



# The PRETORIA CENTRE

of the

## Astronomical Society of Southern Africa

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

### NEWSLETTER JANUARY 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 January at 19h15.

#### Programme:

- Beginner's Corner: "The basics of equatorial tracking" by Pat Kühn.
- What's Up in the Sky: by Percy Jacobs.
- 10 minute break — library will be open.
- Main talk: "Top 10 astronomical breakthroughs of the last century" by Johan Smit.
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Hein Stoltz.

Next observing evening: Friday 21 January 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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## The November 2010 meeting - by Danie Barnardo

The last meeting of 2010 was held on Wednesday 24 November. As usual, quite a number of visitors were present. Visitors were reminded that they have to enter their contact information on the attendance list, in order that a complimentary newsletter can be sent to them.

Announcements included a reminder of the 2011 Karoo Starparty, or as it was dubbed by Auke Slotegraaf, the "National Karoo Starparty". Bookings has started for this event planned for the weekend 29 April to 2 May 2011 at Kambro Padstal, some 20 km north of Britstown. Details are available on the Pretoria Centre website.

In the "Beginners Corner" slot, Michael Poll discussed the different types of nebulae and their classification. He dwelt on the Catalogues of Charles Messier, William and John Herchell, Dreyer, who introduced the NGC (New General Catalogue) in 1888 and the IC (Index Catalogues) in 1898 and 1908, the Caldwell Catalogue, produced by Patrick Moore, the Bennett Catalogue and the ASSA Top 100 Catalogue. Subsequently, he described the classification of the different objects found in the night sky – a thoroughly interesting presentation.

Johan Smit presented "What's up" for December 2010 and January 2011, firstly providing a handy formula for determining the phases of the Moon. Next, he indicated the visibility of the planets and then moved on to the ASSA Top 100 objects that can be spotted during these two months. This approach is in accordance with the newly introduced Observing program of the Pretoria Centre.

Just before the break, Percy Jacobs, as initiator of the Centre's Observing programme, introduced a few changes on his observation sheet and showed some example observation logs already completed by some of the members..

After the break, the main speaker of the evening, Peet van der Walt, was introduced. His subject was "Cosmology and General Relativity". To start off with, he provided definitions of the terms "cosmology", "gravity" and "general relativity". Following this, he gave a short history of the study of the subjects and moved on to a discussion of Special Relativity and General Relativity research by Albert Einstein. He also introduced the basic principles of the subject and discussed space-time geometry, the Einstein equations and light cones. He then stated that general relativity is an extremely complex subject and pointed out that there are 10 equations with 200 000 possible terms involved and that, in the process, space and time becomes convoluted and difficult to separate. He then moved on to some of the tests for general relativity. Subsequently, he introduced the subject of relativistic cosmology, pointing out the work done in the field by researchers such as Milne & McCrea, Gamow, Alpher & Herman and Hawking & Penrose, as well as the detailed map of the Cosmic Background Radiation produced by the COBE, WMAP and Planck probes. Assumptions and principles of relativistic cosmology, including the Cosmological and Copernican principles, cosmic fluid and a theory of gravity was introduced, pointing out the basic observations made including that the redshifts of galaxies increase with distance from the Earth, the distribution of galaxies seems to be the same in all directions and the presence of microwave background radiation which is independent of direction. Then he discussed the current standard model of the evolution of the universe and the significance of the Cosmic Microwave Background. Also discussed was the introduction of supernovae as standard candles and the finding that the expansion of the universe is accelerating. An interesting fact is that 95% of the universe consist of dark matter and dark energy. The verifiability of cosmology was explained, pointing out the past and future light cones of a local observer and the associated problems this poses. Lastly, he pointed out some recent advances, including computer models, observations and new theories, such as analogue gravity and multiverses. He concluded by stating that "the Universe will continue to fascinate, amaze and surprise us for as long as we look up at the sky and ask fundamental questions".

This presentation was extremely thought-provoking and interesting, leading to a longer than usual discussion-, questions- and answer session, which continued with the usual tea/coffee and biscuits after the conclusion of the meeting.

**Summary of “What's Up in the Sky” to be presented - by Percy Jacobs**

**Phases of the Moon**

- New Moon – 3<sup>rd</sup> Feb (rises 05:54).
- First Quarter – 10<sup>th</sup> Feb (rises 11:57).
- Full Moon – 18<sup>th</sup> Feb (rise 18:45).
- Last Quarter – 26<sup>th</sup> Feb (rises 00:05).
- Dark Sky – from about 1<sup>st</sup> Feb to 8<sup>th</sup> Feb & 20<sup>th</sup> to 28<sup>th</sup> (good viewing time).

**Planets**

- Mercury** - mag. -0.5 .Early morning sky – east.
- Venus** - mag. -4.3. “Morning star” - east.
- Mars** - Too close to the sun and therefore cannot be seen this month.
- Jupiter** - mag. -2.2. Sets a few hrs after sunset - west.
- Saturn** - mag. +0.6. Rises mid evening, seen for whole of the rest of the evening - east.
- Uranus** - mag.+5.9. Still next to Jupiter - west.
- Neptune** - mag. 8.0. Sets just after sunset - west.

