



The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER NOVEMBER 2012

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 November at 19h15.

Programme:

- **Beginner's Corner:** "Astrophotography" by Johan Smit
- **What's Up?** by Michael Poll
- 10 minute break — library will be open
- **Main talk:** "Astrophotography" by Doug Sharpe (mountings) and Paul Reed (photography) from Blackburn Astronomical Society, Britain. Online talk.
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Pat Kühn.

Next observing evening

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

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Report of observing evening on 19 October 2012 - by Michael Poll

Four of us came: Rudolph, Michael, Wessel and Danie. With intermittent rain all afternoon, and almost total cloud cover in the evening served to frustrate our observing. Although it did not rain while we were there, the clouds were coming and going, but they seemed to be mostly coming.

It was not quite dark yet, so we did a pitch inspection of the CBC grounds, and found that between the hockey field where we do our observing and the N1 highway is another very large playing field, the existence of which was previously totally unknown to us. There is a very steep slope between the hockey pitch and this lower field.

Having had our geography suitably updated, it was now a bit darker and we could see some watery looking celestial objects peering through the gaps in the clouds. The best was a sighting of Mercury, which was about 20 degrees up in the west, and bright enough to be easily seen. It was 7 days away from its maximum eastern elongation of 24 degrees, which was to occur on October 26th. Above Mercury we could see Antares and Mars and above them again the four day old Moon showing as a misty blur. We saw Vega in the north, Altair in the north east, Fomalhaut nearly overhead in the south and a few stars of Grus.

We called it a night at about 7.30 pm. Ω

Amazing Graze!! An occultation of Jupiter - by Michael Poll

An entry in the 2012 Sky Guide Africa South for November 2nd states: “**02h35: Moon occults Jupiter and Galilean moons**”. This report is compiled by Michael Poll, and is based on comments from Johan Smit, Percy Jacobs, Johan Moolman, George Dehlen, Bosman Olivier, Danie Barnardo and Michael Poll, all members of the Pretoria Centre of the ASSA. Johan Smit, Bosman and Danie observed the event from Johan Smit’s home. Johan Moolman, Percy, George and Michael observed from their respective homes. Photo credits Image 1 - Percy Jacobs.(North is down). Images 2, 3 & 4 - Johan Moolman (North is up).

Michael writes:

I got up sometime after 02h00. With the gap between the Moon and Jupiter still “fairly large” at that time, and looking at Jupiter’s moons in the telescope and comparing the view with the gap as seen with the naked eye, one could judge how far away from Jupiter on the sky the furthest out Galilean moon was. This leading (western most) one was Ganymede. From memory now, (time not recorded) Ganymede was about “half way” between Jupiter and the limb of the Moon. There was a pair of moons between Ganymede and Jupiter. The northern one of these was Callisto, the southern one was Europa. I only noted Io for the first time after the graze was over. It was to the celestial east of Jupiter. George notes that, early on, Io was in fact being occulted by Jupiter, and it re-appeared only a few minutes before the Moon took over.

The moon was about 3½ days past full, but one could not use a moon filter as the Galilean moons would not be visible, and their disappearances would not be seen. Ganymede was the first to be occulted. I timed the disappearance at 03h03 but I think I missed the actual disappearance, as it was difficult to see it near the limb of the moon. For what it is worth (I did not have accurate timing devices, just used my watch to the nearest minute), Jupiter made first contact at 3h27 and at 3h51 Jupiter cleared the moon – this would have been “fourth contact” if the disappearance had been total. The graze therefore lasted 24 minutes for me. George comments that the times he recorded were the same as Michael’s, though he adds that the times were rather subjective as to exactly when the two discs combined/separated. [Michael] had the same problem!

During the graze, the craters near the limb of the Moon seemed to slide past Jupiter like a flowing river. I thought I would not wait for the reappearance, thinking that it might take some time, but then I saw that it looked like it might be a graze. I had not thought about it beforehand, it was only sometime after 03h00 that I “heard for the first time” Johan’s remark at the last meeting about it being a graze. Danie had also mentioned a graze in e-mail correspondence. From the



Image 1



Image 2



Image 4



Image 3

information on Page 53 of the 2012 Sky Guide Africa South, I thought we were going to have a disappearance, and then a re-appearance up to an hour later. I thought that I would abort waiting for the reappearance, but then realised that it was *not going* to disappear. At least we did not have to wait around for a re-

appearance! At 03h46 I noticed a crater in a straight line from Plato to the limb of the moon, the line pointing at Jupiter. The crater is tentatively identified as Fontenelle.

