



The **PRETORIA CENTRE**

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER OCTOBER 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 26 October at 19h15.

Programme:

- **Beginner's Corner:** "Introduction to spectroscopy" by Tom Field.
(See bottom of page 10 of this newsletter.)
- **What's Up?** by Danie Barnardo.
- 10 minute break — library will be open.
- **Main talk:** "Destination Moon" by Patricia Skelton.
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Pat Kühn.

Next observing evening: Friday 21 October 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.

CONTENTS OF THIS NEWSLETTER

Chairman's report of last month's meeting	2
Solar eclipse series	2
Last month's observing evening	3
The Crab Nebula viewing season is almost upon us	4
Photographing the Moon's parallax	5
Summary of "What's Up?" to be presented on 26 October	6
For the Pretoria ASSA Deep Sky Observers (or any observer)	7
Feature of the month: Comet Elenin	8
News items	9
Basics: The blink comparator	10
Note about "Beginner's Corner" on 26 October	10
Arp 273 - two interacting galaxies	11
Pretoria Centre committee	11

Chairman's report of last month's meeting

Beginner's corner featured a fascinating presentation which amounted to an exposition of astronomical sleuthing by James Thomas. A few months ago Neville Young posed a riddle regarding a photo of three hikers on a mountain. He wanted to know where and when the photo was taken. James rose to the challenge and answered the question through the clever use of astronomical software and Google maps. He even offered information on the weather and temperature at the time the photo was taken. He used Starry Nights to determine the time and date of a full moon during which the moon passed through Sagittarius. By stepping back in time, he could determine that the photo was taken in 2010 in June at around 22:00. The temperature at the time was 7°C. Google maps confirmed that the picture was taken on a footpath on Lions Head on Table Mountain in Cape Town.

Neville confirmed that the photo was in fact taken on the date James determined and that his timing was within 30 minutes, as confirmed by the photographer when Neville spoke to him. This just might be the first steps in a new field of forensic science called Forensic Astronomy!

The second presentation was by Percy Jacobs who did "What's Up?" for October. He also encouraged members to participate in the ASSA 100 programme when he presented the results of the observers at that stage.

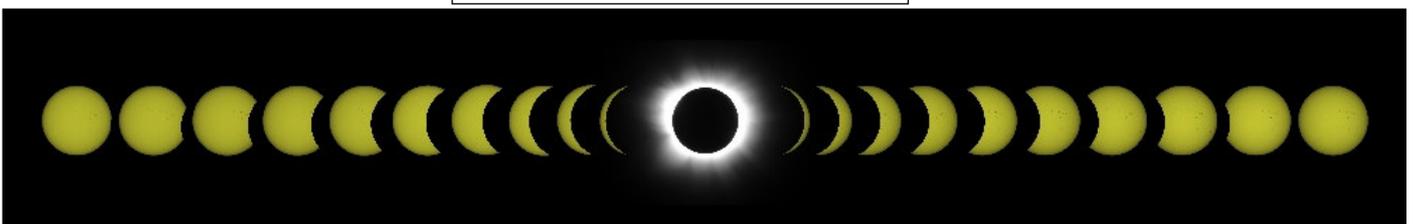
The main lecture was presented by Dr Hubrecht Ribbens, a well known member of the branch and regular presenter of the results of his study of astronomy. He presented a talk on "New developments – solar system objects". In his presentation he covered some of the work done by planetologists (planetary scientists) and astrobiologists. Questions they ask include:

- ◆ How did Earth, moon & solar system evolve?
- ◆ Where are we in the Universe?
- ◆ Where are we going and what's our ultimate fate?
- ◆ Where did life come from?
- ◆ Are we alone in the Universe?
- ◆ Are there other life forms apart from current carbon cycle/phosphate based view?
- ◆ What is a hospitable environment for life?
- ◆ Is water or sunlight essential to life?

The last 50 years marks the Golden Age of Exploration of the Solar System. New findings on the inner planets, asteroid belt, outer planets and beyond are streaming in almost on a daily basis. Probes are showing us fascinating images of new objects that we could not see in high resolution or only see very dimly up to now, e.g. Mercury, Vesta, etc.

Many satellites have given us insight into the workings of the solar system. Some are still on their way to their destinations (e.g. New Horizons to Pluto and Kuiper Belt in 2014) and new ones are to be launched. This will substantially increase our already extensive knowledge base of the solar system. Interesting times lie ahead – in the next five years many fundamental changes could be happening to our thinking and long held concepts of planets/dwarf planets and many other phenomena in the Solar System. We might also be able to make a breakthrough regarding the issue of possible life (current or past) elsewhere in the solar system. Another interesting question – did Earth once had two moons or not? He covered some of these concepts and findings in the hour-long lecture.

