



# The PRETORIA CENTRE

of the

## Astronomical Society of Southern Africa

[www.pretoria-astronomy.co.za](http://www.pretoria-astronomy.co.za)

### NEWSLETTER AUGUST 2011

#### Next meeting

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

**Date and time:** Wednesday 24 August at 19h15.

**Programme:**

- **Beginner's Corner:** "Basics of the barndoor tracker" by Pat Kühn
- **What's Up:** by Percy Jacobs
- 10 minute break — library will be open
- **Main talk:** "String theory"  
by Prof Robert de Mello Koch
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Fred Oosthuizen

Next observing evening: Friday 19 August 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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## Last month's meeting

The meeting was attended by at least 43 people and included visitors that attended our observing evening on the previous Friday. It was surprising to see so many visitors at an AGM. One compliment was given by one of the visitors who commented that this was the first AGM of any organisation that she had actually enjoyed. Many thanks to Fred Oosthuizen who volunteered to take the minutes in the absence of Tony Viljoen.

**The Minutes of the 2011 AGM of the ASSA Pretoria Centre are recorded as follows.**

### 1. Welcome

At 19:20 Johan Smit opened the 2011 Annual General Meeting and welcomed 32 members and 13 visitors.

### 2. Apologies

Apologies were received from Michael Poll, Andrie van der Linde, Danie Barnardo, Neville Young, Gareth Gregory, Tony Viljoen and Johann Hartmann.

### 3. Approval of the Minutes of 2010

Fred Oosthuizen proposed that the minutes of the 2010 AGM be approved. This was seconded by Hubrecht Ribbens.

### 4. Report back

The chairman's report was read by Johan Smit. It was noted that Andrie van der Linde and Casper van der Linde were omitted from the report on the June 15<sup>th</sup> 2011 Lunar eclipse event activities. The corrected report will be posted on our web site. Hein Stoltsz proposed that the report be accepted and the proposal was seconded by Thys Maree.

### 5. Treasurer's Report (Rynhardt van Rooyen)

Rynhardt van Rooyen read the provisional financial report for the year ending June 30<sup>th</sup> 2011. We had a paid up membership of 100, started the year with R32364 in our accounts and ended with R36398, mainly due to an unexpected profit that was made from the Symposium. Current income covers our normal running expenses and it was noted that no increase in membership fees is planned for this year. A full report will be published on our web site. Rudolf Strydom proposed that the report be accepted and the proposal was seconded by Louis Kloke.

### 6. Implications of the new ASSA constitution

The changes to the ASSA constitution that affects centre members were summarised and explained to the audience as such:

All members of any Centre are automatically full members of ASSA

Paid up members of Centers who were, at the same time, members of the "national" Society no longer need to pay subscriptions to the national Society.

Persons who are not able to join a Centre, for example due to geographical location, may join ASSA directly as a "Country Member".

Country Members will pay an entrance fee of R50-00, and an annual subscription of R50-00.

The Chairperson of each Centre is now automatically a member of the national Council.

When the President of ASSA ends his term of office, the Vice President automatically becomes President.

Elected posts on the national council: Vice President, Secretary and Treasurer, and two positions for members without portfolio.

Section Directors and certain other positions (e.g. Editor MNASSA, Scholarships Convener and Webmaster) will be Council appointees.

The membership were reminded of the ASSA AGM and invited to attend and exercise their right to vote.

### 7. Committee Nominations/election

The members nominated and accepted to serve on the Pretoria Centre Committee for 2011/2012 are listed on the last page of this newsletter. Hein Stoltsz, Andrie van der Linde and Gareth Gregory who decided to retire from the committee were thanked for their work on the committee. All of

them expressed their continuing support for the Pretoria centre of the ASSA.

### **8. Other Business**

No nominations were received for the Jack Bennett trophy and Johan Smit proposed that it be awarded to a member, who will remain a secret until the official hand-over can be done. The proposal was unanimously accepted and officially seconded by Percy Jacobs. The audience was sworn to secrecy until the award can be handed over to the proposed recipient.

### **9. Next meetings**

The ASSA AGM of 3 August was advertised as well as our next viewing evening on 19 August and meeting on 24 August.

### **10. Closing**

The membership was thanked for their support over the last year and the AGM was declared closed at 20:00.

### **The meeting then proceeded with the normal programme, which was as follows.**

Percy Jacobs took us on a tour of what to see in August 2011. Apart from the normal visibility of the planets and constellations he pointed out the visibility of Comet P45 Honda Mrkos-Padusakova which will be the brightest comet of the year. It is most easily visible from August onwards. Its closest approach to earth is 0.06AU on 16 Aug (900, 000 km). It will pass through Grus on August 9<sup>th</sup> and Tucana on August 12<sup>th</sup> and it will be next to the large Magellanic cloud on the August 15<sup>th</sup>.

