

The

Volume 125 No. 12
December 2016

Bulletin

*Monthly newsletter of the
Astronomical Society of South Australia Inc*

In this issue:

- ◆ **A visit to Fraunhofer's Hut**
- ◆ **Recently active lava flows on Venus**
- ◆ **A bright evening comet for December**
- ◆ **Arp 284 - interacting galaxies in Pisces**



ASTRONOMICAL SOCIETY of SOUTH AUSTRALIA Inc

GPO Box 199, Adelaide SA 5001

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.ocastronomers.org

Colorado Springs Astronomical Society

www.csastro.org

Central Arkansas Astronomical Society

www.caasastro.org

Arkansas-Oklohoma Astronomical Society

www.aos.org

Gruppo Astrofilii di Piacenza (Italy)

www.astrofilipc.it

ASTRONOMY
2016 AUSTRALIA

AVAILABLE

NOW!

YOUR GUIDE TO
THE NIGHT SKY

Ken Wallace
Glenn Dawes
Peter Northfield

**HAVE YOU GOT
YOUR COPY YET?**

Available at the
General Meetings, or by
mail order

\$25 + \$4 p&h

Email:
secretary@assa.org.au

Cover photo: Beautiful nightscape of the Milky Way taken at Mannum Falls by **Jarrold Koh**. Nice triangle formed by Venus, Antares and Saturn. Nikon D810A DSLR, with Samyang 12mm f/2.8. Exposure: ISO 4000 30 seconds



Activities

December 2016 - the month at a glance

Annual General Meeting of the Astronomical Society of SA Wednesday, 7 December 2016 @ 8:00pm

Kerr Grant Lecture Theatre,
2nd Floor, Physics Bldg,
University of Adelaide,
North Terrace, Adelaide

Guest Speaker:
Steven Raine
ASSA

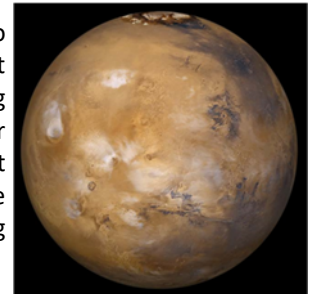
See the speaker biography on page 4

Astronomical anniversaries 2016

From the splendour of Hyakutake's Great Comet to the controversial triumph of the discovery of our solar system's other blue planet; from the revelation of Barnard's Star's stellar speed and the first soft landings on the Moon – or anywhere beyond Earth, to Tycho's construction of Uraniborg observatory; this year marks some significant decadal astronomical and space exploration anniversaries indeed.



Come along on December 7th when Stevo Raine will discuss some of these significant places, people and history commemorating their decadal anniversaries this year showing how we've progressed and learnt through the ages and through some remarkable work by some fascinating people and some of the sights we've seen.



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 8391 5377

Tony Beresford 8338 1231

Heights Observatory (DO 3-34)

Robert Bronca 8266 7504

Whyalla

Peter Mayfield 0405 410 895

Tooperang

Jeff Lowrey 0429 690 610

Northern Yorke Peninsula

Tony "Hendy" Henderson 0429 352 382

Riverland

Tim Vivian 0407 800 225

December 2016 Calendar



Day	Time	Activity
Thu 1	7:30pm	Whyalla Members' Meeting
Fri 2	8:00pm	Public & Members' Viewing, NYP
Sat 3	8:00pm	Member's Viewing Night, Riverland
Sat 3	8:00pm	Members' Viewing Night, Stockport
Wed 7	7:00pm	Beginners' Meeting, Adelaide
Wed 7	8:00pm	General Meeting, Adelaide
Fri 9	8:00pm	Public Viewing Night, The Heights
Tue 13	7:30pm	ASSA Council Meeting

Note: Times shown above and throughout this document are:

3 Apr 2016 to 1 Oct 2016 : South Australia Standard Time (UTC+ 9:30)

2 Oct 2016 to 2 Apr 2017 : South Australia Summer Time (UTC+10:30)

Astronomy Education - Beginners' Talks

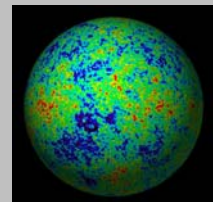
Wednesday, 7 December 2016 @ 7:00pm

Kerr Grant Lecture Theatre



Cosmology

Find out how it all began. We will look at The Big Bang. How it evolved into the Universe we see today and look at possible fates the Universe has in store for us. We will also discuss redshifts and those mysterious entities, dark matter and dark energy.





Reports and Notices

Reports on recent ASSA activities, and notices of upcoming events



Have you got your National Police Check?

- New legislation applies from 11 April 2015
- Impacts on all ASSA members who volunteer at ASSA sanctioned **public** events
- i.e. public viewing nights, school visits, National Science Week, private booked nights

From the 11th April 2015, all members who attend ASSA sanctioned public events **MUST** have a current NPC clearance certificate, or equivalent clearance letter from their employer, and **MUST** have provided ASSA with these details. Non-compliance is a \$10,000 fine to ASSA.

Full details available here:

<https://www.assa.org.au/members/policies>



Please note: Meeting DVD's will not be available next year, however members will still be able to view the meeting recordings via the ASSA website.

Now available!

The ASSA 125th Anniversary 2017 Calendar is now available for purchase - \$20 + \$5 postage

Order now from secretary@assa.org.au

For free delivery from Gawler - Murray Bridge - Goolwa, contact Trish Ellin at tellin@txc.net.au or (08)82613354



Election of Officers 2017

As members are aware, the election for ASSA Council members has been done online for the first time. By the time you read this, voting will have closed.

As more nominations were received than the number of General Councillor positions available, a vote was conducted. As only 1 nomination for each of the Officer positions was received, voting was not required.

All results will be announced at the December 2016 AGM.

Guest Speaker Biography - December 2016 AGM

Steven Raine, ASSA

Inspired by the 1989 'Voyager-II' fly past of Neptune, Stevo Raine has been an ASSA and supernovas member since 1992.