Solar eclipse series



Last month's observing evening - by Michael Poll

Murky. The sky was very murky with mostly moisture but some dust and cloud. At times we could only just see Vega with the naked eye – even though it is the fifth brightest star in the sky. Nevertheless, there were nine telescopes and 30 or more people present, including members and visitors. We were pleased to welcome Michael Neale amongst the visitors. Michael Neale was one of the speakers at our 2010 symposium, and he and some of his friends joined us. His group was the last to leave after helping Johan set up the 12 inch and afterwards helped with closing up the dome.

In spite of the sky conditions, we looked at a surprising number of objects and had some interesting discussions. First off for observing were three telescopic double stars – Alpha Centauri, Beta Cygni (Albireo) and Epsilon Lyrae (the “Double Double”).

Alpha Centauri can still just about be seen as two in a six inch telescope, it will be interesting to see how much more difficult it will be to split them in the next viewing season, (next year) as time moves on to their 2015 close approach. (As viewed from Earth, they will widen after 2015, and continue separating until 2029. Thereafter they will start closing again to their apparent closest, which occurs in November 2037. Periastron is in 2035). Beta Cygni was as pretty as ever, and people who had not seen it before were asked what colours they could see. The first split of Epsilon Lyrae was, as usual, easily made. Some were encouraged to look at it through binoculars. It was explained that the star was at one corner of a smallish equilateral triangle which includes Vega, and people were able to find it with binoculars, and see it as two. In the telescopes, considering the conditions, it took Percy's 10 inch for us to just about see the second split of the brighter star, but the second split of the fainter star was harder to make. We think we did it!

Also in this part of the sky, roughly between Albireo and Altair, is the Coathanger Cluster which almost fits in to the low power field of Michael's telescope. This chance alignment of stars of varying distances was appropriately admired.

Some naked eye viewing in the north part of the sky drew the attention of newcomers and some old comers to the (northern hemisphere) “Summer Triangle” which comprises Vega, Altair and Deneb (Alpha Cygni). Deneb was quite low down, and not seen at its best, but the outline of the Northern Cross, an asterism in the constellation of Cygnus (the Swan) was shown.

The eastern sky was somewhat devoid of bright objects, as it is at this time of year, with the sky conditions making it worse – we tried to see the Square of Pegasus in the north east, but to no avail.

Some people were advised to get a copy of the Skymaps download, but the advisor was beaten to it - Percy had already thoughtfully handed some out! We had a session of revising and reviewing how to use the chart, and for people who had not seen them before, we located the stars Fomalhaut (Alpha Piscis Austrinus), and Alpha Pavonis in Pavo (the Peacock), and the constellation of Grus (the Crane). Also pointed out in Grus were the distinct differences in colour between Alpha Gruis (blue) and Beta Gruis (red), and we looked at the two naked eye doubles, Delta Gruis and Mu Gruis. As it was, these two doubles could not be seen with the naked eye on this evening, but a number of people saw them through binoculars.

It seemed that that was about it, but then it was realised that the tail of Scorpius was still quite high in the west. We looked at Messier 7 which, spite of the sky conditions elicited some appreciative comments from people who were looking at it for the first time. This view naturally led on to a discussion about open clusters (young, with 10s or maybe 100s of stars) and globular clusters (old, with 100s of thousands of stars). There was not much available to show as an example of a globular cluster (M4 was a bit low, and NGC 6752 in Pavo lost in city lights), but an easy one to locate, though not very dramatic to look at under the circumstances, was NGC 6641, a small, soft round glow near the star G Scorpii, which is itself near M7. Another nebulous area of loose stars shown was NGC 6231, near Zeta Scorpii.

A couple more double stars were also viewed – Beta and Nu Scorpii are nice ones for a small telescope. Also noted was the naked eye brightness of Delta Scorpii (the centre star in the

“head” of Scorpius). Delta had “always” been about the same brightness as the stars on each side of it (Beta and Pi) but in 2000 it suddenly brightened up and has remained bright ever since. At about 9.30 pm a little breeze sprang up, which Michael, dressed in several layers of clothes and thick jacket described as “icy”, and which Johan, dressed in a short sleeved shirt described as “nice and fresh”.