The favourable visibility of the asteroids Ceres (in Aquarius) and Vesta (in Capricornus) was also explained. Skills learned by participating in our observing section will come in handy to identify these objects and practical observing skills were again explained.

Sixteen targets from the ASSA top 100 list were shown in just two constellations, Scorpius and Sagittarius. It is thus a good month to get some numbers on paper to submit to the observing section. And with another five right next door in Ophiuchus there is no reason not to spend some time observing.

Our main speaker was Dawie Jansen van Vuuren, a Geographical Information Systems Specialist, specialising in Environmental Management, Development Planning, Disaster Management and Visual Impact Studies. He was contacted to investigate the effect of sky glow on stargazing in a pristine environment. He contacted Johan Smit for some input and it was decided to try and evaluate the sky photographically.

Because the project is still in the beginning stages no firm results could be presented yet. But promising results were shown. It looks quite possible to record the state of the sky photographically. Interestingly, the camera could distinguish sky deterioration due to moisture that was not visible to the naked eye.

Localised sources of sky glow also had virtually no effect on the state of the sky, unless you looked directly across such sources. The photos did show that photographs will be very useful to identify and record sources of sky glow.

Even though no answers were given, the fact that these studies are asked for, and is being done, is promising and the audience were very positive in their support to fight light pollution. We wish to thank Dawie for his efforts and I am sure that through efforts like this we will make significant gains in the future.

I am glad to report that Dawie has joined ASSA Pretoria as a member and we all look forward to work with him in the fight against light pollution.

The meeting ended with the usual refreshments and very lively discussions of the main topic.

### **Settlers dark sky weekend - by Bosman Olivier**

A dark sky weekend is planned for the weekend of Friday 30 September to Sunday 2 October 2011 at the Lord Milner Primary School in Settlers, Limpopo. This is at the beginning of the school holidays, with the moon between new and first quarter. See the attachments to this newsletter.

## Last month's observing evening - by Johan Smit

A typical late winter evening with clear skies awaited the many regulars and visitors. It turned out to be one of the busiest viewing evenings that we ever had. At some stage during the evening Bosman counted 19 telescopes on the field.

Around each scope were at least 2 or 3 viewers, so there could easily have been 60 people attending.

At the start of the evening Mercury was pointed out by Danie and everyone was treated to a small half-moon image. One or two visitors thought that it was the moon they are seeing, and this prompted explanations of how the inside planets display phases, like the Moon does.

Saturn was well viewed by all, because it will soon disappear from the evening sky. Johan brought his by now well-known Longdrop telescope as well as its smaller brother, a restored 4 inch Newtonian, that was promptly adopted by some of the children present. Having two such vastly different scopes next to each other provided the visitors a chance to see that even a little 4 inch telescope does have its advantages. The main advantages are portability and ease of use. A small scope that gets used often gathers more light than a giant telescope that stays packed away because it is too cumbersome to use.

One visitor brought his new telescope and we trained him in setting up, balancing and aligning it and finding his first targets. It was a beautiful 8 inch Newtonian on an equatorial mount with go-to capabilities. Much to the new owners surprise the scope did not show him the sky immediately. He was never shown, or told that, using it properly require at least some knowledge of the sky and operating an equatorial mount. This was a good training exercise for anyone contemplating buying a telescope and opened many eyes to the practical problems of using similar scopes. Yes, it is a good scope, but if you are not committed to learn how to use it properly, you will be disappointed. Fortunately for this owner he made the effort to bring it to the viewing evening where he could practise under guidance of more experienced operators. I trust that he will soon be much happier with his new scope.

In between these activities many visitors were entertained by views of the typical winter gems like the open clusters M6 and M7, and the usual favourites around Crux : the Jewel Box and Omega Centauri as well as Eta Carinae. Because of the many visitors Johan spent most of the time explaining various topics from stellar evolution to African star lore and how to identify the signs of the zodiac.

The other favourites in the north were not neglected and everyone saw the Ring Nebula, the Dumbbell Nebula and the double star, Albireo. The sight of the two "dead stars" prompted explanations to the visitors as to what can happen at the end stages in the life history of typical star.

It was a very busy evening with a lot of talking and explaining and by the time the Moon rose after 23:00, we were thoroughly tired, but very satisfied with the evening. A few diehards had a look at the Moon before we called it quits.

### For sale: telescope in mint condition - Orion Skyview Deluxe 6"

Primary mirror: 152mm, Pyrex glass  
 Secondary mirror: 69mm x 50 mm  
 Focal length: 750mm  
 Focal ratio: f/5  
 Eyepieces 25mm (30x) and 9mm (83x) Plössls  
 Optical tube: Seamless aluminium  
 Focuser: Rack and pinion

Includes 6x (30mm) achromatic finder scope, German-type equatorial mount, aluminium tripod and instruction manual. This was an unused gift – purchased in 2002 for R6,300. Never saw the night sky. Located in Pretoria. Asking R5 800. Contact Monica Hanisch at 012 361 5557.

