



The **PRETORIA CENTRE**

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER JUNE 2017

Next meeting

Venue: The auditorium behind the main building at Christian Brothers College (CBC), Mount Edmund, Pretoria Road, Silverton, Pretoria.

Date and time: Wednesday 28 June at 19h15.

Programme:

- **Beginner's Corner:** TBA later by e-mail to members.
- **What's Up?** by Percy Jacobs.
- 10 minute break — library will be open.
- **Main talk: "Telescope making in South Africa" by Chris Stewart.***
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Pierre Lourens.

* See a summary of his presentation on page 5.

Next observing evening

Friday 23 June from sunset onwards at the Pretoria Centre Observatory, which is also situated at CBC. Turn left immediately after entering the main gate and follow the road.

Contents of this newsletter

Chairman's Report for the meeting of 24 May 2017	2
Outreach Evening at CBC : May 20 th 2017	2
Summary of "What's Up?" to be presented on Wednesday 28 June 2017	3
Report for previous Observing Evening & Summary of "Beginner's Corner" on 28 June	5
Observing: The elusive Herbig-Haro objects	6
Astronomy-related articles on the Internet	7
Astronomy- related images and video clips on the Internet	8
Feature of the month: The E- ELT	9
Astronomy basics	9
NOTICE BOARD	10
Astrophotographs	10-12
Pretoria Centre committee & Old newsletters & Database	12

Chairman's Report for the meeting of 24 May 2017 by Michael Moller

Due to an accident on the N1 causing the delay of members' arrival, the start of the meeting was held back for five minutes, and commenced at 19:20

Percy Jacobs requested that an announcement be made that volunteers with telescopes were needed for the star-gazing event at the National Zoo on Saturday the 27th.

Fred Oosthuizen started the meeting with *What's Up*, which he presented by demonstrating the use of Stellarium. He showed how Mercury and Mars were currently near the sun and not visible for observing. Venus would be up in the morning sky, and Jupiter and Saturn would be up in the early evenings.

He took specific interest in the constellation of Virgo, pointing out the Pinwheel, Black Eye and Sombrero galaxies, as well as the Trifid, Lagoon and Wild Duck nebulae which are all well placed for observation in June.

At 19:35 Prof. Barbara Cunow showed a time-lapse video she took of Jupiter. She used a simple webcam on an undriven 6-inch Newtonian and recorded 10-second video snippets as Jupiter drifted across the field of view. She recorded 11 such snippets over an hour and forty minutes. She then used stacking software to turn each snippet into a frame. The frames were then combined to create an impressive time-lapse video clip, clearly showing the Great Red Spot moving across the face of the planet.

At 19:45 Johan Moolman presented *Beginners Corner* by reporting on the Karoo star party which happened at the end of April. He started by showing some photos he took of contrails created by passing airliners and gave a crash course on the physics of contrails. This was followed by beautiful images of deep-sky objects too numerous to mention.

At 20:00 Johan Smit announced that the Free State star party would be happening on June 23 to June 25 and still had accommodation available.

At 20:20, after a short leg-break, the main topic of the evening was presented by Madelein Bloemhof on Astronomy in Thailand. She talked about the history and mythology of astronomy in Thailand, or Siam as it was previously known, with specific interest on the importance of solar eclipses in Siamese folk lore.

She introduced King Narai which was instrumental in letting Europeans observe the eclipses of 1685 and 1688 from Siam.

More recently King Mongkut (1851-1868) had a strong interest in science from Europe, including Astronomy. He had numerous telescopes and optical instruments imported from Europe and organised international observation parties during solar eclipses.

The meeting concluded at 21:30, after which coffee and biscuits were provided by Michael Poll. Ω

Outreach Evening at CBC : May 20th 2017 - by Michael Poll

Members of the Committee have made contact with Bernard Langton, the new Principal at Christian Brothers College. Danie and Michael had a meeting with him on May 4th 2017.

At the meeting, Mr Langton told us about the School "Camp Out" to be held on May 20th, and we said that we would organise telescopes for the event so that parents and pupils could be introduced to the Centre and to the night sky. An appeal for members to attend with telescopes was circulated, and the response from members was very gratifying – we had about 15 telescopes, and were kept busy for most of the evening, the last of us left at 11:00 pm. **This note is to say "Thank you" to all those members who supported this event. (Editor's note: and from my side, also a hearty word of thanks to those members.)**

Members can also note that, at the meeting with Mr Langton, he undertook to identify one or two teachers who might be keen enough to liaise with the Centre in order that we may interact more with the school. In addition, they would put a link on the CBC website to the Centre website.

It is hoped that this initiative may strengthen our relationship with the school. Ω

Summary of “What’s Up?” to be presented on Wednesday 28 June 2017 - by Percy Jacobs

What's up in July 2017

Phases of the Moon

Dark Sky - ~15th to 25th July - for those who observe from sunset to midnight

Full Moon – 9th July

New Moon – 23th July

Planets

Mercury – west – seen after sunset. From approx.. 6th July till end July, Mercury rises in altitude each night – from on the horizon to 15° above horizon

Venus – east – seen before sunrise – seen as the “morning star”. Venus decreases in altitude each morning. On 1st July, @ 04:30, it is 11° above horizon, and then on 31st July, it is 4° above horizon.