He has written for 'Sky & Space' magazine having three items published there and also writes Science Fiction, a little of which has been published as well as being a contestant on the ABC-TV quiz show "The Einstein Factor" in 2009.

Steven is owned by a cat called 'Zosma' after the star Delta Leonis and a Jack Russell-cross-Fox terrier named (but not by him) Harry plus a very energetic kelpie also not named by him called Chokko.





Reports and Notices

Reports on recent ASSA activities, and notices of upcoming events

Another successful Telescope Clinic

Jeff Lowery reports that no patients were lost!

The Telescope Clinic at Tooperang on Saturday, October 29 went very well with 12 members present and quite a few scopes to check out (some brought multiple patients).

Most of the issues were collimation but there were a few other interesting questions. I need to thank Blair, Nina, Ian, Michael and Alan who all pitched in to assist those who needed help with scopes. It was a very interesting afternoon.

We ran the usual Telescope Clinic BBQ in the comfort of the hall and dinner continued well into the evening. That was mainly because the high cloud cover eliminated any possibility of viewing!

Finally thanks also to all the members who attended. You are the people who make it all worthwhile.

Photos by John Harris



Stockport Spring Star Party - Saturday, 5 November

For a change, we had clear weather, although at 2:00pm I wouldn't have put any money on it. By sunset, it had cleared up completely and we enjoyed clear skies for the rest of the evening.

A small band of clouds did pass over towards the end of the evening, but it did clear quickly. Approximately 130 members and public enjoyed great views of the Moon, Saturn, NGC 253, 47 Tucanae and other celestial sights.

Many thanks to all the helpers who assisted for the viewing, and also to those who arrived early for the working bee. After the recent rains, we had to remove weeds up to 1.5m tall!



Left: Some of the members (wearing hi-vis vests) and visitors preparing for an evening of observing.

Colin Hill also provided a very informative slide show, and Paul Saffi introduced visitors to the 20" telescope.

David Jenke & Jamie Presser gave imaging demos.



History of Astronomy

Germany based member, Robert Purvinskis, tells of a visit to Fraunhofer's hut

A visit to Fraunhofer's Hut

Joseph Ritter von Fraunhofer (6 March 1787 – 7 June 1826) was a German optician. He is known for discovering the dark absorption lines known as **Fraunhofer lines** in the Sun's spectrum, and for making excellent optical glass and achromatic telescope objectives.

As a young physics student in Perth (and later at Adelaide University), I had learned much about spectroscopy, refractive index and optics. Among the prominent names in the history of optics were Joseph Fraunhofer and Robert Bunsen, who could be considered the 'fathers' of modern spectroscopy. Fraunhofer in particular is familiar to astronomers, not only from his accurate measurement of the spectral lines in the solar spectrum, but also from his development of massive large refractors and the invention of the 'german' equatorial mounts, which many of us still use.

Few of us are aware of the 'rags to riches' story behind Fraunhofer's life. Born in eastern Bavaria in 1787, he was an orphan who learned optics in his spare time while apprenticed to a glassworks. After his house collapsed in 1801, young Fraunhofer was rescued from the rubble and drew the attention of the prince-elector of Bavaria as well as a prominent glass-maker. He was sponsored to learn further and eventually joined a master glassworks at Benediktbeuern Abbey south of Munich.





History of Astronomy

Germany based member, Robert Purvinskis, tells of a visit to Fraunhofer's hut

The 'glass hut' at Benediktbeuern, a monastery town on the edge of the Alps, was a unique research facility for improving the quality of optical glass in Germany. At the time, around 1813, Bavaria was still an ally of the French Napoleonic empire, and exchange of information with researchers in Britain, then the leading optics centre, was not possible. Aware of the clear military advantage of the development of better optics, Fraunhofer was able to study in detail the refractive properties of different types of glass, experimenting with different recipes in the 'Glass Hut' next to the monastery.

This led to Fraunhofer's development, together with the Swiss optics expert Pierre Louis Guinand, of large refractor telescopes with achromat (2-glass) objective lenses. This was a major development of the time, with his most important instrument, the famous Dorpat 24 cm refractor, installed in what is now Tartu, Estonia in 1824. They also produced other important instruments such as theodolites.

Fraunhofer's various inventions included grinding and polishing machines, new types of glass furnace, the diffraction grating and of course, in 1814, the spectroscope. It was with this instrument that he measured accurately the 574 dark lines in the solar spectrum now named after him. It was later recognised that these lines mainly represent the 'fingerprint' of various elements in the outer layers of the sun, allowing astronomers to remotely analyse sunlight and starlight to determine the composition of stars. The science of astrophysics was born.

Today in Germany, Fraunhofer is not only a familiar name to astronomers.

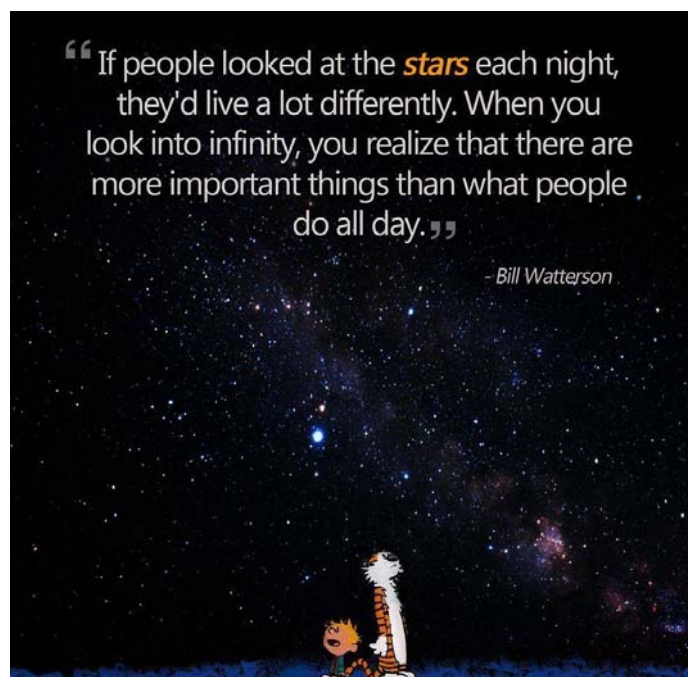
The 'Fraunhofer Society for the advancement of applied research' is now a major contributor to German scientific research, with over 60 institutes across Germany. With a research budget of over 2 billion Euros, it employs over 20,000 scientists and engineers. Over 70% of this funding is earned through external research projects, in fields as diverse as IT, Polymer Research, Factory Automation, Biotechnology, communications, Lasers, Solar Energy and Wind Energy. The famous MP3 compression algorithm that many of us regularly use was developed at one of these institutes.