## Cannibal galaxy NGC 5128, aka Centaurus A

Centaurus A is located approximately 4° north of Omega Centauri (a globular cluster visible with the naked eye) in the constellation Centaurus. Because the galaxy has a high surface brightness and relatively large angular size, it is an ideal target for amateur astronomy observations. The bright central bulge and dark dust lane are visible even in finder scopes and large binoculars. This galaxy is also popularly known as the "Hamburger galaxy".

- Impressive view of the galaxy: <http://www.oneminuteastronomer.com/4107/ngc-5128/>
- The newsletter for April 2010, page 9.
- The newsletter for November 2008, page 8.

### Some items about the cannibalism of our own galaxy, and of other galaxies

- **Cosmic dig reveals vestiges of the Milky Way's building blocks.** The history of the Milky Way is encoded in its oldest fragments, globular clusters and other systems of stars that have witnessed the entire evolution of our galaxy. Astronomers have been gazing through the thick layers of interstellar dust obscuring the bulge of the Milky Way and have unveiled the star cluster Terzan 5. Terzan 5 is one of the bulge's primordial building blocks, most likely the relic of a dwarf galaxy that merged with the Milky Way during its very early days. <http://www.sciencecentric.com/news/09112603-cosmic-dig-reveals-vestiges-the-milky-way-building-blocks.html>
- **Galaxy "crumbs" found in Milky Way.** A new stream of stars has been found running through the constellation Aquarius, and astronomers think the group is all that's left of a smaller galaxy that was recently gobbled up by our home galaxy. The Milky Way hosts more than a dozen known stellar streams, the remnants of satellite galaxies that were gravitationally torn apart and consumed. Most of the other streams loop around the plane of our disk-shaped galaxy, like octopus tentacles grasping a dinner plate. But the newfound Aquarius stream is unique because it is embedded within the galactic plane. It is also the closest stellar stream to Earth yet found. <http://news.nationalgeographic.com/news/2011/02/110207-milky-way-galaxy-aquarius-stream-snack-space-science/>
- **Backward stars point to galactic cannibalism.** Stars orbiting the wrong way in their galaxy's heart are probably the remnants of another galaxy that was eaten. Astronomers have noted for years that the stars at the heart of some galaxies orbit in the opposite direction to that of their neighbours further out. One suggestion has been that the stars were part of a smaller galaxy swallowed up by the host, but it was hard to find evidence to clinch the case. Now, observations bolster the galactic cannibalism theory. <http://www.newscientist.com/article/mg21028064.100-backward-stars-point-to-galactic-cannibalism.html>

### Web links

- **Space Shuttle Discovery's flight deck during decommissioning in the Orbiter Processing Facility.** [http://360vr.com/2011/06/22-discovery-flight-deck-opf\\_6236/index.html](http://360vr.com/2011/06/22-discovery-flight-deck-opf_6236/index.html)
- **Spring Southern Star Party website.** <http://www.southernstarparty.org/spring-2011-ssp>
- **How the northern lights form [Video].** [http://www.scientificamerican.com/blog/post.cfm?id=how-the-northern-lights-form-video-2011-07-06&WT.mc\\_id=SA\\_CAT\\_SPC\\_20110707](http://www.scientificamerican.com/blog/post.cfm?id=how-the-northern-lights-form-video-2011-07-06&WT.mc_id=SA_CAT_SPC_20110707)
- **Exceptionally deep view of a strange galaxy, NGC 4921.** <http://www.sciencecentric.com/news/09020711-exceptionally-deep-view-strange-galaxy.html>

Special Issue of **Physics Comment** (September 2010) about **Astronomy in South Africa** is available for download from (file size about 1.2 MB):

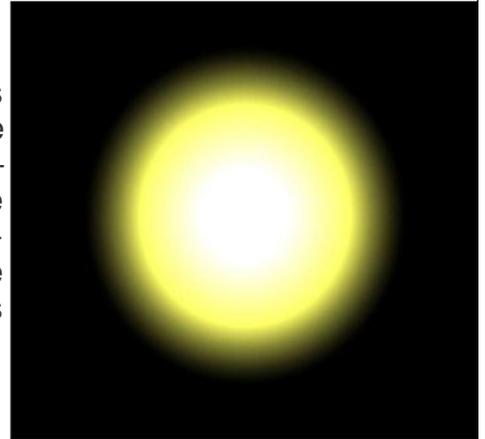
[www.saip.org.za/PhysicsComment/](http://www.saip.org.za/PhysicsComment/) (select the September 2010 issue)

## Basics: Dwarf stars - brown, red, orange, yellow, blue, white and black: Part 2 by Hubrecht Ribbens

### Yellow dwarfs

Yellow dwarfs, also known as G V stars, are a class of main sequence stars with masses of 80% to 100% of the mass of the Sun. The Sun is classified as a yellow dwarf. Yellow dwarfs (which are actually white to yellow in colour), have surface temperatures of 5,000 - 6,000 K. The Sun is the maximum possible mass for a Yellow Dwarf. Yellow dwarf stars have a lifespan of about 10 billion years until it expands, leaves the main sequence and becomes a red giant.

