



The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER MAY 2006

The next meeting of the Pretoria Centre will take place at Christian Brothers College, Pretoria Road, Silverton, Pretoria

Date and time Wednesday 24 May at 19h15
Chairperson Fred Oosthuizen
Beginner's Corner Michael Poll
What's Up by Wayne Mitchell

+++++++ **LEG BREAK - Library open** +++++++
MAIN TALK

“Meteorites” by Paul Botha *

The meeting will be followed by tea/coffee and biscuits as usual.
The next social/practical evening will be held on Friday 19 May at the Pretoria Centre Observatory, which is also situated at CBC. Arrive anytime from 18h30 onwards.

* See page 5

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Last month's meeting - by Michael Poll

Michael Poll was in the Chair. Announcements were made about the visit to Nylsvley on May 26th – 28th 2006, and a night stay at Tswaing Crater which is to be arranged for the night of August 26th 2006. Also noted were Scopex on May 6th, and the ASSA Symposium at Bloemfontein from 28th – 30th September 2006.

Johan Smit gave Beginner's Corner, on the subject of Resolving Power, which is the ability of a telescope to separate two points close together. Johan compared the optics of the eye with those of various types of telescope, explaining why a telescope can show more than the eye. The smallest detail visible on the moon with the naked eye is 60 km and the smallest with a 6 inch telescope is 1.3 km.

Andrie van der Linde gave a nicely illustrated "What's Up?" showing the naked eye aspects of the sky for May, principally the "Southern Crosses" (there are three - Southern, Diamond and False) which are well placed for viewing during the month, together with the many naked eye and binocular clusters in the region. For the planets, Mars and Saturn are in the evening sky - Mars in Gemini and Saturn in Cancer. Mars is moving rapidly towards Saturn. Mercury could be seen below Venus in the morning sky in the early part of the month. Also in the morning sky, Comet 73P/Schwassmann-Wachman would pass near the Ring Nebula (M57) in Lyra.

The main talk of the evening was delivered by Ad Sparrius, and was entitled "The Big Bang". His talk was a breathtakingly broad picture of Cosmology, and how cosmology has been turned from myth into science.

Ad started by showing a cosmic zoom, illustrating our place in the Universe, and introduced special relativity – which proposes that, as the speed of light is approached, mass increases, length decreases in the direction of travel, and time slows down. Also

gravity occurs because mass makes space curved – the first observational proof of this was at the 1919 total solar eclipse, but another proof is the bending of light by a massive galaxy (or a group of galaxies) acting as a lens, giving rise to gravitational arcs.

Originally it was thought that the universe was, on a large scale, static, so Einstein introduced the Cosmological Constant as a pushing force to overcome gravity. When it was found that the universe was expanding, Einstein thought that the Cosmological Constant was no longer necessary. Georges Lemaitre suggested that the universe had started with the "explosion" of a primeval atom, and the expansion from this explosion was still continuing. Given that the universe is expanding as a result of the Big Bang, there are three possibilities as to its future. A closed universe means that it will eventually contract due to gravity, leading to a "Big Crunch". If there is not enough mass, gravity would be less, and the universe would expand forever – an open universe. A flat universe means that the force of expansion would just balance gravity, and the universe would expand forever but at a slower and slower rate. Current observations favour a flat universe.

Ad finished his talk with the scenario of the Big Bang. A singularity of infinite density, mass and temperature expanded very rapidly. At 300 000 years the temperature was 3000°K at which the primeval particles became electrically neutral, allowing the formation of atoms. At the present time, the temperature has now fallen to 3°K, and is known as the Cosmic Microwave Background Radiation. The CMBR was first predicted in 1948 [George Gamow] and first detected in 1965 by Arno Penzias and Robert Wilson. The CMBR is the major proof of the occurrence of the Big Bang.

Last month's observing evening - by Michael Poll & Johan Smit

About 20 or so star-starved persons came to the observing evening, perhaps tempted by some signs in the afternoon that there might be some holes in the clouds. In the event, for most of the evening, the clouds got bigger and the holes got smaller, until there were no holes at all! We were able to show some newcomers Alpha Centauri and Jupiter, and next to Jupiter, Alpha Librae, which is a wide double in binoculars.

That was nearly about it, except that Johan and Dirk stayed on discussing their home built telescopes, and eventually some holes appeared. Saturn and Jupiter were seen, and there was even a glimpse of the Jewel box and Omega Centauri. However "just as we were really starting to enjoy the viewing, the clouds closed up again, this time seriously, and we drove home in the rain". Nobody can accuse anyone of not trying!