Mars – not visible, on the other side of the sun – nearly in line

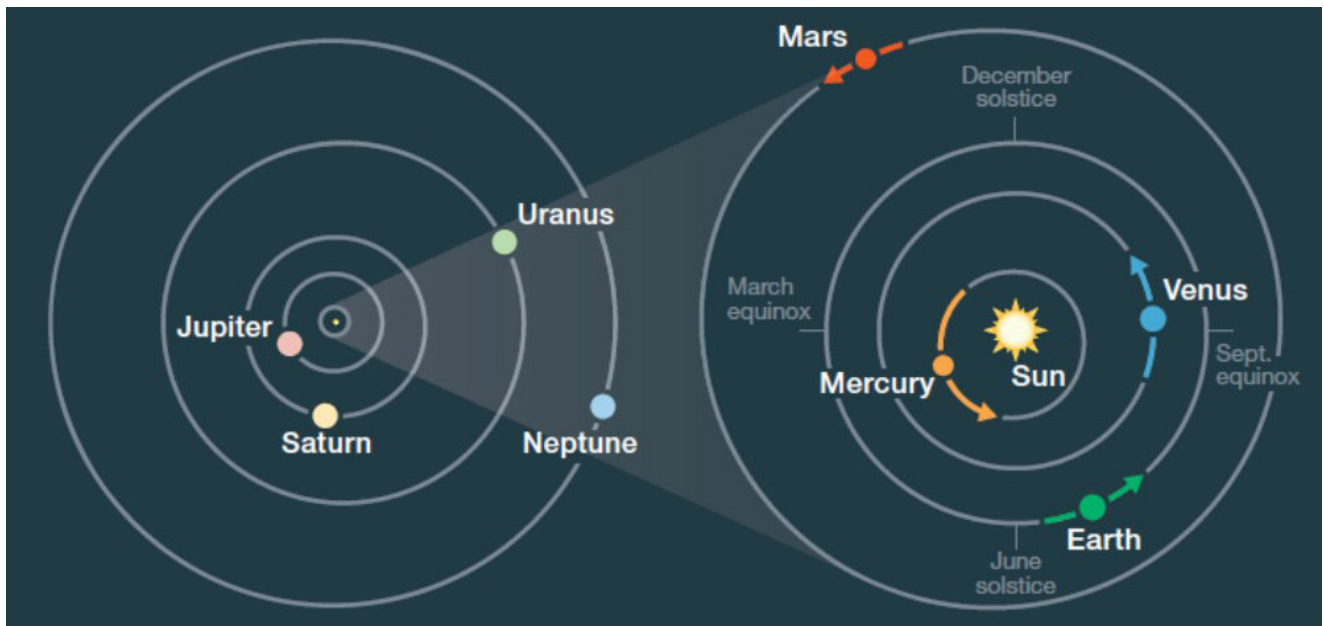
Jupiter – west, in Virgo. Approx. 40° above horizon on the 13th July at about 20:30

Saturn – north / east – on the 13th July at about 20:30. Saturn is about 60° above horizon

Neptune – east – on 28th July at about 21:00, Neptune is about 14° above horizon

Uranus – east – on 28th July at about 01:00, Uranus is about 20° above horizon

Planet Locations in month of July (compliments of Sky & Telescope)