On the right is an illustration of a yellow dwarf star

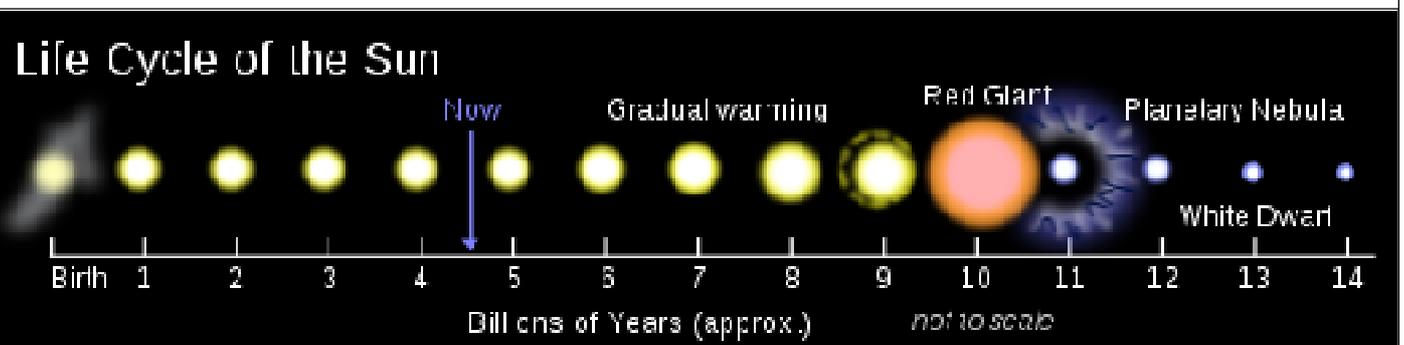


### Blue dwarfs

A blue dwarf is a hypothetical class of star that develops from a red dwarf star after it has exhausted much of its hydrogen fuel supply. Since red dwarf stars fuse their hydrogen slowly and are fully convective (allowing a larger percentage of their total hydrogen supply to be fused), the Universe is currently not old enough for any blue dwarfs to have formed yet. Their existence is predicted based on theoretical models.

### White dwarfs

White dwarfs are thought to be the final evolutionary state of all stars whose mass is not high enough to become supernovae - over 97% of the stars in the Milky Way. After the hydrogen fusing lifetime of a main-sequence star of low or medium mass ends, it will expand to a red giant. After shedding its outer layers to form a planetary nebula, it will leave behind this core, which forms the remnant white dwarf. The life cycle of the Sun, that will eventually become a white dwarf surrounded by a planetary nebula, is illustrated below. The material in a white dwarf no longer undergoes fusion reactions, so the star has no source of energy, nor is it supported by the heat generated by fusion against gravitational collapse..