**Events & highlights**

- Orion Nebula – star birth region
- Southern Cross
- Large & Small Magellanic Clouds (Galaxies)
- Pleiades
- “Johan” Heart Cluster in Vela – NGC 2457
- Crab Nebula – supernova - M1
- 47 Tucanae
- NGC 3132 – one of the brightest planetaries with central star visible

**Meteor Showers**

Alpha Centaurids – Feb 7 – Mon (Jan 28<sup>th</sup> to Feb 21<sup>st</sup>) – approx. 5 per hr – 22:00 to 03:30

**Some interesting Constellations – shall be discussed in more detail at meeting**

- Orion – Rigel & Betelgeuse
- Canis Major - Sirius
- Canis Minor - Procyon
- Taurus - Aldebaran
- Gemini - Castor & Pollux
- Vela - Gamma Velorum
- Centaurus
- Southern Cross
- PLUS many more – go out and look for them using your Sky Map Chart

**For our ASSA Top 100 Observers**

Carina:

46	NGC 3766, VdB-H 120
47	NGC 3918, Blue Planetary
54	NGC 4945, LEDA 45279
55	NGC 5128, Centaurus A
56	NGC 5139, Omega Centauri
59	NGC 5281, VdB-H 152
60	NGC 5460, C 1404-480
61	NGC 5662, VdB-H 162

Canis Major:

21	NGC 2287, Messier 41
22	NGC 2362, Tau CMa cluster

### Office for Astronomy Development

The IAU (International Astronomical Union) will operate an OAD (Office for Astronomy Development) in South Africa in the near future. The OAD will be hosted by the SAAO (South African Astronomical Observatory) in Cape Town. This is part of a ten-year plan initiated by the IAU to exploit astronomy in the service of education capacity building in the developing world.

The OAD will mobilize professional and amateur astronomers, engineers and teachers around the world in the service of developing countries. The wide range of activities that it will coordinate include the education of young disadvantaged children, science education at all levels, the training of school teachers and building up research capacity in university departments throughout the developing world.

### Mysterious structures balloon from Milky Way's core

Two huge bubbles that emit gamma rays have been found billowing from the center of the Milky Way galaxy, astronomers have announced. The previously unseen structures, detected by NASA's Fermi Gamma-ray Space Telescope, extend 25,000 light-years north and south from the galactic core.

"We think we know a lot about our own galaxy, but what we see here are these enormous structures ... [that] suggest the presence of an enormous energetic event in the center of our galaxy.", said a spokesman. "For now the source of all that energy is unclear", said another.

The image is artist's depiction of the Milky Way galaxy and the lobes.

<http://news.nationalgeographic.com/news/2010/11/101110-science-space-mystery-structures-gamma-rays-bubbles/>



### Solar eclipse on 4 January 2011

In the early hours of 4th January 2011, there was a solar eclipse visible from the Northern Hemisphere where it is currently very cold. If you were in the right place, the eclipse was under way at sunrise and the Moon moved in front of the top 3/4 of the sun, making it look like two horns rising.

[http://spaceweather.com/eclipses/gallery\\_04jan11.htm?PHPSESSID=dpoc0ifnk3uljo9n902k4bbsi6](http://spaceweather.com/eclipses/gallery_04jan11.htm?PHPSESSID=dpoc0ifnk3uljo9n902k4bbsi6)

(Sent in by Neville Young.)

## Rock solid link: asteroid doomed the dinosaurs



Scientists have debated for two decades whether a giant space rock wiped out the dinosaurs or if some other catastrophe did it. Now, a blue-ribbon panel of scientists has banded together to support the link between the Chicxulub asteroid impact crater in Mexico's Yucatán Peninsula with the mass extinction of dinosaurs and the majority of life on our planet 65 million years ago.

Peter Schulte, Assistant Professor at the University of Erlangen in Germany, said in a press statement: "Combining all available data from different science disciplines led us to conclude that a large asteroid impact 65 million years ago in modern day Mexico was the major cause of the mass extinctions."

Above is an artist's impression of a giant rock from space slamming into Earth 65 million years ago near what is now Mexico's Yucatan Peninsula.

<http://www.space.com/scienceastronomy/dinosaur-killing-asteroid-100304.html>

## Dark, dangerous asteroids found lurking near Earth

An infrared space telescope has spotted several very dark asteroids that have been lurking unseen near Earth's orbit. Called the Wide-Field Infrared Survey Explorer (WISE), the new NASA telescope was launched on 14 December 2009 on a mission to map the entire sky at infrared wavelengths. It began its survey in mid-January 2010.