I first noticed at 03h44 that Ganymede had *re-appeared*, but when you first recover it, you wonder how long it has been there! However it may have re-appeared from behind a sliver of the dark limb of the Moon. At 03h48 I noticed that the pair of moons was back. At 03h59 I could see Jupiter with the naked eye, and I stopped observing at 04h06.

Bosman commented:

“How lucky could we be, to see a ‘grazing occultation’ - at least we had something to look at all the time!” and he added “Nice pictures everybody!” George comments that it was a good experience.

Johan Smit writes:

To see how lucky we were to see Jupiter just running along the edge [of the Moon]. I worked out the width of such a grazing track on Earth. I did some quick calculations assuming that Earth and the Sun and the Moon and Jupiter are perfectly lined up. That assumption is quite correct for an occultation to occur. My last assumption was that the occultation occurred at opposition, when the distance between Earth and Jupiter is at its minimum. We are close to opposition, so Jupiter was a bit further away than the figure I used in my calculations, exact opposition will be on December 2nd 2012. This means the grazing track on November 2nd was slightly smaller than my calculation shows. Anyway after some calculations, such a track works out to just about 91 km wide.

Considering that we estimated anything between 80 and 90% occultation, it means that if

we were between 9 and 18 km south from Centurion (somewhere in Midrand) we would have seen a full occultation, for a short while. In the same vein, if we were between 73 and 82 km north of Centurion, Jupiter would have just missed the Moon, so Piet Bennett from Shekinah would probably [not have seen an occultation].

Michael adds :

I suppose I was furthest north of all the persons in this correspondence – perhaps about 20 - 30 km further north than Johan. Johan's group estimated about an 80% - 90% occultation. I had not previously thought about this aspect, but I saw no more than a 60% disappearance. I could see at least part of the north equatorial belt all the time.

George writes that we were lucky in another sense as well – the weather. There was about 50% cloud cover for him, and having been pessimistic the previous evening he had only set up a small refractor (“mistake”!) – there was good viewing between the gaps in the clouds. Michael also comments about the clouds - there was plenty of open sky, and the clouds did not in the end interfere, but he noted that the clouds were moving directly from south to north. For the past few weeks the cloud had been coming from the north east or north west, and only went from south to north during the night –the next morning they were from the north east again.

The next two Moon/Jupiter occultation events are November 29th 2012 and December 26th 2012, both in the early morning. George says that he will use a larger telescope, and try and get some photographs as well.

Amazing sights need some sacrifices – Percy was writing to Pierre at 15h00 on November 2nd, and had been awake since 01h00. Percy said that he did finally catch up with sleep – “the sleep was great - so was Jupiter though”. Retirees were able to spend an extra hour in bed! Ω

Chairman's report of the monthly meeting on 24th Oct 2012 by Percy Jacobs

To our visitors, we offer a warm welcome to the Pretoria ASSA Society and trust you enjoyed the meeting and shall consider becoming a member and join us in our regular activities.

The meeting had a few unexpected “technology dependent glitches”, but proceeded well and still remained captivating.

The talk from JPL on the Mars Curiosity did not happen due to unexpected poor signal strength from Cell C's 3 G connection on the night. Some quick thinking and unplanned preparedness from one of our members who quickly came to the rescue and we proceeded with a pre-recorded talk on “History of the Universe” – all about the complexity and thresholds of the Universe.

The meeting started with Michael Poll (Pretoria ASSA Committee Member & ex Committee Chairman) presenting “There's Blue Moons and there are Blue Moons”. Michael discussed the various and many meanings of “Blue Moons” – from moon looking actually blue, to the statement “I'll marry you, m'lady, when the Moon is blue!” – which is “never”, to 2nd full moon of the month, to a reference to sadness to name but a few.

Once in a Blue Moon ... is a common way of saying not very often, but what exactly is a Blue Moon? It is the second Full Moon to occur in a single calendar month. The average interval between Full Moons is about 29.53 days, whilst the length of an average month is roughly 30.4 days. This makes it very unlikely that any given month will contain two Full Moons, though it does sometimes happen. The well-known Metonic Cycle of lunar phases (whereby the phases of the moon occur on the same dates of the year) is 19 years long. During this time, there are 235 lunar months, and hence 236 Full Moons. There are also 228 calendar months, so at least 8 of those months must have seen two Full Moons.

Then it was Johan Smit (Pretoria ASSA Committee Member & ex Chairman) who presented What's Up for the month of Nov 2012. Johan highlighted that we should go outside in the early hrs of the morning in the month of Nov to observe and capture the occultation of Jupiter by the moon.

The meeting ended with discussion over tea & coffee.