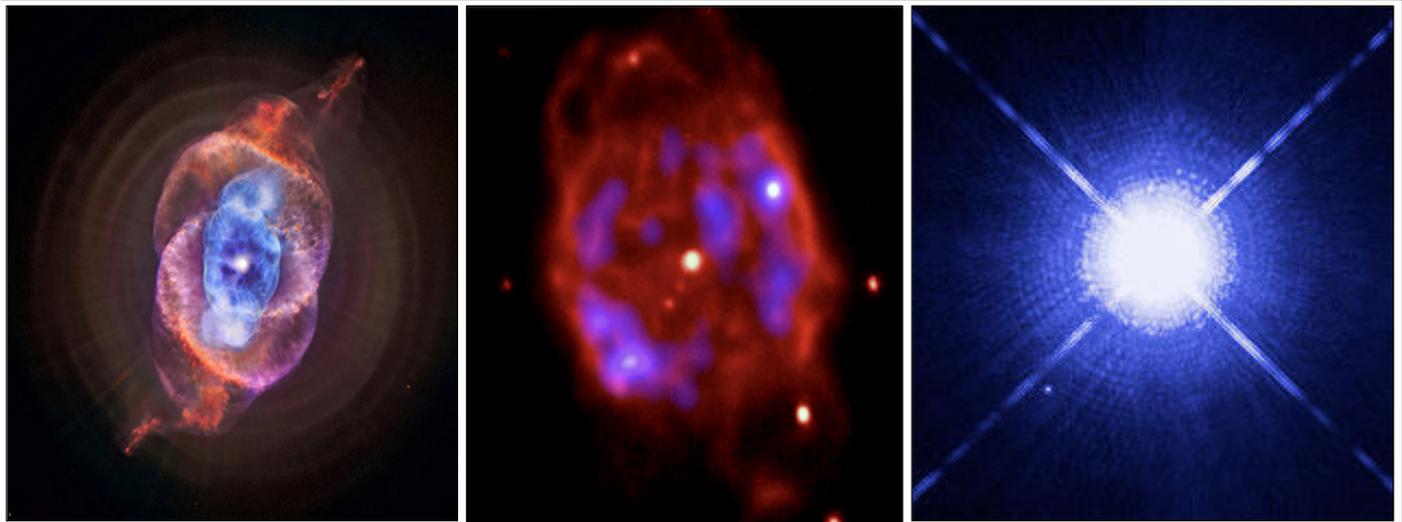


<http://pixdaus.com/single.php?id=19877>

A white dwarf is very hot when it is formed, but since it has no source of energy, it will gradually radiate away its energy and cool down. This means that its radiation, which initially has a high colour temperature, will lessen and redden with time. Even a fairly large white dwarf, with a mass similar to that of the Sun, is only about as big as Earth. The lowest-mass white dwarf known is SDSS 091709.55+463821.8. It lies 7,400 light-years away near the border of the constellations Lynx and Ursa Major. Its discovery was announced in 2007 by a team of American astronomers. It is a member of a binary star system and has evidently lost much of its matter in the past to a companion star, which also appears to be a white dwarf. The two now orbit each other every 7.6 hours at a distance of about 1,040,000 km and with a speed of 536,000 km/h.

### Black dwarfs

Over a very long time, a white dwarf will cool to temperatures at which it will no longer



emit significant heat or light, and it will become a cold black dwarf. Therefore, a black dwarf is a hypothetical [stellar remnant](#), created when a [white dwarf](#) becomes sufficiently cool to no longer emit significant [heat](#) or [light](#).

The images above show from left to right: **1.** NGC 6543, the Cats Eye Planetary Nebula. **2.** NGC 40, a dying, Sun-like star. **3.** Image of [Sirius A and Sirius B](#), the latter a white dwarf seen as a faint pinprick of light to the lower left of the brighter Sirius A.



The image on the left is a graphic illustration of a black dwarf.

Since the time required for a white dwarf to reach this state is calculated to be longer than the current [age of the universe](#) of 13.7 billion years, no black dwarfs are expected to exist in the Universe yet, and the temperature of the coolest white dwarfs is one observational limit on the age of the Universe.

**THE END**

**Summary of “What's Up?” to be presented on 24 August - by Percy Jacobs**

**Moon**

First Quarter	4 <sup>th</sup> Sept
Full Moon	12 <sup>th</sup> Sept
Last Quarter	20 <sup>th</sup> Sept
New Moon	27 <sup>th</sup> Sept
Dark Sky	1st week of month & last 2 weeks of month (good viewing time)

**Planets**

- Mercury:** mag. 1.0 (in the east - Leo)  
 1hr before sunrise 1<sup>st</sup> week  
 1/2hr before sunrise by mid month  
 Remains close to the sun and not visible by month end
- Venus:** mag. (-)3.9 (in the west – bottom of Virgo)  
 Visible for about an hr after sunset – low on horizon
- Mars:** mag. (+)1.4 (in the east - Gemini)  
 Rises about 03:00 and visible until sunrise
- Jupiter:** mag. (-)2.6 (in the east – next to Aries)  
 Rises at about 22:00 on the 1<sup>st</sup>

Rises at about 20:30 by month end

**Saturn:** mag. (+)0.9 (in the west - Virgo)  
Sets at 20:30 on the 1<sup>st</sup>  
By month end sets at 19:00

**Uranus:** mag.(+)5.7 (in the east - Pisces)  
Rises at sunset and visible all night

**Neptune:** mag. (+)7.8 (in the east - Aquarius)  
Rises at sunset – visible all night

## Events

### September 23 Equinox

This signals the beginning of spring in the south. On the equinox the Earth reaches its point in its orbit when the sun is directly overhead at the equator at noon.

### Harvest moon

1st Full Moon that occurs closest to the autumnal equinox

### Meteor Showers – may still see something early Aug

None in September

### Saturn's Moons

1<sup>st</sup> Sept @ 18:00 - Tethys & Enceladus – two of the 60 odd moons that are visible.