The Geysers of Enceladus

Four fissures in the south pole of Saturn's moon Enceladus are spewing out a plume hundreds of kilometers high and the ejecta are leaving a vapour trail that rings Saturn.

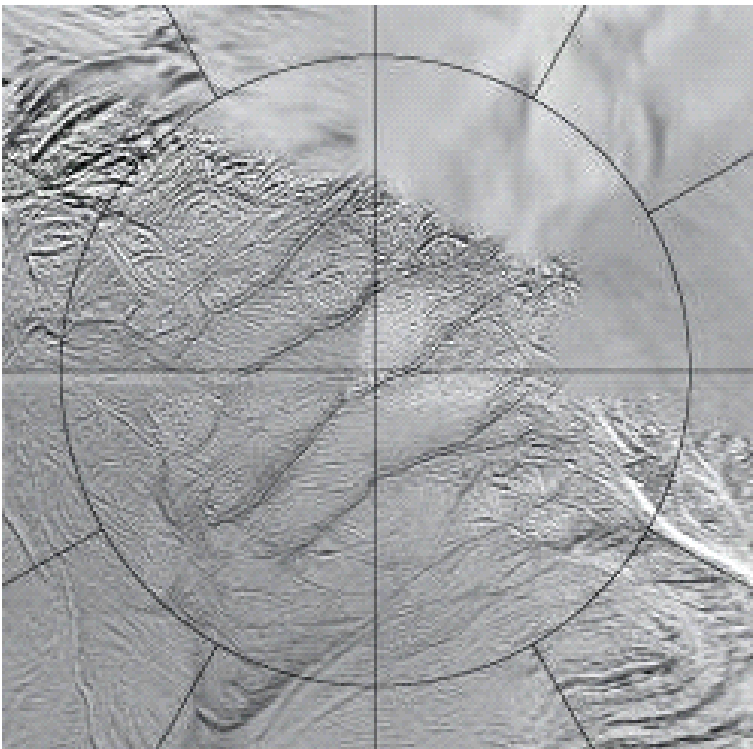
This was discovered by the spacecraft Cassini, presently orbiting Saturn, when it flew past Enceladus on 14 July 2005, skimming within just 173 kilometers of the moon's surface. Meanwhile, Cassini's Composite Infrared Spectrometer (CIRS) picked up unexpectedly strong infrared radiation (heat) from the south pole. Zooming in, CIRS found that the fissures are at a temperature of at least -183°C , 15°C warmer than most of the moon's surface. "It's like flying by Earth and discovering that Antarctica is warmer than the equator," said a researcher. The source of the heat remains a big puzzle.

Other instruments on Cassini sampled a vast plume of water vapour towering above the south pole. Water is pouring out at a rate of half a ton per second. Cassini also detected dust and ice grains in the plume.

A chance to learn more will come during Cassini's next close pass of Enceladus, scheduled for 2008. Exploring whether or not Enceladus represents a bona fide habitable zone will be a job for a future mission. The likelihood of liquid water "is thrilling beyond imagination", said Carolyn Porco, head of the imaging team.

