

## "The Southern Cross"



## HERMANUS ASTRONOMY CENTRE NEWSLETTER

JULY 2009

Welcome to the latest newsletter, and also to new members Malcolm Baldwin, Mike Downes and Mick Fynn. No New Scientist articles are attached this month. Steve Kleyn will send any of interest out separately later in the month.

We hope you have enjoyed accessing the Centre's new website ([www.hermanusastronomy.co.za](http://www.hermanusastronomy.co.za)). Several members, as well as others with an interest in astronomy, have given positive feedback regarding both its design and content. However, there is always room for improvement and Derek Duckitt continues to welcome feedback, including suggestions, from members.

The large constellation of Sagittarius (the archer) is visible in our winter night sky, immediately south-east of Scorpius. Its most identifiable feature, the 'teapot', can be found using Scorpius as a reference point. The teapot is positioned at right angles to Scorpius, with the 'spout' pointing towards the tip of the scorpion's tail and the tip of the triangular 'lid' facing towards the east. The 'steam' apparently billowing from the spout is a rich Milky Way star field. The exact centre of the Milky Way galaxy is believed to be a point between the tip of the spout and the tip of Scorpius's tail.

### CENTRE MEETING - 28 MAY

Dr Amanda Gulblis from the South African Astronomical Observatory (SAAO) in Cape Town gave a talk entitled 'Chasing stellar occultations by

Pluto: 2006 - 2009'. Dr Gulblis made a fascinating, but complex topic both interesting and informative to a lay audience, and her talk prompted a number of relevant and interested questions from the audience at the end of the formal presentation. Apart from what members learned about occultations and the valuable information they provide, the talk also identified the importance of international co-operation among astronomers, despite the logistical challenges involved in organising and undertaking such research.

### FUTURE CENTRE EVENINGS 2009

The monthly Thursday meetings will be held at 7 pm on the following days:

23 July	22 October
20 August	19 November
24 September	17 December

The speaker at July's meeting will be Case Rijdsijk, Chairman of the ASSA Garden Route Centre based in Sedgefield. He was recently recognised by the National Science and Technology Forum for his commitment to communicating his enthusiasm for, and knowledge of, physics and astronomy to a range of audiences. He will be presenting two topics: an update on 'What's new in the universe' and his main subject is going to be - "The Star of Bethlehem".

### ACTIVITIES

**Absolute beginners astronomy interest group** On 1 and 2 July, John and Irene Saunders, Steve Kleyn and Derek Duckitt hosted the second group evenings. A total of 22 people attend over the two days, of which 3 became new members with a possibility of a further 3 also joining the Centre. There was great interest and enthusiasm amongst participants, who enjoyed relatively good views of the night sky and viewing of the same Basic Astronomy Powerpoint presentation used at local schools.

**Educational activities** On 22 June, Pierre de Villiers, assisted by other members, gave a presentation on the solar system, the Milky Way and the universe to Grades 1 - 7 learners at the Overstrand learning Academy. The children were keen, asking several questions and enjoying the practical demonstrations as well as the visual and verbal presentation.

**Wortelgat Outreach Trust** Members have met up with Trust representatives and passed on the SAAO CD's obtained by Frans Marais and run through the extensive information included in it.. We will continue working with them to support their implementation of the CD workbook information and related subjects to their students.

## OBSERVATORY COMMITTEE REPORT.

The Mayor of Overstrand Municipality has written a strong letter in support of the development of astronomy in the area. John Saunders will send out copies of the letter to members, in due course.

John Saunders recently also signed a Memorandum of Understanding with Dr. Marius Venter of the Overstrand Local Economic Development Agency (OLEDA) as part of a partnership towards the agency's goal of bringing together all aspects of sport, tourism, arts and sciences in the Overstrand with a building to be constructed near Hoy's Koppie, in which the Centre will play an important role. They will, in turn, be distributing details of our plans to all of their financial contributors. Hopefully, this will assist in raising the necessary funding for the observatory. Other ideas and sources of finance also continue to be sought.

## ASTRONOMY NEWS FROM STEVE KLEYN

**1 Mars e-mail hoax** For the sixth year in a row, a message about the Red Planet is popping up in email boxes around the world. It instructs readers to go outside after dark on 27 August and behold the sky. "Mars will look as large as the full moon," it says. "No one alive today will ever see this again." Don't believe it. It's a hoax..... What will really happen if you go outside after dark on 27 August is that Mars won't even be there. On that date, the red planet will be nearly 250 million km away from Earth and completely absent from the evening sky.

The Mars Hoax started in 2003 when Earth and Mars really did have a close encounter. On 27 August of that year, Mars was only 56 million km away, a 60,000-year record for Martian close approaches to Earth. Someone sent an e-mail alerting friends to the event. The message contained some misunderstandings and omissions—but what e-mail doesn't? A piece of advanced technology called the "forward button" and some imaginative editing did the rest. The composer probably believed everything he or she wrote in the message. If that's true, a better name might be the "Mars Misunderstanding" or maybe the "Confusing-E-mail-About-Mars-You-Should-Delete-and-Not-Forward-to-Anyone-Except-Your-In-Laws."

**2 New Galactic Atlas-** A new galactic atlas has revealed that the Milky Way is peppered with thousands of previously unseen clumps of cold dust - potential stellar nurseries. The map was made using the APEX telescope in

Chile, which surveyed the sky at sub-millimetre wavelengths, which lie between infrared and radio.