Blowing from the east, it the breeze made us call it a day, except a few people stayed to watch Jupiter rise. The atmosphere made the planet’s image boil, but we did see all four Galilean moons. Jupiter was also observed from the Centre 12 inch in the dome. As mentioned, the seeing was poor, but the two equatorial bands on the planet were seen, and as always, the view was spectacular in the 12 inch, despite the bad seeing. The Jupiter viewing season proper will be under way by next month’s Observing Evening which is October 21st.

The Crab Nebula viewing season is almost upon us - by Michael Poll

The Crab Nebula is Number One (M1) on Charles Messier’s list of nebulous objects. It is in the northern evening sky from about the beginning of November until about the end of February.

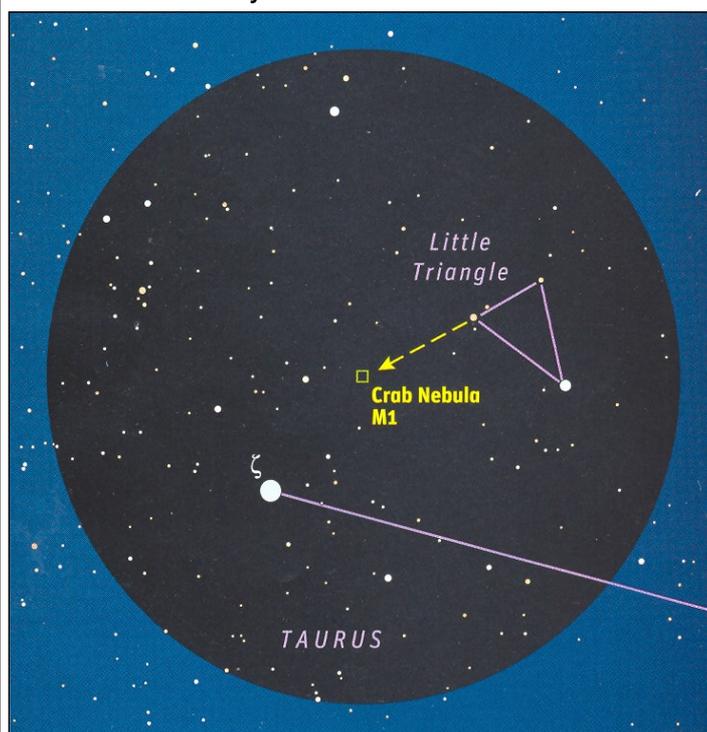
Charles Messier was a Frenchman who came to Paris in 1751 at the age of 21. He discovered 21 comets.

By chance, in August 1758, Messier found a small object, which he described as: *“nebulousity above the southern horn of Taurus, not containing any star. It is a whitish light, elongated like the flame of a taper, discovered while observing the comet of 1758this light was a little like that of a comet I had observed before, however it was too bright, too white, and too elongated to be a comet”*.

Later, Messier became serious about making a list of such nebulous objects, saying *“I endeavoured to find others so that astronomers would not confuse these same nebulae with comets just beginning to shine”*.

Although Messier discovered the Crab Nebula independently, he learned later that the object had been discovered in 1731 by the Englishman John Bevis. Bevis informed Messier of his own discovery in a letter written to Messier on June 10th 1771. Messier acknowledged this original discovery in the later publications of his catalogue.

The nebula was named “The Crab” because it had the appearance of a crab’s claw in a drawing done by Lord Rosse in 1848. Rosse noted that it had “ branches streaming off from the oval boundary like claws”.



The Crab Nebula is the remnant of a supernova that exploded in 1054. The original explosion was recorded in China, where it was stated to have been visible in daylight for more than three weeks. No one in Europe knew about this supernova until 1846, when records were found in Chinese annals.

In 1921, the American, John Duncan, found that the nebula was expanding and he noted that the speed of expansion implied an explosion 900 years previously. It was Edwin Hubble, in 1928, who suggested that the nebula was the remains of the Chinese supernova of 1054. The nebula is 6 300 light years away.

The attached finder chart is taken from Sky and Telescope, February 2007, page 52. The Nebula is in the constellation of Taurus, and the bright star in the field, Zeta (ζ) Tauri, is the star that Messier described as “the southern horn of Taurus”.

**Photographing the Moon's parallax
by Barbara Cunow**

**Pretoria Centre of the Astronomical Society of Southern Africa, South Africa
Sternwarte Riesa, Germany
Barbara.Cunow@gmail.com**

The total eclipse of the Moon on June 15, 2011 was a great opportunity to document the lunar parallax. During totality, the Moon is faint enough to allow taking pictures where both the Moon and the background stars are visible. When two pictures taken at the same time at two different locations are combined by matching the star patterns, the resulting image shows the background star field and two images of the Moon at different positions relative to the stars.