Feature of the month: Milky Way surrounded by a halo of hot gas by Pierre Lourens

Astronomers have used NASA's Chandra X-ray Observatory to find evidence that our Milky Way is embedded in an enormous halo of hot gas that extends for hundreds of thousands of light years. The estimated mass of the halo is comparable to the mass of all the stars in the galaxy.

http://www.nasa.gov/home/hqnews/2012/sep/HQ_12-331_Chandra_Hot_Gas.html Ω

Basics: Natural light sources from the night sky - by Pierre Lourens

First, there is moonlight. When the moon is full, it swamps all other sources of light from the night sky. There is also light from the auroras. However, this is confined to high latitudes. In this article, only the natural sources of light seen by middle and low latitude observers on a moonless night will be considered. This light derives from three principal sources: night-time airglow (aka nightglow), the interplanetary light and integrated starlight. For a middle latitude observer, each of these three sources provides on the average about one third of the total natural light from the night sky. (The contribution from extragalactic nebulae is less than one percent of the total from these three sources. Starlight scattered by interstellar dust near the galactic plane is known as diffuse galactic light. It also makes only a small contribution compared to these three sources.) The sky brightness is typically quoted in units of astronomical magnitudes per square arc second of sky.

Night-time airglow.

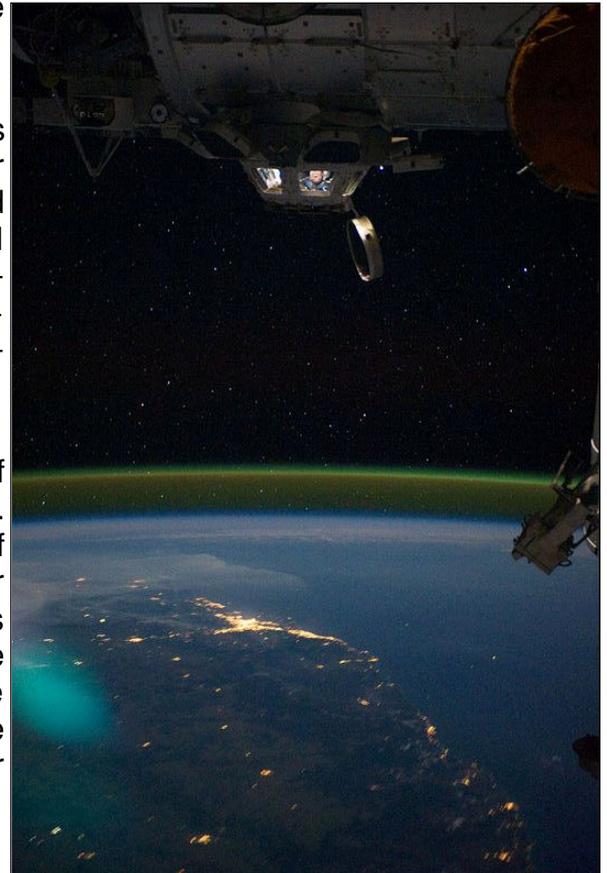
Night-time airglow is caused by various processes in the upper atmosphere, in a layer somewhat above 80 kilometers. These involve sunlight, and to a much lesser extent, cosmic rays striking the atoms, ions, molecules and molecular fragments of the gases in the upper atmosphere, exciting them, and which then radiate light later. This glow is not noticeable from the ground during the daytime, because then it is completely swamped by the blue part of sunlight which is scattered by the molecules of the atmosphere to give us our blue sky. Since this layer is relatively low, the layer's brightness contribution as seen from the ground is a minimum at the zenith and increases toward the horizon (the van Rhijn effect). The image, captured from the International Space Station now orbiting Earth, shows the night-time airglow above the horizon.

The interplanetary light.

This is due to sunlight scattered by dust particles orbiting the Sun. These particles are concentrated near the ecliptic plane. This results in the zodiacal light and the gegenschein, with a light bridge (aka the zodiacal band) between them visible under exceptional conditions. This was discussed in the newsletter for November 2011, page 9. Studies have shown that some interplanetary light is also found at all ecliptic latitudes.

Integrated starlight.