The 'Glass Hut' is today a small museum and part of the Monastery is a youth hostel. One of Fraunhofer's telescopes (the one first used to observe Neptune in Germany) is on display in the Deutsches Museum in Munich.

The Dorpat refractor is still in Tartu (see my article from ASSA Bulletin, April 2014).



Above: the author in front of Fraunhofer's Hut.





Review

Paul Curnow reviews a tour offered by Adelaide-based The Backyard Universe

The Backyard Universe - Ediacaran Skies Tour 2016

By Paul Curnow [B.ED]

The Flinders Ranges is a timeless place; it is a place of solitude as well as being the site of the incredible *Ediacaran* Fossil discoveries, hence a geological wonderland. It is a place of aesthetic beauty and has some of the darkest skies on planet Earth. Moreover, its unique faunal and botanical diversity has made it an attraction for photographers, scientists, and interested individuals from all over the world. In addition, the Flinders Ranges contains some of the world's oldest artworks, and is the traditional homelands of the Adnyamathanha Peoples.

Recently, I had the good fortune to be among around 20-individuals who attended 'The Backyard Universe - Ediacaran Skies Tour October 2016'. This tour is the brainchild of Joe & Lyn Grida, and Fraser & Loraine Farrell. It particularly focuses on astronomy and looking at deep sky objects, in addition to looking at the magnificent geological features of the Flinders Ranges. For those of you who want to get away from the hustle and bustle of the city and witness truly dark skies, with some learned tour leaders, this is a tour I would highly recommend.

Our first night was spent around the camp fire with some wine and nibbles, and I had the honour of telling some Aboriginal Dreaming stories about the night sky, with particular reference to the Adnyamathanha. In addition, there is nothing quite like sitting around a camp fire getting to know others in such a relaxed environment. Subsequently, our second evening was spent looking through telescopes as Fraser Farrell, Joe Grida, and Alan Brinkworth gave us a guided tour of the stellar firmament,

while Lyn Grida and Loraine Farrell chatted to guests. We got to see deep sky wonders like the 'Silver Coin' galaxy (NGC 253), the planets Mars, Venus, Saturn and Neptune; in addition to 47 Tuc (NGC 104), the 'Ring Nebula' (M57), the 'Tarantula Nebula' (30 Doradus), and the red-hued carbon star X Trianguli Australis to name but a few.

From a geological perspective, Fraser Farrell took people through some of the history of the Blinman township with an underground tour of the Blinman Mine, where copper mining took place from around 1862 through to when the ore ran out in 1918. Additionally, a tag-along geology tour of the magnificent Parachilna Gorge, which included morning tea at Angorichna Village, was enjoyed by all. Then Fraser Farrell, with input from Joe Grida, explained the geology of the ranges as well as the unique fossilised life forms that can be found in the region. What is more, people got to see ancient fossilised stromatolites (formed by early cyanobacteria) in addition to the fossilised skeletons of coral-like archaeocyaths in the 530-million year old Wilkawillina Limestone.

One of the highlights for me was to see the debris layer from the Acraman Meteorite Impact, (*see photo below left*) which occurred some 580-million years ago in the Gawler Ranges of South Australia. Gostin et al (2011) says, "... a smaller but significant asteroid measuring ~4.7-km in diameter hit South Australia around 580-million years ago at Lake Acraman in the Gawler Ranges. The impact site in ancient volcanic rocks now bears the deeply eroded scar of the initial transient cavity, measuring ~40-km in diameter, that led to the formation of a larger collapsed crater ~90-km across." Thus, our group was able to see the 'ejecta layer' (pictured) thrown out some 385-km from this gigantic impact to the east to where we were located.

There were many other activities that I haven't mentioned on this trip, such as the sunset drinks and nibbles with spectacular views to Wilpena Pound and Lake Torrens. Furthermore, there was a tour of a working woolshed and our day in Blinman where we were able to see stunning contemporary artworks from the region. In conclusion, I highly recommend you consider taking one of the tours now being offered by 'The Backyard Universe', it's a great opportunity to see beautiful country, stimulate the brain, and meet people of like mind.

References: Gostin, Victor, McKirdy, David, & Williams, George, 2011, *Ice, an Asteroid Impact and the Rise of Complex Life*, Australasian Science (May), pgs 34-36, Victoria.





Recently active lava flows on the eastern flank of Idunn Mons on Venus

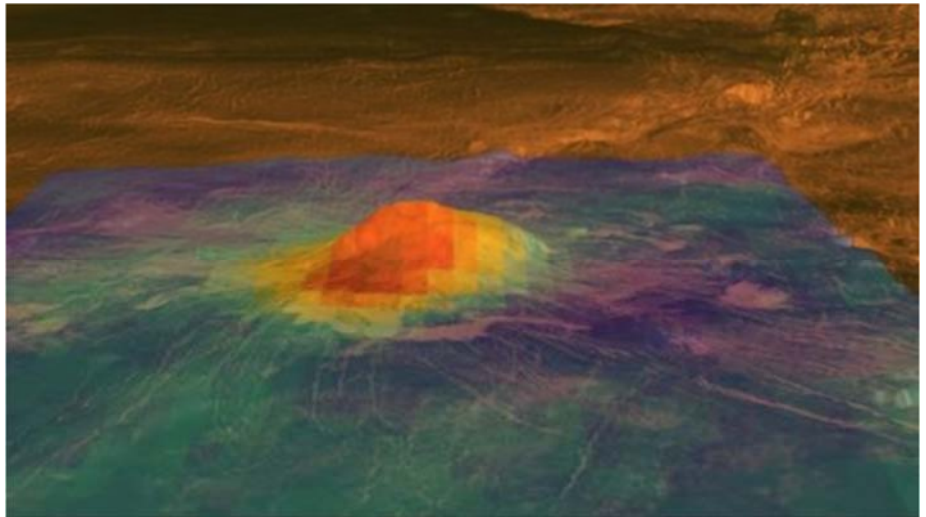
The European Space Agency's Venus Express mission has provided a great amount of data from the surface and atmosphere of Earth's inner twin planet. Among these observations was the mapping of the southern hemisphere of Venus in the near infrared spectral range using the VIRTIS (Visible and InfraRed Thermal Imaging Spectrometer) instrument.