Journal reference: *Science* vol 311, p 1399

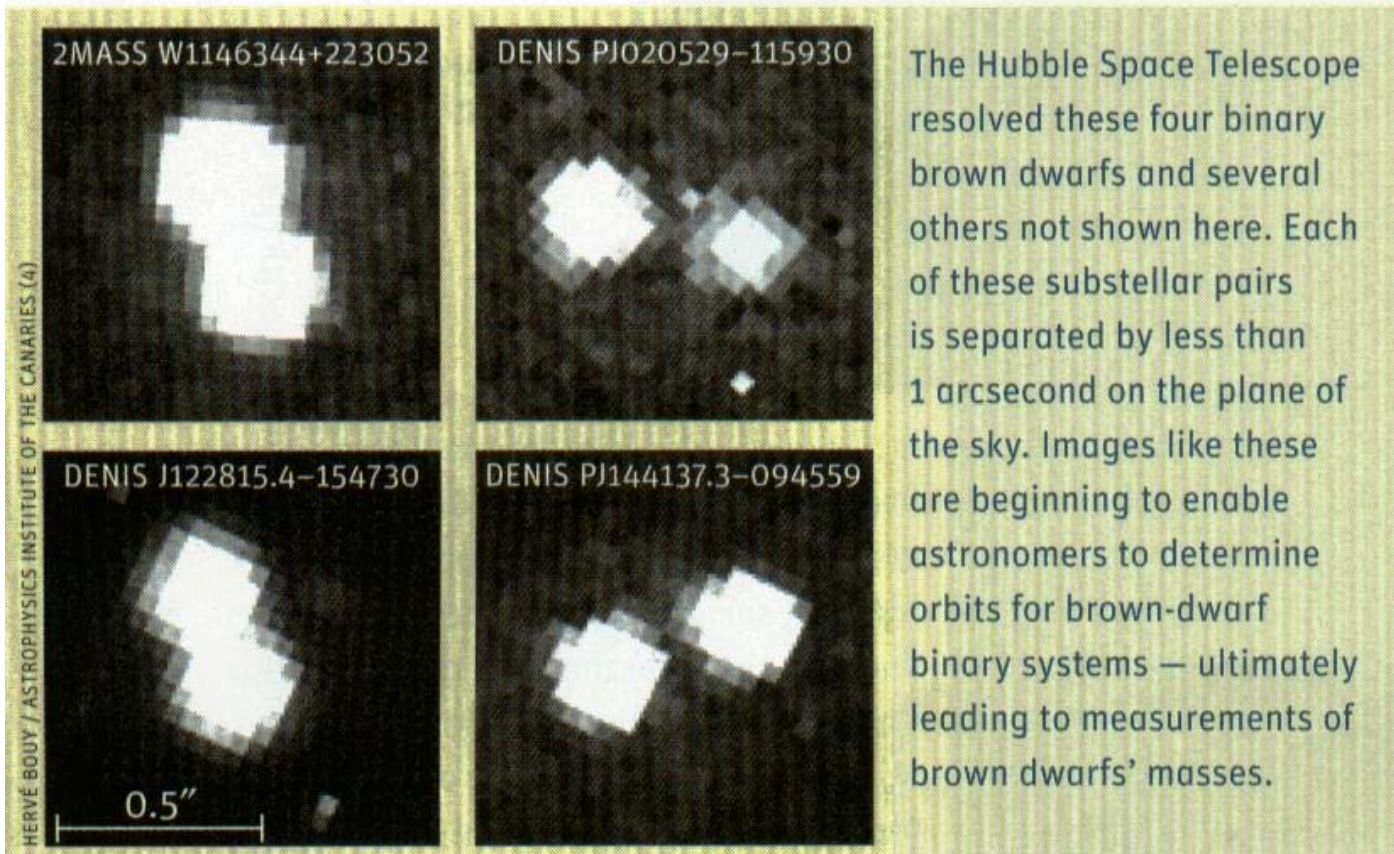
Websites: <http://www.newscientistspace.com/article/dn8830.html>
<http://www.newscientistspace.com/article/dn7924.html>



Above left: The four long fissures straddle the south pole of Enceladus and run for more than 100 kilometers. The circular grid marks 60° South (Image: NASA)

Above right: Fountain-like volcanic activity was revealed on the surface of Enceladus in this image backlit by the Sun (Image: NASA/JPL/Space Science Institute)

In Afrikaans sou ons sê: "Daar's water!"



Letter to members- by Chris de Coning

The Astronomical Society of Southern Africa (ASSA) would like to hear your opinion concerning the Society. The National body of ASSA has been searching for new ways forward. To do so we need to gauge members attitudes, things that you are satisfied with, and off course, things you grumble about. (If you are a member of a local centre and not a national member we still like to hear your opinion because the issues still affect you)

The need for change had its origins amongst members of the National Council of ASSA. Letters that was circulated can be read on the website referred to below. Perhaps the opinions contained in these letters will encourage participation in the process. If you have an opinion or a suggestion, please express it. The Society depends on the efforts of its members.

We need to have all contributions by 15 July 2006 in preparation for the AGM in August. Thus at your leisure visit the following website: <http://assa.saao.ac.za/future/>

Read the original debate and / or the arguments as grouped according to topics. Print the letters and take them with you. Please ponder the ideas and when you are ready, formulate your ideas and send to: siriusa@absamail.co.za

We will post your letter on the website under current debate, and the important ideas will be placed under the relevant topic.

P.S. Due to the nature of my work I am often away from the internet for a few days at a time, so please understand if you do not receive a prompt reply.

Editor's note: Chris de Coning is Director of the Historical Section of the ASSA.