Events

Meteor Showers

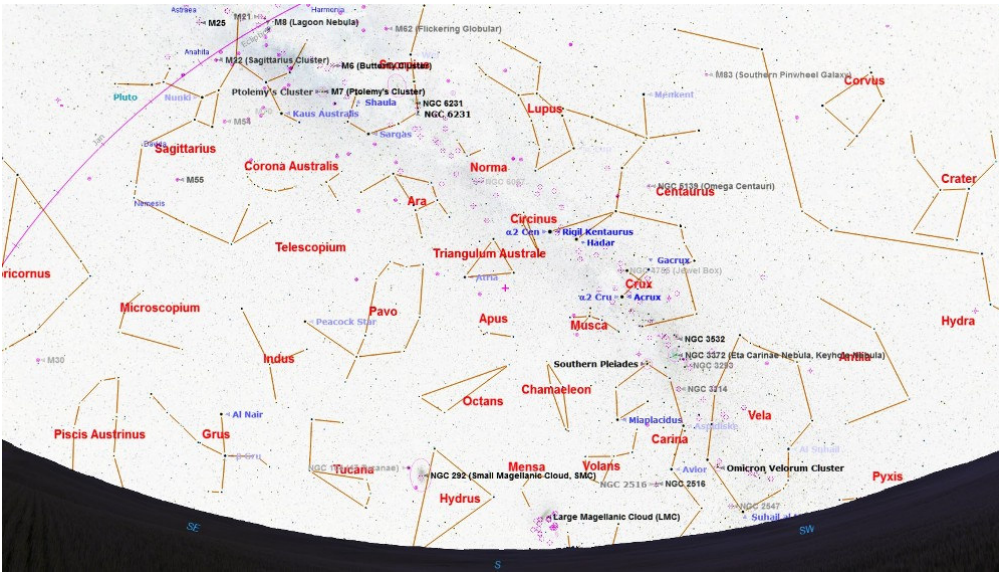
30th July – 22:00 to 05:00

South. delta Aquariids

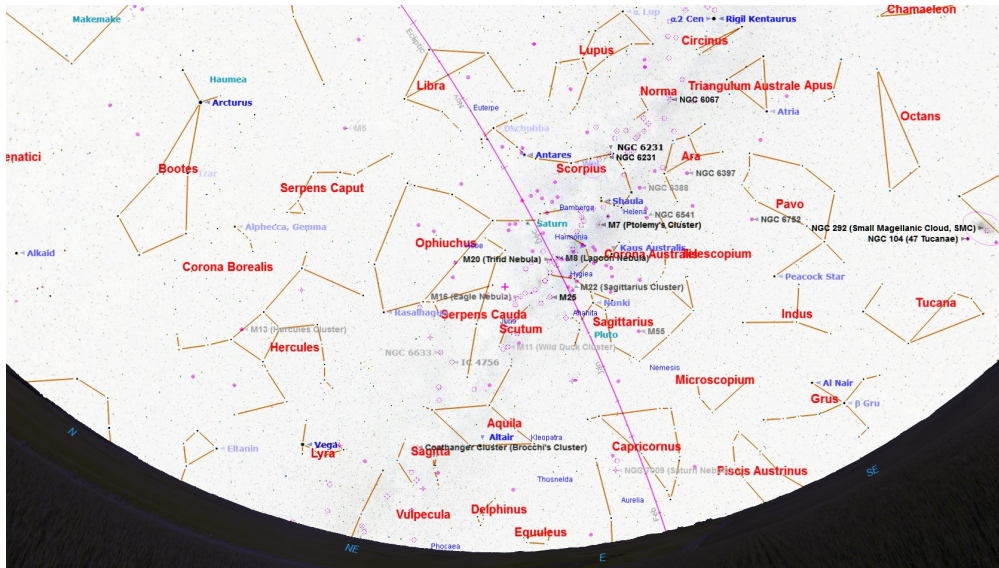
Rate/hr - 15 to 25

15th July – International Observe the Moon Night (continued on next page)

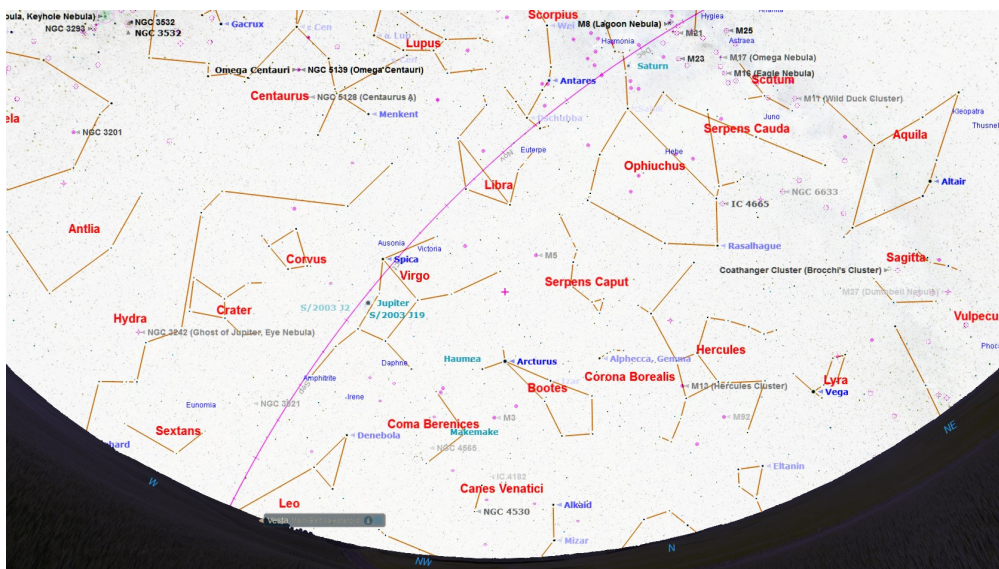
Constellations in July South



East



North



**Report for Observing Evening on Friday May 19th 2017
- by Michael Poll**

Not a cloud in sight! A bit chilly later on though. We had about 15 people, mostly visitors, and three telescopes. It was nice to see Wayne Mitchell visiting us.

Being the brightest thing on view, Jupiter was the first object we looked at, with two moons to the east and two to the west. During the evening we watched Ganymede and Callisto change places.

We also saw two passes of the International Space Station. The first was at 18h 00 when it travelled from the south to the south east, with a highest altitude of 22° at 16h02 and magnitude -2.5. As it was not long after sunset we were able to watch it almost to the eastern horizon. The second pass was at 18h46, when it rose south of west, but disappeared into the Earth's shadow before it had gained much altitude. The magnitude was -0.8.

At various times during the evening we showed the visitors around the naked eye sky. We looked at the Zodiacal constellations stretching across the sky: – Gemini, (Cancer not visible!), Leo, Virgo, Libra (we could only see Alpha and Beta), and later on we saw Scorpius. We noted Canopus and Sirius in the west, and the southern Crosses – Crux, the Diamond Cross and the False Cross.

We looked at a few double stars in the various telescopes: – Alpha Centauri – now a bit easier to split than it was a couple of years ago; Alpha Crucis, which is actually a triple, and later on we were able to have a look at Beta Scorpii and Nu (ν) Scorpii. Beta Scorpii is an unequal pair having magnitudes of 2.6 and 4.9. The first split of Nu shows two stars of magnitudes 4.0 and 6.3.

