

# "The Southern Cross"



## HERMANUS ASTRONOMY CENTRE NEWSLETTER OCTOBER 2010

Welcome to this month's newsletter and to the following new members: - Elwin Mills, Margie Searle, Marise Campbell, Aletta Horne, Riaan Pieters, Dr. Jean Faurie, Gerhard & Elsie Smit, & Lynette Geldenhuys.

Another milestone for the HAC as our membership tops the HUNDRED mark bringing our total number of members to 102. A fantastic achievement.

### SEPTEMBERS ACTIVITIES:

September has been an interesting month with a superb presentation by Case Rijdsdijk to our monthly meeting on Thursday the 9<sup>th</sup> September followed on the 13<sup>th</sup> September by Beginners Astronomy with a presentation by John Saunders titled "The Solar System".

Both meetings had a large attendance taking almost every available seat in the Magnetic Observatory's lecture hall.

Here is an overview of Case Rijdsdijk's presentation "SALT: Construction and Eye Surgery" from Pierre de Villiers.

"The Hermanus Astronomy Centre's monthly meeting on Thursday 9<sup>th</sup> September was privileged to hear a BRILLIANT Sherlock Holmes-style talk on the topic "Why SALT needed eye surgery" by a science educational heavyweight in the South Africa. Case Rijdsdijk, a Vice-President of the Astronomical Society of Southern Africa ("ASSA") and Director responsible for Education and Communication, was recently recognised through a special award from the ASSA for his enthusiastic communication of physics and astronomy to learners over a lifetime.

With characteristic passion and enthusiasm Case described the lack of sharp focus - "image quality" or IQ as he called it - that has plagued SALT ("Southern Africa Large Telescope" at Sutherland) since first light in 2005 and how each component of the very complex system was rigorously tested to determine the root cause of the problem. The optics of both the primary mirror, which comprises 91 hexagonal mirrors of 1,1 meter each, and the four mirrors of the Spherical Aberration

Corrector ("SAC"), which brings the images of all 91 mirrors into corrected focus, proved to be exceptionally good. Likewise the SALT imaging camera (not surprisingly called SALTICAM!) and the all-important spectrographs - SALT was designed mainly for spectroscopy - also passed their tests with flying colours. The root cause of the problem was eventually traced to minute distortions in the steel and aluminium suspension rings that carry the SAC, caused by the differential expansion of steel and aluminium.

The defect was fixed and brilliant sharp-focus images were obtained at the end of August. All attending were impressed by the technology involved and justifiably proud that such unbelievably accurate remedial action could be done in South Africa.

Pierre rounds his report off by saying "A brilliant talk by a master of his subject!" Well said Pierre. A superb evening and thoroughly enjoyed by an enthusiastically large audience.

Unfortunately the night sky wasn't kind to us for stargazing after Case's lecture but we had a superbly clear night after the Beginners Astronomy evening where both Venus and Jupiter (with its four Galilean moons) were clearly visible. Several telescopes and binoculars homed in on the beautiful Globular Cluster of Omega Centauri, The Jewel Box located next to the Southern Cross and a number of other galactic objects.

### DAYLIGHT OCCULTATION OF VENUS BY THE MOON

Johan Retief notified members in advance via e-mail of a daylight occultation of the Moon and Venus on 11<sup>th</sup> September. Venus disappeared behind the dark side of the Moon at around 16:20 and reappeared on the bright side of the Moon at 16:54. What a beautiful sight it was for all to see.

COSMOLOGY The Cosmology group meetings continue to draw more and more attendees on the first and third evenings of each month.

At the first meeting in September Philipp Wagner was the guest speaker explaining the detail of his book "The Other Side of the Speed of Light".

On the second meeting of the month on the 20<sup>th</sup> September, Pierre Hugo (Chairman of the Cosmology Group) chaired the first of three discussion groups concerning "Relativity".

### EVENTS FOR OCTOBER:-

8<sup>th</sup> and 9<sup>th</sup> of October: A trip to Sutherland for twenty members and partners which includes:-\_A Night Tour at the SALT Observatory, a "Technical Tour of SALT", and an evening at the Kambrokind Stargazing Centre.

### Beginners Astronomy Part 2 - 'The Life & Death of Stars'

7.00 pm at the Hermanus Magnetic Observatory. As usual, after the evening's presentation, weather and time permitting, there will be live observing with the Centre's telescope.

If you wish to come along, it is essential to contact John Saunders - 028 314 0543 or e-mail [shearwater@hermanus.co.za](mailto:shearwater@hermanus.co.za) by the Friday before each meeting as space is limited.