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This Month's Main Talk

The presenter of our main talk this month is Paul Botha. Paul is a mineral specimen collector with a keen interest in meteorites. He annually attends the biggest mineral show in the world, in Arizona. The broader interest in meteorites gained momentum after NASA began their yearly meteorite hunts in Antarctica in the 1970's. Now there are systematic searches elsewhere, particularly in the Sahara Desert.

Meteorites fall into basic categories of stony meteorites, iron meteorites, stony iron meteorites and the rarer achondrite meteorites, each category again being further classified. Most meteorites come from the asteroid belt, but some are proved to come from Mars and the Moon. Some minerals found on Earth are suggested to be the result of meteoritic impact.

News from Scope-X by Johan Smit

The Scope – X exhibition was held at the War Museum in Johannesburg on Saturday May 6th 2006. Fred Oosthuizen, Dirk Wolmarans and Johan Smit from the Pretoria Centre exhibited their completed telescopes. All the telescopes on display at the Exhibition were judged by a panel of experts, and awards were made on the following criteria:

- 1 Excellent workmanship in the construction of a telescope.**
- 2 Outstanding optical quality.**
- 3 Innovation .**

It is most pleasing to note that two of the three awards went to telescope builders from the Pretoria Centre. Congratulations to:

Dirk Wolmarans, who received the award for the optical excellence of his 8 inch f 4.5 telescope. This is truly an outstanding achievement, considering the fact that this is the first mirror he has made. To successfully make a mirror of such a short focal length is very difficult, because the tolerances required are much tighter than on a "normal" longer focal length f 6 or f 8 mirror.

Johan Smit, who received the award for innovation. He received the award for the design of a helical Crayford type of focuser that is easy and cheap to build with the minimum of tools and components. This focuser operates without any backlash and has an infinitely fine adjustment of focus without any image shift. Also, his novel spider and finder-scope design contributed to the judge's decision in making this award.

Considering the relatively short time that the Pretoria Centre telescope making class has been running, these are outstanding achievements. However, many thanks are due to the Johannesburg Centre for their assistance in running the class.

If anyone is considering making a telescope, please contact Johan Smit. The builders of this year have set a very high standard and we wish to continue this tradition of excellence. Maybe it will be *you* who receives an award next year?

A picture a day

Each day a different image or photograph of our beautiful and fascinating universe is featured, along with a brief explanation written by a professional astronomer.

