"The Southern Cross"

HERMANUS ASTRONOMY CENTRE NEWSLETTER NOVEMBER 2010

Welcome to this month's newsletter and to new member: Lance Croser

2011 Membership Fees.

Our membership fee for 2011 has been increased to R100 per person but the R50 for the second family member, will remain the same. You may pay your membership fee at any time from now and the details are as follows:-

Payable in Cash or Cheque made out to Hermanus Astronomy Centre and mailed to HAC Treasurer Pierre de Villiers, 129 8th Street, phone 028 313 0109 or on-line - ABSA Hermanus. Branch Code: 632005
Account Nbr: 9230163786. Account Name: Hermanus Astronomy Centre
Reference: - **Your name** (MOST IMPORTANT)

Octobers Activities:

1. On Monday the 4th October the Cosmology met and HAC member Gavin Turner's house and the topic for discussion was "String Theory". A lively and fascinating debate took place.

Cosmology Group meetings occur on the 1st and 3rd Monday evenings of each month. All HAC members may attend. There is no additional charge. Group leader Pierre Hugo welcomes new attendees whenever they wish. If you are in the least bit interested, contact pierre@hermanus.co.za or 028 312 1638. You will not be disappointed as you will soon find yourself involved in lively debate on a wide variety of cosmology subjects with other HAC members.

2. On the 8th and 9th of October: Twenty members and partners went on a weekend trip to Sutherland which included:-

(i) On the Friday evening everyone attended a Night Tour at the SALT Observatory with stargazing using their 14" and 16" telescopes. It was

a "clear skies" night and some superb views of Venus, Jupiter & the Galilean Moons, The Jewel Box, Globular Cluster Tocana 47 and many other treasures of the night sky.

(ii) The next day – Saturday afternoon, a very comprehensive Special "Technical Tour of SALT" by two of the permanent engineers was arranged. I think I can safely say on behalf of all those present, it was simply fantastic.

(iii) Later that same evening a wholesome supper was served at the Kambrokind Stargazing Centre followed by an astronomy lecture by Ed Foster, and last of all "stargazing 'til midnight" with Ed Foster, Auke Slotegraaf (both well known to the HAC) and Jurg Wagener, owner of the Kambrokind Guest House. Unfortunately the night sky clouded over quite early but I understand the stars came out from 10.30 pm and all those that stayed enjoyed some more very good stargazing.

3. On Thursday the 14th October HAC Chairman John Saunders gave a presentation titled "Comets – The Trailblazers". It was an interesting talk about how comets are formed, their hugely parabolic orbits with the vast majority originating in the Oort Cloud beyond Pluto. Information on renowned Comet Hunters in history plus some "light entertainment" concerning Comet memorabilia available via the internet.

Events for November:-

Part 3 of Beginners Astronomy – 'The Milky Way & beyond' scheduled for the 8th November has unfortunately been postponed until early in the New Year.

Monday - 1st November.

Pierre Hugo, convener of the Cosmology Group, has very kindly donated a set of professional DVD recordings of lectures on Cosmology to the HAC. 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. This will take place from 7.30 pm at the Hermanus Magnetic Observatory

The lectures are free of charge to all HAC members. 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

The first two sets (30 minutes duration) of 36 Cosmology DVD's are titled:-

(i) The Journey Ahead.
(ii) Denizen's of the Universe

For more information contact Pierre Hugo at pierre@hermanus.co.za or on 028 312 1638.

Thursday 11th November - Our monthly meeting 7.00 pm at the Hermanus Magnetic Observatory. The Guest Presenter will be Dr. Amanda Gulbis, Astronomer from the SAAO in Capetown. Amanda's talk will be titled "Probing the outer solar system through stellar occultations".

As always this will be followed by stargazing from the HMO Car Park (weather permitting).

FRIDAY 10th December – Our annual **CHRISTMAS PARTY**
From 7.00 pm at Baleens Guest House Restaurant, on 9th & 10th Street, Voelklip.

The menu will include a three course Christmas dinner. A full menu and price details will follow shortly.

Husband & wives of members will be most welcome however space at the restaurant is limited to a maximum of sixty people so please contact John & Irene on 028 314 0543 or via e-mail to if you wish to join us.

EDUCATION OUTREACH

Monet North. On Sunday the 24th October our second day working the Monet North telescope took place at the very quickly rearranged venue of the offices at Coastal Trusses in Steenbras Street. Unfortunately the planned venue of the Hermanus High School had to be abandoned as "someone-had-pulled-the-plug" and internet access was not available.

Once the group was resettled at Coastal Trusses, other complications furthered delayed access to Monet for another frustrating hour.

The group did eventually have success tracking Comet Hartley 103/P which Derek Duckitt managed to photograph moving across the sky. Some of the students attending also enjoyed some time using and operating the telescope.
Towards the end of the session, a technical problem unexpectedly occurred and automatically closed the telescope.

Our next session is booked for Sunday the 28th November however we are currently negotiating with the HMO for some operational midweek time.

MONTHLY CENTRE EVENINGS for 2011

13 January	03 February (AGM)	10 March	07 April
05 May	02 June	07 July	04 August
01 September	06 October	03 November	09 December

OBSERVATORY NEWS

No further news at this time but an announcement is expected to be made on our progress in the near future.

