4 arc-seconds.

Below: Pluto and Charon, processed by Damian Peach from the raw images on the mission site. This three image stack shows both Pluto and Charon, 8 million km from the spacecraft on July 7, 2015

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<td>NEW MOON</td>
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<td>26</td>
<td>21</td>
<td>Jupiter at conjunction</td>
</tr>
<tr>
<td>29</td>
<td>18</td>
<td>FULL MOON</td>
</tr>
<tr>
<td>29</td>
<td>22</td>
<td>Neptune 2.9°S of Moon</td>
</tr>
<tr>
<td>30</td>
<td>15</td>
<td>Moon at perigee</td>
</tr>
</tbody>
</table>

**Moon Phases - August 2015**
Two bright binocular comets during August!

C/2014 Q1 PANSTARRS
Arrived at perihelion on 2015 July 6 at 0.31AU, about the same distance as Mercury to the Sun.

The comet was imaged at magnitude 4 by Michael Jager in Austria when situated only 10 degrees from the Sun! Just goes to show what is achievable when you push equipment to the limits.

By mid-July, the comet moved sufficiently far enough away from twilight to be visible, low in the western evening sky in Cancer. Although the apparition is unfavourable, the big plus with C/2014 Q1 is that it is a returning visitor, with an orbital period of 38,000 years.

The comet has been baked by the Sun on previous encounters. If this is the case, the comet may have switched on as it arrived at perihelion. Be prepared for outbursts. The comet is expected to display a lovely dust tail, showing strong curvature to the North, perhaps a few degrees long.

During August, the comet is likely to fade from magnitude 7.5 to 10.0 as it recedes from Earth and Sun, but the prediction is uncertain. Be prepared for the comet to appear significantly brighter or fainter.

On August 1, you will find the 7th magnitude comet situated in Sextans, low in the evening sky at about 19 degrees altitude at 7pm local time. However, moonlight interferes until the night of the 2nd. See the chart below.

The comet treks slowly southeastwards and crosses into Crater on the 5th. On the 11th, it will be 1.5 degrees west of Lambda Crt. By the time it enters Hydra on the 18th, it has faded to magnitude 9 and moonlight once again starts to interfere. On the 23rd, the comet is 30' to the west of a magnitude 11 elliptical galaxy NGC 4105. At the end of August, the now magnitude 10 comet is situated in Centaurus.

C/2013 US10 Catalina
This comet was discovered as an asteroid in late October 2013 by the Catalina sky survey, hence the asteroid designation, but was later shown to be travelling in a retrograde/parabolic orbit, more typical of a comet! This is an intrinsically bright object that has the potential to reach faint naked eye visibility for a considerable period between Oct 2015 to Jan 2016.

Now for the bad news - it is another first time visitor (dynamically new) that is lagging behind prediction and may fall short on it's expected peak of magnitude 4 in November. It also arrives at perihelion on November 15 at a distance of 0.82AU from the Sun, unfortunately on the opposite side of the Sun!
Not all bad news- the orbit is retrograde and the comet will have 2 Earth approaches during the apparition, the first of which occurs this month. On August 14, the comet has the first Earth pass of 1.08AU on its inbound journey, beautifully situated for southerners.

Post perihelion, it has a relatively favourable Earth pass at 0.72AU on January 17, 2016, when it will be better situated for northerners. On the evening of August 2, you will find the magnitude 8.0 comet situated in Tucana, 45' to the east of Delta Tuc in the southeastern sky.

It remains as a south circumpolar object during August as it moves into Indus on the 4th and Pavo on the 8th, passing 30' south of Epsilon Pav on the 12th. On August 14, the comet has the first Earth pass of 1.08AU on its inbound journey and reaches its greatest declination south of -73 degrees. See the chart below.

It crosses into Apus on the 18th and Triangulum Australe on the 22nd, where it then lies within a degree of Alpha TrA. On August 28-29, it lies within a degree of Beta TrA and should have brightened to magnitude 7.0.

Since the comet is circumpolar, you can avoid moonlight interference by observing the comet during evening hours between Aug 2-19 and morning hours after this, until full moon of August 30th.

Please email me photos at mmatti@westnet.com.au for inclusion in the next bulletin, and as usual, check my Southern Comets website for latest updates:

Southern Hemisphere Comets
A roundup of bright and telescopic comets visible for southern hemisphere observers

VicSouth Desert Spring Star Party
November 6-9, 2015
Bookings now open!
http://vicsouth.info/2015.htm
This month’s Variable Vagaries column was contributed by Paul Montague.

**Part 1 - Observing and capturing data on the variable NT Aps**

As a Deep Sky Imaging group member of a few years standing, who has developed some interest in learning about photometry, in this month’s Variable Vagaries article I will try to share some of my experiences of trying to obtain a light curve for an eclipsing binary.

This is only my second attempt at photometry, and there is still a lot to learn! But it is an area of amateur astronomy that seems to offer a lot of challenges and some unique rewards. Not least, it can offer the chance for amateurs to make a contribution to real science.

My choice of target was informed by my impatience to get as complete a set of data as possible in one session! With a non-permanent setup, repeated set up of equipment for multiple sessions can be a pain. Hence my goal was to try to obtain a light curve for a complete period of an eclipsing binary. This means a period of no more than 8 hours or so, and scanning the list of DSLR Eclipsing Binaries in the Southern Eclipsing Binaries program of VSS (http://www.variablestarssouth.org/projects/projects/eb-and-ew-binaries-project), I found a short period target in a reasonable position for the time of year, namely NT Aps.