Website address: <http://apod.nasa.gov>

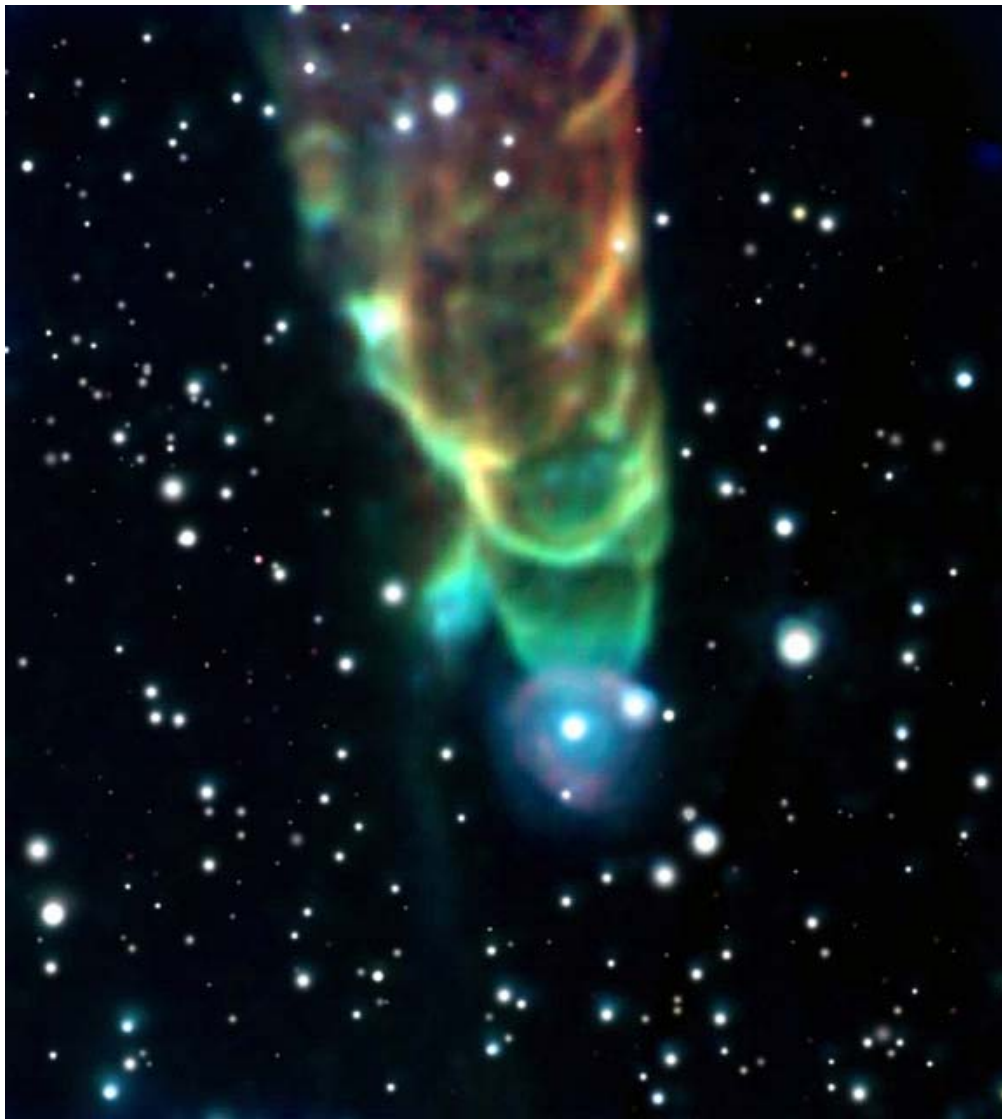
Giant "Tornado" in Space

While examining a region where new stars are forming with NASA's Spitzer Space Telescope, astronomers found a surprise -- an object that looks like a giant tornado in space. The apparent tornado is shaped by a cosmic jet packing a powerful punch as it ploughs through clouds of interstellar gas and dust.

The "tornado" is actually a shock front created by a jet of material flowing downward through the field of view. A still-forming star located off the upper edge of the image generates this outflow. The jet slams into neighbouring dust clouds at a speed of more than 160 kilometres per second, heating the dust to incandescence and causing it to glow with infrared light detectable by Spitzer. The outflow that powers the "tornado," designated Herbig-Haro 49/50, had been observed before, most recently using a ground-based telescope at the Cerro Tololo Inter-American Observatory. Intrigued by the shock emission spotted at Cerro Tololo, astronomers then targeted Spitzer onto the region and were thrilled to see a spectacular spiral structure emerge.

Herbig-Haro 49/50 is located in the Chameleon I star-forming complex, a region containing more than 100 young stars. Most of the new stars are smaller than the sun, although some are more massive. Visible-light observations have found a number of outflows in the region, however most of those outflows have no infrared counterpart.

Website: <http://www.cfa.harvard.edu/press/pr0606.html>



A Southern African Amateur Telescope

Three German amateur astronomers of the Vereinigung der Sternfreunde (Society of Star Friends), Germany's largest amateur astronomy association, have built a telescope and observatory in Namibia. The telescope is a hefty 0.6-m (24-inch) Cassegrain telescope named "Ganymede". The observatory in which it is housed, is named "Capella" and is situated at Amani Lodge, 20 km southwest of Windhoek, atop the Kupferberg range at an altitude of about 2100 meters. They did not want to build the observatory in Germany because of the country's unfavourable weather conditions and its severe air and light pollution due to its high population density. They considered the Canary Islands, but after hassles and delays, decided on Namibia.

Seeing conditions at the site are good and transparency is normally very good. There are approximately 180 clear nights a year. The limiting visual magnitude is usually better than 6.5, and even the gegenschein and zodiacal light are often visible. They consider the site to be an astronomer's paradise. They plan to use the telescope for astronomical research, not only for making beautiful images. Their long-term goal is to control it remotely from Germany via the Internet – a real challenge!

They have certainly set us a noteworthy example to follow. There is also a 10-inch Meade LX200GPS at the observatory for use by guests at Amani Lodge. Why not visit the observatory on your next trip to Namibia?

See also: Sky & Telescope, April 2005, p 110. On pp 132 et seq. are some of their astrophotos.

The observatory has a website at: www.capella-observatory.com



One of the images made with the telescope at the Capella observatory. It shows M16, the Eagle nebula in the constellation Serpens.



Another image made with the telescope at the Capella observatory. (See page 7 for article.) It shows M20, the Trifid nebula in the constellation Sagittarius.

PRETORIA CENTRE COMMITTEE

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