



The **PRETORIA CENTRE**

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER NOVEMBER 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 23 November at 19h15.

Programme:

- **Beginner's Corner:** "The stars: a look at their birth, life and death" by Michael Poll.
- **What's Up:** by Johan Smit.
- 10 minute break — library will be open.
- **Main talk:** "Astrophotography" by Barbara Cunow.
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Danie Barnardo.

Next observing evening

Friday 18 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.

CONTENTS OF THIS NEWSLETTER

Last month's meeting	2
Last month's observing evening	3
Tidbits	3
What's up in the sky in December 2011 and January 2012? Summary of coming presentation "What's Up" to be given on 23 November	4
Photographs taken at last month's meeting	6
News items	7
Feature of the month: Arp 220	8
Basics: The zodiacal light and the Gegenschein	9
Black Eye galaxy	10
Pretoria Centre committee	10

The programme for the October meeting was somewhat different to the usual format, with “Beginners corner” and “What’s Up” conspicuous by their absence. In their place we had a double bill of two “main” talks. The “Whats Up” summary for November did appear in the October newsletter as usual though. Before the main proceedings began, one important piece of business was conducted. This was the presentation of the annual Jack Bennett Award, which was this year presented to Danie Barnado for his unfailing efforts and substantial contribution on behalf of the Pretoria Centre. The citation, read out by centre Chairman Johan Smit, highlighted Danie’s work in connection with the library, our website and various outreach events.

The first speaker provided an “historical first” in the sense that this was an on-line event. Tom Fields, author of the RSpec spectroscopy analysis software, delivered a fascinating talk entitled “An Introduction to Spectroscopy”. He spoke to us live from Seattle in Washington over the internet. We had the pleasure of seeing Tom on live video as well as following his excellent slide presentation. Tom is clearly passionate about his subject and is very active in this branch of astronomy. His recent interview with Sky & Telescope can be viewed as a video on Tom’s website: www.rspect-astro.com/

Tom briefly covered the history of spectroscopy starting with Fraunhofer and Bunsen in the 19th century and went on to explain the basic physics and chemistry which apply to this subject. It was interesting to learn that interesting and useful results can be obtained with very basic equipment, even in urban environments. The key item to get started is a diffraction grating that looks like a standard 2” or 1.25” filter and screws into an eyepiece or camera adapter. Imaging hardware can range from a simple webcam through DSLR cameras to more sophisticated CCD imaging devices. Once the spectral image of the star or other object has been acquired, it is imported into the RSpec software, where some clever processing takes place to produce a truly impressive spectrum as well as an annotated luminance curve with a detailed analysis of absorption and emission lines. Anyone interested in trying their hand at spectroscopy would do well to visit Tom’s website at the address above, where a great deal of useful information, diagrams and trial software together with practical examples are available.

The second talk was delivered by Patricia Skelton, a Ph.D. student and lecturer at UNISA. Patricia’s presentation was entitled “Destination Moon”, which took the audience on a nostalgic (and historically detailed) tour of the “Space Race” which took place in the latter part of the twentieth century and culminated in the United States landing men on the moon. Patricia began by covering the origins of the space race, with Wernher von Braun and his team of German scientists being “recruited” to work on the American rocketry and space program after the 2nd World War.

Moving on, we relived the launch of the first artificial satellite into earth orbit in 1957 (the Russian Sputnik), closely followed by the American Explorer 1 and the formation of NASA in October 1958. Next was the first human into earth orbit, achieved by Russia’s Yuri Gagarin in 1961 and America’s John Glenn in 1962.

The space race was re-defined during 1961, when American President J.F. Kennedy issued the historic Moon Challenge to land men safely on the moon by the end of 1969. This saw the establishment of the Gemini (USA) and Voskhod (Soviet) programmes, which made essential advances towards men being sent safely into space. These were followed by the Apollo and Soyuz programmes. Several tragic events occurred along the way, notably in 1967 when fatal accidents took place in both the American and Soviet programmes.

After a period of consolidation the space race advanced by leaps and bounds and the success of the American Saturn V rocket as well as other many other advances saw the USA outstrip the Soviet challenge and finally succeed with the historic manned moon landing of Apollo 11 in July 1969.