Many of these dark asteroids have orbits that are steeply tilted relative to the plane in which all the planets and most asteroids orbit. This means telescopes surveying for asteroids may be missing many other objects with tilted orbits, because they spend most of their time looking in this plane.

The image is an artist's depiction of an asteroid entering Earth's atmosphere. (Fortunately it is not a real image!)

<http://www.newscientist.com/article/dn18616-dark-dangerous-asteroids-found-lurking-near-earth.html>



## Star hurtling towards us

A star is hurtling towards us. It will almost certainly clip the outskirts of the solar system and send comets towards Earth – though not for a while.

Vadim Bobylev of the Pulkovo Observatory in St Petersburg, Russia, modelled the paths of neighbouring stars using data from the European Space Agency's Hipparcos satellite and from ground-based measurements of the speeds of stars. He found four previously unidentified stars that will pass within roughly 9.5 light years of Earth. They will tug on the Oort cloud, a diffuse cloud of icy objects around the solar system thought to be a reservoir of comets.

However, the biggest threat comes from another star, Gliese 710, an orange dwarf now 63 light years away but zooming our way at 14 kilometers per second. Previous studies have already suggested that Gliese 710 could pass through the Oort cloud in about 1.5 million years.

<http://www.newscientist.com/article/dn18655-hurling-star-on-a-path-to-clip-solar-system.html>

## Join the search for intelligent extraterrestrial life

You are officially invited to join the search for intelligent extraterrestrial life. And no, that doesn't mean you should head to Kansas, USA and lie in a cornfield awaiting the mother ship of ET's to scoop you up. All you have to do is log on to SETIQuest.org, which went live recently.

SETIQuest is the product of astronomer Jill Tarter's TED Prize wish. After being awarded the TED Prize last year, Tarter was given the opportunity to make a single wish before an auditorium full of the top names in technology and design. Tarter wished that they would "empower Earthlings everywhere to become active participants in the ultimate search for cosmic company".

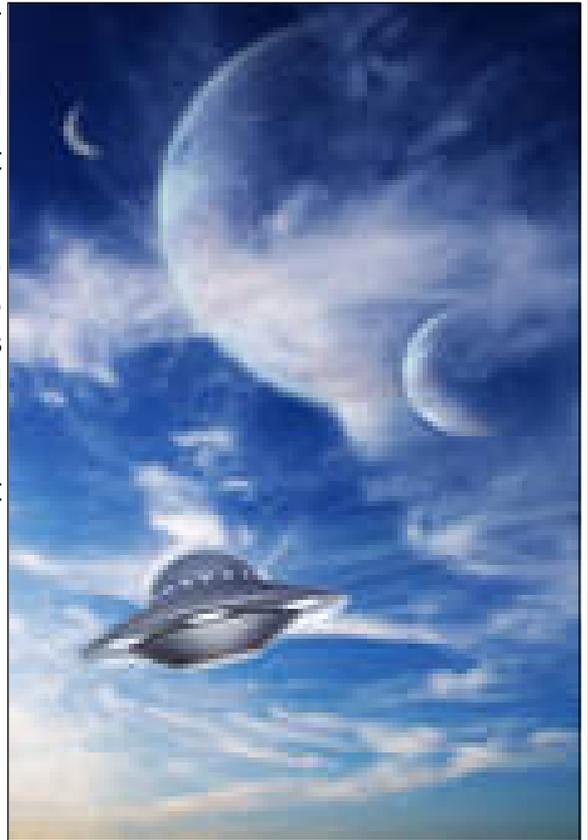
With SETIQuest, Tarter and TED are making that happen. The website will make vast amounts of SETI data available to the public.

- <http://www.newscientist.com/article/dn18516-seti-opens-up-its-data-to-citizen-scientists.html>
- The Allen Telescope Array of the SETI Institute: January 2009 newsletter, page 8.

### However, their idea is not original.

- SETI@home: April 2004 newsletter, page 7.

The image shows a totally imaginary scene of an alien craft in the sky of its home planet.



## Earth calling: A short history of radio messages to ET

The human race first deliberately advertised its existence on the outer panels of space probes, some of which were engraved with codes and images containing information about itself. These immediately prompted arguments about how much we should give away about ourselves. However, if we really want to break the ice with our cosmic neighbours, it will probably be by sending messages that travel at the speed of light, not at the speed of a Pioneer probe.

A certain artist had a mad idea: Joe Davis is an artist and a research affiliate at Massachusetts Institute of Technology. In the mid-1980s, he became concerned that no image of humans had been sent into space representing the details of human genitals or reproduction. So he led a project to transmit the sounds of vaginal contractions towards neighbouring star systems. To do so, he recorded the vaginal contractions of ballet dancers.

The messages were to be sent from MIT's Millstone Hill Radar to Epsilon Eridani, Tau Ceti and two other stars. However, only a few minutes of footage was transmitted before the United States Air Force, which had jurisdiction over the facility, shut the project down.