On June 15, totality started at 21.22 SAST and ended at 23.03 SAST, hence the eclipse was visible from Africa and Europe. We decided that this was an excellent opportunity set up an international collaboration to try to record the lunar parallax between South Africa and Germany. Members of the Pretoria Centre of the Astronomical Society of Southern Africa and of the Sternwarte Riesa in Germany were contacted for a project to photograph the totally eclipsed Moon and the background stars.

During the whole event, the Moon was high in the sky for South Africa. For Germany however, the Moon only rose at the beginning of totality, and the eclipsed Moon was always close to the horizon. Therefore, it was decided to photograph the Moon during the last part of totality, when the Moon was highest for the observers in Riesa. The times for photographing the Moon were set at 22.30 SAST, 22.40 SAST, 22.50 SAST and 23.00 SAST.

During the eclipse, the skies were clear in Pretoria, and the totally eclipsed Moon could be seen very nicely in front of the central regions of the Milky Way. Unfortunately, the weather was cloudy in Riesa, but a few gaps in the clouds allowed some observations at the end of totality. Both in Riesa and in Pretoria, teams of enthusiastic observers took pictures of the Moon, and we were able to obtain images at both sites for 23.00 SAST. Table 1 lists the observers who contributed pictures for this project.

Table 1. Observers contributing images of the Moon

Observing site	Observer
Riesa, Germany	Christian Bartzsch
“	Lisa Glagowski
“	Michael Nietzsche
“	Stefan Schwager
Pretoria, South Africa	Barbara Cunow
“	Percy Jacobs
“	Pat Kühn
“	Neville Young

Figure 1 shows the lunar parallax between Riesa and Pretoria at 23.00 SAST. The picture is a combination of an image taken in Pretoria and one obtained in Riesa. It shows the eclipsed Moon with the starry background. North is up and east is to the left. The northern Moon is the one seen from South Africa, the southern Moon is the one observed from Germany. The parallax of the Moon is clearly visible - the two Moons are 1.7 Moon diameters apart.

Our results demonstrate how large the lunar parallax is between South Africa and Germany and how easy it is to record it during a total lunar eclipse. A project like this is an excellent opportunity for an international collaboration between amateur astronomers and to show the general public how the skies at different observing sites differ apart from the effects due to different latitudes.



Figure 1. Parallax of the Moon between Pretoria and Riesa at 23.00 SAST. The image is a combination of two images, one taken by S. Schwager and the other one by B. Cunow.

This project was not our first attempt to record the parallax of the Moon. During the total lunar eclipse at October 27/28, 2004, we were able to photograph the parallax between South Africa and Canada. Our pictures show a parallax of 3.3 Moon diameters between Pretoria/Johannesburg and Edmonton/Calgary, which is one of the largest parallaxes (perhaps even the largest parallax) ever recorded from the Earth's surface. Figure 2 shows the large parallax we could record between Pretoria

and Calgary. The results were published in Cunow B., Monthly Notes of the Astronomical Society of Southern Africa, 2005, vol. 64, nos. 1&2, p. 9.

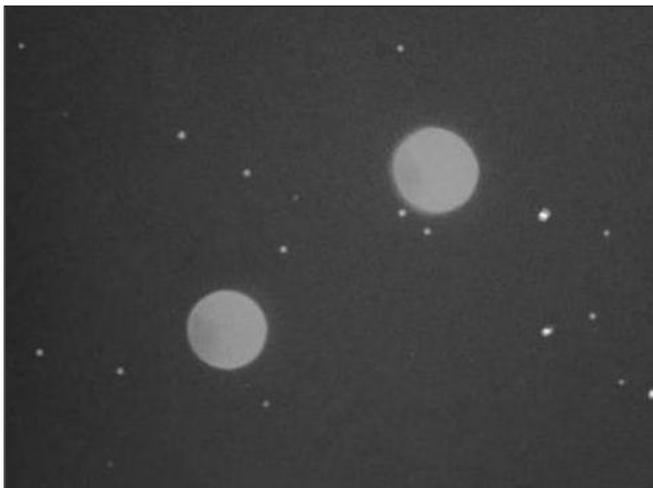


Figure 2. Parallax of the Moon on October 28, 2004 between Pretoria and Calgary. The image is a combination of two images obtained at 4.25 SAST, the one in Calgary taken by L. McNish, the one in Pretoria by B. Cunow. North is up and East is to the left.