Patricia rounded off her talk with several interesting anecdotes of subsequent events and closed by soundly debunking the “We were never really there” conspiracy myth. The presentation was enhanced throughout with video clips which added nicely to the overall experience. These can all be found on Youtube, or in the multimedia section of the main NASA website.

Last month's observing evening - by Johan Smit

An early summer evening with clear skies awaited the regulars and visitors. Some of our regular attendees like Michael Poll, Danie Barnardo, Bosman Olivier and Anton Grobler were busy elsewhere. Michael did pop in for a short visit and the rest did an outreach event for a group of scouts. True to Michael's nature he first explained some interesting naked eye observations to some visitors before leaving.

Again one of the visitors brought her new scope and we quickly managed to familiarise her with the scope and soon she was able to find her own favourites. **Moral of the story: To ensure that you and your new scope start your relationships on a solid base, bring it to the observing evening so that we can help you to get to know each other.**

The viewing started with Venus low in the west showing nearly a "half-moon" crescent. This never fails to impress first time visitors and gives us a chance to explain why the inner planets show phases similar to the Moon.

Then we spent some time on Albireo in the north and the striking colour contrast of the companions resulted in another series of explanations about stellar compositions, temperatures and spectra. Despite the light pollution, the Ring Nebula was seen in the larger telescopes. Guess what? This prompted another set of explanations about stellar evolution. So, if you find the monthly meeting's talks too long and boring, come to the practical evening for some relaxed one-on-one tuition.

Last views of the winter gems (like M6 and M7) were seen. The other favourites in the north were not neglected and everyone saw the Dumbbell Nebula and we even had a go at the great galaxy in Andromeda. A distinct glow was seen by most observers, but we were jealous of our colleagues with the scouts under some nice dark skies. The coat hanger cluster was also shown to those who brought along binoculars.

Jupiter was viewed as soon as it rose above the trees, and despite the impartial nature of our observing evenings it turned into an informal comparison of views between the scopes on the field. Pat Kuhn's home-made 6 inch Dobsonian was the clear winner. Surprisingly, a 4 inch Newtonian was the runner up. We could make out the red spot in the 4 inch. To say that its owner, Ab Vonkeman was pleased, is an understatement.

This little 4 inch scope belonged to the late Louis Barendse and was restored by Johan Smit. Ab bought it from Louis' widow, Marianne, and is now the proud owner of a scope with some history behind it and some impressive optics on the side.

Johan has restored another identical telescope that also came from Louis' estate. This one is also available to anyone wishing to own a nice portable scope with above average optics and some historic significance. The proceeds of the sale will go to Louis' widow, Marianne. Contact Johan Smit if you are interested.

And on this commercial note we closed the observing evening.

Tidbits

- **Earth from space.** Aegean islands. http://www.esa.int/esaEO/SEMLH2GURTG_index_0.html
- **October 2011 issue of MNASSA.** Can be downloaded from <http://www.mnassa.org.za/>
- **An overview of the history, mythology, and current scientific knowledge of the planets, moons and other objects in our solar system.** Add to your favourites. <http://nineplanets.org/>
- **Awesome action animation depicts Russia's bold robot retriever to Mars' moon Phobos.** See also the 4th news item on page 7. <http://www.universetoday.com/90725/awesome-action-animation-depicts-russia%e2%80%99s-bold-robot-retriever-to-mars-moon-phobos/>
- **Astronomy magazine's latest special issue: 50 Weirdest Objects in the Cosmos.** <http://www.astronomy.com/en/Press%20Room/Press%20Releases/2011/10/50%20Weirdest%20Objects%20in%20the%20Cosmos.aspx>
- **Johannesburg Planetarium website.** Add to your favourites. <http://www.planetarium.co.za/>

What's up in the sky in December 2011 and January 2012? Summary of coming presentation "What's Up" to be given on 23 November - by Johan Smit

Festive (holiday) season. Instead of spending money, look at the stars. It's free (and much nicer). Start with the Moon:

New Moon is on 25 November and full Moon on 10 December.

New Moon is again on 24 December and full Moon on 9 January, with new Moon again 23 January

The best dark sky evenings are from 3 days past full Moon to 8 days before full Moon.

Now to Dec 02

Dec 13 to Jan 01

Jan 12 to End Jan

Basically, the last 2 weeks of every month.