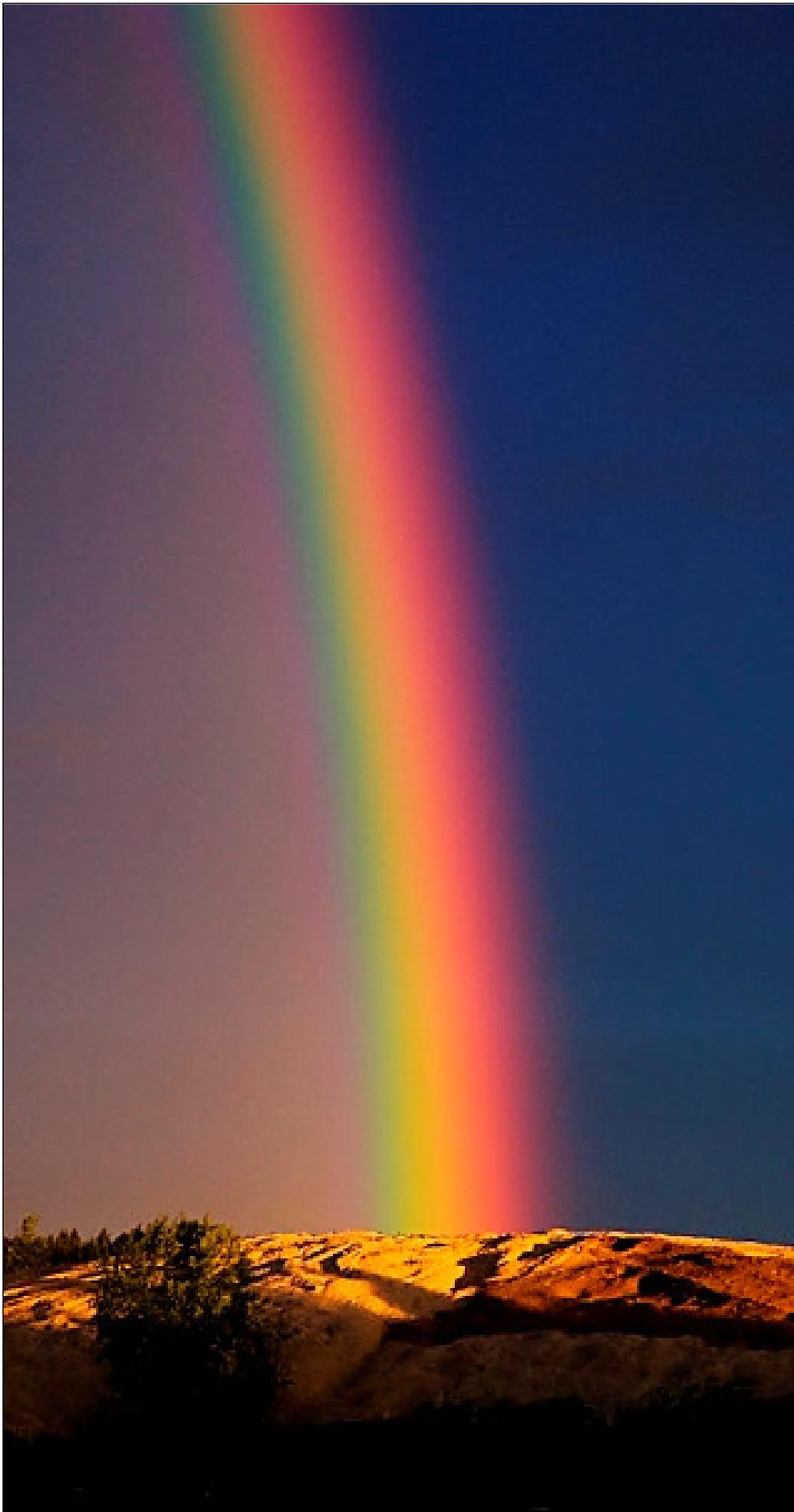
Nevertheless, the sounds of vaginal contractions that were sent will have reached Epsilon Eridani in 1996 and Tau Ceti in 1998. It is unclear what sort of reply we should expect.

<http://www.newscientist.com/article/dn18417-earth-calling-a-short-history-of-radio-messages-to-et.html>

## Stephen Hawking warns against contacting aliens

Astrophysicist Stephen Hawking caused a bit of a buzz when he warned that we shouldn't attempt to contact aliens because the outcome probably wouldn't be good (for us, anyway). But once again, Neil deGrasse Tyson is a voice of reason about the whole thing. Watch a clip from the Discovery Channel's "**Stephen Hawking's Universe**" about fearing aliens.

<http://www.universetoday.com/2010/05/04/will-aliens-be-hostile/>

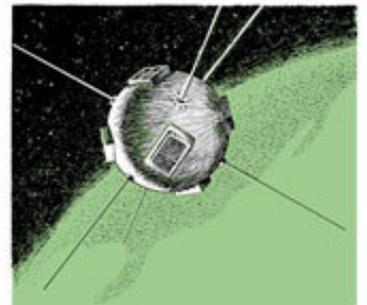


**Rainbow**

This photograph (left) depicts an atmospheric phenomenon (a rainbow) in the atmosphere of the third planet from an average star that we call the Sun.