ASTRONOMY NEWS

Nemesis is a hypothetical hard-to-see red dwarf star or brown dwarf, orbiting the Sun at a distance of about 50,000 to 100,000 AU (about 1-2 light-years), somewhat beyond the Oort cloud. This star was originally postulated to exist in order to explain a perceived cycle of mass extinctions in the geological record, which seem to occur once every 27 million years or so.

In 1984, palaeontologists David Raup and Jack Sepkoski published a paper claiming that they had identified a statistical periodicity in extinction rates over the last 250 million years using various forms of time series analysis. They focused on the extinction intensity of fossil families of marine vertebrates. Invertebrates, and protozoans, identifying 12 extinction events over the time period in question. The average time interval between extinction events was determined as 26 million years. At the time, two of the identified extinction events (Cretaceous-Tertiary and Late Eocene) could be shown to coincide with large impact events. Although Raup and Sepkoski could not identify the cause of their supposed periodicity, they suggested that there might be a non-terrestrial connection. The challenge to propose a mechanism was quickly addressed by several teams of astronomers.

Development of the Nemesis hypotheses

Two teams of astronomers, Whitmire and Jackson, and Davis, Hut, and Muller, independently published similar hypotheses to explain Raup and Sepkoski's extinction periodicity in the same issue of the journal *Nature*. This hypothesis proposes that the Sun may have an as yet undetected companion star in a highly elliptical orbit that periodically disturbs comets in the Oort cloud, causing a large increase in the number of comets visiting the inner solar system with a consequential increase in impact events on Earth. This became known as the Nemesis (or, more colourfully, Death Star) hypothesis.

If it does exist, the exact nature of Nemesis is uncertain. Richard A. Muller suggests that the most likely object is a red dwarf with magnitude between 7 and 12, while Daniel P. Whitmire and Albert A. Jackson argue for a brown dwarf. If a red dwarf, it would undoubtedly already exist in star catalogues, but its true nature would only be detectable by measuring its parallax; due to orbiting the Sun it would have a very low proper motion and would escape detection by proper motion surveys that have found stars like the 9th magnitude Barnard's star.

Other possible evidence: questions about orbital path of Sedna

The extremely distant planetoid Sedna has an extra-long and unusual elliptical orbit around the Sun, well beyond Pluto, ranging between 76 and 975 AU (where 1 AU is the distance between the Earth and the Sun). Sedna's orbit round the Sun is estimated to last between 10.5 and 12 thousand years. Its discoverer, Mike Brown of Caltech, noted in a Discover magazine article that Sedna's location doesn't make sense:

"Sedna shouldn't be there," said Brown. "There's no way to put Sedna where it is. It never comes close enough to be affected by the Sun, but it never goes far enough away from the Sun to be affected by other stars."

Brown postulates that perhaps a massive unseen object is responsible for Sedna's mystifying orbit, its gravitational influence keeping Sedna fixed in that far-distant portion of space.

Current and pending scientific searches for Nemesis

If Nemesis exists, then it may be detected by the planned Pan-STARRS or LSST astronomical surveys.

In particular, if Nemesis is a red dwarf star or a brown dwarf, then the WISE mission (an infrared sky survey, currently underway, that will finish covering most of our solar neighbourhood in movement-verifying parallax measurements by 2013) is expected to be able to find it, if it exists.

DID YOU KNOW?

Mars is the location of two structures which, together, are the third wonder of the solar system – the largest canyon and tallest mountain.

Valles Marineris

This huge slash in the Martian surface was named after the Mariner 9 Mars orbiter of 1971-1972 which discovered it. Located along Mars' equator, it extends across nearly a quarter of the planet's circumference.

A system of canyons, it is more than 4,000 km long, an average 200 km wide, and up to 7 km deep It is 6-7 times deeper, 20 times wider and 5 times longer than the Grand Canyon. On Earth, it would extend across the continental US. Sunrise at one end starts over 6 hours before it happens at the other end.

At first, theories about its formation ranged from erosion by water or melting of permafrost, to sinking of subsurface magma. It is now generally agreed to be a tectonic crack, or rift system, which formed as the crust rose to the west, subsequently being widened by erosional forces. Some channels within the system may have been formed by water.

Olympus Mons

This massive volcano is three times higher than Mt Everest, peaking 21 km above the mean surface level of Mars. Although reaching near to the boundary, it does not extend beyond the thin Martian atmosphere. There are steep cliffs towards the base, which is 550 km in width, and approximately the size, in area, of the state of Arizona. The caldera at the top is 85 km long, 60 kms wide and up to 3 km deep.

Much wider than it is tall, it has a shallow dome and is a shield volcano, like those found in Hawaii. Very liquid lava would have flowed out of vents over a long period of time. The huge size compared to Earth's shield volcanos is probably because Mars lacks tectonic plates. The crust would have remained stationary over a hotspot with the volcano becoming increasingly large over time.

The oldest parts have been dated to 115 million years ago and the most recent at 2 million years ago. This young age suggests the possibility of future volcanic activity.

Sources New Scientist magazine, Wikipaedia, plus other Internet and printed sources

For more information on the Hermanus Astronomy Centre, visit our website www.hermanusastronomy.co.za

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