Notice how the Moon moves around:

Nov 26 – Moon furthest South (-22.3).

Dec 06 – Moon at apogee (405 414 Km)

Dec 10 – Moon furthest North (+22.2).

Dec 22 – Moon at perigee (364 800 Km)

Dec 23– Moon furthest South (-22.3).

Jan 02 – Moon at apogee (404 579 Km)

Jan 05 – Moon furthest North (+22.2).

Jan 17 – Moon at perigee (369 882 Km)

Also see some planets move:

Nov 14 Mercury greatest eastern elongation (23° E)

Nov 24 Mercury stationary

Nov 26/27 Watch Venus/Moon/Mercury

Dec 04 Mercury inferior conjunction.

Dec 23 Mercury greatest western elongation (22° W)

Note how fast Mercury have moved from the evening side (east), to the morning (west), side of the sun.

Do not forget the other planets:

Jupiter --- Early evening. Sets at 23:12 at the end of January

Mars --- rises now after midnight to 21:18 end Jan.

Venus --- Visible after sunset in the west.

Notice how Mercury moves relative to Venus.

Saturn --- Early morning. Rises now at 04:00. Rises at 23:00 at the end of January.

Uranus and Neptune --- Early evening --- Sets now at midnight --- Challenging.

Catch up on the ASSA top 100 list:

ASSA top 100 --- how to choose

Early evening

RA 21:00 to 00:00

Numbers 98, 99, 100

Late evenings or towards end January

RA 00:00 to 06:00

Numbers 1 to 20 --- 20% of the challenge

3 Bright nebulae

8 Globular clusters

9 Galaxies

3 Planetary nebulae

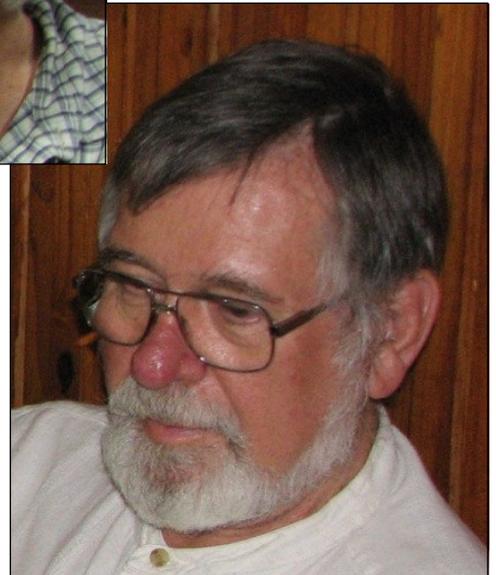
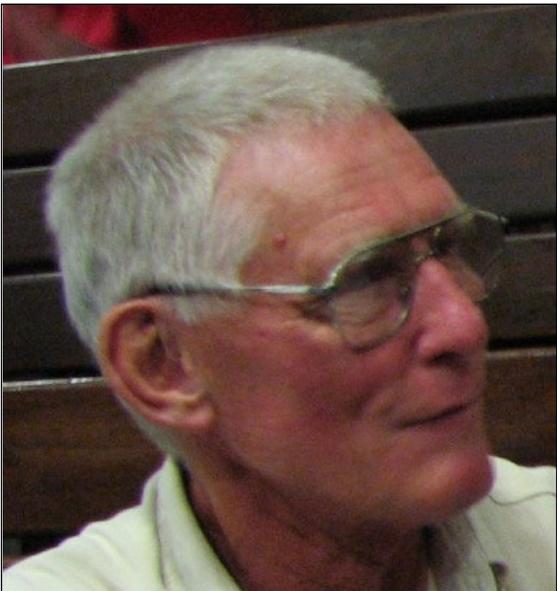
And to help you, here is the list suitable for viewing over this period:

#	Object ID	Bennett ID	Type	Size	Con	RA	Dec	Vis
1	NGC 55, LEDA 1014	Ben 1	Glxy	32'x5.6'	Scl	00 15	- 39 11	Sep-Feb
2	NGC 104, 47 Tucanae	Ben 2	Glcl	31'	Tuc	00 24	- 72 05	Sep-Feb
3	NGC 247, LEDA 2758	Ben 3	Glxy	18' x 5'	Cet	00 47	- 20 46	Sep-Feb
4	NGC 246, PN G118.8-74.7		Plnb	4' x 3.5'	Cet	00 47	- 11 53	Oct-Feb
5	NGC 253, Silver Coin	Ben 4	Glxy	22' x 6'	Scl	00 48	- 25 17	Sep-Feb
6	NGC 288, Melotte 3	Ben 5	Glcl	14'	Scl	00 53	- 26 35	Sep-Feb
7	SMC, Small Magellanic Cloud		Glxy	5° x 3°	Tuc	00 53	- 72 50	Sep-Feb
8	NGC 362, Melotte 4	Ben 7	Glcl	13'	Tuc	01 03	- 70 51	Sep-Feb
9	NGC 1068, Messier 77	Ben 9	Glxy	7.1' x 6.0'	Cet	02 43	- 00 01	Oct-Feb
10	NGC 1261, GCl 5	Ben 11	Glcl	7'	Hor	03 12	- 55 13	Oct-Apr
11	NGC 1291, LEDA 12209	Ben 12	Glxy	11'	Eri	03 17	- 41 08	Nov-Mar
12	NGC 1316, Fornax A	Ben 14	Glxy	12' x 8.5'	For	03 23	- 37 12	Oct-Mar
13	NGC 1365, LEDA 13179	Ben 16	Glxy	9' x 4'	For	03 34	- 36 08	Oct-Mar
14	NGC 1535, PN G206.4-40.5	Ben 22	Plnb	20" x 17"	Eri	04 14	- 12 44	Nov-Mar
15	NGC 1851, GCl 9	Ben 32	Glcl	11'	Col	05 14	- 40 03	Nov-May
16	LMC, Large Magellanic Cloud		Glxy	11° x 9°	Dor	05 24	- 69 45	Oct-Apr
17	NGC 1904, Messier 79	Ben 34	Glcl	3'	Lep	05 25	- 24 33	Nov-May
18	NGC 1976, M 42, Orion Nebula		Brtn	1.1° x 1°	Ori	05 35	- 05 27	Nov-May
19	NGC 1977, C 0532-048		Brtn	20' x 10'	Ori	05 36	- 04 52	Nov-May
20	NGC 2070, Tarantula, 30 Dor	Ben 35	Brtn	40'	Dor	05 39	- 69 06	Oct-Apr
98	NGC 7089, Messier 2	Ben 127	Glcl	13'	Aqr	21 34	- 00 49	Aug-Nov
99	NGC 7099, Messier 30	Ben 128	Glcl	11'	Cap	21 40	- 23 11	Aug-Nov
100	NGC 7293, Helix Nebula	Ben 129	Plnb	15' x 12'	Aqr	22 30	- 20 48	Aug-Nov

Happy observing, drive safely, and all of the best for 2012.

Photographs taken at last month's meeting

Clockwise, from top left: 1. Patricia Skelton, who gave us the main talk. 2. Eugene Geldenhuys, a member. 3. Bosman Olivier, a committee member. 4. Johan Smit, our chairman, handing over the Jack Bennett award to Danie Barnardo, a committee member. This award is a floating trophy in the form of a telescope that belonged to Jack Bennett, one of the founders of the Pretoria Centre of the ASSA. 5. Michael Poll, a committee member. He was formerly our chairman and was President of ASSA for 2 years.



News items

- **ESA centrifuge opens door to high-gravity worlds.** Astronauts' jobs sometimes weigh heavy on them: crews returning from space briefly endure 'g-loading' more than four times Earth normal. Scientists interested in hyper gravity need to create it for minutes, days or even weeks at a time. http://www.esa.int/esaCP/SEMWSX6UXSG_index_0.html
- **Dark and bright: ESA chooses next two science missions.** The powerful influence of the Sun and the nature of the mysterious "dark energy" motivate ESA's next two science missions. http://www.esa.int/esaCP/SEMOZ59U7TG_index_0.html
- **Discovered: very cool stars.** Scientists have discovered six "Y dwarfs"-- star-like bodies with temperatures as cool as the human body. The infrared WISE telescope spotted them within a distance of about 40 light-years from the Sun. http://science.nasa.gov/science-news/science-at-nasa/2011/23aug_coldeststars/
- **Trouble for the Phobos-Grunt mission.** Russia's unmanned spacecraft sent to Mars' moon Phobos, apparently has encountered problems. See also the 4th tidbit on page 3. <http://www.universetoday.com/90803/trouble-for-the-phobos-grunt-mission/>