The origin of this photograph is probably Finland.

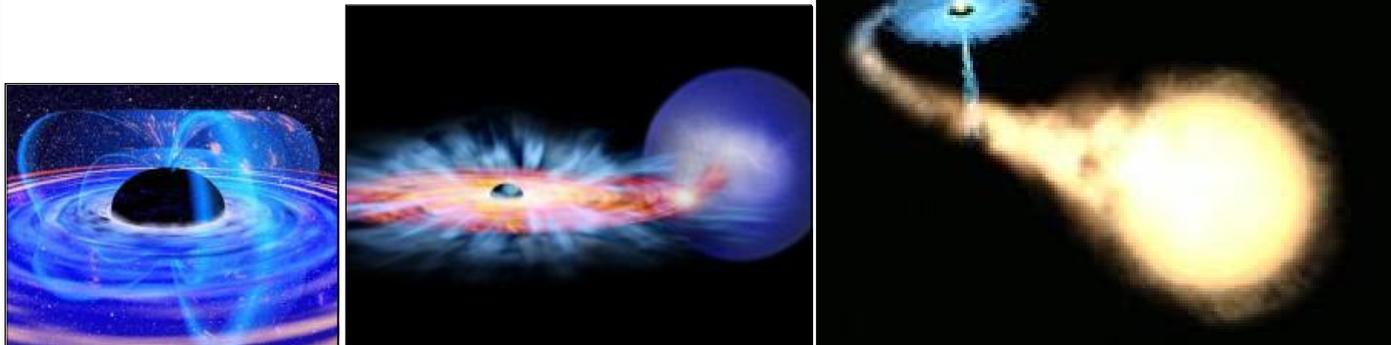
Photograph sent in by Tony Viljoen.



## Black holes

Undertake a journey to the strange world of black holes.

[http://hubblesite.org/explore\\_astronomy/black\\_holes/](http://hubblesite.org/explore_astronomy/black_holes/)



Three artist's representations are shown above. On the left is a black hole. In the middle is a black hole and a star, and on the right also a black hole and a star.

## Closure of the IYA Secretariat

The following letter, circulated by Pedro Russo, the International Year of Astronomy 2009 Coordinator, was received by MP in mid-December and is copied here for the interest of Centre Members.

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Dear Friends,

The International Year of Astronomy 2009 (IYA2009) Secretariat will finish its activities on 31 December 2010, following three and a half years of service. While closure of the IYA2009 Secretariat marks the end of the largest project that the International Astronomical Union (IAU) has ever embarked upon, the organisation remains committed to promoting education and public outreach throughout the world.

In July 2007, the International Astronomical Union (IAU) established the IYA2009 Secretariat at the European Southern Observatory's (ESO) Headquarters in Garching, Germany. The Secretariat's role was to act as a hub for IYA2009 activities. It coordinated projects from the planning stages through to evaluation, and was a central contact and resource centre for the hundreds of national nodes, international organisations, global projects, the media and the general public. The Secretariat was embedded in ESO's education and Public Outreach Department, which provided invaluable support and expertise for IYA2009.

The IYA2009 was a huge success, involving 148 countries around the world organising hundreds of thousands of individual activities reaching hundreds of millions of people. Feedback has been extremely positive. The impact of IYA2009 on the scientific literacy of the general public will take time to be assessed, but the first positive results are emerging. In Sweden, a recent public poll demonstrated a noticeable change in the appreciation for astronomy: interest in astronomy increased from 53% in 2008 to 67% in 2009. The IAU believes that the communication of astronomy research throughout 2009 contributed significantly to this.

During 2010, the IYA2009 Secretariat has been supporting the continuation of projects — under the umbrella title, Beyond International Year of Astronomy — and communicating the impact of the Year in publications and at conferences. Recently, the IYA2009 Secretariat has released a 1450-page IYA2009 Final Report and a 24-page Final Report Summary.

As part of the legacy of IYA2009, the IAU is implementing a decade-long plan for the global development of astronomy, called The Strategic Plan: Astronomy for the Developing World. The IAU has chosen the South African Astronomical Observatory as the location for its Office for Astronomy Development (OAD). Starting in March 2011, the OAD will coordinate a wide range of activities designed to promote astronomy throughout the developing world. Earlier this month, Kevindran Govender, Chair of the IYA2009 Cornerstone project Developing Astron-

omy Globally, was appointed Director of the OAD.

On a personal note, in early 2011 I will be starting a new position at Leiden University in the Netherlands, where I will be the International Project Manager of the educational project Universe Awareness, an IYA2009 Cornerstone project. I have enjoyed my tenure as IYA2009 Coordinator and I have appreciated the opportunity to work with the talented team at ESO, ePOD and IAU.