Otherwise, we looked at a few of the favourite winter clusters – the Theta Carinae cluster (a.k.a the Southern Pleiades, IC 2602); NGC 3235, the Wishing Well cluster; The Jewel Box in Crucis (NGC 4755); NGC 2547 the Heart Cluster near Gamma Velorum, and M41, which is slightly south of Sirius. Omega Centauri was viewed using low and high powers. Although Cancer was not visible, Johan located the Beehive Cluster (M44) and showed this also to the visitors

The Jewel Box is very close to the star Beta Crucis, and we showed both the star and the cluster in the same low power field. We have not looked at M41 in our viewing evenings during this season, but it is still a nice catch, and easy to find. With Scorpius well up before we left, we looked at M7.

Johan notes that with the light polluted skies, a low power, wide field view was more pleasing than high power views - using a low power, wide field telescope was easy on such a night, because one can sweep effectively to locate targets that may be "invisible".

For our final hurrah we had a marvellous view of Saturn, and could make out the Cassini division in a 6 inch telescope. Ω

Summary of coming presentation under "Main talk" on 28 June

Telescope Making in South Africa - an overview of a small group's products and techniques. Some interesting developments are highlighted, following over 25 years of experimenting with alternative approaches, thoughtful repurposing, innovation and lateral thinking. Partly driven by the need to produce viable and effective instruments at low cost, various aspects are quite novel, globally applicable and worth adopting where appropriate. Ω

Observing: The elusive Herbig-Haro objects - by Magda Streicher

Faint nebulosity is something that is always a challenge to search out, but it takes a lot of will power and determination to detect faint objects. No effort can be spared – from averted vision, the highest power possible, relative large telescope with high power, available filters and the darkest skies possible. Depending on the type of nebula, filters can sometimes be the clinching factor with a positive observation. According to Professor Derck Smits of Unisa, Herbig-Haro objects are shock-excited nebulae associated with stars in the early stage of evolution, with masses less than about 4 solar masses. Jets of material, ejected at velocities up to 400 km/s, from the young stellar object (YSO) impact the interstellar medium (ISM), creating a shock front that ionises the gas and produces optically visible nebulae.

The subject of this essay is the very elusive and faint Herbig-Haro objects close to and around NGC 1999, inspired by a challenge from my friend Derck, which I took up without hesitation. It has turned out to be by no means an easy task, and may be some of the most difficult objects to observe through amateur telescopes.

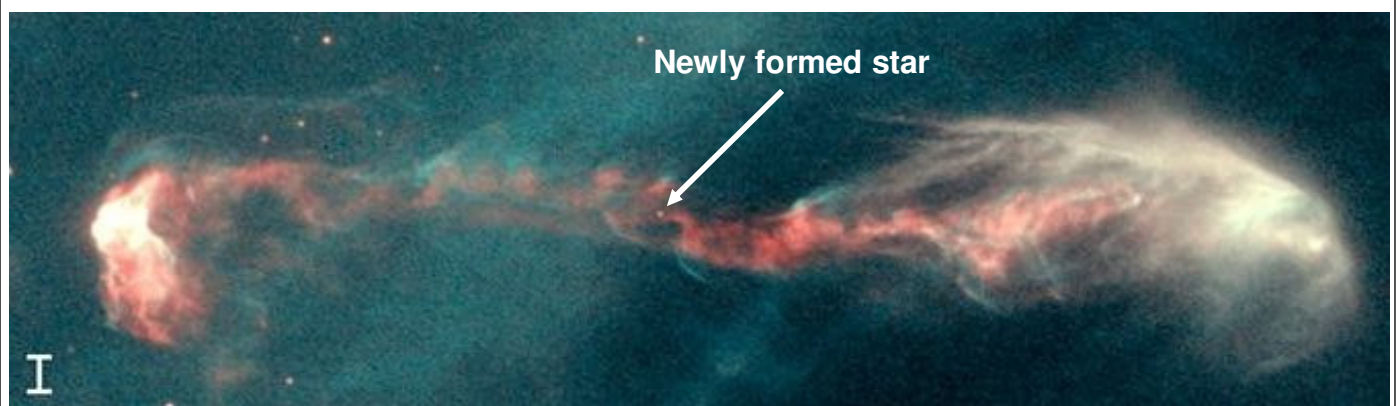
NGC 1999 pointed the way to the first of these HH objects. With a detailed star map I identified the indicated position of HH 1 at RA: 05h36m20.34 & DEC: -06°45'08.4, barely 2.5' south-southwest of NGC 1999. Filters can be a handy tool, but I found that I hardly gained through various deep sky filters and almost nothing through a OIII filter. However, exercising great care I detected a very faint haze that looked like an extremely faint out-of-focus star, visible only for mere moments. The best strategy is to place NGC 1999 out of the visible frame and use the old reliable technique of averted vision. I made a careful sketch of all the stars and nebulosity seen at the indicated position. Paperwork afterwards showed that I was more or less at the right spot, but only worth a try with bigger telescopes.

"*These are pretty tough objects*", I muttered to myself at the time when I approached HH 2, which is 4.3' south of NGC 1999 at RA: 05h 36m 25.30s & DEC: -06°47'15.8. With averted vision and concentration, I glimpsed a very faint, small hazy spot containing a magnitude 14 stellar knot. This is one of the brighter HH objects, but I am afraid I could not see any small detail like bow shocks and stellar jets in the delicate nebulosity of the material being ejected by the young star. The structure further south is HH 222, more popular known as The Waterfall. The origin remains mysterious. Another Herbig-Haro object is HH 47, associated with the dark globule known as "Bok's Valentine" in the constellation Vela.