Planets

- **BepiColombo Mercury explorer to be launched on Ariane.** ESA has now firmly entrusted its precious Mercury explorer to Europe's largest rocket – the Ariane 5. Europe's first mission to probe the Solar System's innermost planet will depart in July 2014. http://www.esa.int/esaSC/SEMPRL0UDSG_index_0.html
- **Strange hollows found on Mercury.** The planet Mercury is dotted with holes that appear to be unlike any other landform yet seen in the solar system. http://science.nasa.gov/science-news/science-at-nasa/2011/24oct_sleepyhollows/
- **ESA finds that Venus has an ozone layer too.** Ozone has only previously been detected in the atmospheres of Earth and Mars. http://www.esa.int/esaSC/SEMER89U7TG_index_0.html
- **Rare Martian lake delta spotted by Mars Express.** ESA's Mars Express has spotted a rare case of a crater once filled by a lake, revealed by the presence of a delta. Read this article and related articles. http://www.esa.int/esaSC/SEMM71VTTRG_index_0.html
- **Probe spots the remains of a Martian lake and river.** <http://www.newscientist.com/blogs/shortsharpscience/2011/09/probe-spots-remains-of-martian.html>
- **Mars Express observes clusters of recent craters in Ares Vallis.** More evidence of liquid water on Mars long ago. http://www.esa.int/esaSC/SEMGJB9U7TG_index_0.html
- **Fifty new planets found - largest haul yet.** Fifty new alien worlds have been found. This brings the total number of known extra solar planets to **645***. "This is looking more and more like a golden age of exoplanet discovery", said an astronomer. How pleased Carl Sagan would have been! <http://news.nationalgeographic.com/news/2011/09/110912-exoplanets-super-earths-space-science-new-planets-found/>

* The number was 645 on 12 September 2011. To see the present number of known extra solar planets, go to website <http://exoplanet.eu/>

Black holes

- **ESA spacecraft reveal new anatomy around a black hole.** Spacecraft have shown unprecedented details close to a black hole with a mass of 300 million solar masses. http://www.esa.int/esaCP/SEMAQQ6UXSG_index_0.html
- **Which came first: galaxy or black hole?** Scientists don't know which came first. It also turns out that a galaxy need not be a giant galaxy to have a super massive black hole. Small dwarf galaxies with giant black holes have been discovered. <http://news.discovery.com/space/galaxy-black-hole-110920.html>

Feature of the month: Arp 220

Arp 220, located 250 million light-years away in the constellation Serpens, is the 220th object in Halton C. Arp's **Atlas of Peculiar Galaxies**. It is an ultra-luminous infrared galaxy, with the luminosity of a trillion (1000 billion or million million) suns.

While we Milky Way dwellers get a miserly ration of supernovae – just 2 per century on average – Arp 220 is treated to 400 magnificent stellar explosions per century. It is the highest supernova rate of any known galaxy. This furious volley of detonations occurs because Arp 220 is actually two galaxies in the process of merging. That violence funnels gas to Arp 220's core, where it fuels prolific star formation. Many of these are massive, short-lived stars that soon explode as supernovae.

Ultra-luminous infrared galaxies such as Arp 220 are, contrary to appearances, powerful sources of visible light – but they are obscured by thick shrouds of dust. The dust absorbs the visible light and is then heated, which makes them glow strongly in the infrared.

And although the Milky Way may turn into a similar supernova factory when it collides with the great galaxy in Andromeda, forming "Milkomeda", that smash-up isn't due for another 5 billion years.....