I would like to thank you all for your hard work, support and dedication in making IYA2009 an astronomical success!  
Season's greetings, Pedro Russo.

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You can find the complete press release here:

<http://www.astronomy2009.org/news/pressreleases/detail/iya1008/>

(Sent in by Michael Poll.)

**Observing evening November 2010: report - by Michael Poll & Johan Smit**

A clear evening after many cloudy ones, and during the day it did not look too promising either. Nevertheless, clear it was, although a nearly-full moon washed out the sky quite a lot.

The moon and Jupiter were the first objects targeted. The moon featured some nice craters near the sunrise limb. Jupiter was showing two moons only early on – both Io and Europa were in eclipse, although Io re-appeared just after 20h00. A bright object in the western twilight caught our attention and this turned out to be Mercury, which was coming into a favourable eastern elongation, but would be at its best in the first week of December. A fairly bright object to the north (right) of Mercury caused a little speculation (?Antares) but it was Mars – the object showed as a disc, looking smaller than Mercury’s disc. [In fact, Mars had passed Antares on November 7<sup>th</sup>, and Sky Guide gave Mercury as being 1½° south of Mars on November 20<sup>th</sup>]. This could be the last sighting of Mars until after its conjunction on February 4th 2011.

A very bright satellite was seen, moving from the north to the south east. It was brighter than Jupiter at one point, and it was deduced that this was the International Space Station. [Note from Michael : I wanted to check this on Heavens Above, but left it for a couple of days and the data was no longer available. However, on Monday November 22<sup>nd</sup>, I was outside at 19h 15 and I saw the same satellite again – same brightness, same track direction, but further west, so it was almost certainly the ISS we saw at the observing].

Michael did some lunar geography (or more correctly selenography), picking out craters around the limb. Among those identified were Grimaldi (previously known, the darkest spot on the moon) but also names were put to Hevelius (to the north of Grimaldi) Lohrmann and Cavalerius, which are two smaller craters on either side of Hevelius. Lohrmann is in between Grimaldi and Hevelius. Further north is the brilliant white crater Aristarchus, with Herodotus next to it. A famous landmark on the moon –Schroter’s Valley lies near these craters, and there it was! Even in a 6 inch telescope, the length and the width could be appreciated. The Valley is a 168 km long sinuous rille, the longest such feature on the moon. Its maximum width is 10 km. Amongst the craters in the south, Tycho with its rays was noted and also very near the limb, Clavius, with its distinct superimposed craterlets was identified.

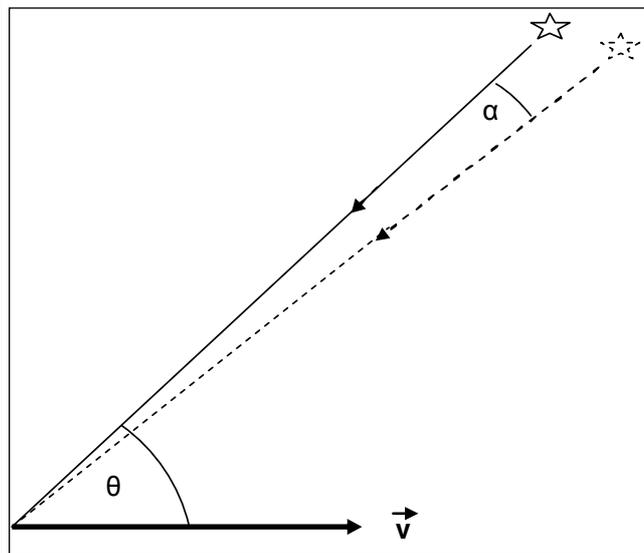
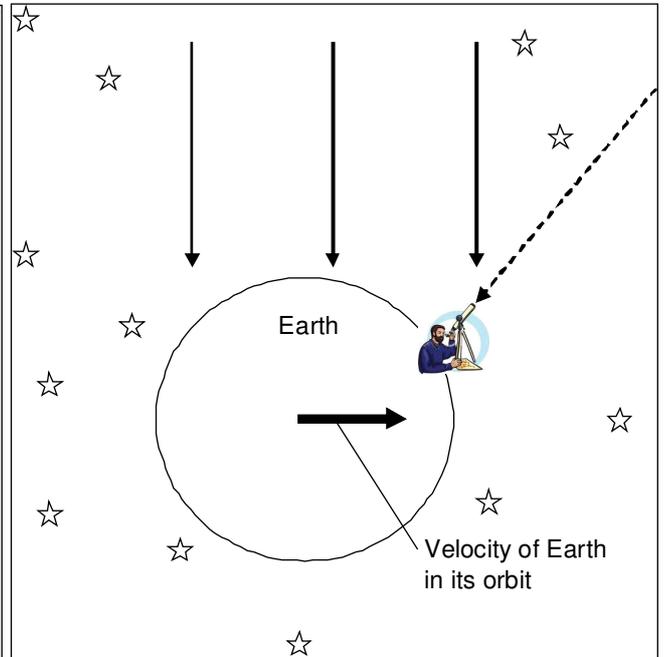
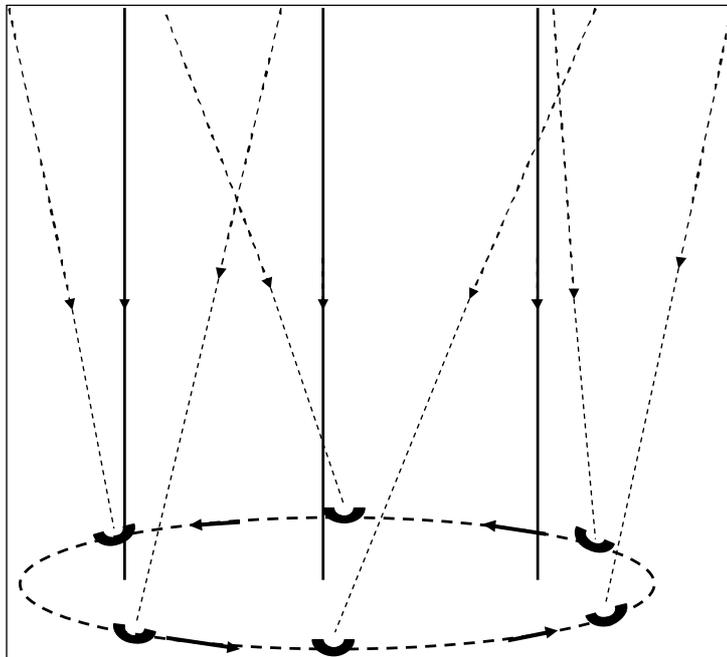
A couple of observers were attending to some of the objects on the ASSA 100 list that Percy has presented to the Centre. In doing the drawings, a discussion point arose as to how to relate the cardinal points in the sky to the view in the eyepiece, as the drawing needs to have the cardinal points indicated. After giving the matter some thought, Johan prepared some simple rules and presented them the monthly meeting on the following Wednesday