However the thick and permanent cloud cover of Venus limits the achievable resolution, similar to observing a scene through fog. Using a numerical model, planetary researchers at the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt, DLR) pushed the limits of the data resolution.

With this new technique the emissivity anomalies were analyzed on the top and eastern flank of Idunn Mons, a volcano with a diameter of 200 kilometers at its base situated in the southern hemisphere of Venus. These anomalies provide an indication of geologically recent volcanism in this area.

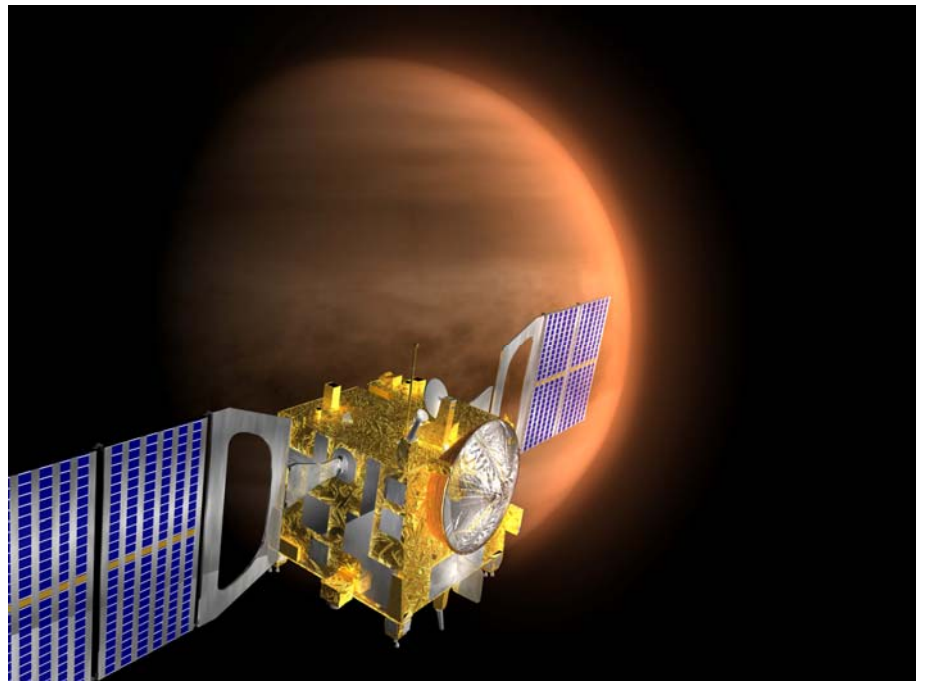
"We could identify and map distinctive lava flows from the top and eastern flank of the volcano, which might have been recently active in terms of geologic time," says Piero D'Incecco, planetary researcher at the DLR who is presenting these results today at the joint 48th meeting of the American Astronomical Society's Division for Planetary Sciences (DPS) and 11th European Planetary Science Congress in Pasadena, California.

"With our new technique we could combine the infrared data with much higher-resolution radar images from the NASA Magellan mission, having been in orbit about Venus from 1990 until 1992. It is the first time that -- combining the datasets from two different missions -- we can perform a high resolution geologic mapping of a recently active volcanic structure from the surface of a planet other than Earth."



Above: The figure displays an elevation model of Idunn Mons (46S; 146 W), overlain on VIRTIS emissivity anomaly. In red, the areas characterized by recent volcanic activity. Credit: NASA/JPL-Caltech/ESA

Below: An artist's impression of the ESA's Venus Express spacecraft.



This study will also provide motivation for future projects focused on the exploration of Venus, as for example the NASA Discovery VERITAS mission proposal or the ESA

Story Source: Europlanet Media Centre. "Recently active lava flows on the eastern flank of Idunn Mons on Venus." *ScienceDaily*, 18 October 2016. <www.sciencedaily.com/releases/2016/10/161018081619.htm>.



EnVision M5 mission proposal that -- in combining high-resolution radar and near-infrared mapping -- will extend the frontiers of our current knowledge of the geology of Venus.