Below is an image of Arp 220 in visible light, made by the Hubble Space Telescope's Advanced Camera for Surveys



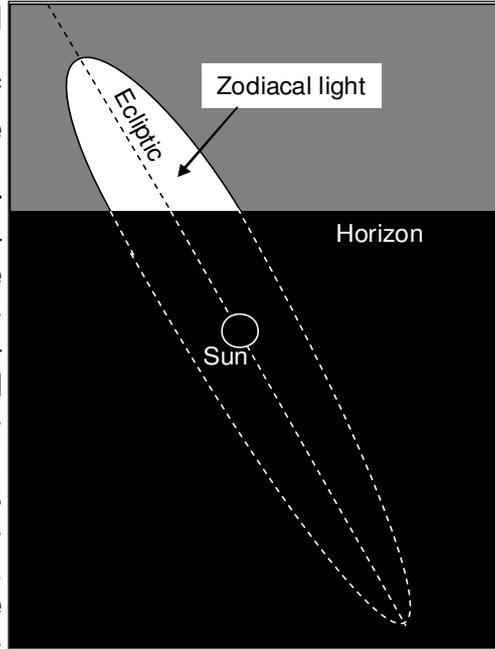
<http://www.newscientist.com/article/dn21024-astrophile-star-exploded-just-another-day-in-arp-220.html>

http://en.wikipedia.org/wiki/Arp_220

<http://hubblesite.org/newscenter/archive/releases/2006/26/image/a/>

Basics: The zodiacal light and the Gegenschein - by Pierre Lourens

The zodiacal light appears as a very diffuse, faint patch of light extending from the Sun into the sky above the faint twilight after sunset or before sunrise. That what can be seen is part of an elliptical patch of light centered on the Sun and with its long axis approximately coinciding with the ecliptic, as shown in the figure immediately on the right. The ecliptic is also the center line of the zodiac, hence the name "zodiacal light".

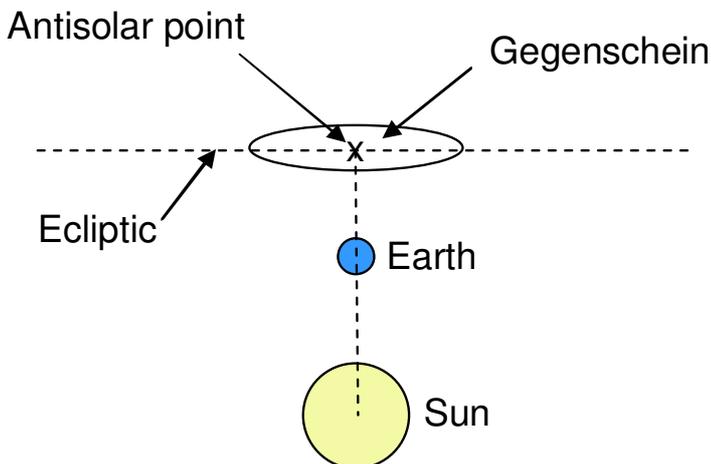


The zodiacal light is best seen at times of the year when the ecliptic is at a steep angle to the local horizon. The photograph top right shows the zodiacal light.

"Der Gegenschein" is German. It means "the counter glow". It is a faint, irregular elliptical patch of light in the night sky, approximately centered on the antisolar point and with its long axis approximately coinciding with the ecliptic, as shown in the figure below left. The photograph below right shows the Gegenschein. The Gegenschein is fainter than the zodiacal light - even fainter than the Milky Way - so any additional light from the moon, street lights, or a nearby planet and any obscuring haze makes it impossible to see it.

Both the zodiacal light and the Gegenschein can only be observed in a very dark, clear night sky. There have been reports that under very favourable viewing conditions, the zodiacal light extends right up to the Gegenschein.

There are countless numbers of dust particles orbiting the Sun. The planes of their orbits lie near the ecliptic plane, so that this thick disk of orbiting interplanetary dust is approximately centered around the ecliptic plane. The zodiacal light is caused by sunlight scattered through a scattering angle of about 90° from this thick disk of dust particles. The Gegenschein is caused by sunlight scattered through a scattering angle of about 180° from the same. Both the zodiacal light and Gegenschein thus lie approximately centered along the ecliptic.



http://en.wikipedia.org/wiki/Black_Eye_Galaxy
<http://www.skyimagelab.com/black-eye-galaxy.html>



M64 or NGC 4826, aka Black Eye Galaxy
 Its unusual properties can be explained by the theory that it collided with a smaller galaxy about 1 billion years ago. In northern constellation Coma Berenices. 17 million light-years away. **Visible in small telescopes.**

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]	