I would like to thank everyone who participated in this project. Furthermore I would like to thank the members of the Sternwarte Riesa for making me an honorary member of the Sternwarte Riesa in 2009. More information about the project including images from all the participants can be found at the websites of the Pretoria Centre of the

Astronomical Society of Southern Africa at www.pretoria-astronomy.co.za and of the Sternfreunde Riesa at www.sternenfreunde-riesa.de and the Sternwarte Riesa at www.sternwarte-riesa.de. An article about this project will be published in MNASSA. Finally it should be noted that in June South Africa and Germany use the same local time: South African Standard Time SAST and Mitteleuropäische Sommerzeit MESZ are identical.

Summary of "What's Up?" to be presented on 26 October - by Danie Barnardo

Phases of the Moon

- First Quarter – 2 November
- Full Moon – 10 November
- Last Quarter – 18 November
- New Moon – 25 November

Best observing time is at the end of the month from about 20 to 27 November (our viewing evening is on 18 November).

Planets & Solar System

- Mercury:** (mag -1.7 to -0.3) is visible for about an hour after sunset on the 1st to about the middle of the month, close to
- Venus:** (mag -3.9) in Scorpius low in the east. A rare opportunity to view these two planets early in the evening
- Mars:** (mag 1.1) is visible in Leo from about 01:00 till sunrise and rises steadily earlier
- Jupiter:** (mag -2.9) is visible all night in Cetus, setting just before sunrise at month end

Saturn: (mag 0.7) rises just before sunrise and is visible for about an hour

Uranus: (mag 5.8) is visible all night in Pices and sets about an hout before surise

Neptune: (mag 7.9) is visible in Aquarius and sets just after midnight

Taurids meteor shower: (north on 5 November and south on 11 November) is spoilt by a waxing gibbous Moon

Leonids meteor shower: peaking on 17 November is normally very productive, but is spoilt by a waning Moon before midnight

Constellations visible in November

As **Scorpius** and **Sagittarius** sets in the west, the summer constellations of **Orion**, **Canis Major** and **Taurus** rises in the east. **Pegasus**, **Phoenix**, **Eridanus**, **Cetus**, **Fornax**, **Perseus**, **Reticulum** and **Tucana** are some of the other constellations visible in November, while **Crux** is low in the south. The Sculptor galaxy in the constellation of **Sculptor** is high in the sky, while it is probably the best time to spot the Andromeda galaxy in **Andromeda**, low in the northern sky.

Highlights in November

7 November @ 20:00: Venus 2° north of Mercury and Arcturus

19 November @ 04:00: Regulus and Mars 5.1° north of a 45% moon

22 November @ 04:00: Spica and Saturn 8.1° east of a 14% moon

26 November @ 19:40: Mercury 4.4° west of an 8% moon with Venus

27 November @ 19:30: Venus 7° west of an 8% moon with Mercury.

**For the Pretoria ASSA Deep Sky Observers (or any observer)
How to analyze and record what you are observing
What to fill in on the "Observing Log Sheet"
by Percy Jacobs**

Open Clusters

- (a) Relation to the surrounding field stars.
- (b) How many stars are there?
- (c) Range of brightness / magnitudes.
- (d) How are the stars concentrated?
- (e) Look for prominent empty spaces.
- (f) Are there clumps/chains of stars?
- (g) Glow of unresolved stars/nebulosity?
- (h) Central / prominent individual stars?
- (i) Any striking double stars resolved?
- (j) Stars with a particular colour?

Globular Clusters

- (a) Are individual stars seen? (unresolved – granular – partially resolved – well resolved).
- (b) How are the stars concentrated towards the nucleus?
- (c) Estimate the size of the nucleus (compare with the size of the halo).
- (d) Look for prominent empty spaces / starless patches.
- (e) Any clumps/chains of stars?

Galaxies

- (a) Galactic nucleus shape/brightness?
- (b) Are there stars very near by, or within the galaxy?
- (c) Are there darker areas within galaxy?
- (d) Any areas of uneven brightness?

Planetary Nebulae

- (a) Is a disk seen?
- (b) Edge sharply defined?
- (c) Colour of the nebula?
- (d) Central star visible?

Dark Nebulae

- (a) How well does the nebula stand out.
- (b) Is it isolated, or part of larger complex?
- (c) How dark is it?
- (d) Are the edges sharp or diffuse?
- (e) Stars superimposed on the nebula?