Because the Milky way is very flattened, most of the starlight we see, comes from low galactic latitudes. In fact, the integrated starlight from the richest parts of the Milky Way is more than a factor of 10 brighter per unit area than that from the galactic poles. Telescopes reveal over 100 times as many stars per square degree on the galactic equator as at the poles, but their relative contribution is reduced by their larger mean distance from the Sun and by intervening clouds of interstellar dust. Ω



Summary of "What's Up?" to be presented on November 28th 2012 by Michael Poll

Moon Phases

Last quarter	December 6 th ,	January 5 th
New :	December 13 th ,	January 11 th
1 st Quarter :	December 20 th ,	January 18 th
Full :	December 28 th ,	January 27 th

Sunrise and Sunset

December 1 st	Earliest sunrise	05h07
December 21 st (solstice)	Sunrise	05h13 Sunset: 18h57
January 12 th	Latest sunset	19h03

Jupiter: Is in Taurus, in the sky all night for most of December

December 3rd Opposition, rises at sunset

Rises before sunset by end December, sets at 03h00 December 31st

Moon near Jupiter 2012 November 28th - 29th
 2012 December 25th -26th
 2013 January 21 - 22nd

Occultation of Jupiter early morning November 29th Moonset 05h37

Occultation of Jupiter early morning December 26th Moonset 03h34

Saturn: Is on the Virgo - Libra border

December 1st Rises at 03h00

January 1st Rises at 01h15

January 31st Rises at 23h30

Venus near Saturn on November 26th, 27th, 28th, 29th

Moon near Saturn in pre dawn sky on December 10th, January 7th

Venus: In east before sunrise

December 1st Rises at 3h15, Sunrise 5h10

January 1st Rises at 3h30, Sunrise 5h20

January 31st Rises at 4h40, Sunrise 5h40

Moon near Venus: December 11th , January 10th

Mercury: In morning sky beginning of December

December 5th Maximum elongation: 21 degrees

Superior conjunction January 18th

December 9th – 11th : Mercury, Venus and Saturn together in north east before sunrise