To have a Professor of Astronomy as a friend is one thing; to discuss Herbig-Haro objects with him quite another! At least with this observation it has been proved that given the right amount of commitment and effort, every challenge can produce an effect. Ω

Object	Type	RA	DEC	Magnitude	Size
Herbig-Haro 1		05h36m20.3	06°45'08.4	14.7	6"
Herbig-Haro 2		05h36m25.3	06°47'15.8	14.2	8"

Below: Herbig-Haro object HH47, imaged by the Hubble Space Telescope. The scale bar represents 1000 Astronomical Units (AU). (1 AU = Average distance between Earth and the Sun.)



Astronomy-related articles on the Internet

- **Close pass of asteroid 2017 GM!** It's only 4 meters in diameter, but it passed only 16 000 km from Earth. http://earthsky.org/space/extremely-close-asteroid-2017-gm-april-4-2017?utm_source=EarthSky+News&utm_campaign=4a9c1098d2-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-4a9c1098d2-394671529&mc_cid=4a9c1098d2&mc_eid=febfe10e42
- **Dwarf planet Ceres & the case of the vanishing ice volcanoes.** The solitary mountain on the dwarf planet Ceres may be slowly disappearing. http://www.space.com/36348-ceres-vanishing-ice-volcanoes.html?utm_source=sp-newsletter&utm_medium=email&utm_campaign=20170407-sdc
- **10 biggest telescopes on Earth.** <http://www.space.com/14075-10-biggest-telescopes-earth-comparison.html>
- **Merging galaxies behaving strangely.** When a large and small galaxy merge, astronomers expect the super massive black hole at the center of the larger galaxy to be the one to feed on gas and dust and shine in high-energy x-rays. But in the merging galaxy system known as Was 49, the smaller galaxy – confoundingly – contains the feeding black hole. http://earthsky.org/space/nustar-puzzling-galaxy-merger-was49?utm_source=EarthSky+News&utm_campaign=9267e8198c-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-9267e8198c-394671529&mc_cid=9267e8198c&mc_eid=febfe10e42
- **6 most likely places for alien life in the solar system.** Seth Shostak, Senior Astronomer at the SETI Institute, lists 6 places (actually 7, because he groups Ganymede and Callisto together.) <http://www.space.com/15716-alien-life-search-solar-system.html>
- **Distant object 'DeeDee' makes the dwarf planet grade.** The solar system's dwarf-planet population is about to increase by one. http://www.space.com/36445-deedee-distant-dwarf-planet-alma-telescope.html?utm_source=sp-newsletter&utm_medium=email&utm_campaign=20170412-sdc
- **Potential energy source for life spotted on Saturn's moon Enceladus.** Also see a video clip. http://www.space.com/36455-saturn-moon-enceladus-energy-source-life.html?utm_source=sp-newsletter&utm_medium=email&utm_campaign=20170414-sdc
- **'Dragonfly' drone could explore Saturn moon Titan.** Also see a video clip about the descent of the Huygens probe to the surface of Titan in 2005. <http://www.livescience.com/58841-dragonfly-quadcopter-saturn-moon-titan-explorer.html>
- **Exoplanet discovery by an amateur astronomer.** http://www.space.com/36478-amateur-exoplanet-discovery-citizen-science-power.html?utm_source=sp-newsletter&utm_medium=email&utm_campaign=20170414-sdc

Observing.

- **Mimosa.** Blue-white Mimosa (or Beta Crucis, or Becrux) is the 19th brightest star in the heavens. http://earthsky.org/brightest-stars/southern-mimosa-is-the-19th-brightest-star?utm_source=EarthSky+News&utm_campaign=b7674b1444-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-b7674b1444-394671529&mc_cid=b7674b1444&mc_eid=febfe10e42
- **The Coma cluster of galaxies.** It lies in constellation Coma Berenices (Berenice's Hair) which lies between declination -13° and -33° and is therefore visible from Pretoria for part of the year. http://earthsky.org/clusters-nebulae-galaxies/the-coma-berenices-galaxy-cluster?utm_source=EarthSky+News&utm_campaign=5545096f10-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-5545096f10-394671529&mc_cid=5545096f10&mc_eid=febfe10e42

Astronomy- related images and video clips on the Internet

- **Watch a full rotation of the moon.** Video clip compiled from images made by the Lunar Reconnaissance Orbiter which is in a polar orbit around the moon. <http://earthsky.us1.list-manage.com/track/click?u=e56e7a92b1c5790f7343ef95a&id=28587729d7&e=febfe10e42>
- **New views of Uranus' auroras and rings.** NASA has just released a new composite image combining Voyager 2 and Hubble data. http://earthsky.org/space/new-views-of-uranus-auroras-and-rings?utm_source=EarthSky+News&utm_campaign=30a764b4b5-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-30a764b4b5-394671529&mc_cid=30a764b4b5&mc_eid=febfe10e42
- **Earth and its moon as seen from Saturn - Cassini probe looks back. (This reminds me of the book "Pale blue dot" by Carl Sagan. Read it if you have not yet done so.)** <http://www.livescience.com/58787-earth-as-seen-from-saturn-cassini-probe-looks-back-video.html>
- **The last of Hubble's Frontier Fields.** With a final observation of remote galaxy cluster Abell 370, the HST's mind-stretching Frontier Fields program came to an end. http://earthsky.org/space/abell-370-last-of-frontier-fields?utm_source=EarthSky+News&utm_campaign=a994a1ccb1-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-a994a1ccb1-394671529&mc_cid=a994a1ccb1&mc_eid=febfe10e42
- **Lots of documentaries on astronomy-related subjects.** <https://www.youtube.com/watch?v=9mVRc80vhhQ>
This one is special (see image below): <https://www.youtube.com/watch?v=ly7NzjCmUf0>
- **It's twilight time: 15 favorite photos. They were taken all over the world. This is really classy.** http://earthsky.org/earth/twilight-best-photos?utm_source=EarthSky+News&utm_campaign=94b2afe90b-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-94b2afe90b-394671529&mc_cid=94b2afe90b&mc_eid=febfe10e42