**3 Uranium found on the Moon** Before crashing into the lunar surface in June, Japan's Kaguya spacecraft mapped the moon's elements. It detected gamma rays emanating from radioactive metal uranium - the first time the element has ever been detected on the moon. Uranium, which is the heaviest naturally occurring element on Earth, is concentrated in certain areas on the moon, such as the South Pole Aitken Basin - the largest impact crater in the solar system - and depleted in higher terrain. The discovery could reveal more about the geological history of the moon, which is thought to have formed from the detritus of an impact between the Earth and a Mars-sized object billions of years ago.

**4 Mystery of the missing Sunspots** For some time now, scientists have been puzzled by the late start of a new cycle of sunspot activity which normally occurs on a regular 11 year cycle. The answer may have been found.

Helioseismology is used to detect shifting masses which send pressure waves rippling around the stellar interior and give rise to pressure nodes which bounce around the interior and make the sun "ring" like an enormous bell. Now the combined efforts of GONG (Global Oscillation Network Group) from various locations around Earth, and SOHO (the Solar and Heliospheric Observatory) from space have revealed that the Sun generates new "jet streams" near its poles every 11 years at depths of up to 7 000 km below the surface. These jet streams migrate slowly from the poles to the equator and, when they reach a critical latitude of 22 degrees, a new sunspot cycle begins.

It has been found that the jet streams which would herald the next solar cycle have moved very sluggishly since the end of the last solar cycle and only now are reaching the critical latitude to start the return of sunspot activity in the months to come. The last time that a solar minimum of equal extent occurred was in the 17th century, known as the Maunder Minimum. It seems that this will now not happen again and the sunspot cycle is not "broken".

### DID YOU KNOW?

Part 2 of our overview of solar system structures found beyond Neptune includes information on comets and the Oort cloud.

## Comets

The word means 'hair of the head' in Greek because they look like 'stars with hair'. They were seen historically as omens eg. of catastrophes or death, or signs eg. to start a war. By Nov 2008, there were 3628 known comets, but there may be up to 1 trillion comet-like bodies in the outer solar system. Most comets have elongated elliptical orbits. Orbital periods range from a few to >100,000 years.

Comet nuclei are a loose collection of dust, ice, rocky particles and frozen gases, ranging from 100m to 40 kms across. They also contain organic compounds. They are irregularly shaped, as they are too small for their gravity to make them spherical. They tend to be very dark objects due to their included organic compounds.

Comets have been classified into 2 groups:

1. Short period - 2 groups

- Jupiter family - from the scattered disc - orbit periods <20 yrs
- Halley family - from the Oort cloud - orbit periods 20 - 200 yrs
- orbits mostly as far as Jupiter, but some only to Neptune
- thrown towards the sun by gravitational perturbations of the outer planets
- orbit mostly in the same direction as the planets
- by 2006 175 comets had been identified as periodic eg. Halley

2. Long period - originate in Oort cloud

- orbits last from 200 to many thousand years
- orbits extend far beyond the outer planets and planes of orbit vary widely
- thrown towards the sun by gravitational perturbations of nearby stars

Comets are frozen structures in the outer solar system, but, when close to the Sun, exhibit a coma and a tail of dust and gases, due to heating by solar radiation. Radiation pressure and the solar wind cause the tail to point away from the sun. Visibility of the tail is a result of reflection off dust and ionisation glow from gases. The dust and gases form separate tails, pointing in different directions. While the nucleus of a comet may be small, the coma can be the size of the sun, and tails can extend 150 million km (1 AU), or more.

Comets leave a trail of debris behind them, causing meteor showers if the earth passes through the debris eg. Swift-Tuttle comet, from 9 -13 August

every year. They can disintegrate, collide, or lose all their volatile elements and become small lumps of rocks, a bit like an asteroid.

### **Oort cloud**

The hypothetical existence of a spherical cloud of comets was proposed in the 1930s, but the concept was revived and developed in 1950 by Jan Hendrik Oort. It is 1,000x more distant than the Kuiper belt and may lie as far as a light year from the sun, nearly a quarter of the distance to Proxima Centauri. Its outer edge defines the gravitational boundary of the solar system.

Oort cloud objects are largely composed of iced water, methane and ammonia. The cloud matter is thought to have formed closer to the Sun, but been scattered out by gravitational effects of the outer planets early in the evolution of the solar system.

It is believed to be the source of all long period and Halley-type short period comets. Orbits of Oort cloud objects are affected by stars in the Milky Way, which dislodge them, sending them towards the inner solar system.

The cloud is thought to have 2 regions:

- inner disc-shaped cloud (Hills cloud). Postulated to contain 5x as many objects than the outer cloud - the largest concentration of comets in the solar system. Smaller, but denser and with a greater mass than the outer cloud
- outer spherical cloud - contains several trillion nuclei larger than 1 km, with neighbouring comets tens of millions of kilometres apart. Total mass estimated at 5x Earth.

**Reference** <http://en..wikipedia.org>

### COMMITTEE MEMBERS.

John Saunders (Chairman)	028 314 0543
Steve Kleyn (Technical Advisor)	028 312 2802
Pierre de Villiers (Treasurer)	028 313 0109
Irene Saunders (Secretary)	028 314 0543
Pierre Hugo (Auditor & librarian)	028 312 1639
Jenny Morris (Newsletter editor)	071 350 5560
Derek Duckitt (IT & website co-ordinator)	082 414 4024
Johan Retief (Monthly sky maps)	028 315 1132
Frans Marais (Education co-ordinator)	028 314 1148
Piet Daneel	028 314 034