Mars: Is in Sagittarius at beginning of December – moves into Capricornus

December 1st Sets at 21h00

January 1st Sets at 20h30

April 18th Conjunction with sun

Geminid Meteor Shower

Duration December 4th - December 16th . Maximum December 14th

Best dates December 13th, 14th and 15th

Activity shows slow rise to maximum, then sharp drop

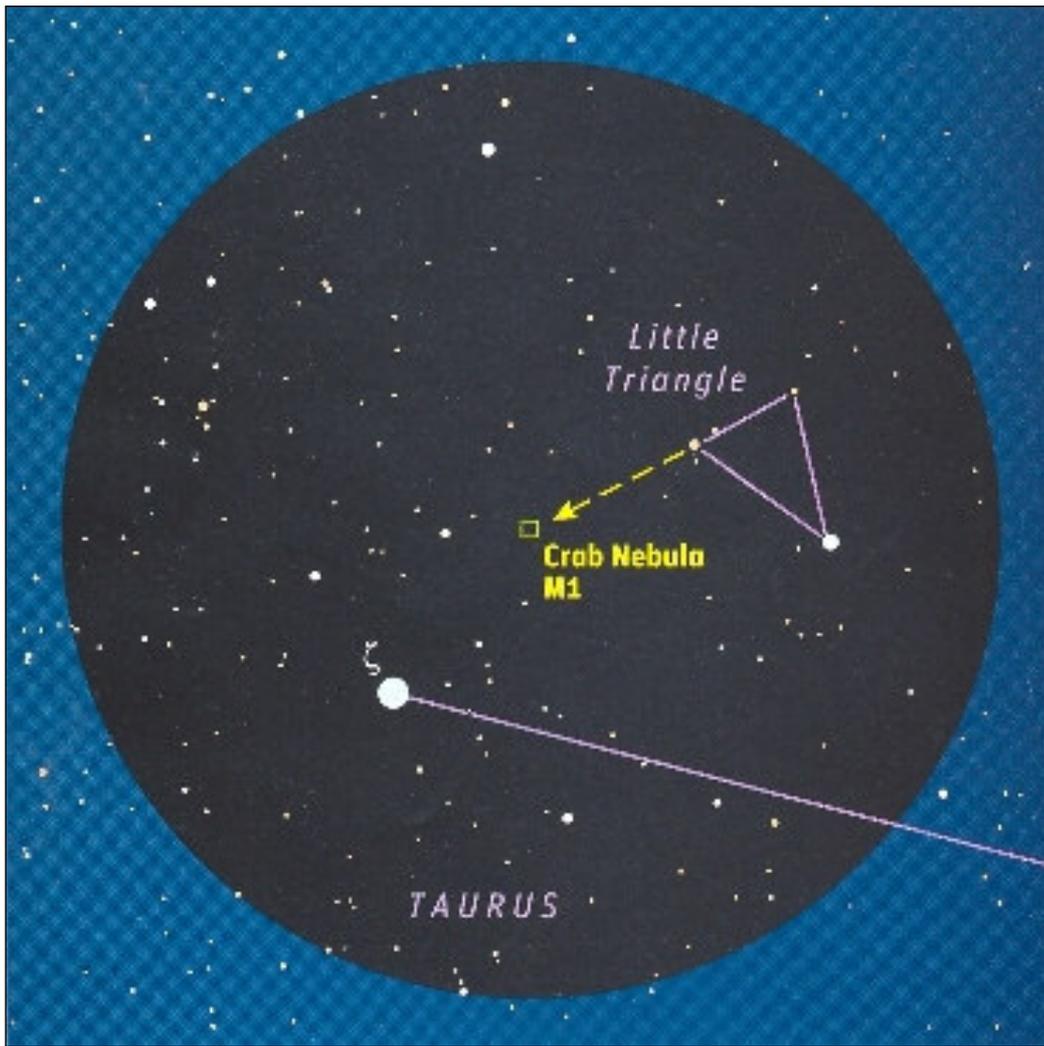
Brightness tends to increase with date

Constellations

Northern sky Pegasus, Andromeda & Pisces

North eastern sky Taurus, Orion

A finder chart for the Crab Nebula (Messier 1) is shown on the next page. The chart is taken from the magazine "Sky and Telescope" for February 2007, page 52. Ω