ASTRONOMY

Finding out you really just don't matter

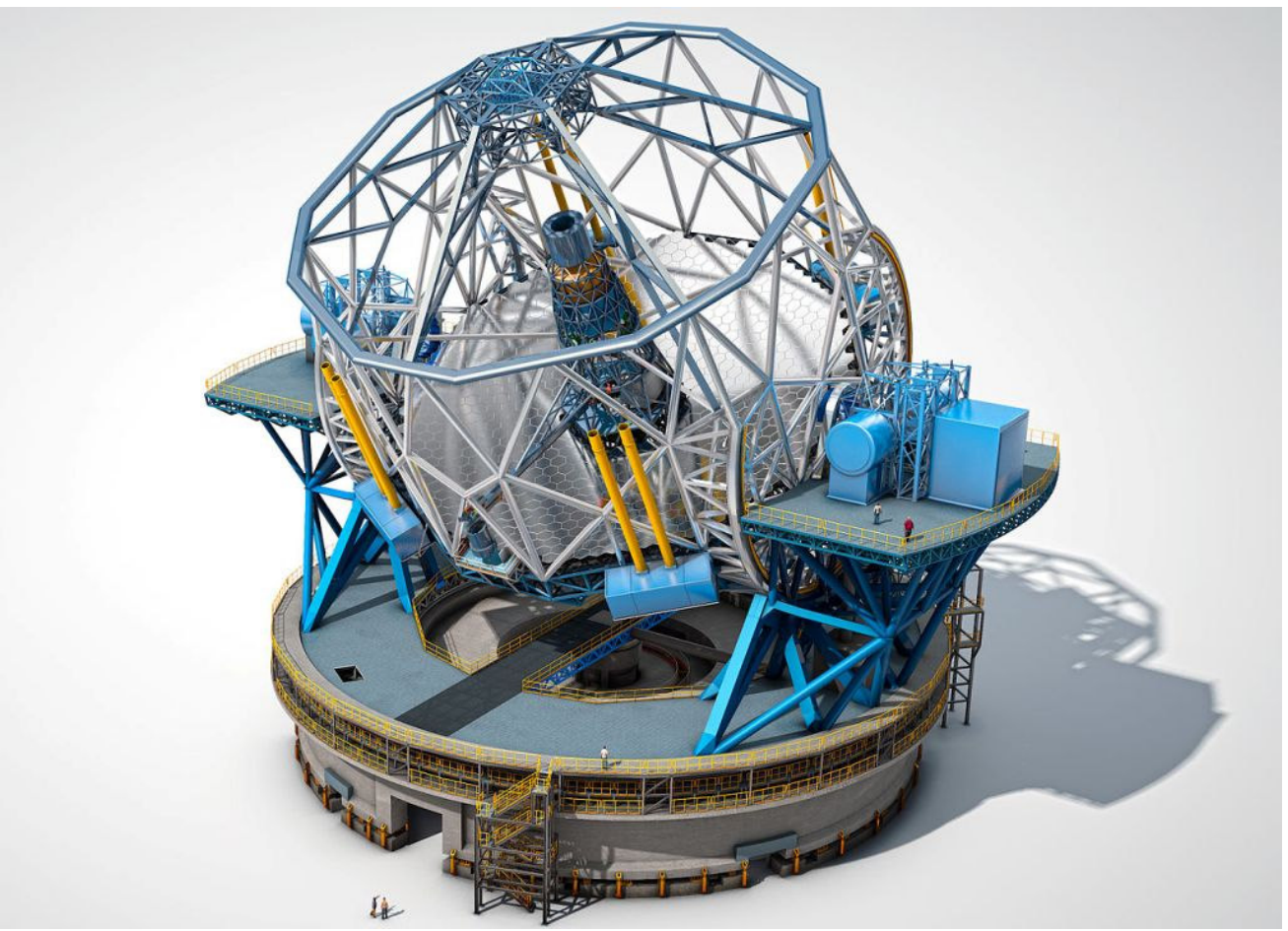
Feature of the month: The E-ELT

When completed, the **European Extremely Large Telescope (E-ELT)** will be even larger than the **Thirty Meter Telescope (TMT)**. The E-ELT's primary mirror will have a diameter of **39.3 meters** and consist of 798 hexagonal segments. $\pi(39.3/2)^2 / \pi(30/2)^2 = 1.72$. The E-ELT will therefore gather 72% more light than the TMT. The secondary mirror will have a diameter of 4.2 meters and a mass of 3.5 metric tons. The E-ELT will have adaptive optics and make observations in the visible, near and mid-infrared parts of the electromagnetic spectrum.

Construction has started on Cerro Amazonas in Chile. First light is expected in 2024. Below is an artist's depiction of the finished telescope.

https://en.wikipedia.org/wiki/European_Extremely_Large_Telescope

http://www.space.com/36952-extremely-large-telescope-secondary-mirror-cast.html?utm_source=sd-newsletter&utm_medium=email&utm_campaign=20170526-sdc



Astronomy basics

Put these web links on your list of favourites. They are all links to astronomy education web sites.