Bright Nebulae

- (a) Are there areas of uneven brightness?
- (b) Dark lanes/patches?
- (c) Any other structure.

Please follow the above when completing Observation Log Sheets and submitting

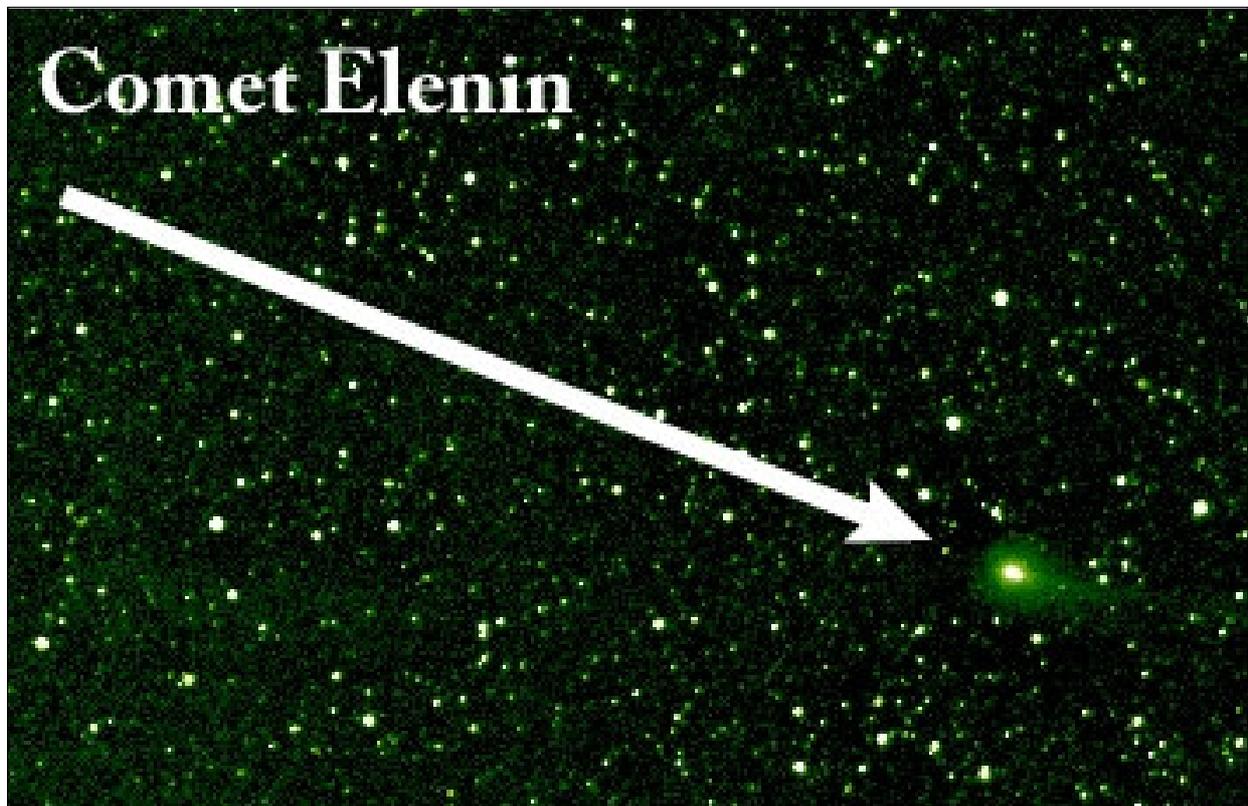
Feature of the month: Comet Elenin

Comet C/2010 X1, aka comet Elenin, has attracted an extraordinary amount of attention. E.g., the keywords "**Comet Elenin**" with the Google search engine on a computer yields **7.37 million** web links. Fantastic claims are to be found on the Internet about Comet Elenin, such as:

- The alignment of the comet with planets causes earthquakes.
<http://www.ufo-blogger.com/2011/04/nasa-elenin-2011-comet-planetary.html>
- Comet Elenin has a massive UFO fleet following in formation in its tail.
http://www.youtube.com/watch?v=MZfy4a_T2oo
- Comet Elenin is actually a brown dwarf with mass 2.5 times that of Jupiter. It is named Nibiru. Nibiru will cause damage and death as it comes close to Earth. NASA is misleading the world by making everyone believe that Nibiru is a comet.
<http://www.thetrueawakening.com/2011/03/comet-elenin-misnamed-on-purpose-nibiru.html>
<http://jimmyprophet.wordpress.com/2011/03/01/the-planet-xnibiruelenin-brown-dwarf-event-timeline-2011/>
- Comets Honda and Elenin fulfill Mayan, Hopi and Christian prophecies.
<http://alamongordo.com/prophecies-predictions/comets-honda-elenin-fulfill-several-prophecies/>
- Much more. See "*RECENT NEWS*" on the website at <http://alamongordo.com/>

But let's have some sober science on the topic.