Meet some fellow members of the Pretoria Centre of the ASSA

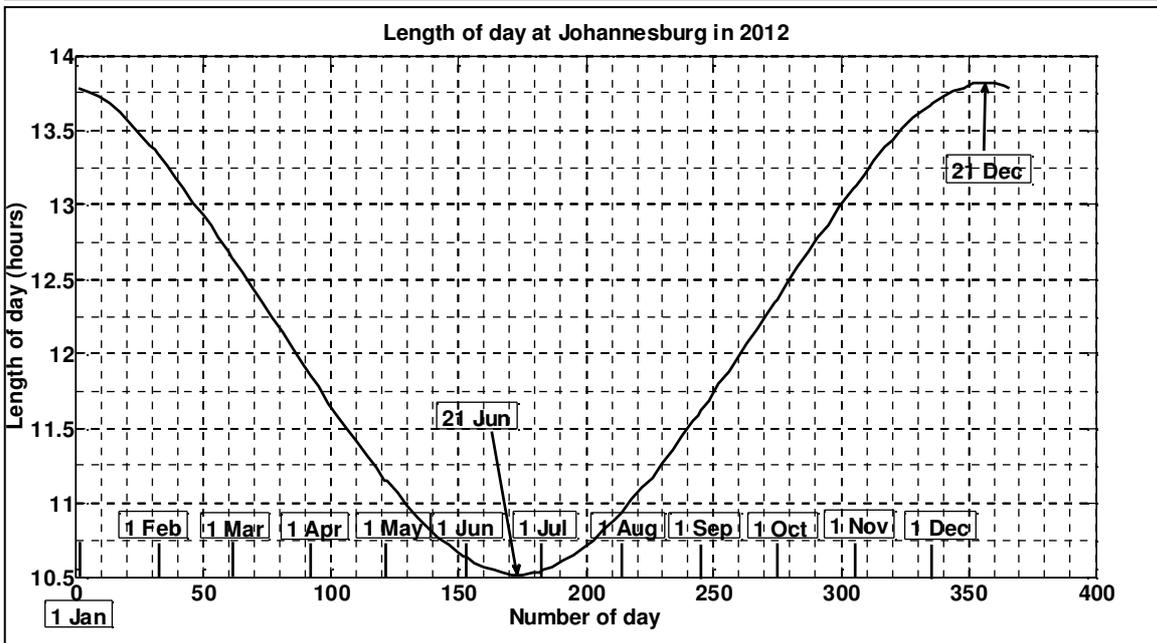
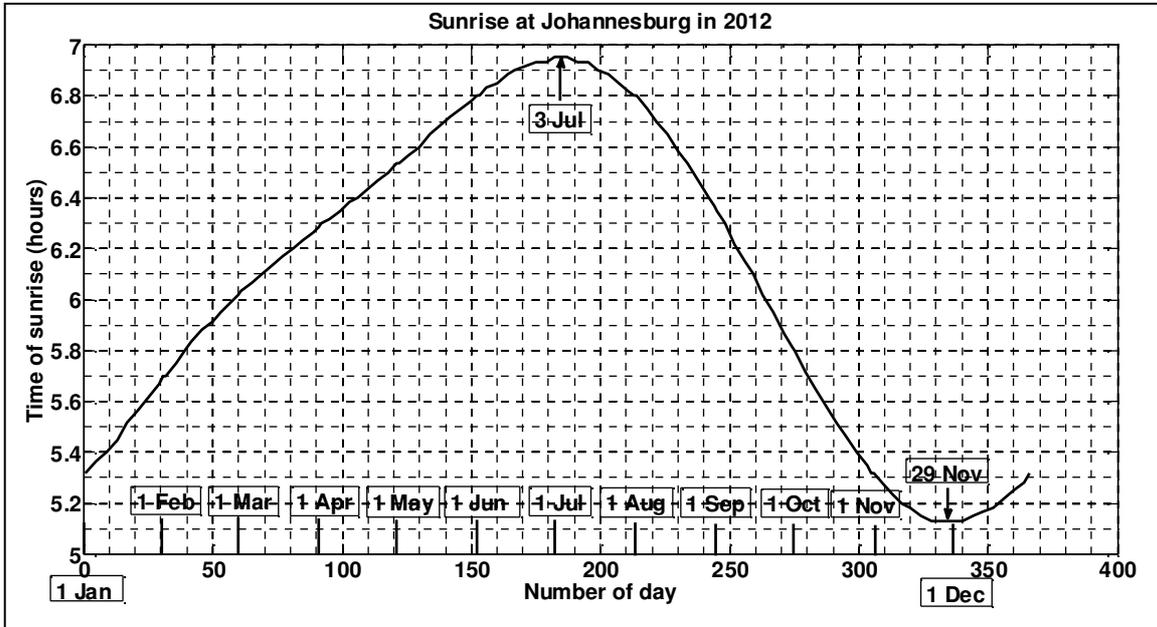
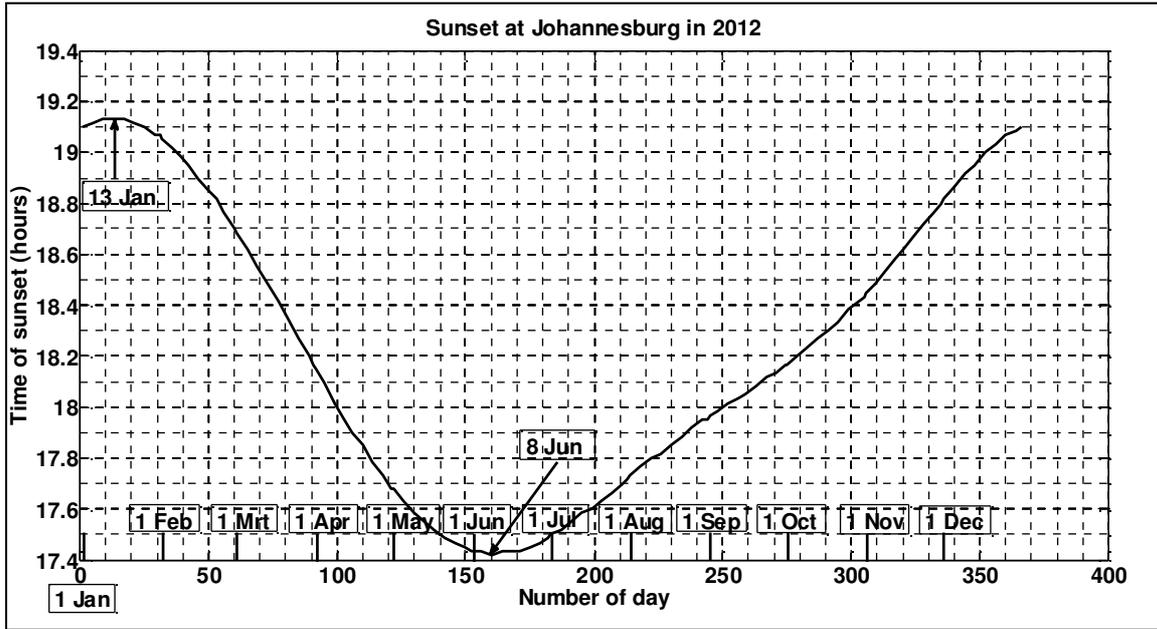


Josè da Silva



Michelle Ferreira, a committee member

Times of sunset, sunrise & length of day at Johannesburg - by Pierre Lourens



For the plots on the previous page, I used the data given in Sky Guide Africa South 2012 for times of sunrise and sunset. Features that became clear from the plots are:

- The date of the shortest day coincides with neither the date of latest sunrise nor the date of earliest sunset.
- The date of the longest day coincides with neither the date of earliest sunrise nor the date of latest sunset.