### Lunar Occultation

21<sup>st</sup> Sept @ 05:30 - Of the star mu Geminorum – mag. 2.9

### Constellations

West – Libra, Scorpius, Ophiuchus, Lyra

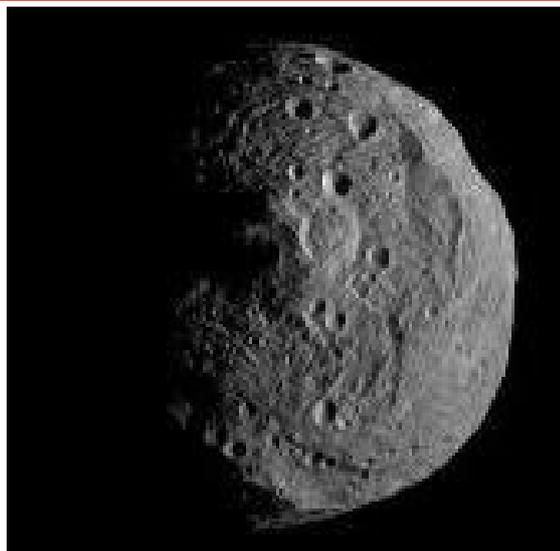
East – Cetus, Pisces, Pegasus, Sculptor

North – Cygnus, Sagitta, Vulpecular, Delphinus

South – Sagittarius, Pavo, Grus, Horologium, Reticulum, Tucana

### “ASSA Top 100” Observers

Louis Kloke	8
Michael Poll	4
Pat Kühn	11
Percy Jacobs	8
Grant Thompson	13
George Dehlen	9
<b>Total</b>	<b>53</b>



### FEATURE OF THE MONTH: Spacecraft DAWN enters orbit around asteroid Vesta

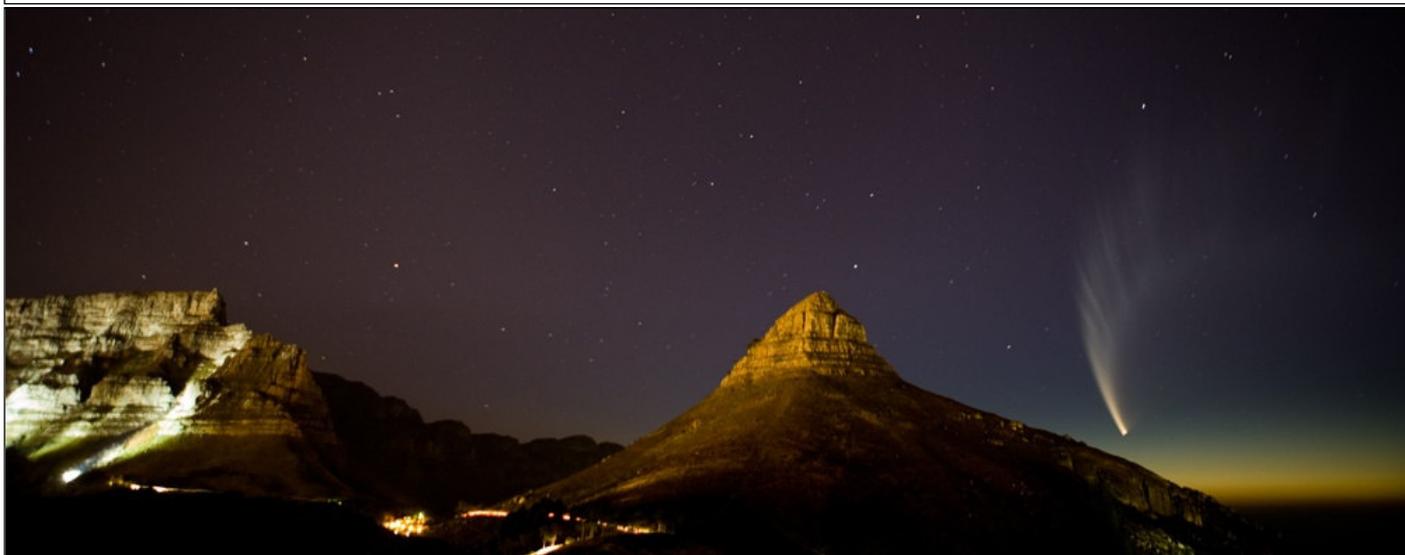
DAWN made history by entering orbit around asteroid Vesta. An incredible exploration milestone was reached. DAWN will spend about a year studying the asteroid before moving on to visit another, bigger asteroid called Ceres. DAWN has a solar-powered ion propulsion system. On the left is the first image of Vesta sent back to Earth by DAWN.