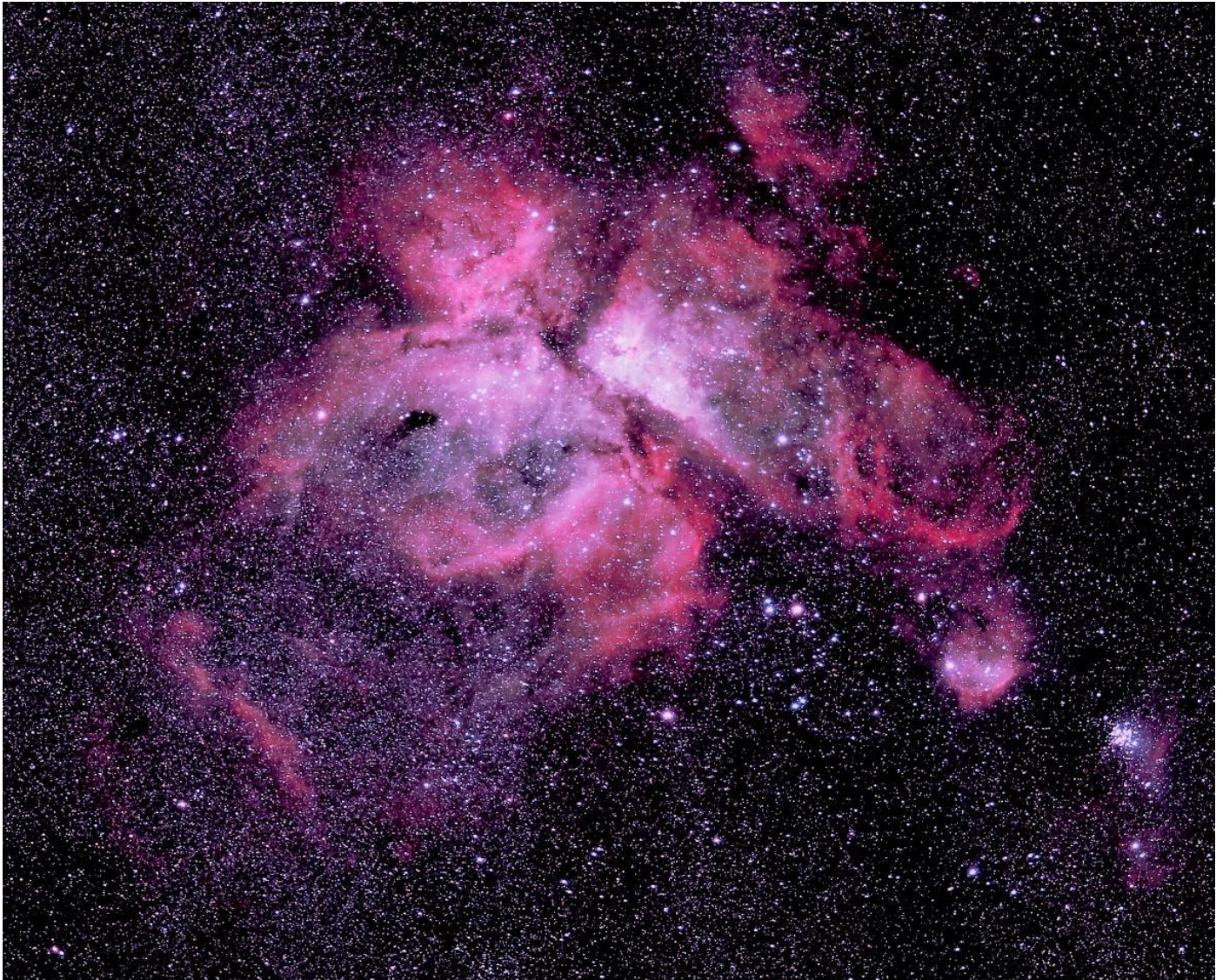
<https://www.youtube.com/watch?v=nrP4a4MCo8A>

<http://astro.unl.edu/>

<https://www.youtube.com/watch?v=2-Ttcfmbrkl>

<https://www.youtube.com/watch?v=1eR4vCOjZx8>

The **Carina Nebula** in the southern constellation Carina (Keel). It is between 6500 and 10 000 light-years from Earth and has a radius of 460 light-years. At its center is the highly luminous hyper giant star Eta Carinae (Is it a binary?), surrounded by the Homunculus Nebula. Photograph by Johan Moolman.



NOTICE BOARD



**The next winter / summer solstice of the southern / northern hemisphere will occur on Wednesday, June 21 2017 at 06h24 SAST.
The slowest sunsets are at the solstices.**