This is summarized below. Since Johannesburg and Pretoria are only about 50 km apart, the figures for Pretoria are not much different from these. (The resolution of the data I used is not very good. The dates are days apart, and the times of sunrise and sunset are only given to the nearest minute. Therefore the figures below are only approximate.)

Date of latest sunrise: 3 July. Time of latest sunrise: 06h57.

Date of shortest day: 21 June. Duration of shortest day: 10h 30m.

Date of earliest sunset: 8 June. Time of earliest sunset: 17h25.

Date of earliest sunrise: 29 November. Time of earliest sunrise: 05h08.

Date of longest day: 21 December. Duration of longest day: 13h 49m.

Date of latest sunset: 13 January. Time of latest sunset: 19h08.

The length of the day is rapidly increasing during November. This is evident from the steep slope of the third graph during this time. Ω

Clouds: things to curse at? - by Pierre Lourens

Clouds at night are cursed at by professional and amateur astronomers alike, for the simple reason that clouds prevent them from doing observing of heavenly bodies. But clouds are things of beauty and scientific interest. And, after all, they do bring us rain.

I invite members to visit the website of the **Cloud Appreciation Society**. The link is <http://cloudappreciationsociety.org/>. On the site are thousands of images of beautiful cloud-scapes in jpg format, and which you can download from there on your computer's hard disk **for free**, and use them as screen savers on your computer screen. One of them is shown below.

I urge members to not only look up at the sky at night (when there are no clouds!), but also by day and appreciate the clouds in the skies of planet Earth. You can do this just about anywhere and all day long, and it needs no equipment. I am a keen cloud observer myself. A book I recommend is "**Clouds of the world**" by **Richard Scorer**. Books about cloud observing can be ordered on the abovementioned website. **Stop cursing and start appreciating!** Ω

Cumulus clouds with a pileus cap just south of Darwin, Australia



Noteworthy items

- **A curious cold layer in the atmosphere of Venus.** Scientists have uncovered a very chilly layer at temperatures of around -175°C in the atmosphere 125 km above the planet's surface. http://www.esa.int/esaSC/SEMILCERI7H_index_0.html
- **Chasing clouds on Venus.** The wind speed is derived from tracking cloud features as they whip around the planet faster than 100 m/s (= 360 km/h). http://www.esa.int/esaSC/SEMR1EFRI7H_index_0.html
- **Crescent Mars.** A rare image of crescent Mars was captured during a flyby of spacecraft Rosetta. The flyby was the second of four planetary gravity assists needed to slingshot Rosetta to its final destination. http://www.esa.int/esaSC/SEMAR9ERI7H_index_0.html
- **X-raying stellar winds.** Two massive stars racing in orbit around each other have fierce stellar winds. As the winds crash into each other, it generates X-rays. http://www.esa.int/esaSC/SEM3H93S18H_index_0.html
- **An Earth mass planet orbiting Alpha Centauri B.** This is the research article in which the discovery was announced and which was published in the science journal **Nature**. <http://www.eso.org/public/archives/releases/sciencepapers/eso1241/eso1241a.pdf>
- **Alpha Centauri Bb: an interstellar target?** <http://news.discovery.com/space/could-we-mount-an-interstellar-mission-to-alpha-centauri-bb-121018.html#mkcpgn=emnws1>
- **The Solar System's grandest canyon.** Valles Marineris on Mars is over 4000 km long, 200 km wide and 10 km deep. http://www.esa.int/esaSC/SEMAEO4S18H_index_0.html
- **Astrobiology tries to unravel the origins of life.** See a 12-minute video clip. http://www.esa.int/esaSC/SEMMQCERI7H_index_0.html
- **Large water reservoir at the dawn of stellar birth.** ESA's Herschel space observatory has discovered enough water vapour to fill Earth's oceans more than 2000 times over, in a gas and dust cloud that is on the verge of collapsing into a new Sun-like star. And there is more than 3000000 frozen Earth oceans' worth of water ice in the cloud as well. http://www.esa.int/esaSC/SEMVAO2S18H_index_0.html
(See also the second news item on page 9 of the January 2012 newsletter.)
- **After-effects of Saturn's super storm shine on.** The storm occurred in the northern hemisphere as Saturn was approaching its summer solstice, which it will only reach in 2017. A giant oval vortex is persisting long after the visible effects of the storm have subsided. We can expect more such storms in the years to come. (A note in passing: in 1989, Saturn reached its perihelion, and then white spots appeared in its atmosphere. These were similar to the thunderclouds of planet Earth, but on a much larger scale.)
See: <http://apod.nasa.gov/apod/ap111226.html>
See two video clips here: http://www.esa.int/esaSC/SEMLPIMFL8H_index_0.html
- **Hubble Deep Field.** See a video clip about the farthest ever view of the Universe. http://hubblesite.org/hubble/discoveries/hubble_deep_field/
- **ASSA Symposium 2012: videos on YouTube.** Several talks given recently at the ASSA Symposium in Cape Town can now be watched on YouTube, and more are being added. http://www.psychohistorian.org/display_article.php?id=201210290905_assa_symposium2012
- **NASA'S NuSTAR reveals flare from Milky Way's black hole.** http://www.nasa.gov/home/hqnews/2012/oct/HQ_12-370_NuSTAR_First_Images.html
- **Star caught in the act of devouring one of its planets.** In 5 billion years, Earth could be devoured in the same way when the Sun will have become a red giant. http://science.nasa.gov/science-news/science-at-nasa/2012/25oct_friedplanets/
- **Born-again star foreshadows fate of Solar System.** A dying Sun-like star mimics the possible fate our own Solar System faces in 5 billion years.