[http://www.scientificamerican.com/article.cfm?id=nasa-spacecraft-enters&WT.mc\\_id=SA\\_CAT\\_SP\\_20110718](http://www.scientificamerican.com/article.cfm?id=nasa-spacecraft-enters&WT.mc_id=SA_CAT_SP_20110718)

[http://science.nasa.gov/science-news/science-at-nasa/2011/01aug\\_smoothmove/](http://science.nasa.gov/science-news/science-at-nasa/2011/01aug_smoothmove/)

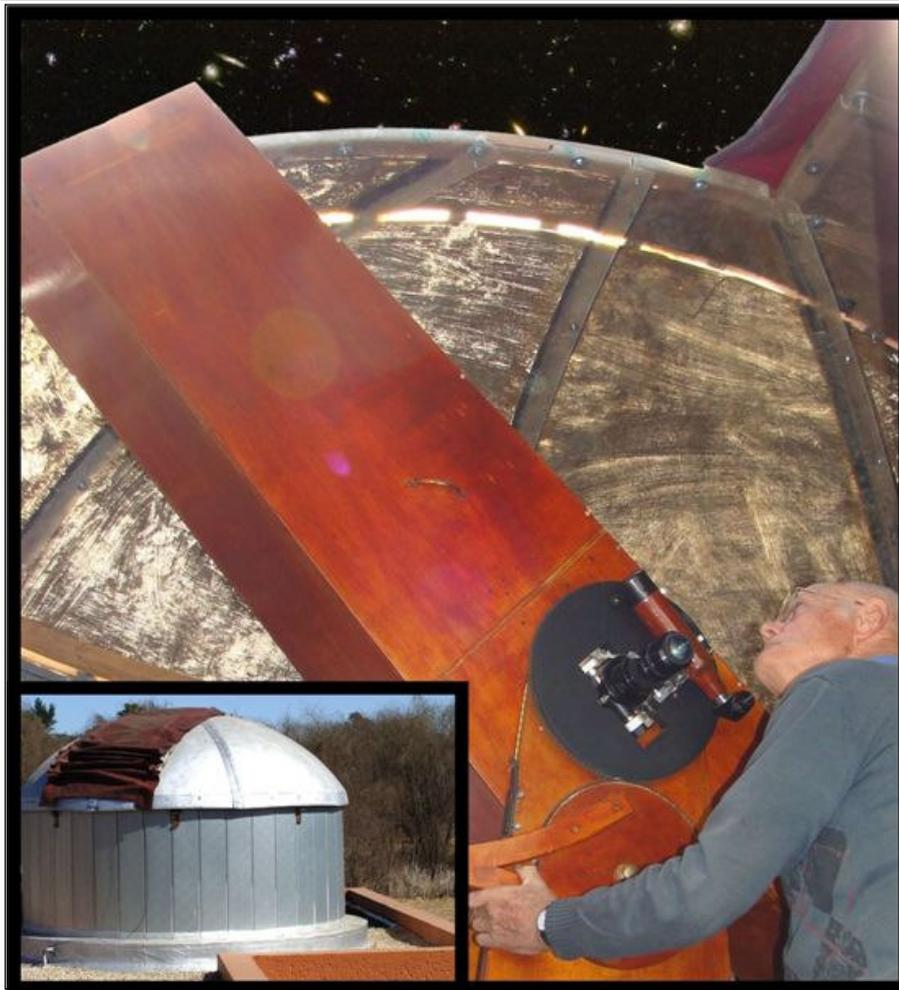
## Comet McNaught

This beautiful photograph shows Table Mountain on the left with the Twelve Apostles in shadow to its right and behind it, and Lion's Head in the middle foreground. Comet McNaught is visible to the right of Lion's Head. Photograph taken on 20 January 2007 at 21h15. Photographer unknown. Photograph sent in by Dr Adam Viljoen, one of our members.



## News items

- **The flames of Betelgeuse.** A new image reveals a vast nebula around the famous red supergiant star. <http://www.astronomy.com/en/News-Observing/News/2011/06/The%20flames%20of%20Betelgeuse.aspx>
- **Exploding stars can make good dust factories.** ESA's Herschel space observatory has discovered that titanic stellar explosions can be excellent dust factories. In space, the dust mixes with gas to become the raw material for new stars, planets and, ultimately, life. [http://www.esa.int/esaSC/SEMZT27TLP index\\_0.html](http://www.esa.int/esaSC/SEMZT27TLP index_0.html)
- **Strange star cluster in a class of its own.** Star cluster NGC 6791 shares characteristics of both open clusters and globular clusters, making it a strange sort of hybrid. <http://www.livescience.com/14499-strange-star-cluster-class.html>
- **Smells like the beach.** If there is anything that is predictable about planetary science, it is the unpredictability. One of the best examples of this trait has been the remarkable story of Saturn's moon Enceladus. <http://blogs.scientificamerican.com/life-unbounded/2011/07/08/smells-like-the-beach/?CFID=205568722&CFTOKEN=97395192>
- **Deep magma ocean fuels hundreds of volcanoes on Jupiter moon.** There is a deep ocean of magma lurking beneath the crust of Jupiter's moon Io, a new study says. <http://news.nationalgeographic.com/news/2011/05/110513-jupiter-moon-magma-ocean-io-galileo-space-science/>
- **New moon found at Pluto.** This is moon number 4. [http://www.esa.int/esaSC/SEMNGVCT5QG index\\_0.html](http://www.esa.int/esaSC/SEMNGVCT5QG index_0.html)
- **New uses for International Space Station.** For more than a decade, the International Space Station has been a busy orbiting research laboratory. But it could soon take on a new role as a test bed for ambitious missions deeper into space. [http://www.esa.int/esaCP/SEMMXJFTFQG index\\_0.html](http://www.esa.int/esaCP/SEMMXJFTFQG index_0.html)
- **M107 - A swarm of ancient stars.** The globular cluster M 107, aka NGC 6171, has undergone intensive observations. It is a compact and ancient family of stars that lies about 21 000 light-years away in the constellation of Ophiuchus. <http://www.sciencecentric.com/news/10120803-a-swarm-ancient-stars.html>