Search for Location and Extent of the Lava Flows

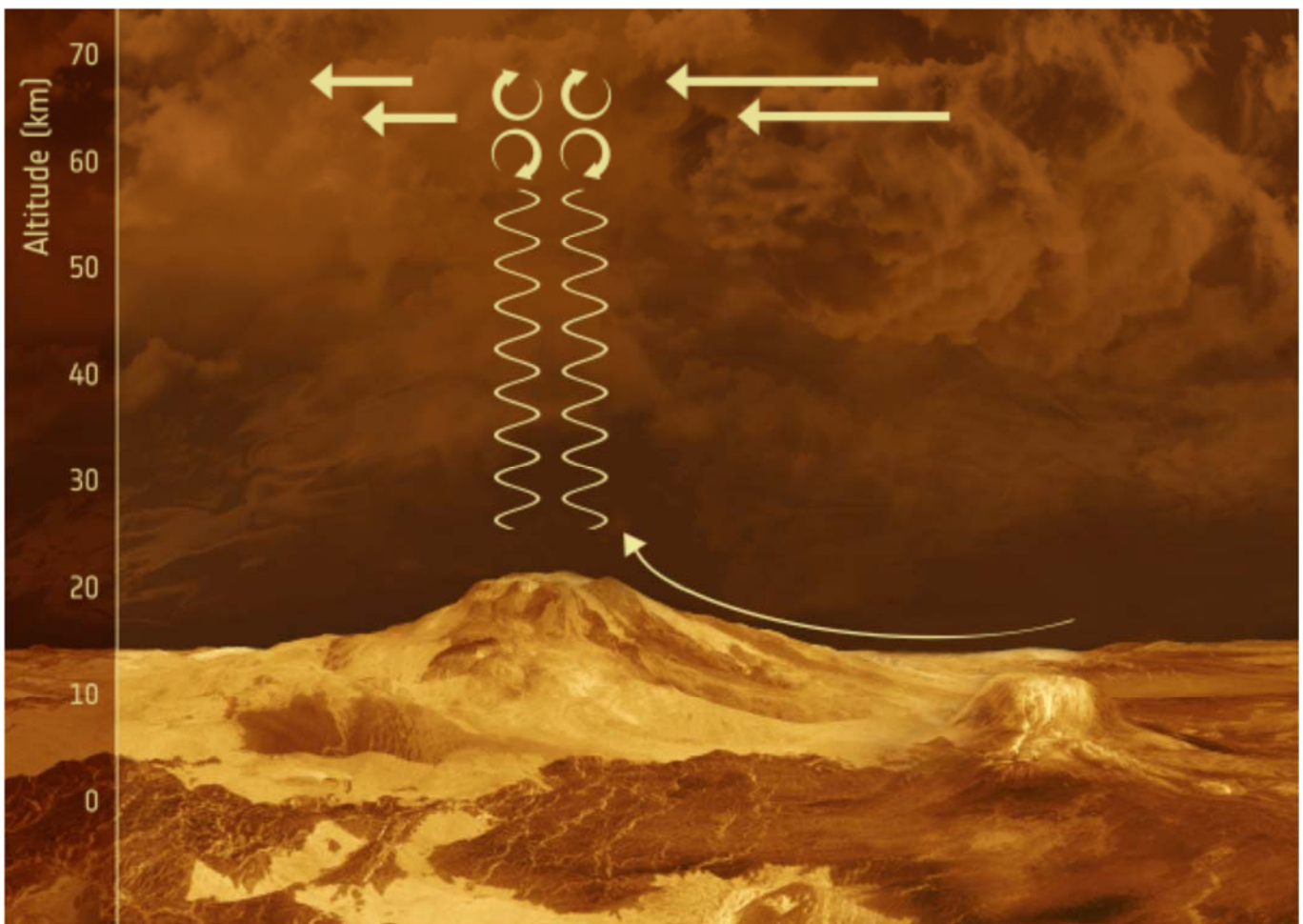
From 2006 until 2014 the ESA Venus Express probe was analyzing the atmosphere and surface of Earth's twin planet. The Visible and InfraRed Thermal Imaging Spectrometer (VIRTIS) has provided data that indicate the occurrence of recent volcanic activity on Venus.

DLR scientists Piero D'Incecco, Nils Mueller, Joern Helbert and Mario D'Amore selected the eastern flank of Idunn Mons -- Imdr Regio's single large volcano -- as the study area, since it was identified in VIRTIS data as one of the regions with relatively high values of thermal emissivity at 1 micron wavelength.

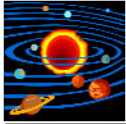
Using the capabilities of specific techniques developed in the Planetary Spectroscopy Laboratory group at DLR in Berlin,

the study intends to identify location and extent of the sources of such anomalies, thus the lava flows responsible for the relatively high emissivity observed by VIRTIS over the eastern flank of Idunn Mons. Therefore the lava flow units on the top and eastern flank of Idunn Mons are mapped, varying the values of simulated 1 micron emissivity assigned to the mapped units. For each configuration the total mismatch as root mean square error in comparison with the VIRTIS observations is calculated.

In the best-fit configuration, the flank lava flows are characterized by high values of 1 micron simulated emissivity. Hence, the lava flow units on the eastern flank on Idunn Mons are likely responsible for the relatively high 1 micron emissivity anomalies observed by VIRTIS. This result is supported by the reconstructed post-eruption stratigraphy, displaying the relative dating of the mapped lava flows, that is independent of the 1 micron emissivity modeling. Values of average microwave emissivity extracted from the lava flow units range around the global mean, which is consistent with dry basalts.



Using observations from ESA's Venus Express satellite, scientists have shown for the first time how weather patterns seen in Venus' thick cloud layers are directly linked to the topography of the surface below. Rather than acting as a barrier to our observations, Venus' clouds may offer insight into what lies beneath.



Solar System Highlights

The major planets during December 2016

by John Newell

The **Sun** will rise at 6am and set at 8:10pm on the 1st of the month, on the 31 it will rise at 6:10am and set at 8:30pm. The shortest night of the year will be just 9 hours 30 minutes on the night of the summer solstice which occurs at 9:14pm on the 21st.

The **Moon** should look wonderful next to Venus in the evening of the 3rd, first quarter will be on the 7th. Full Moon at perigee will be at 10:37am on the 14th. The last quarter will be on the 21st and the new Moon will be at 5:24pm on the 29th.

In the evening of the 11th **Mercury** will be at its greatest Eastern Elongation of 20.8 degrees from the Sun and it will reach inferior conjunction on the 29th.

Venus at her best, high in the evening sky all month, will move into Capricorn on the 7th and will be near to Mars and Neptune at the end of the month.

Mars now dimming, sets at 12:41am on the 1st, moves into Aquarius on the 16th and sets at 11:45pm on the 31st. Despite the failure of the Schiaparelli lander, ESA's ExoMars

Trace Gas Orbiter has arrived safely. Aerobraking until November 2017, its suite of instruments should provide unparalleled resolution of atmospheric gases and subsurface water ice. Details at <http://exploration.esa.int/mars/48523-trace-gas-orbiter-instruments/>.

Ceres in Cetus magnitude 7.5 sets at 4:11am on the 1st, will be stationary next to Uranus on the 15th and sets at 2:06am on the 31st magnitude 7.9.