**Basics: aberration of starlight - by Pierre Lourens**

The aberration of starlight is the apparent displacement of starlight in the direction in which the Earth is moving. This can be understood by an analogy. Imagine a ship going around in a circle on the sea, while a rain shower is falling vertically down (as it would have appeared to an observer who is on a stationary boat in the sea). When the ship moves in a certain direction, it will seem to an observer on the ship as if the rain is falling obliquely from that direction. (See figure 1.)

**Figure 1**

**Figure 2**



**Figure 3**

With reference to figure 3, let:

$\theta$  be the angle of the star above the plane of the ecliptic. ( $0 < \theta < 90^\circ$ .) (This is the angle at which an observer who is stationary with respect to the Sun, would have seen the star.)

$\alpha$  be the angle through which the observer has to tip his telescope in order to observe the star.

$c$  be the speed of light in vacuum.

$v$  be the speed of the Earth (in the ecliptic coordinate system) in its orbit around the Sun.

Using classical physics, the following simple formula is derived for the case where the velocity of Earth (in the ecliptic coordinate system) is in the direction shown in figure 3.

$$\alpha = (v/c) \sin \theta \quad (1)$$

For the case where the velocity of Earth is antiparallel to that shown in figure 3 (which will

Now imagine a star \* at the north ecliptic pole. There is a shower of light coming from the star. The light is falling vertically down (as seen by an observer who is stationary with respect to the Sun). Imagine an observer with a telescope on Earth, observing the star. When the Earth moves in a certain direction, it will seem to the observer as if the light is falling obliquely from that direction. That is, he will have to tip his telescope somewhat in the direction in which the Earth is moving in order to see the star in the telescope. (See figure 2. The angle through which the telescope is tipped, is exaggerated in the figure.) As Earth moves around the Sun, it will seem to the observer as if the star describes a circle around the north ecliptic pole.

be the case 6 months later), this formula is exactly the same.

Using modern physics (more specifically, special relativity theory), more complicated and different formulae are found for the two cases, but because the angle  $\alpha$  in radians and  $v^2/c^2$  are very small numbers, it is found that ( $\approx$  means "approximately equal to"):

$$\alpha \approx (v/c) \sin \theta \quad (2)$$

for both cases, to an exceedingly good approximation. So we can use the classical formula (1) for both cases with confidence.

The following points about formula (1) should be noted:

- The distance of the star does not appear in (1).  $\alpha$  is therefore independent of the distance of the star.
- The wavelength of the light does not appear in (1).  $\alpha$  is therefore independent of the wavelength of the light observed.
- The derivations above for any other observing instrument (the human eye, a camera, spectrograph, photometer, or whatever) result in exactly the same formulae.  $\alpha$  is therefore independent of the instrument used.
- No characteristic (such as length of telescope tube, size of aperture, width of slit, or whatever) of the instrument considered, appears in (1).  $\alpha$  is therefore independent of all the characteristics of the instrument, whatever the instrument.