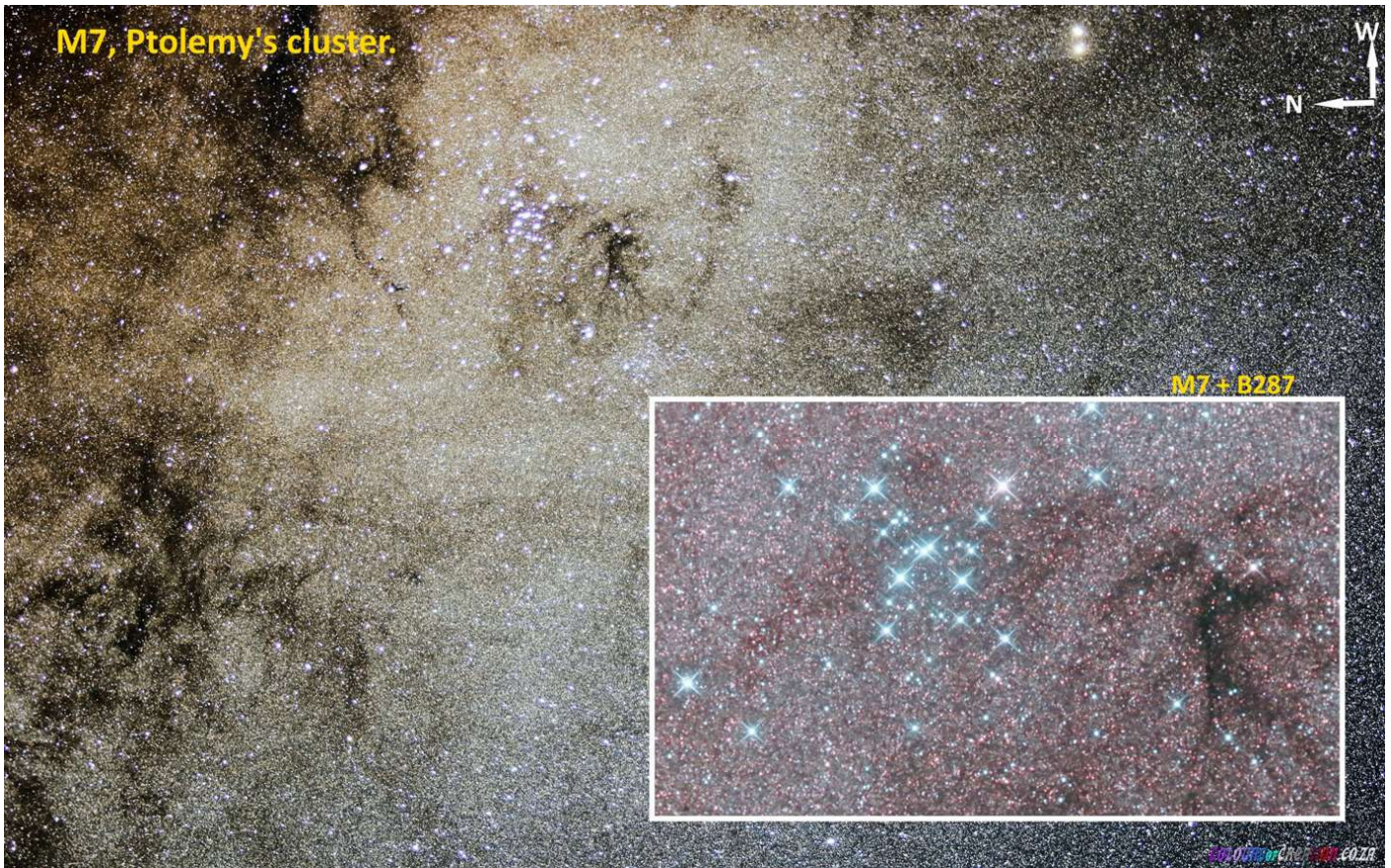
<https://en.wikipedia.org/wiki/Solstice>

[http://earthsky.org/astronomy-essentials/longest-sunsets-around-solstices?
utm_source=EarthSky+News&utm_campaign=2262253a52-
EarthSky+News&utm_medium=email&utm_term=0_c643945d79-2262253a52-
394671529&mc_cid=2262253a52&mc_eid=febfe10e42](http://earthsky.org/astronomy-essentials/longest-sunsets-around-solstices?utm_source=EarthSky+News&utm_campaign=2262253a52-EarthSky+News&utm_medium=email&utm_term=0_c643945d79-2262253a52-394671529&mc_cid=2262253a52&mc_eid=febfe10e42)

Immediately below: M7 aka NGC6475 and Ptolemy's cluster in the southern constellation Scorpius (The Scorpion).

Below: Several nebulae in the southern constellation Sagittarius (The Archer).

Photographs by Johan Moolman.



The **Lagoon Nebula** aka **M8** is a giant interstellar cloud in the southern constellation Sagittarius (The Archer). It is classified as an emission nebula and as an HII region. It is 5 000 light-years from Earth and measures 140 light-years by 60 light-years. Photograph by Johan Moolman.



★ Pretoria Centre committee ★

★ Chairman	Johan Smit	072 806 2939
★ Vice Chairman	Michael Poll	074 473 4785
★ Secretary	Michael Poll	074 473 4785
★ Newsletter Editor	Pierre Lourens	072 207 1403
★ Events	Michael Moller	082 789 8968
★ Librarian and		
★ Webmaster	Danie Barnardo	084 588 6668
★ Curator of Instruments	Johan Smit	072 806 2939
★ Public Relations Officer	Fred Oosthuizen	072 373 2865
★ Observing Coordinator	Percy Jacobs	060 883 8106
★ Treasurer and		
★ Membership Secretary	Michelle Ferreira	073 173 0168
★ Member	Bosman Olivier	082 883 1869

Old newsletters: All old newsletters from January 2004 onward are on our website. They contain a record of our Centre's activities as well as astronomical information.

Database: Members are reminded that a database of the books in our library is to be found on our website. The database was created by Danie Barnardo, one of our committee members.