Jupiter in Virgo, rises at 3:25am on the 1st, rises with the Moon and Spica on the 23rd and rises at 1:39am on the 31st.

Saturn is in conjunction with Sun on the 10th and rises at 4:55am on the 31st.

Uranus in Pisces magnitude 6.1, sets at 3:31am on the 1st, sets with the moon on the 10th, is stationary along the ecliptic on the 29th and sets at 1:32am on the 31st.

Neptune in Aquarius magnitude 7.7 sets at 1:44am on the 1st, sets with the Moon on the 7th and sets with Mars at 11:43pm on the 31st.

Pluto in Sagittarius magnitude 14.3, sets with the Moon at 10:43pm on the 1st and is just a week away from conjunction with the sun by the 31st.

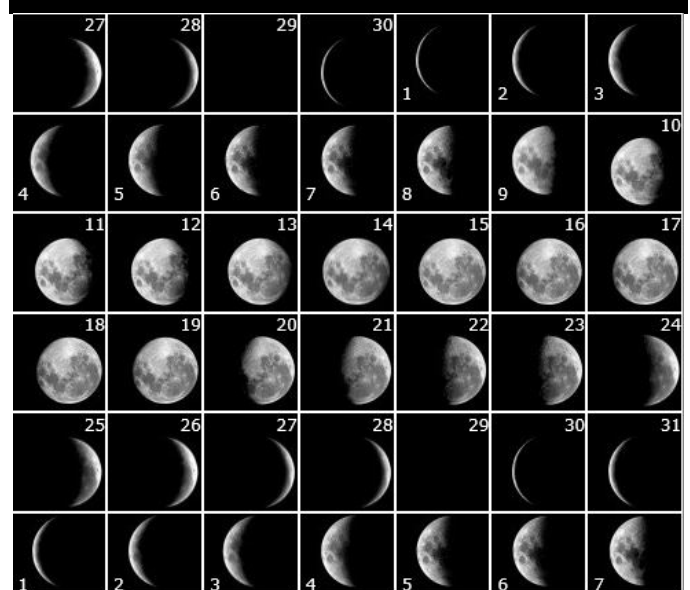
Gemini will rise around 10pm for the peak of the **Geminids** Meteor Shower on the 13th which may be visible even with the full moon.

Diary of phenomena December 2016

d h (UT)

- 1 19 Moon furthest South (-18.9°)
- 3 10 Venus 5.8°S of Moon
- 5 8 Mars 2.9°S of Moon
- 6 21 Neptune 0.7°S of Moon
- 7 8 FIRST QUARTER
- 10 11 Saturn at conjunction
- 10 21 Mercury greatest elong E(21°)
- 12 23 Moon at perigee
- 13 4 Aldebaran 0.5°S of Moon
- 14 0 FULL MOON
- 14 21 Moon furthest North (18.9°)
- 18 18 Regulus 1.0°N of Moon
- 19 3 Mercury stationary
- 21 1 LAST QUARTER
- 21 10 Solstice
- 22 18 Jupiter 2.3°S of Moon
- 25 6 Moon at apogee
- 27 21 Saturn 3.6°S of Moon
- 28 18 Mercury inferior conjunction
- 29 3 Moon furthest South (-19.0°)
- 29 4 Mercury 1.8°S of Moon
- 29 6 NEW MOON
- 29 16 Uranus stationary
- 30 0 Pluto 2.7°S of Moon

Moon Phases - December 2016





Southern Hemisphere Comets

by Michael Mattiazzo

A roundup of bright & telescopic comets visible for southern hemisphere observers

The past few months have been one of the quietest periods for cometary activity. However, the action starts to heat up in December, with a binocular comet coming into visibility.

45P Honda-Mrkos-Padjusakova

Is one of the brighter of the short period comets. The famous Japanese comet hunter M. Honda was the first to spot it in 1948, on Dec 3rd, followed by the Slovakian observers A. Mrkos and L Padjusakova a few days later, estimating it at magnitude 9.

Since then, the comet (with an orbital period of 5.3 years) has been observed 12 times out of the 13 apparitions. The current apparition of 2016-17 will be one of the most favourable.

This comet will arrive at perihelion on 2016 December 31 when it will be 0.53AU away from the Sun.

It is then due for an exceptionally close approach to the Earth on 2017 February 11, when it will be 0.084AU or 12 million kms away, and potentially peak at magnitude 6, because the light-curve is strongly asymmetric, appearing brighter post-perihelion.

As December begins, you will find the magnitude 12 comet in Sagittarius, low in the southwestern evening sky, to the west of Chi 1 Sgr. Venus will be 4 degrees to the east of 45P. The comet will brighten very rapidly as it approaches perihelion. It plays chasey with Venus during December as it follows Venus in its path but never manages to catch up. Moonlight interferes from December 3-15. The comet is a degree to