During the course of a year, to an observer on Earth, a star at the north ecliptic pole seems to move around in a small circle with angular diameter  $2(v/c)$ . A star at an angle  $\theta$  above the plane of the ecliptic (with  $0 < \theta < 90^\circ$ ), seems to move around in a small ellipse with the angular diameter of the long axis  $2(v/c)$  and that of the short axis  $2(v/c) \sin \theta$ . A star right on the ecliptic seems to move to and fro in a straight line along the ecliptic, spanned by an angle of  $2(v/c)$ . This is illustrated in figure 4. Below the plane of the ecliptic, the apparent orbits are similar.

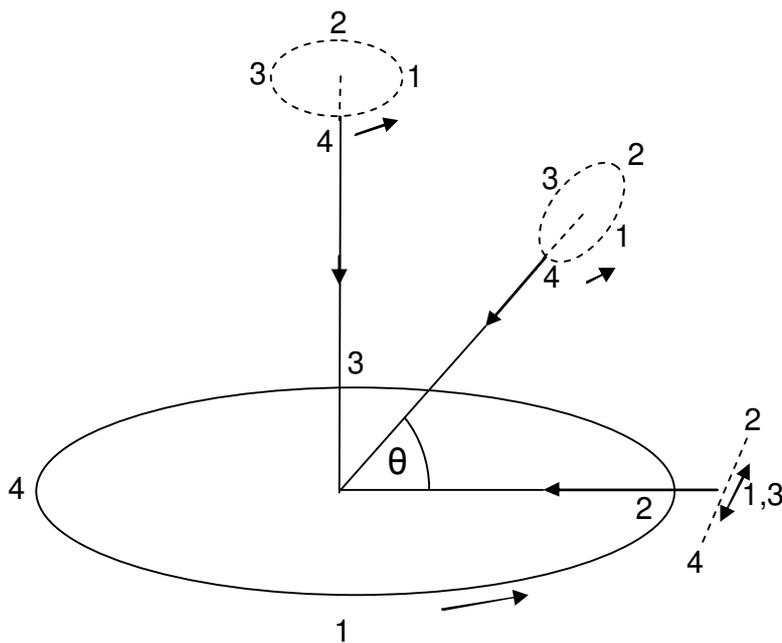
$v/c$  is known as the **constant of aberration**. Its value is 0.00009934 radians, which is 20.47 arcseconds, written as 20.47".

Aberration was discovered by James Bradley in 1728. He was trying to measure the parallax (a minute annual shift of nearby stars against the more distant background of stars) as the orbital motion of the Earth changed the observer's position in space. He did this with the intention of determining the distances of stars. Instead, careful observations revealed that the apparent positions of **all stars** shifted back and forth annually by up to 20" in a way that was not connected to the expected parallax effect.

Today we know that the parallaxes of stars are much smaller, which is the reason why it was first measured for a star only much later. This was accomplished by Friedrich Bessel in 1838 for the star 61 Cygni. Its parallax is 0.292". The star with the largest parallax is Alpha Centauri. Its parallax is 0.745".

Bradley's observations demonstrated both the motion of the Earth around the Sun and the finite speed of light.

**Figure 4. The numbers mark corresponding positions of Earth in its orbit and positions on the apparent aberration orbits of stars. (Not to scale.)**



\* In order to avoid unnecessary complications, all stars considered here have no velocity component (velocity in the ecliptic coordinate system) parallel to the plane of the ecliptic.



## SN remnant in the LMC

This image from NASA's Hubble Space Telescope (HST) shows delicate filaments which are actually sheets of debris from a stellar explosion in the Large Magellanic Cloud (LMC), a small companion galaxy to the Milky Way visible from the southern hemisphere.

Denoted N 49, or DEM L 190, this supernova (SN) remnant was a massive star that died in a supernova blast whose light would have reached Earth thousands of years ago. This filamentary material will eventually be recycled into building new generations of stars in the LMC. Our own Sun and planets are constructed from similar debris of supernovae that exploded in the Milky Way billions of years ago.

Similar debris of supernovae that exploded in the Milky Way billions of years ago.

This seemingly gentle structure also harbors a spinning neutron star that may be the central remnant from the initial blast. It is quite common for the core of an exploded supernova star to become a spinning neutron star (also called a pulsar - because of the regular pulses of energy from the rotational spin) after the immediate shedding of the star's outer layers.

<http://hubblesite.org/newscenter/archive/releases/2003/20/image/a/>

### 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 ]	
Centre Representative	Michael Poll	012 331 1615 [ H ]	
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 ]	
Assistant Treasurer	Percy Jacobs	082 498 4680 [ Mobile ]	
Member	Hein Stoltsz	083 302 5096 [ Mobile ]	
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