14th October our monthly meeting when the presentation will be:-

### Comets - The Trailblazers.

As with Beginners Astronomy, this will again be followed by stargazing from the HMO Car Park (weather permitting).

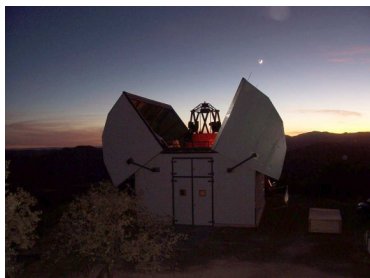
4<sup>th</sup> and 18<sup>th</sup> of October the Cosmology Group meetings will continue with the remaining two discussions on the subject of "Relativity". For more information contact Pierre Hugo at [pierre@hermanus.co.za](mailto:pierre@hermanus.co.za)

Pierre Hugo, convener of the Cosmology Group, has donated a set of professional DVD recordings of Cosmology lectures to the Centre. The introduction will be presented on Monday 1st November followed by further sets of two lectures on each day on the first Monday of each month. Non-members will be able to attend their first lecture free of charge but thereafter they will be expected to join the HAC and pay a full membership fee. This promises to be a fascinating and very exciting innovation for the Centre.

### EDUCATION OUTREACH

On the 28<sup>th</sup> September John Saunders presented the HAC slide show "Introduction to Astronomy" to the enthusiastic ladies of "Quest" at Mollegren Park, Eastcliff.

### MONET TELESCOPE



A "**FIRST FOR SOUTH AFRICA**" and an educational breakthrough for the Hermanus Astronomy Centre. It is the most significant event since it was formed almost three years ago.

The exciting development of going online with the fully automated 1.2 metre Monet telescope located at the Macdonald Observatory in Texas was realized on Sunday 3<sup>rd</sup> October. The practice session was led by Dr. Rick Hessman, Director of the Institut für Astrophysik via an online web-cam from Goettingen, in Germany via SKYPE. The session included students from the Hermanus High School and Qhayiya Secondary School plus related Science Teachers, HAC Committee and members with telescope knowledge. The morning was an enormous success. Two further sessions have been arranged for October & November. The project will then be available to all the schools in the Overstrand to become a regular feature in our very energetic educational outreach programme.

### MONTHLY CENTRE EVENINGS 2010

8<sup>th</sup> November - Part 3 of Beginners Astronomy - 'The Milky Way & beyond'.

11 November      Presenter: Amanda Gulbis, Astronomer from the SAAO Cape Town. Amanda's talk will be titled "Probing the outer solar system through stellar occultations".

9 December      Christmas party

13 January      More details in next month's newsletter.

03 February      AGM

### OBSERVATORY NEWS

Sufficient funding has now been secured and as soon as it is in the HAC bank account, the 2nd phase of the Environment Impact Assessment for this project can be completed. At least three alternative sites are under consideration. However until everything is formally confirmed the location must remain undisclosed. An announcement will be made in due course.

### SCIENCE, ARTS & CULTURE CENTRE

You may have read in the Hermanus Times issue of 30 September that a Science Arts & Culture Centre is being planned for Hermanus. The HAC along with the HMO is at the forefront of these negotiations. More information will be forthcoming on this exciting project in the weeks ahead.

### WHAT'S UP:

1. A very bright Venus has been visible to the north-west as the bright 'evening star' for several months, setting increasingly later every day. Venus will only be visible in the evenings until early October, after which it becomes the 'morning star' from November. Don't forget Johan Retief's Sky for the

Month for October (to be released shortly) where Jupiter is highlighted and will be special for Planetary enthusiasts.

2. The small, but obviously dolphin-shaped, constellation of Delphinus can be found high in the northern sky between the bird-like shape of Aquila (the eagle) and the large 'square' of Pegasus (the winged horse). From the southern hemisphere, the 'dolphin' appears to have its head pointing downwards and its tail upwards, appearing to be curving back into the sea. It is the 69<sup>th</sup> smallest of the 88 constellations. Its place in mythology is thought to be the dolphin sent by Poseidon to bring the sea nymph Amphitrite for him to marry.

[Johan Retief's articles to the Fisherhaven "Havens Voice" - September edition.](#)

### OF JUPITER AND HIS LOVERS

In September 2010, Jupiter will be "in opposition". This means that the giant planet will come to within 593 million kilometers from the earth and clearly visible until the 12<sup>th</sup> of October, our moon will not interfere much in our attempts to observe Jupiter. Even at this late date Jupiter will only be some 601 million km from earth.

Jupiter's four largest moons, known as the Galilean Moons (Galileo Galilei recorded their discovery in January 1610), will be visible through a good pair of binoculars.