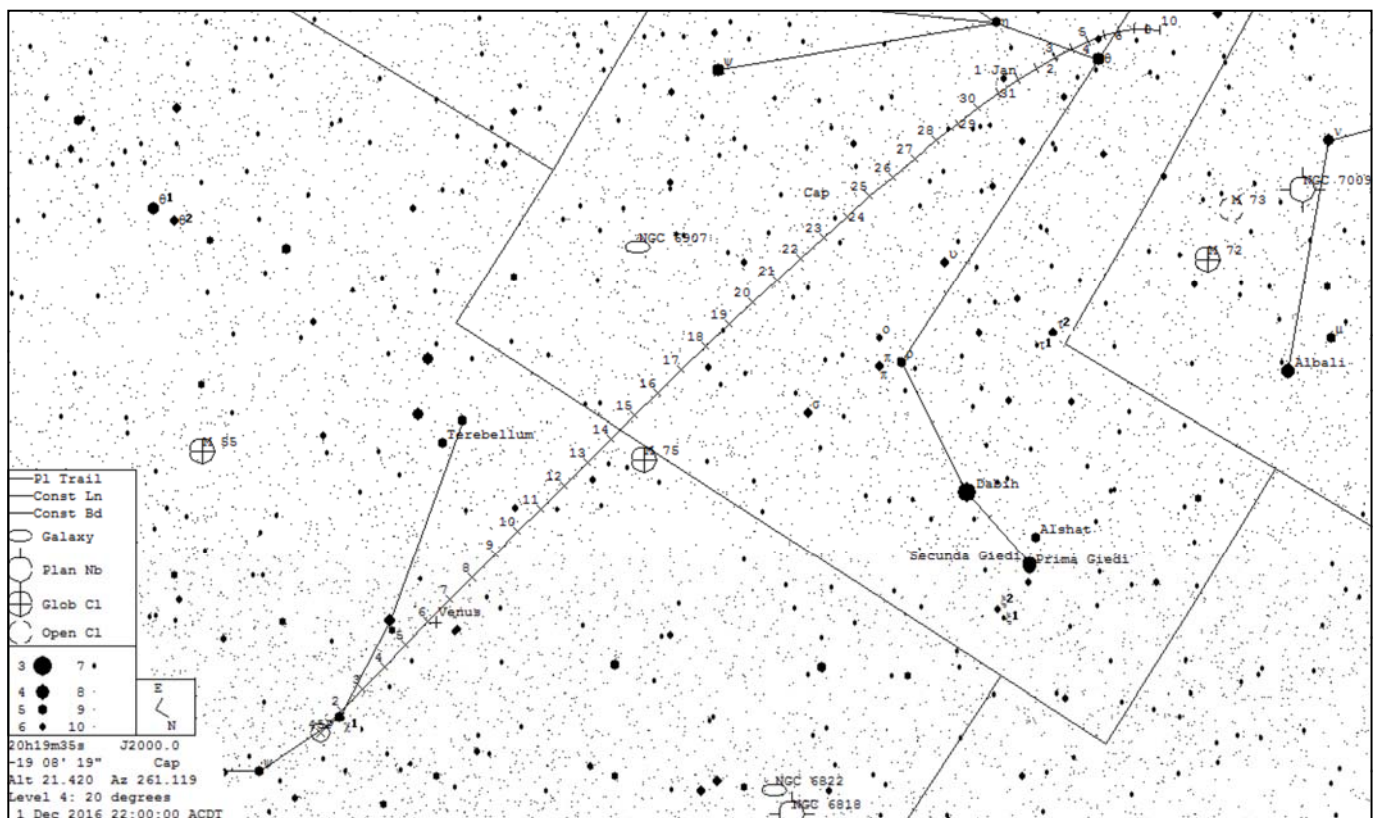
the south of globular cluster M75 on the 14th.

The evening of Dec 16 offers the first patch of dark sky, when the now magnitude 9 comet has moved into Capricornus. Unfortunately, its altitude will remain quite low, 10 degrees at 10pm ACDT.

By the end of December, the comet has brightened to magnitude 7, but is only at 5 degrees altitude at 10pm ACDT. The comet will sink into twilight at the start of 2017, then return in February morning skies.



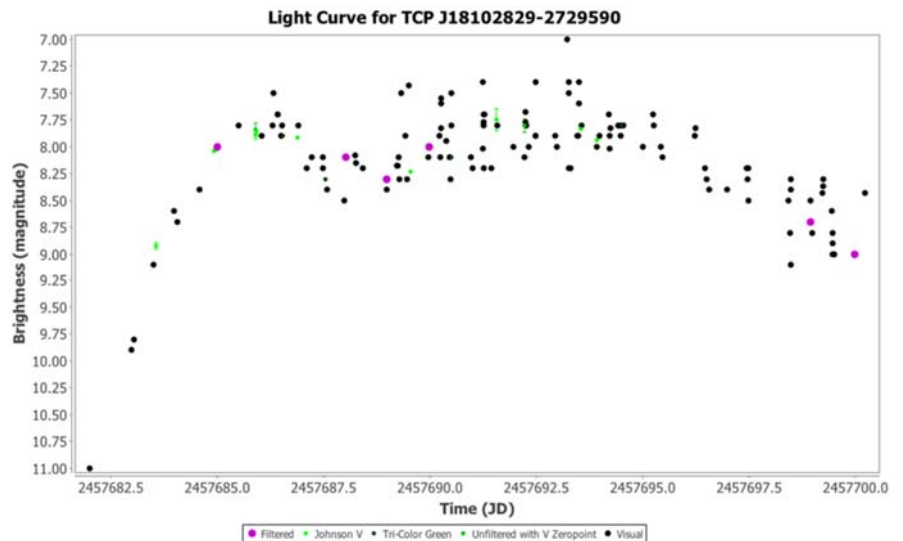
Above: This image was taken by M. Jäger, Austria, on 2011 September 29.14, using a 20-cm telescope



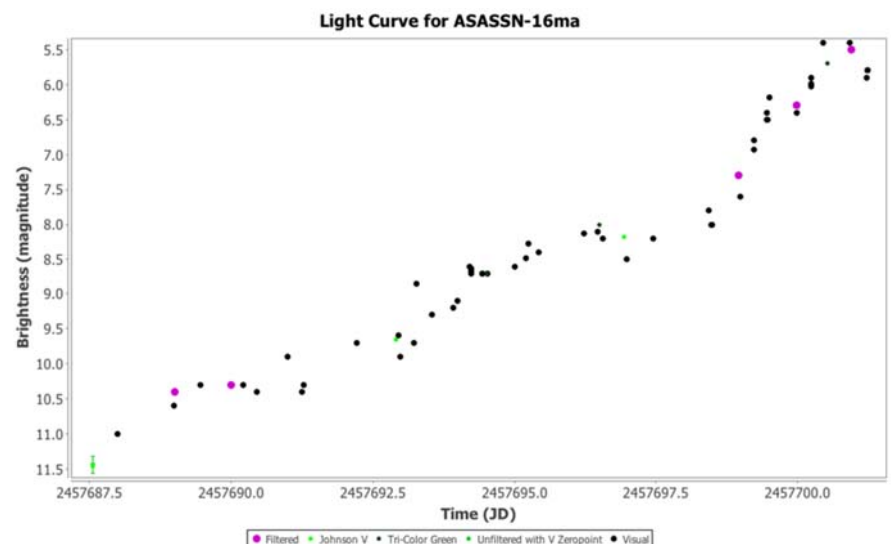


Robert Jenkins wrote in the October 2016 installment of *The Bulletin* about the B-V indices of various novae. The last few weeks have been brimming with novae! Also, this month sees the return of plots. ☺

TCP J18102829-2729590 was discovered on October 20 in Sagittarius, by Koichi Itagaki of Japan, located not far from one of my favourite Cepheid variables, W Sagittarii. It rose from magnitude 11 to 7.8 in a few days and after some undulations, has so far reached a maximum of around magnitude 7.4. It's currently declining. My visual observations with a Meade 8" SCT at 82x are shown in purple.