### New book - by Neville Young

This composite photograph shows Fred Oosthuizen with the Stevick-Paul telescope that he built and mounted inside his observatory on the roof of his house. The photograph is being included in Neville Young's book "Astronomy - Yes You Can" which will reach the bookshops in March next year. Neville is a former chairman of the Pretoria Centre and is still a member of it. The book is also being translated into Afrikaans by Bosman Olivier, a committee member of the Pretoria Centre. The book is intended to interest the layman in astronomy particularly and in science generally, but has been received with great interest by the experienced amateur Michael Poll and the professional Barbara Cunow, who are helping Neville to ensure that the content of the book will be accurate.

### Registering your green laser pointer: HOW TO DO IT - by Percy Jacobs

#### Application Form "[SBLN-1](#)"

Application for licence to use a non-medical laser

#### Web Address for Application Form

<http://www.doh.gov.za/departement/radiation/licensing.html>

or download it from the website of the Pretoria Centre of the ASSA

**Fax completed application forms to fax number 021 946 1589**

**ASSA or Pretoria Centre of ASSA Membership Confirmation Letter**

**Under Section "C: Details of Electronic Product"**

#### Example if you have all the details:

Brand and Model Name : LISHEN – LSDP-G-12 – Green Laser Pointer – 20MW  
 Product Serial Number : 604622  
 Manufacturer : LISHEN  
 Supplier in South Africa : Eridanus Optics – Andrie van der Linde  
 Product Sales Licence No. : 893/13701

#### Example if you don't have all the details:

Brand and Model Name : Unknown - Green Laser Pointer – 20MW  
 Product Serial Number : Maybe written on laser or just say unknown  
 Manufacturer : Unknown  
 Supplier in South Africa : Eridanus Optics – Andrie van der Linde – Tele No. -----  
 Product Sales Licence No. : Unknown – was not provided by seller

**NB: ONLY REGISTER YOUR GREEN LASERS THAT HAVE POWER > 5mW**

**The Earth - moon system**

A double planet? From 7.2 million kilometers away on December 16, 1992, NASA's robot spacecraft Galileo took this picture of the Earth-moon system. The bright, sunlit half of the Earth contrasts strongly with the darker subdued colours of the moon. Our moon is one of the largest moons in the solar system. It is even larger than the dwarf planet Pluto. In this picture, the Earth-moon system actually appears to be a double planet. The ratio: mass of moon/mass of planet is 1/81 for the Earth-moon system, which is the largest known such ratio in the solar system.



**Pretoria Centre committee**

Chairman	Johan Smit	072 806 2939 [ Mobile ]	
Vice Chairman	Danie Barnardo	084 588 6668 [ Mobile ]	
Secretary	Tony Viljoen	072 247 6648 [ Mobile ]	012 654 5783 [ H ]
Newsletter Editor	Pierre Lourens	072 207 1403 [ Mobile ]	012 654 6366 [ H ]
Treasurer and Membership Secretary	Rynhardt van Rooyen	082 325 8745 [ Mobile ]	
Member	Michael Poll	074 473 4785 [ Mobile ]	
Librarian	Danie Barnardo	084 588 6668 [ Mobile ]	
Curator of Instruments	Johan Smit	072 806 2939 [ Mobile ]	
Public Relations Officer	Fred Oosthuizen	072 373 2865 [ Mobile ]	
Observing Director	Percy Jacobs	082 498 4680 [ Mobile ]	
Member	Bosman Olivier	083 883 1869 [ Mobile ]	
Member	Pat Kühn	082 895 5686 [ Mobile ]	
Member	Johan Hartmann	083 276 1323 [ Mobile ]	
Member	Hubrecht Ribbens	082 448 0633 [ Mobile ]	