- ♦ <http://news.discovery.com/space/comet-elenin-wont-kill-us-says-nasa-110817.html>
- ♦ Animation, overhead view and plot of comet Elenin's path in the sky (as seen from Earth).
<http://www.curtrenz.com/comets>
- ♦ There is evidence that the comet is falling apart.
http://www.msnbc.msn.com/id/44626837/ns/technology_and_science-space/



Comet Elenin as seen by NASA's STEREO spacecraft on 6 August 2011.

News items

- **Spacecraft sees solar storm engulf Earth.** For the first time, a spacecraft far from Earth has turned and watched a solar storm engulf our planet. A movie was made of it. Solar physicists say it could lead to important advances in space weather forecasting.
http://science.nasa.gov/science-news/science-at-nasa/2011/18aug_cmemoie/
- **Black hole hosts Universe's most massive water cloud.** In a galaxy 12 billion light-years away resides the most distant and most massive cloud of water yet seen in the Universe. The giant cloud of mist swaddles a type of actively feeding super massive black hole known as a quasar. <http://news.nationalgeographic.com/news/2011/07/110726-most-massive-water-cloud-quasar-black-hole-space-science/>
- **Dead galaxy? Don't think so.** Astronomers examined old galaxies and were surprised to discover that they are still making new stars. The results provide insights into how galaxies evolve with time. <http://www.universetoday.com/86095/dead-galaxy-dont-think-so/>
- **Planet formation in action?** An international team of astronomers has been able to study the short-lived disc of material around a young star that is in the early stages of making a planetary system. For the first time a smaller companion could be detected that may be the cause of the large gap found in the disc.
<http://www.sciencecentric.com/news/11022429-planet-formation-action.html>
- **Large flares from small stars.** M-dwarfs (red dwarf stars) are plentiful in our galaxy. But life around M-dwarfs may not be easy, because the habitable zones for planets around M-dwarfs are closer to the stars than the distance of the Earth from the Sun, and M-dwarfs have much more powerful flares than Sun-like stars.
<http://news.discovery.com/space/large-flares-from-small-stars.html>
- **Planet made of diamond?** The discovery of a small fast spinning star known as a pulsar has led astronomers to detect a planet orbiting around it. The planet is likely made of diamond.
<http://www.abc.net.au/science/articles/2011/08/26/3302280.htm>
- **Huge explosion most distant ever seen.** A new record for the most distant object ever observed - 13.14 billion light years way. It means the Universe was just 520 million years old when this massive burst of gamma rays erupted from a supernova explosion.
<http://www.abc.net.au/science/articles/2011/05/26/3226848.htm>
- **Vampire stars.** These stars may steal from other stars, resulting in a strangely youthful appearance. Found in the heart of the Galaxy, these "blue stragglers" have been spotted elsewhere in the Galaxy. They seem to lag in age next to other stars with which they formed, appearing hotter, and thus younger and bluer. <http://news.nationalgeographic.com/news/2011/06/110609-vampires-stars-cannibals-galaxy-space-science/>
- **Giant black holes found at dawn of the Universe.** New look at X-ray data reveals monsters at hearts of first galaxies. <http://news.nationalgeographic.com/news/2011/06/110615-black-holes-first-galaxies-early-universe-space-science/>

Asteroids

- **Asteroids cook up ingredients of life.** A set of pristine meteorites has provided fresh support for the notion that the chemical ingredients of life came from outer space.
<http://www.abc.net.au/science/articles/2011/06/10/3239563.htm>
- **NASA plans to visit an NEA.** The OSIRIS-REx spacecraft, targeted for launch in September 2016, will intercept the near Earth asteroid (NEA) 1999 RQ36. It will orbit the NEA for a year, gather samples and propel the sample capsule back to Earth.
http://science.nasa.gov/science-news/science-at-nasa/2011/16aug_osirisrex/
- **Exploring an asteroid with the Desert RATS.** Training for exploration of an asteroid.
http://www.esa.int/esaCP/SEMKCN3UNSG_index_0.html

Basics: The blink comparator

The blink comparator (aka blink microscope), was an instrument that enabled two photographs of the same part of the sky, taken at different times, to be compared in a way that drew attention to any differences between them. The comparator had two optical paths so that the images of the two photographic plates could be seen together in one viewing eyepiece. By careful adjustment of the position of the plates, the separate imaged were brought into exact coincidence. The plates were then alternately illuminated, changing from one to the other about once a second. All features that were identical on both plates appeared unchanging in the alternating illumination, but any object that was on only one of the two plates was seen to blink on and off. Also, an object that changed its position between the times of exposure of the two plates was seen to jump to and fro, and an object that changed its brightness appeared to pulsate at the illumination frequency.