NT Aps is an eclipsing binary with a magnitude range of 8.4 to 8.87 and a period of 0.2947660 days (AAVSO VSX). It is of type EW, of which the prototype is W Ursae Majoris, in which the stars are either in contact or very near contact - hence the short orbital period. As such, the light curve is in constant change, since the stars never achieve separation. The magnitude range was well within the range of my equipment, being a one shot colour CCD (QHY8) and an 8" Ritchey-Chretien astrograph. These are mounted on an NEQ6-Pro mount.

From previous experience with astroimaging, I knew that about a 20 to 30 second exposure would put the star well in the middle of the CCD’s range, avoiding the non linear ends of its sensitivity range - important for the comparison of the target star with the reference star(s). However, my one previous attempt at photometry had taught me that precise focussing can be counterproductive. With the widely spaced green pixels of a colour camera (I restricted to green as this is nearest the standard Johnson V filter), a lightly focussed star can be partly lost in the gaps between pixels.

This can result in inconsistent measurements, and defocussing the star can help offset the effect by spreading it over more pixels. With some defocus (much against my instinct after a couple of years of astrophotography) an exposure of about 45 seconds per frame was needed to keep the level high enough to subdue the noise.

Allowing for the download time for each frame, about 450 frames later I had gathered what should be enough data to cover one period of the binary, together with a set of corrective frames, especially "flats" (images of a uniformly lit field, in order to ensure correct weighting across the whole image so that different stars’ magnitudes may be legitimately compared).

**Part 2 will be published next month - Ed**

**About the author:**
Paul is a former mathematical physicist who transitioned to work in computer security after migrating from the UK, and now works at DSTO. He took up visual astronomy (and joined ASSA) in 2008 and astrophotography in 2012.
Hickson Compact Group 88 in Aquarius

Hickson 88 consists of only 4 galaxies at a distance of about 260 million light-years. All four are spirals with three nearly face on. All are of unusually low contrast making details rather indistinct. In the image below, from left to right (top to bottom) they are NGC 6978, NGC 6977, NGC 6976 and PGC 65612. The latter being a flat galaxy. That gives me two reasons to observe this group, it’s a Hickson Compact Group and there’s a flat galaxy in the group. You know my love for flat galaxies! This group is in north-western Aquarius, only 6.3 degrees NNW of NGC 7009, the Saturn Nebula.

NGC 6978 is classed as Sb AGN galaxy. It was discovered by Albert Marth in 1863 and is HCG 88A. Albert Marth was a German astronomer who worked in England and Ireland. He arrived in England in 1853 to work for George Bishop, a rich wine merchant and patron of astronomy. At that time, paid jobs in astronomy were quite rare.

NGC 6977 is classed as SB(r)a pec galaxy, and was also found by Albert Marth in 1863. It is HCG 88B by Hickson’s labelling. It is a faint, slightly elongated N-S smudge in the eyepiece of my 16” telescope.

NGC 6976 is classed as SAB spiral with HII emission. At 14th magnitude, and a size of 1.3’ x 1.1’, it has very low surface brightness which makes it very difficult to see, unless you are under a very dark sky.

The fourth member, PGC 65612, is HCG 88D. This galaxy was not seen in the 16” telescope. I’ll wait till we get to the Alpana astrocamp in mid-August, and darker skies.

Studies indicate that the 3 NGC galaxies all show signs of being stirred up by interaction with each other.

<table>
<thead>
<tr>
<th>Label</th>
<th>Designation</th>
<th>Type</th>
<th>Magv</th>
<th>Size (arcmin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCG88 A</td>
<td>NGC 6978</td>
<td>Sb</td>
<td>13.3m</td>
<td>1.5’x0.7’</td>
</tr>
<tr>
<td>HCG88 B</td>
<td>NGC 6977</td>
<td>SB(r)a pec.</td>
<td>13.3m</td>
<td>1.3’x0.9’</td>
</tr>
<tr>
<td>HCG88 C</td>
<td>NGC 6976</td>
<td>SAB(r)bc</td>
<td>14.0m</td>
<td>1.3’x1.1’</td>
</tr>
<tr>
<td>HCG88 D</td>
<td>PGC 65612</td>
<td>Sc</td>
<td>14.8m</td>
<td>1.1’x0.2’</td>
</tr>
</tbody>
</table>

Above: Hickson Compact Group 88, imaged by Kent Biggs, Columbus, Texas. RC Optical System 20” F/8.2 telescope, 4165.6 mm Focal Length, SBIG ST10XME CCD Camera with Adaptive Optics. Exposure: LRGB = 330:80:60:80 minutes
Contact information

Here’s how to contact various members of Council, Regional Co-ordinators and SIG’s

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The group meets on the first Thursday of the month.
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Email: whyalla@assa.org.au

Northern Yorke Peninsula
The NYP’pers hold combined members’ and public viewing nights monthly.
Coordinator: Tony Henderson
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Riverland
The Riverland group hold combined members’ and public viewing nights monthly.
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Above: The winter Milky Way, imaged by Bob Ferrige at the June 2015 The Springs AstroCamp. A single shot – 10mins at 10mm, F7.1. Sigma 10-20mm on a Nikon D7000, piggybacked on a Skywatcher ED100 scope and NEQ6 mount

Below: Another image from The Springs AstroCamp. Tom Valencic imaged the Eta Carinae Nebula (NGC 3372) with an Orion ED80T CF telescope, Skywatcher EQ5pro mount, Canon EOS600D, 180 sec exposures, ISO800 x 25,ISO1600 x 10 20xDarks, 0xFlats, 50xBias, BackyardEOS, DSS and Pixinsight