Galileo named these moons "Cosimo's Stars", for his benefactor Grand Duke Cosimo II de Medici. At Cosimo's suggestion these names were later changed to "Medicean Stars" to honour all four Medici brothers. The names that finally were accepted and still hold good today, were those proposed by Simon Marius who claimed that he discovered these moons at about the same time as Galileo. The moons are named for the four lovers of the Greek god Zeus (the equivalent of the Roman god Jupiter). The names are (from near to far) *Io*, *Europa*, *Ganymede* (the largest of the four moons) and *Callisto*. With the exception of Europa, all these moons are larger than our own Moon. (Note: Jupiter has many smaller moons and even faint rings similar to Saturn, but not visible from Earth).

This strange planet consists mostly of hydrogen (75%) and helium (24%). From a dense core at the centre of the planet, a large volume of metallic hydrogen is followed by molecular hydrogen in a gaseous state. There are traces of other elements in its atmosphere. The planet spins at a high speed and completes one revolution around its axis in less than 10 hours, which makes it the fastest rotation of any planet in the solar system. This high speed of rotation also causes the planet to have an oblate shape.



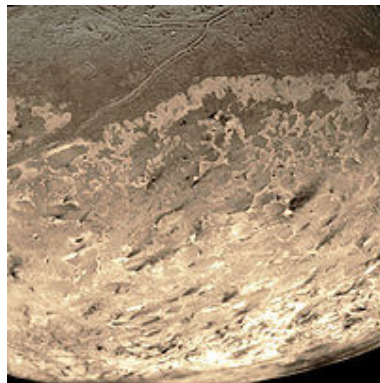
## DID YOU KNOW?



**1. Exo-Planets.** If there is one “Christopher Columbus” type event in recent astronomy, it must be the exciting new discoveries of “exo-planets”. These are planets in orbit around stars other than the Sun. It is only in the last ten years that the discovery of planetary systems have been found with any certainty. With new technology and the Hubble telescope the number of planets has rocketed from a mere handful to 464 at the latest count.

The vast majority of exo-planets are super giants either larger than or as large as Jupiter but orbiting very close to their host star. The one thing that none of them have is water, the essential ingredient for life. However, this may change as a large planet called *Gliese 581G* is the most likely candidate to have such an abundance of water. These exo-Planets are known as “Ocean Planets”. *Gliese 581G* is however 20.3 light years distant and although this makes it one of the nearest planets to Earth, it would take 650,000 years to reach travelling at the fastest speeds possible so far.

**2. Huge cryo-geysers** found on Triton, one of Neptune’s moons, are the fifth wonder of the solar system.



Triton is the largest moon of Neptune. Discovered on 1846 by Lassell, it was photographed by Voyager 2 in 1989. It is the 7<sup>th</sup> largest moon in the solar system - 2,700 km in diameter, larger than dwarf planets Pluto and Eris.

Like our Moon, it keeps one face towards the planet at all times. Unlike the Moon, however, it lies on its side, with the poles on its equator. It is also the only large moon in the solar system with a retrograde orbit - an orbit in the opposite direction to its planet’s direction. Because of its orbit and similarity in composition to Pluto, it is thought to have been captured from the Kuiper belt.

It has a crust of frozen nitrogen, water ice and dry ice over an icy mantle thought to cover a substantial core of rock and metal, the core making up  $\frac{2}{3}$  of its mass. Surface temperatures drop to almost  $-200^{\circ}\text{C}$ .

Triton is one of the few moons in the solar system known to be geologically active. It has a relatively young surface with a rich geological history evidenced by

complex cryovolcanic and tectonic terrains. The surface is relatively flat, with few impact craters, and is young, varying from 50m - 6m years old.

Geologically active, its surface processes are similar to those that produce volcanoes and rift valleys on Earth, but with water and ammonia lavas as opposed to liquid rock. The surface is also cut by complex valleys and ridges. In addition, there are also a few cryovolcanoes - an icy volcano which forms on icy moons. Rather than liquid rock, these erupt volatiles like water, ammonia or methane.

Part of the crust is also dotted with geysers believed to erupt nitrogen. Voyager 2 observed numerous geyser-like eruptions of invisible nitrogen gas and dust from beneath the surface in plumes up to 8 km high. The tops of these emissions are blown away by prevailing winds. Their location suggests that their activity is linked with solar heating, with solar radiation passing through surface ice, slowly heating and vaporising sub-surface nitrogen until enough gas pressure accumulates for it to erupt through the crust. Each geyser eruption can last up to a year, depositing large volumes of material. This nitrogen plume activity is separate from Triton's other cryovolcanic activity.

**Sources** New Scientist magazine, Wikipedia, plus other Internet and printed sources

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