The eye is very effective at detecting the few varying objects among what could be tens of thousands of star images on a long exposure photograph. This simple technique made possible the discovery of stars of large proper motion, minor planets, comets and variable stars, without the need to compare individually every star image on two photographs of the same part of the sky, taken at different times.

Some of the discoveries made with the blink comparator are:

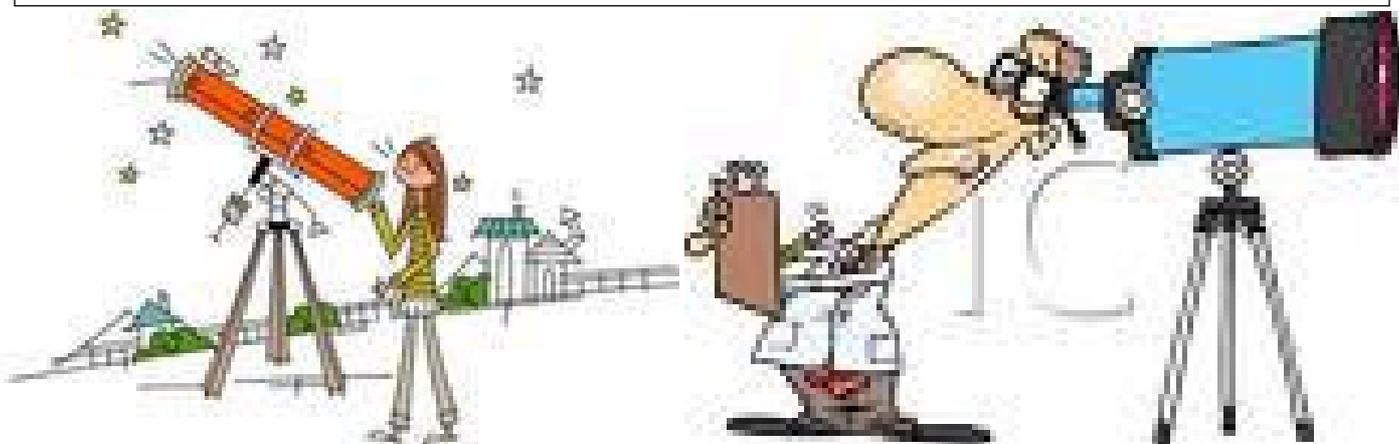
- ◆ The discovery of the dwarf planet Pluto by Clyde Tombaugh at Lowell Observatory in 1930.
- ◆ The catalogue of over 100 000 stars brighter than magnitude 14.5 with detectable proper motion, produced by W J Luyten. It is a monumental work.
- ◆ The discovery, at various observatories around the world, of nearly 30 000 variable stars.

You will note that the paragraphs above are written in the past tense: the blink comparator has become a museum piece. In modern times, CCD's have largely replaced photographic plates and astronomical images recorded by CCD's are stored digitally on computers. The blinking technique can easily be performed on a computer screen rather than with a physical blink comparator apparatus as before. You can do it yourself on your PC. <http://www.instructables.com/id/Blink-Comparator-on-Personal-Computer/>

There are even more modern replacements for doing what the blink comparator had done in the past. http://en.wikipedia.org/wiki/Blink_comparator

Below left: Barbara Cunow making observations of the moon.

Below right: Percy Jacobs, as happy as a hobo locked in a wine cellar, peering through a telescope with one eye and looking at his clipboard with the other while recording his observations.



Note about “Beginner’s Corner” on 26 October

For the first time ever at any ASSA meeting, an on-line speaker, live from America. Tom Field is the author of real time spectroscopy software that is used by amateurs to analyze spectra. <http://www.rspec-astro.com/>



Arp 273 - two interacting galaxies

http://www.scientificamerican.com/gallery_directory.cfm?photo_id=7ECDACAC-D100-2BB7-FADC6A89FE064FBB

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]	