Several days later on October 26, another nova was discovered in Sagittarius by ASAS-SN (pronounced "assassin"), the All-Sky Automated Survey for Supernovae. I estimated it visually, again with my Meade LX-90 8" SCT, on October 28 at magnitude 10.3. After a week of poor weather and being interstate for work, I caught ASASSN-16ma on the rise (November 6) at magnitude 7.3. Several hours later others were recording it at around magnitude 6.5.



As I write, this nova is on verge of naked eye visibility. My last observation was 5.5 with a couple of subsequent observations at around 5.8 after I went to bed last night.

I finish this month with a *non-variable vagary* that some may find of interest. I attended the recent public lecture by Guy Consolmagno, the Vatican astronomer, summarised by Paul Curnow in the October 2016 issue of *The Bulletin*; I've mused about it on my blog. See the links below.

Links

TCP J18102829-2729590

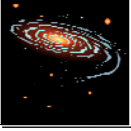
- <https://www.aavso.org/content/tcp-j18102829-2729590-possible-nova-107-mag-sagittarius>
- <http://www.skyandtelescope.com/astronomy-news/observing-news/new-bright-nova-in-sagittarius>

ASASSN-16ma

- <https://www.aavso.org/aavso-alert-notice-561>
- <https://www.aavso.org/content/asasn16-ma-v-59>

Vatican astronomer

- <https://dbenn.wordpress.com/2016/10/28/musings-on-lecture-by-vatican-astronomer/>



Alone in the dark

A guide to observing faint fuzzies in our night sky

by Joe Grida



ARP 284 - interacting galaxies in Pisces

NGC 7714 is a spiral galaxy at 100 million light-years from Earth — a relatively close neighbour in cosmic terms.

As we can see from the image below, the galaxy has witnessed some violent and dramatic events in its recent past. Tell-tale signs of this brutality can be seen in NGC 7714's strangely shaped arms, and in the smoky golden haze that stretches out from the galactic centre. So what caused this disfigurement? The culprit is a smaller companion named NGC 7715. The two galaxies (a pair also known as Arp 284) drifted too close together between 100 and 200 million years ago, and began to drag at and disrupt one another's structure and shape.

As a result, a ring and two long tails of stars have emerged from NGC 7714, creating a bridge between the two galaxies. This bridge acts as a pipeline, funnelling material from NGC 7715 towards its larger companion and feeding bursts of star formation. Most of the star-forming activity is concentrated at the bright galactic centre, although the whole galaxy is sparking new stars. The interactions between

these galaxies should continue for several hundred million years more, after which a single central galaxy may result.

Astronomers characterise NGC 7714 as a typical Wolf-Rayet starburst galaxy. This is due to the stars within it; a large number of the new stars are of the Wolf-Rayet type — extremely hot and bright stars that begin their lives with dozens of times the mass of the Sun, but lose most of it very quickly via powerful winds.

Located at RA 23:36, Dec +02:09, this 12.2 magnitude galaxy is not easy to observe due to the presence of 5.7 magnitude, Spec F5, 16 Piscium only 4' to the north-west. When trying to observe this object, place the star outside the field of view. I tried to observe this pair of galaxies at the recent VicSouth Desert Spring Star Party; but was thwarted by cloudy skies. I've also just found out that there is a quasar in the field as well; with a z of 1.871, which equates to a 10 billion year light travel time!

Challenging times ahead. Bring on the clear weather!!



Above: The NASA/ESA Hubble Space Telescope has captured this striking view of spiral galaxy NGC 7714. This galaxy has drifted too close to another nearby galaxy and the dramatic interaction has twisted its spiral arms out of shape, dragged streams of material out into space, and triggered bright bursts of star formation. Image credit: NASA/ESA



Contact information

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

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REGIONAL GROUPS

Whyalla

The group meets on the first Thursday of the month.

Coordinator: Peter Mayfield

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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

Ph: 0429 352 382

Email: nyp@assa.org.au

Riverland

The Riverland group hold combined members' and public viewing nights monthly.

Co-ordinator: Tim Vivian

Ph: 0417 800 225

Email: riverland@assa.org.au

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Radio Astronomy Peter Gray 0418 829 632

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ozymandias@senet.com.au

ASSA 125th Birthday Celebrations assa125@assa.org.au



Members' Gallery

Highlighting members' astrophotos



Above: M8 - The Lagoon nebula imaged by **Tom Valencic** at Bendleby Ranges in September 2016, using an Orion ED80TCF, Skywatcher Heq5pro mount, QHY9 Mono CCD Camera @ -20°C. Exposures: Ha 10x120sec, 10x300sec, 11x600sec, RGB 12x300sec exposures ea, 20xDarks, 20xFlats, 50xBias, Software – EQMOD, AstroTortilla, PHD2, Nebulosity3, Pixinsight & PS

Below: NGC6723 and dust in Corona Australis imaged by **Tom Valencic**, during the Alpana AstroCamp in August 2016, using the same equipment as above. LRGB 110:75:75:75 mins of 300sec exposures, 20xDarks, 20xFlats, 50xBias. Software – EQMOD, AstroTortilla, PHD2, Nebulosity3, Pixinsight