http://www.esa.int/esaSC/SEM0UBGPI9H_index_0.html

- **Spot the International Space Station over your back yard with new NASA service.** http://www.nasa.gov/home/hqnews/2012/oct/HQ_12-384_Spot_Station.html
- **Wolf-Rayet bubble.** It spans nearly 60 light-years across and was blown by the powerful stellar wind of the Wolf-Rayet star HD 50896, which will soon become a supernova. http://www.esa.int/esaSC/SEM1A52Q8H_index_0.html
- **Top 10 Halloween horrors of alien planets.** Exoplanets are mysterious, bizarre, but ultimately exciting. Many of these alien worlds seem downright scary. <http://news.discovery.com/space/top-10-exoplanet-horrors-halloween-121026.html#mkcpgn=emnws1>
- **Asteroid 2007 PA8 was 9 million km from Earth on 30 October.** <http://news.discovery.com/space/monster-asteroid-pinged-as-it-buzzes-earth-121106.html#mkcpgn=emnws1>
- **The most mind-blowing space spirals: photos.** <http://news.discovery.com/space/most-mind-blowing-space-spirals-121019.html#mkcpgn=emnws1>
- **Astronomy video clips.** <http://news.discovery.com/videos/space-doomsday-asteroid.html>
- **A link to a lot of links.** <http://gizmodo.com/space/>

Debunking UFO's

- <http://news.discovery.com/space/fatal-distraction-can-ufos-cause-airline-accidents-121031.html#mkcpgn=emnws1>
- <http://www.lifeslittlemysteries.com/896-7-ways-to-generate-a-great-space-hoax.html>
- <http://news.discovery.com/space/triangular-ufo-alien-121901.html>
- <http://news.discovery.com/space/are-ufos-stalking-the-mars-lander-120917.html>
- http://en.wikipedia.org/wiki/List_of_UFO-related_hoaxes
- <http://news.discovery.com/human/denver-ufo-likely-has-earthly-explanation-121113.html#mkcpgn=emnws1> Ω

**Amazing views inside the data centers of Google, our modern oracle
by Pierre Lourens**

When Johan Gutenberg invented the printing press in the 1400's, it was a revolution: it gave many people access to a lot of information. The invention of the Internet was a similar, but greater revolution: it gave many more people access to much more information. And this happened in our own lifetimes! The Internet only came into existence about 1990. It is the greatest library ever created with the easiest access ever, and it has been growing ever since its infancy.

For people like us who are interested in astronomy, it gives us access to a vast amount of astronomical information. But this information, as well as all other information, is stored somewhere. Google allows us a first ever look inside the Internet at the eight vast data centers that power the online world

<http://www.dailymail.co.uk/sciencetech/article-2219188/Inside-internet-Google-gives-unique-look-inside-vast-data-centres-power-online-world.html>. Ω

MNASSA

The October 2012 issue of MNASSA is now online and can be downloaded from the usual website at <http://www.mnassa.org.za/>



The Pleiades

The Pleiades star cluster (aka M45) consists of many hot, young stars that were all formed at the same time within a large cloud of interstellar dust and gas. The blue haze that accompanies them is due to very fine dust which scatters the blue light from the stars.

http://en.wikipedia.org/wiki/Pleiades#Reflection_nebulosity



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Vice Chairman	Danie Barnardo	084 588 6668
Secretary	Tony Viljoen	072 247 6648
Newsletter Editor	Pierre Lourens	072 207 1403
Treasurer and Membership Secretary	Rynhardt van Rooyen	082 325 8745
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